Complementary and alternative medicine (CAM) in reproductive-age women: a review of randomized controlled trials

Adriane Fugh-Berman a,b,∗, Fredi Kronenberg b

a Department of Rehabilitation Medicine, Rosenthal Center for Complementary and Alternative Medicine, Columbia University College of Physicians and Surgeons, Washington, DC 20036, USA
b Department of Health Care Sciences, George Washington School of Medicine, 1112 18th Street, NW, 500, Washington, DC 20036, USA

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Abstract

Purpose: Complementary and alternative medicine (CAM) therapies are widely used in the general population. This paper reviews randomized controlled trials of CAM therapies for obstetrical and gynecologic conditions and presents therapies that are likely to be used by women of reproductive age and by pregnant women.

Data Sources: Sources included English-language papers in MEDLINE 1966–2002 and AMED (1985–2000) and the authors’ extensive holdings.

Study Selection: Randomized controlled clinical trials of CAM therapies for obstetric and gynecologic conditions.

Data Extraction: Clinical information was extracted from the articles and summarized in tabular form or in the text.

Data Synthesis: Ninety-three trials were identified, 45 of which were for pregnancy-related conditions, 33 of which were for premenstrual syndrome, and 13 of which were for dysmenorrhea. Data support the use of acupressure for nausea of pregnancy and calcium for PMS. Preliminary studies indicate a role for further research on Vitamin B6 or ginger for nausea and vomiting of pregnancy; calcium, magnesium, Vitamin B6, or chaste-tree berry extract for PMS; and a low-fat diet, exercise, or fish oil supplementation for dysmenorrhea.

Conclusions: Limited evidence supports the efficacy of some CAM therapies. Exposure of women of reproductive age to these therapies can be expected.

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Keywords: Complementary and alternative medicine; Reproductive-age women; Herbal medicine; Dietary supplements; Acupuncture; Mind–body therapies; Pregnancy; Premenstrual syndrome; Review

1. Introduction

Women are frequent users of complementary and alternative medicine (CAM) in many countries [1–5] including the US, where women use CAM more than do men (48.9% versus 37.8%) [6]. Pharmacologically active CAM treatments may be used by women at risk for pregnancy, or women who are trying to become pregnant. The current stage of knowledge is still inadequate to sufficiently inform clinicians, researchers, and the public about either benefits or potential risks. The following is a review of prospective, randomized controlled trials of CAM therapies relevant to obstetrics and gynecology. Our purpose in this review is to identify exposures that can be expected in women of reproductive age. Possible reproductive effects of such exposures will be the subject of a future review.

Sources for this review included MEDLINE, (1966–2002), the Alternative and Complementary Database (AMED) of the British Library (1985–2000), and the authors’ own extensive files. Databases were searched under the terms women’s health, pregnancy, labor, postpartum, morning sickness, infertility, premenstrual syndrome, endometriosis, and fibroids; combined with alternative medicine, herbal medicine, herbs, traditional medicine, Traditional Chinese Medicine (TCM), Ayurveda, Ayurvedic medicine, naturopathy, chiropractic, osteopathy, massage, shiatsu, reiki, relaxation therapy, yoga, homeopathy, aromatherapy, and therapeutic touch. Most studies are summarized in the tables: conditions with two or fewer studies are summarized only in the text.
2. Menstrual cycle

2.1. Premenstrual syndrome (PMS)

PMS is a spectrum of physical, emotional, and behavioral symptoms of unclear etiology. Women experiment extensively with self-medication in search of relief. Thirty-three randomized controlled trials have been performed on herbs, vitamins, minerals, manual therapies, diet and exercise, and mind-body approaches (Table 1) [7–38].

Vitamin B6 (pyridoxine) has been the subject of the most trials, and the majority of these trials show some benefit. Pyridoxine deficiency is one hypothesized cause of PMS, and in Europe, B6 supplementation is an accepted treatment. Most studies assessed an overall symptom score; studies of individual symptoms might be more instructive. Vitamin B6 doses ranged from 50 to 600 mg per day; no dose-response effects were seen. Many of the studies were not adequate methodologically, nor was there sufficient consistency in dose or outcome measures among them to enable specific clinical recommendations. Additional studies are warranted to establish optimal dosing. Vitamin B6 is a benign therapy, at least in doses ≤100 mg daily; sensory neuropathy has been reported in patients taking large doses of B6 (usually >2000 mg daily) [39]. Reducing dietary fat or increasing exercise also may benefit PMS; none of the studies reported here had placebo comparison groups, but these harmless interventions would be expected to have other health benefits as well. Disturbances in calcium or magnesium regulation may contribute to PMS; intracellular (but not plasma) magnesium levels have been found to be lower in women with PMS [40]. Some evidence suggests benefit for both calcium [21,22] and magnesium [23–25] as benign, effective treatments.

Chaste-tree berry (Vitex agnus-castus) extract may also be promising. Two studies, each using a different dose and different outcome measures, reported a benefit of Vitex over the comparison (placebo or Vitamin B6), but only relative to baseline [29,30]. In two of three small trials, evening primrose (Oenethera biennis) oil does not appear to be effective [26,27]. Trials of manual therapies (reflexology, chiropractic, massage) [35–37] and mind-body treatments [38] are few and have been hampered by small sample sizes, high dropout rates, and lack of placebo control; but perhaps should be explored further based on initial beneficial outcomes.

2.2. Dysmenorrhea

Thirteen, mostly small, studies have examined CAM treatments for menstrual pain (Table 2) [32,41–52]. Further research is indicated on the promising effects of diet and exercise on dysmenorrhea. Specific dietary components may be important; oily fish, for example, are rich in the polyunsaturated fatty acids eicosapentaenoic acid and docosahexaenoic acid, which may modulate prostaglandin production.

Exercise (not necessarily aerobic) also appears to help menstrual pain; women who exercise appear to have fewer menstrual symptoms than women who do not exercise [47–50]. These studies were not blinded. Although an appropriate placebo control for exercise trials is difficult to imagine, treatment-controlled trials are a viable option, and are warranted given the encouraging outcomes reported previously.

Only one randomized controlled study of acupuncture was located [51]. Some benefit was demonstrated, and additional studies should be initiated.

3. Infertility

There is little evidence that CAM therapies are effective for female infertility. Only two studies were identified. Cognitive behavioral therapy or a support group intervention as adjuncts to conventional treatment were compared to routine care in a year-long, randomized, single-blind controlled trial in 184 infertile women, all receiving fertility drugs [53]. Intervention groups met weekly for two hours. Cognitive-behavioral treatment included relaxation techniques, cognitive restructuring, methods for emotional expression, and nutrition and exercise information. The support group talked about personal issues, relationships, and self-esteem, among other subjects. Dropout rates were high: 9/56 (16%) in the cognitive behavioral group, 16/65 (25%) in the support group, and 38/63 (60%) among controls. Among study completers, 55% in the cognitive-behavioral group, 54% in the support group, and 20% of controls had viable pregnancies. Although time to viable pregnancy using survival analysis indicated a significantly higher viable pregnancy rate in both treatment groups compared to control, the large and unequal dropout rates render these data uninterpretable.

A randomized, double-blind, controlled trial of a homoeopathic preparation of chaste tree berry (Vitex agnus-castus) tested placebo against 50 drops three times daily of Phyto Hypophyson L. (Steidl-Pharma GmbH, Herrsching, Germany) for 3 months or three cycles in 67 women with infertility associated with amenorrhea or oligomenorrhea. There was no significant difference between groups in spontaneous menstruation, pregnancy, or take-home baby rates during the treatment or 6 months later [54]. Vitex may have hormonal effects: a randomized double-blind placebo-controlled trial of 52 women with luteal phase defect due to latent hyperprolactinemia found that Vitex extract (20 mg daily) reduced prolactin levels, normalized luteal phase length, and normalized luteal progesterone levels [55]. Additionally, a case of ovarian hyperstimulation was attributed to Vitex [56].
<table>
<thead>
<tr>
<th>Reference</th>
<th>Subjects</th>
<th>Study design and duration</th>
<th>Intervention</th>
<th>Outcome measures</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>[7]</td>
<td>60 women (56 completed, 46 analyzed) with moderate-severe PMS</td>
<td>Randomized, double-blind, placebo-controlled crossover trial, duration: 4 months (treatment for three menstrual cycles)</td>
<td>Vitamin B6 (50 mg per day) vs. placebo</td>
<td>Significant reduction in 3 of 4 symptom categories ($P &lt; 0.005$)</td>
<td>Emotional symptoms improved significantly more in drug vs. placebo months ($P &lt; 0.05$); those who improved on one or more symptoms significantly improved on all symptoms compared with placebo months; no difference between groups</td>
</tr>
<tr>
<td>[8]</td>
<td>60 women (52 completed) with moderate-severe PMS</td>
<td>Randomized, double-blind, placebo-controlled crossover trial, duration: 7 cycles (3 cycles treatment, 3 cycles placebo)</td>
<td>Optivite B6 (80 mg per day) vs. placebo</td>
<td>No difference between groups</td>
<td>No difference between groups</td>
</tr>
<tr>
<td>[9]</td>
<td>76 women with PMS</td>
<td>Randomized, double-blind, placebo-controlled, duration: 4 cycles</td>
<td>Vitamin B6 (120 mg per day) vs. placebo</td>
<td>9 symptoms in 3 groups (menstrual, emotional, mental)</td>
<td>Significant more women in treatment group improved (75% of treatment group vs. 51% of placebo group; $P = 0.001$)</td>
</tr>
<tr>
<td>[10]</td>
<td>76 women (57 completed) with moderate-severe PMS</td>
<td>Randomized, double-blind, placebo-controlled, duration: 3 cycles (1 cycle baseline, 2 cycles treatment)</td>
<td>Vitamin B6 (120 mg per day) vs. placebo</td>
<td>Positive effect only in 2 symptom subgroups (emotional intensity and balance change) ($P = 0.01$); no improvement in depression, anxiety, or other symptoms</td>
<td>No difference between groups</td>
</tr>
<tr>
<td>[11]</td>
<td>175 women (129 completed) with PMS</td>
<td>Randomized, double-blind, placebo-controlled crossover trial, duration: 3 months</td>
<td>Vitamin B6 (25 mg per day) vs. placebo</td>
<td>Self assessment (worse, no better, slightly better, substantially better, cured)</td>
<td>No difference between groups (65% of treatment group and 59% of placebo group; “substantially better” or “cured”) ($P = 0.89$)</td>
</tr>
<tr>
<td>[12]</td>
<td>63 women with PMS</td>
<td>Randomized, double-blind, placebo controlled</td>
<td>Vitamin B6 (300 mg per day) vs. placebo</td>
<td>10 symptom scale</td>
<td>Positive effect in 2 of 4 symptom subgroups (negative emotion and balance change) ($P = 0.05$); no improvement in depression, anxiety, or other symptoms</td>
</tr>
<tr>
<td>[13]</td>
<td>31 women (31 completed) with PMS</td>
<td>Randomized, double-blind, placebo controlled crossover trial; duration: 3 cycles</td>
<td>Vitamin B6 (300 mg per day) vs. placebo</td>
<td>No difference between groups</td>
<td>No difference between groups (65% of treatment group and 60% of placebo group; “substantially better” or “cured”) ($P = 0.89$)</td>
</tr>
<tr>
<td>[14]</td>
<td>42 women with mastalgia</td>
<td>Randomized, double-blind, placebo controlled</td>
<td>Vitamin E (400 IU per day) vs. placebo</td>
<td>No significant difference between B6 and placebo</td>
<td>No difference between groups (82% of treatment group and 70% of placebo group; “substantially better” or “cured”) ($P = 0.3$)</td>
</tr>
<tr>
<td>[15]</td>
<td>31 women (31 completed) with PMS</td>
<td>Randomized, double-blind, placebo controlled, duration: 3 months</td>
<td>Calcium carbonate (two TUMS E-X tablets twice daily, providing 600 mg elemental calcium) vs. placebo</td>
<td>Luteal phase symptom scores significantly lower compared with placebo for depression, irritability, tension, breast tenderness, oedema and bloating, headache, and acne</td>
<td>No difference between groups in global symptom or ranking of individual symptom; significant increase in lateral magnitudes in B6 group</td>
</tr>
</tbody>
</table>

**Note:** The above table represents a subset of studies focusing on CAM treatments for premenstrual syndrome, with specific interventions and outcomes highlighted. For a comprehensive review, please refer to the original source.
Compared to baseline, magnesium, but not placebo, significantly reduced MDQ scores ($P < 0.02$) for symptom clusters, magnesium reduced only 1/5 symptom clusters (negative affect) ($P < 0.05$). It is not stated whether or not differences between groups was significant. Additional 2 months magnesium significantly decreased scores in both groups, compared to 2-month time point ($P < 0.05$).

At all time points, treated group was significantly better than placebo group ($P < 0.05$) by analysis of variance.

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At all time points, treated group was significantly better than placebo group ($P < 0.05$) by analysis of variance.
### Other CAM therapies

<table>
<thead>
<tr>
<th>Study</th>
<th>Participants &amp; Completion</th>
<th>Study Design</th>
<th>Duration</th>
<th>Intervention 1</th>
<th>Measures 1</th>
<th>Measures 2</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>[34]</td>
<td>23 women (all completed)</td>
<td>Randomized, controlled trial, duration: 12 weeks</td>
<td>Aerobic exercise vs. Strength training (1 h × 3 per week)</td>
<td></td>
<td>23 item Menstrual Symptom Questionnaire</td>
<td>Compared to baseline, total MSQ scores significantly decreased in the aerobic group ($P &lt; 0.05$) but not the strength group.</td>
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<tr>
<td>[35]</td>
<td>50 women (35 completed)</td>
<td>Randomized, controlled study, duration: 8 weeks</td>
<td>Ear, hand and foot reflexology, 30 min treatment once a week vs. reflexology at incorrect points</td>
<td></td>
<td>PMS scale including 19 somatic and 19 psychological symptoms</td>
<td>Significantly greater decrease in premenstrual symptom scores in the treated group compared to the placebo group ($P &lt; 0.01$).</td>
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<tr>
<td>[36]</td>
<td>45 women (25 completed)</td>
<td>Randomized, placebo-controlled crossover trial, duration: 3 cycles (treatment or placebo for first and third, no treatment for second cycle)</td>
<td>Chiropractic spinal adjustment and self lesion therapy vs. Sham treatment (manual force at incorrect points) 2–3 times during the week before menses</td>
<td></td>
<td>Moos premenstrual symptom questionnaire and total daily scores from daily symptom monitoring</td>
<td>Mean global scores after treatment were significantly improved over baseline or sham treatment ($P &lt; 0.01$ for both). Both groups improved significantly over baseline ($P &lt; 0.01$).</td>
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<tr>
<td>[37]</td>
<td>24 women</td>
<td>Randomized controlled trial, duration: 5 weeks</td>
<td>Massage therapy (60 min, 3 sessions during the week before menses) vs. progressive muscle relaxation (twice-weekly for 4 weeks or twice-weekly for 1 week)</td>
<td></td>
<td>Center for Epidemiological Depression Scale, Menstrual Distress Questionnaire, State Trait Anxiety Inventory, Profile of Mood States, and visual analog scale on pain intensity. Tests administered before and after interventions on first and last day of study</td>
<td>Massage therapy significantly decreased scores on STAI, POMS, and VAS from pre-massage levels on first and last days ($P &lt; 0.05$). Compared to baseline, MSQ scores, but not CES-D, significantly improved in the massage group from the first to the last day of the study. Relaxation only decreased anxiety on the first day; no other measures were affected. All groups improved in most measures. The relaxation group improved significantly more than other groups on 1/3 subtypes (physical symptoms) on the Premenstrual Assessment Form ($P &lt; 0.025$).</td>
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<tr>
<td>[38]</td>
<td>107 women (46 completed)</td>
<td>Randomized, controlled trial, duration: 3 months</td>
<td>&quot;Relaxation response&quot; vs. two controls: a symptom-charting group and a reading group</td>
<td></td>
<td>Premenstrual Assessment form, and Daily Rating Form</td>
<td>All groups improved in most measures. The relaxation group improved significantly more than other groups only on 1/3 subtypes (physical symptoms) on the Premenstrual Assessment Form ($P &lt; 0.025$).</td>
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<tr>
<td>Reference</td>
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<td>[32]</td>
<td>51 women (33 completed)</td>
<td>Randomized controlled crossover study, duration: 4 months (each phase lasted 2 months)</td>
<td>Low-fat vegetarian diet vs. regular diet plus a placebo pill</td>
<td>Duration of dysmenorrhea, pain intensity</td>
<td>Duration of dysmenorrhea significantly ↓ from baseline (days) during diet phase but not placebo phase. Differences in pain intensity between the placebo and diet phases were significant for only one of three days with pain.</td>
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<td><strong>Dietary supplements</strong></td>
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<td>[41]</td>
<td>100 high school students (age 16-18)</td>
<td>Randomized placebo-controlled trial; duration: 2 cycles</td>
<td>Vitamin E 500 IU per day 2 days before expected menses, until third day of menses</td>
<td>Severity of pain by visual analog scale</td>
<td>Both groups experienced significant decrease in menses pain scores at 1 month, but Vitamin E showed significantly greater improvements compared to placebo significantly more women in the treated group (68%) improved, compared to 47% (18%) of controls. 76% of treated women vs. 36% of controls improved during menses. Comment: this trial was not truly randomized (alternative allocation). Statistical analysis not presented.</td>
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<tr>
<td>[42]</td>
<td>100 university students (ages 18-21); 83 completed</td>
<td>Randomized, double-blind, placebo-controlled trial; duration: 3 months (and 2 months follow-up)</td>
<td>Vitamin E 50 mg tds (tid) from 10 days before expected menses, until fourth day of menses</td>
<td>Pain severity during menses (also assessment during premenstrual phase)</td>
<td>Significantly more women in the treated group (34/50, 68%) improved, compared to 9/50 (18%) of controls. 76% of treated women vs. 29% of controls improved during menses.</td>
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<td>[43]</td>
<td>556 young women (ages 12–21); 530 completed</td>
<td>Randomized, double-blind, placebo-controlled, crossover trial; duration: 5 months (unequal phases: 2 months, then 3 months)</td>
<td>Vitamin B1 (Thiamine hydrochloride) 100 mg per day (2 or 3 times in months, depending on treatment assignment)</td>
<td>Improvement in pain</td>
<td>In group that started with thiamine, 90% improved, compared to &gt;3% of those who started on placebo; improvement persisted 3 months through placebo phase. 98% of group that started with placebo experienced improvement after 2 months of thiamine. Comment: these results appear too good to be true and generally implausible.</td>
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<td>[44]</td>
<td>42 adolescents (27 completed)</td>
<td>Randomized placebo-controlled crossover trial; duration: 6 months (each phase lasted 2 months)</td>
<td>Fish oil daily dose contained: eicosapentaenoic acid 1080 mg, docosahexaenoic acid 720 mg, and Vitamin E 1.5 mg vs. placebo Fish oil, fish oil with B12, and oil or placebo (containing fat) 5 capsules daily for 3 cycles</td>
<td>Cox Minimal Symptom scale</td>
<td>Compared with baseline, fish oil but not placebo significantly ↓ symptoms scores (P = 0.0006).</td>
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<tr>
<td>[45]</td>
<td>78 women</td>
<td>Randomized, double-blind, placebo-controlled trial; duration: 3 cycles</td>
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<td>Menstrual Symptom Questionnaire and visual analog scale for pain</td>
<td>Compared to baseline, only fish oil with B12 significantly ↓ symptoms scores (P &lt; 0.01).</td>
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<td><strong>Herbs</strong></td>
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<tr>
<td>[46]</td>
<td>40 women with dysmenorrhea and a traditional Chinese medicine diagnosis of “deficiency”, “yin”, “stagnated blood” and “cold”</td>
<td>Double-blind, placebo-controlled trial; duration: 2 cycles, with 2 cycle baseline assessment and 3-month follow-up</td>
<td>Chinese herbal formula (Bingji-Plus Flu Sar in Chinese translation, or Toku-shakuyaku-san in Japanese translation)</td>
<td>Pain severity by visual analog scale</td>
<td>Compared to placebo, treatment significantly reduced pain scores throughout two treatment months and two follow-up months (P &lt; 0.05 for first treatment months, P &lt; 0.005 for subsequent months). No serious adverse effects reported.</td>
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<td><strong>Exercise</strong></td>
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<tr>
<td>[47]</td>
<td>36 college women</td>
<td>Randomized controlled, non-blinded trial; duration: 3 cycles</td>
<td>Aerobic training for three menstrual cycles vs. sedentary control</td>
<td>Mini Menstrual Distress Questionnaire</td>
<td>Training group had significantly lower MDQ scores during examination than controls (P = 0.05).</td>
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</tbody>
</table>
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[48] 302 junior high school students Randomized, controlled, non-blinded trial; duration: 3 years
Daily Golub exercise (Golub exercises involve twisting and bending)

Frequency of premenstrual difficulties
39% of exercise group reported dysmenorrhea, compared to 61% of controls (P < 0.05)

[49] 101 college students Randomized, controlled, non-blinded trial; duration: 15 weeks
Billig exercises vs. non-Billig exercises
Dysmenorrhea symptoms
Both types of exercise significantly decreased

[50] 53 college students Randomized, controlled trial with three different controls; duration: 20 weeks
Billig vs. Mosher vs. series exercises
Dysmenorrhea symptoms
All exercises significantly decreased

Acupuncture

[51] 43 women Randomized, controlled trial with three different controls; duration: 3 menstrual cycles
True acupuncture vs. three controls: sham acupuncture (at non-acupuncture points); "standard" controls (usual treatment); and "visit controls" (usual treatment and extra-office visits). Acupuncture groups were treated three times per month
Pain score
There was no significant difference between groups in mean monthly pain scores. The proportion of women whose average pain scores were halved after treatment (10/11) was significantly higher in the real acupuncture group than the other groups (P < 0.05)

Chiropractic

[52] 45 women with primary dysmenorrhea Randomized controlled trial; duration: single treatment on first day of menses
Spinal manipulative therapy (SMT) vs. sham manipulation
Menstrual Distress Questionnaire and a visual analog pain scale
Compared with baseline, the SMT group had significantly less abdominal pain (P = 0.019) and lower MDQ scores than the sham-treated group (P = 0.003)
Bilateral use of acupressure bands

**Table 3**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Subjects</th>
<th>Study design and duration</th>
<th>Intervention</th>
<th>Outcome measures</th>
<th>Results</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>[65]</td>
<td>138 women; 9–11 weeks pregnant</td>
<td>Randomized, controlled trial; duration: 10 days (each phase lasted 5 days)</td>
<td>P6 acupressure wrist bands vs. placebo bands (no button) on both wrists</td>
<td>Nausea, vomiting, dry retching</td>
<td>No significant difference between groups</td>
<td>P &lt; 0.001 for all differences compared to placebo.</td>
</tr>
<tr>
<td>[66]</td>
<td>33 women hospitalized with hyperemesis gravidarum</td>
<td>Randomized, controlled crossover trial; duration: 6 days</td>
<td>P6 acupressure vs. superficial acupuncture (each given three times daily)</td>
<td>Degree of nausea by VAS scores</td>
<td>Significantly less nausea in the P6 group compared to the other groups (P &lt; 0.005)</td>
<td>Initial VAS estimates for nausea differed between groups, so equal of VAS reduction was calculated.</td>
</tr>
<tr>
<td>[67]</td>
<td>60 women (54 completed); 7–12 weeks pregnant, with morning sickness</td>
<td>Randomized, controlled crossover trial; duration: 10 days (each phase lasted 5 days)</td>
<td>Acupressure bands vs. no therapy</td>
<td>Nausea and vomiting scale</td>
<td>Compared to no therapy, acupressure significantly reduced nausea and vomiting in 12/20 subjects (P &lt; 0.002)</td>
<td>No clear control.</td>
</tr>
<tr>
<td>Study</td>
<td>Participants</td>
<td>Study Design</td>
<td>Intervention</td>
<td>Outcomes</td>
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<tr>
<td>[67]</td>
<td>90 women with morning sickness (80 completed)</td>
<td>Randomized controlled trial, duration: 10 days</td>
<td>Acupuncture bands on P6 or placebo point</td>
<td>Rhizode index of nausea and vomiting P0.002) but not emesis. Both groups improved significantly from baseline No significant difference between groups (all groups improved significantly over baseline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[69]</td>
<td>161 pregnant women (149 completed)</td>
<td>Randomized controlled trial; crossover trial, duration: 1 day (n=71), 2 days (n=80)</td>
<td>P6 stimulation with TENS unit vs. placebo unit</td>
<td>Nausea and vomiting assessment (remained, no change, improved)</td>
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<tr>
<td>[70]</td>
<td>70 women (67 completed) with morning sickness</td>
<td>Randomized, double-blind trial, placebo-controlled trial, duration: 5 days (each phase lasted 7 days, with 2-day washout)</td>
<td>P6 stimulation with TENS unit vs. placebo</td>
<td>Nausea and vomiting (visual analog scale)</td>
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| ...   | ...          | ...          | ...          | ...      | ...
This was primarily a safety study that shows that hot tub immersion during early labor is safe. Immersion significantly increased maternal heart rate, maternal temperature, and fetal heart rate; maternal blood pressure was not affected. There were no differences between groups in any other parameters (fetal and maternal vital signs, before and after tub use), time to delivery, method of delivery, rate of chorioamnionitis or endometritis, Apgar scores, hospital readmissions.

Randomized controlled crossover trial; duration 3 separate days

- Oral, 159 women

- Midwives who had taken a 4-day course in acupuncture for labor pain

- None of the subjects went into labor before amniotomy the next day

- 18 women in labor (90 analyzed)

- Change in cervical length, time from EDC to delivery, duration of labor and stages of labor, proportion treated with oxytocin, mode of delivery

- No difference in birth weight

- 50 pregnant, low-risk women in active labor (cervical dilation 3-6 cm)

- Labor induction

- 41 pregnant low-risk women in active labor, on expected day of confinement

- Standardized acupuncture treatment at two points (LI-11 and SP-6) bilaterally every other day for up to 10 days (after which participants had induction as done). Control group received no acupuncture. TENS stimulation of standardized acupuncture points vs. sham TENS

- Cervical length shortened at a faster rate, and time from EDC to delivery was significantly shorter in the acupuncture group (5.0 days) than the control group (7.9 days) (P = 0.03). There were no differences in other outcome measures.

- Subjects were not post-dates. None of the subjects went into labor before amniotomy the next day.

- 90 women in labor (73 analyzed)

- Temperature, mean arterial pressure, urine output, mean arterial pressure

- Urine output, mean arterial pressure

- Urine output after shoulder-deep immersion

- None of the subjects went into labor before amniotomy the next day

- 40 women in labor (30 analyzed)

- Acupuncture as adjunct or alternative to labor analgesia vs. conventional analgesia

- Acupuncture significantly reduced the need for epidural analgesia compared to controls (22 vs. 33; 65.3% vs. 85.7% CI 0.3–0.92) and the acupuncture group reported a higher degree of satisfaction. No differences between groups in pain intensity or labor outcomes. At 17 min, significantly more treated women had decreased anxiety (P = 0.03); the difference was significantly greater than other treatments (P < 0.05). MAP and heart rate decreased significantly from baseline in all groups (P < 0.005).

- 97 women in preterm labor (37-41 weeks, singleton pregnancies, in early, spontaneous labor (cervical dilation 3-5 cm))

- Standardized acupuncture treatment with cervical changes; unilateral needles or bilateral needles; 20 women dropped during course, after 1-2/3 months and were analyzed separately

- At 37 min, significantly more treated women had decreased anxiety (P = 0.03); the difference was not significant at 60 min. After 60 min, 95% of treated women reported decreased pain, while all controls reported increased pain (P < 0.001). Mean pain scores were lower in bathers at 15 and 60 min (however, mean pain scores were significantly higher among bathers at baseline). The adherent experimental group had significantly longer gestations, and a higher rate of pregnancy prolongation than non-adherent subjects or controls. There was no difference in birth weight.

- Reference: Subjects Study design and duration Intervention Outcome measures Results Comments

- None of the subjects went into labor before amniotomy the next day

- 98 women in labor (68 analyzed)

- Acupressure at selected or determined points to labor anesthesia vs. conventional analgesia

- Acupressure significantly reduced the need for epidural analgesia compared to controls (22 vs. 33; 51.1% vs. 75.6% CI 0.3–0.92) and the acupuncture group reported a better degree of satisfaction. No differences between groups in pain intensity or labor outcomes. At 17 min, significantly more treated women had decreased anxiety (P = 0.03); the difference was significantly greater than other treatments (P < 0.05). MAP and heart rate decreased significantly from baseline in all groups (P < 0.005).

- 18 women with low-risk singleton pregnancies, in early, spontaneous labor (cervical dilation 3-5 cm)

- Standardized acupuncture treatment at two points (LI-4 and SP-6) bilaterally every other day for up to 10 days (after which participants had induction as done). Control group received no acupuncture. TENS stimulation of standardized acupuncture points vs. sham TENS

- Cervical length shortened at a faster rate, and time from EDC to delivery was significantly shorter in the acupuncture group (5.0 days) than the control group (7.9 days) (P = 0.03). There were no differences in other outcome measures.

- 107 women in preterm labor (37-41 weeks, singleton pregnancies, in early, spontaneous labor (cervical dilation 3-5 cm))

- Standardized acupuncture treatment with cervical changes; unilateral needles or bilateral needles; 20 women dropped during course, after 1-2/3 months and were analyzed separately

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Comparisons were post-hoc. Hypnosis group had higher pain threshold than relaxation group on IPT at sessions 3 and 4, and sessions 5 and 6. Hypnosis group had lower scores on MPQ (P < 0.01), shorter Stage I labor (P < 0.001), more spontaneous deliveries (P < 0.05), and their infants had higher Apgar scores at 1 and 5 min (P < 0.001).

Compared to controls, the relaxation group had significantly improved scores on the STAI, CES-D, and Rosenberg Self-Esteem scale. Companions were post-hoc.

**Postpartum outcome**

- **180 multiparous women with singleton pregnancies (60/60 analyzed)** 
  - Randomized, controlled, single-blind trial
  - Postnatal massage by subject (3–4 times per week for 4 weeks, starting 8 weeks before estimated due date) vs. no massage
  - Postnatal status (maternal, Delivery type) 
  - For women <30 years old: Treatment reduced tears significantly (P < 0.001), more spontaneous deliveries (P < 0.05)

- **1527 women (1034 without previous vaginal birth); 1522 completed** 
  - Randomized, single-blind, controlled trial
  - Postnatal massage (self-administered, 20 min daily from 34–35th weeks till delivery) vs. usual obstetric care
  - Intact perineum, Episiotomy 
  - Randomized, placebo-controlled trial; duration: 7 days

- **999 women (572 women without prior vaginal birth; all apparently completed)** 
  - Randomized, single-blind, controlled trial
  - Postnatal massage (self-administered, 20 min daily from 34–35th weeks till delivery) vs. no massage
  - Postnatal status, Episiotomy, Incontinence of urine, gas or stool

- **1340 women carrying singleton pregnancies (all apparently completed)** 
  - Randomized controlled trial
  - Postnatal massage (by a midwife) during second stage of labor
  - Intact perineum, Episiotomy

**Postpartum discomfort**

- **407 postpartum women** 
  - Randomized, single-blind, controlled trial; duration: 14 days
  - Lavender oil (6 drops in bath water daily) vs. synthetic lavender oil vs. aromatic placebo (2-methyl 3-isobutylpyrazine)
  - Postnatal discomfort (visual analogue scale)

- **164 women with spontaneous or induced vaginal delivery (31 completed)** 
  - Randomized, placebo-controlled trial
  - Homeopathic Arnica montana in two potencies (D6 and D30) vs. placebo (5 tablets sublingually every 4 hours for two days, then 3 times daily for 3 days)
  - Postnatal pain, breast pain, perceived appearance of infant

**Location**

- **51 mothers of premature infants (55 completed)** 
  - Randomized controlled trial, duration: 7 days
  - Breast milk volume and fat proportion of milk ("mammary")

- **71 mothers of premature infants (95 completed)** 
  - Randomized controlled trial, duration: 7 days
  - Breast milk volume and fat proportion of milk ("mammary")

Among primiparas, no differences in any outcomes. More treated women had vaginal births (56.5%) than controls (42.6%); there was no difference in postnatal outcomes among women with a previous vaginal birth.

There were no differences in rates of intact perineum or number of episiotomies, or 1st or 2nd degree tears. Third degree tears were significantly less common in the treated group (RR 0.47, 95%CI 0.23–0.93).

Randomized, single-blind, controlled trial; duration: 4 weeks Relaxation and guided imagery, using a tape-recording; 15 min daily vs. control (listening to taped music for 15 min). Both interventions were performed daily, and both groups underwent childbirth education classes.

Randomized controlled trial Perineal massage (by a midwife) vs. usual obstetric care; duration: 7 days.

Randomized, placebo-controlled trial; duration: 10 days Arnica montana (potencies D6 and D30) vs. placebo (3 tablets sublingually every 4 hours for two days, then 3 times daily for 3 days).

Randomized, single-blind trial Hypnotic induction (one session with therapist, then taped instructions) vs. progressive relaxation exercises using a tape-recording. Both interventions were performed daily, and both groups underwent childbirth education classes.

Randomized controlled trial; duration: 20 min at 3–5 cm dilation vs. attention control (partner present) Perineal massage; POMS-D V AS for Well-being; mood, appearance, mood 

Randomized, placebo-controlled trial; duration: 10 min daily from 34–35th weeks till delivery) vs. no massage.
<table>
<thead>
<tr>
<th>Reference</th>
<th>Subjects</th>
<th>Study design and duration</th>
<th>Intervention</th>
<th>Outcome measures</th>
<th>Results</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>[98]</td>
<td>39 breastfeeding women with engorgement</td>
<td>Randomized, placebo-controlled trial</td>
<td>Cabbage extract topical cream vs. placebo cream, each applied to the breast and left there for 2 h</td>
<td>Level of breast engorgement (by probe protraction) and symptoms (modified Hill and Humenick Breast Engorgement scale, Bourbonais pain scale) pre-treatment, pre-feed, and post-feed</td>
<td>No difference between groups</td>
<td></td>
</tr>
<tr>
<td>[99]</td>
<td>28 breastfeeding women with engorgement</td>
<td>Randomized controlled trial</td>
<td>Chilled cabbage leaves applied to one breast vs. room temperature cabbage leaves applied to the other breast; leaves were applied between feeds</td>
<td>Pre-treatment and post-treatment pain scores (Bourbonais pain scale)</td>
<td>No difference between groups</td>
<td>No blinding, no negative control</td>
</tr>
<tr>
<td>[100]</td>
<td>34 breastfeeding women with engorgement</td>
<td>Randomized controlled trial</td>
<td>Chilled cabbage leaves applied to one breast vs. chilled gel pack applied to the other; each treatment renewed as needed (usually every 2–4 h) for 8 h</td>
<td>Pre-treatment and post-treatment pain scores (Bourbonais pain scale)</td>
<td>No difference between groups</td>
<td>No blinding, no negative control</td>
</tr>
<tr>
<td>[101]</td>
<td>120 breastfeeding women (72 h postpartum) (96 completed)</td>
<td>Randomized, controlled, open trial; duration: 6 weeks</td>
<td>Application of cold cabbage leaves vs. routine care including hot compresses</td>
<td>Breast engorgement (questionnaire before each feeding and at 6 weeks)</td>
<td>No significant change in engorgement</td>
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</table>
4. Fibroids, endometriosis, and pelvic pain

No controlled trials of CAM treatments were identified for the treatment of fibroids, endometriosis, or pelvic pain.

5. Pregnancy

Many women are concerned about taking drugs during pregnancy, and may explore CAM therapies to treat symptoms. A surprisingly large number of CAM trials were identified for relieving pregnancy-related conditions. These 42 studies are summarized in Table 3 [57–97].

5.1. Nausea and vomiting

Several treatments for pregnancy-related conditions appear promising. Acupuncture point stimulation for nausea and vomiting of pregnancy should be considered a proven treatment; 10 of 14 studies found significant benefit on at least one measure. Only three studies utilized needles; nine utilized acupressure bracelets, one used self-applied finger pressure, and one used TENS unit stimulation. All but one study tested stimulation of the P-6 acupuncture point, which is easily located on the volar aspect of the wrist. Two studies (including one that also tested P6) tested individualized acupuncture. It is difficult to conduct such studies in a truly double-blind manner. Nonetheless, non-invasive, self-administered therapy for morning sickness is benign and should be encouraged; health care practitioners should familiarize themselves with the P6 point (Fig. 1) to be able to instruct patients in this procedure.

Two relatively small studies of ginger for morning sickness have found a significant benefit [71,72]. Ginger is safe in the dose used (1 g per day), which does not exceed what would be expected in some meals. Ginger is used medicinally by many traditional cultures.

Vitamin B6 lessened nausea in two trials [72,73]. Vitamin B6 was one component of Bendectin, the only treatment for morning sickness ever approved by the Food and Drug Administration.

The duration of studies on CAM therapies for nausea and vomiting of pregnancy ranged from 1 day to 4 weeks; most lasted less than 2 weeks. Duration and consideration of gestational age are both important in evaluating outcomes, because nausea and vomiting of pregnancy is generally self-limited and improves over time. Most studies of CAM therapies for nausea and vomiting of pregnancy have found a benefit. Given the prevalence of the problem, larger trials are warranted.

5.2. Other pregnancy symptoms

Back pain, leg cramps, and leg edema are common symptoms during pregnancy. One study supports acupuncture over physiotherapy for pregnancy-related back or pelvic pain; massage improved both back pain and mood in one study. Plant-derived rutosides reduced leg edema and cramps in one trial [78]; magnesium also decreased leg cramps compared to placebo [77]. Immersion in water (whether passive [79] or active [80]) increased urine output, but no studies have examined the effect of immersion specifically on pregnancy-related leg edema. These treatments are benign.

5.3. Labor induction and outcomes

Two studies have tested acupuncture point stimulation for inducing labor; no dramatic effects were seen in either trial. One trial indicated a promising role for moxibustion (heat stimulation of acupuncture points) as a non-invasive treatment for turning breech babies [81]. There may be a place for mind-body therapies or massage in decreasing anxiety and pain during labor, but more research needs to be done to delineate benefits. Perineal massage may increase the likelihood of an intact perineum; however, although four studies found a benefit in at least one subgroup [91–94], there was no consistency among trials in which subgroups benefited. In single trials, neither aromatherapy [95] nor homoeopathy [96] reduced perineal discomfort. Listening to a relaxation/imagery tape increased breast milk volume in mothers of premature infants [97]. Application of cabbage leaves or cabbage extract failed to help breast engorgement in four controlled trials [98–101].

6. Discussion

Most controlled trials of alternative approaches for the conditions we have reviewed have been small. Definitive efficacy studies are lacking, and mechanisms of action are largely unexplored. But encouraging and intriguing studies do exist.

Substantial evidence supports the use of acupuncture point stimulation (primarily by acupressure) for nausea of pregnancy. Calcium, magnesium, Vitamin B6, and Vitex may be helpful for PMS, and there is intriguing preliminary information on ginger or Vitamin B6 for morning sickness, and on mind-body therapies to reduce pain and anxiety during labor or postpartum.

CAM therapies are quite popular among pregnant women, and safety issues must be more clearly delineated. Larger clinical trials and determination of subpopulations of women for whom particular treatments may be most appropriate are needed.

Herbs and dietary supplements are not all risk-free. Many herbs are being promoted for new, non-traditional uses. Newly formulated combination herbal products (often containing novel mixtures and/or subtherapeutic doses) should be avoided until research data are available; currently no safety or efficacy data on such combinations have been published. The subtherapeutic doses often found in such
preparations may render them harmless, but harmlessness cannot be assumed. There are, of course, numerous herbs with a long history of use in many cultures. Only a small number of these herbs have been studied to date. The guidance of knowledgeable herbalists can be sought (easier said than done) while research data slowly accumulate.

While plant foods are presumed safe, the isolated, often concentrated components that are now flooding the market have not been tested for safety of long-term use. Further, the lack of adequate product quality control in the United States makes it difficult to know which supplement brands are reliable. The number of herbal products in the American market is increasing rapidly, and recommended dosages are increasing, without research supporting the need for or safety of these larger doses.

Health care providers and consumers should be aware that despite the potential usefulness of many CAM therapies, scientific research to date is limited. Product advertising hype far exceeds scientific knowledge, and scientific evaluation is essential to enable an informed choice among treatments. Many studies on CAM therapies are not well-reported. Future studies would benefit from enrolling an adequate number of subjects, appropriate blinding, and placebo controls, use of standard outcome measures, and presentation of all data and statistical analyses. However, because herbs, vitamins, and other natural products have limited patentability, and because there is no requirement for testing before marketing, industry-sponsored research will remain limited. Federal, private, and other alternative funding sources must bridge this gap; scientific evaluation of both safety and efficacy of these therapies is important to public health.

Acknowledgments

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