Supplement A. Benefit on palpitations from intervention articles (n=33).

Author, year	*Result-prevalence*	*Result-severity*	*Comparison*
DRUG THERAPIES (n=15)			
Hormonal agents (n=14)			
Anarte et al., 1998 [36]		HT + Psychological pre tx 1.00 (0.81) and post tx 0.18 (0.39), p<0.0001; HT pre tx 0.63 (0.72) and post tx 1.19 (0.74), p=0.0026	Severity in HT + psychological group significantly lower than in HT group at post tx (p=0.0001)
Carmignani et al., 2010 [38]		All three groups (HT, isoflavone, or placebo) improved over time (16 weeks)	NS group difference (p=0.43)
Checa et al., 2005 [39]	Palpitations (yes) at 6 months HT < Calcium and raloxifene groups (p=0.0004), at 12 months NS (p=0.545)		Prevalence at 6 months HT < Calcium and raloxifene groups (p=0.0004), at 12 months NS (p=0.545); text does not match table results at 12 months
Chittacharoen et al., 2004 [40]		Among 38 women with palpitations, 26.3% improved, 60.5% unchanged, 13.2% worsened at 6 months	NA
Elfituri et al., 2005 [41]		Severity significantly decreased in both groups over time from month 0 to 3, 6, 12 months: 0.82 (0.39) to 0.06 (0.24), 0 (0), 0 (0) for tibolone group (p's < 0.001); 0.74 (0.44) to 0.04 (0.2), 0 (0), 0 (0) for HT group (p's<0.001)	NS group difference for severity change from months 0 to 3 or 3 to 6
Fluck et al., 2002[a] [49]		Baseline and improvement data not available	Significantly less severe palpitations in tibolone vs. untreated group (p<0.05).

Kim et al., 2019 [42]		For transdermal estrogen, 1st heart discomfort 1.55 (1.15) to 2nd heart discomfort 1.10 (0.98) (p=0.050); For tibolone, heart discomfort 1.42 (1.24) to 2nd heart discomfort 0.85 (0.83) (p=0.029) from pre- to posttreatment at 6 months	NS group difference
Moyer et al., 2018 [43]		NS palpitations improved on HT (oral or transdermal estrogen) and placebo	NS group difference
Nevinny-Stickel, 1983 [50]		NS palpitations improvement from both tibolone (Org OD 14) and placebo	Tibolone = placebo
Polo-Kantola et al., 1998 [44]		No effect on palpitations from transdermal estradiol (estrogel and evorel) group and placebo group	NS group difference
Pornel 1996 [45]	All groups incidence of palpitations decreased over time	All groups (Menorest, Premarin, and Estraderm) severity of palpitations decreased over time, less than 1.3% of women reported severe palpitations at 12 weeks after treatments	NS group differences in incidence and severity reduction over time
Takamatsu et al., 2001 [46]		56.8% (n=25) improved palpitations with counseling, 9.1% no response in palpitations with counseling for 6 months	Greater improvement in palpitation in counseling than HT
Tit et al., 2017 [47]		At 6 months, palpitations improved for 15.79% on HT, 14.52% on isoflavones/phytoestrogens, 10.38% untreated control; at 12 months, palpitations improved for 20.00% on HT, 17.75% on isoflavones/phytoestrogens,	HT, isoflavones not reported

	16.03% control	
Glaser et al., 2011 [48]	Mean ↓: 1.06 to 0.29 (pre-post tx at 3 months, p<0.0001)	NA
Non-hormonal drug therapies – Antihypertensives (n=1)		
Kujala et al., 2014 [54]	Both groups (severity) improved over time (8 weeks); Relief from palpitations in 24.5% (p=0.0315) Moxonidine; 40.8% (p=0.0012) atenolol	NS group difference in improvement on palpitations
NON-DRUG THERAPIES (n=18)		
Supplementary treatments – isoflavones and other phytoestrogens (n=5)		
Agosta et al., 2011 [55]	Estromineral reduced palpitations severity by 20.9%, Estromineral Serena reduced palpitations severity by 21.1% by 4th week. Estromineral reduced palpitations severity by 42.9%, Estromineral Serena reduced palpitations severity by 46.4% by 8th week. At 12 weeks, Estromineral reduced palpitations severity by 56.8%, while Estromineral Serena reduced palpitations severity by 60%	Estromineral = Estromineral Serena by palpitations improved from baseline to week 4, 8, and 12
Ahsan & Mallick, 2017 [56]	Postmenopausal group, 18.81% improvement in mild to moderate symptoms (p<.05, n=11), 33.33% improvement in severe to very severe symptoms (n=2); perimenopausal group, 31.3% (n=23) improvement in mild to moderate symptoms (p<0.01), none had severe symptoms after 12-week tx	NA

Auerbach et al., 2012 [57]		Severity at weeks 4, 8, 12, 24 in both Pomegranate seed oil and placebo groups was 0.0 (1.0)	NS group difference at week 4 (p=0.31), week 8 (p=0.99), week 12 (p=0.82), or week 24 (p=0.08)
Costa et al., 2017 [58]	More asymptomatic women in both isoflavone + exercise and placebo + exercise groups	Less severe symptom in both isoflavone + exercise and placebo + exercise groups after 10 weeks tx	NS group differences in (1) frequency of women with no, mild, mod, or severe symptom and (2) % disappearance of symptom
Davinelli et al., 2017 [59]	78.8% reduction in palpitations with Equopausa group(p<0.001). Sig reduction in palpitations from 63.3% to 23.3% at 1 month (p<0.01), to 13.4% at 3 months within Equopausa group (p<0.001); in placebo from 66.7% to 43.4% at 1 month, to 36.7 at 3 months		Reporting mild palpitations in Equopausa vs. placebo at 3 month 13.4% vs. 36.7% (p < 0.001)
<u>Supplementary treatments – *Rheum rhaponticum*</u> (n=3)			
Hasper et al., 2009[b] [60]		Mean heart complaints changed from baseline to week 48 to week 96: ERr 731 group 3.0 (0.8) to 0.6 (0.5) to 0.6 (0.5), placebo group 2.9 (0.6) to 0.7 (0.6) to 0.6 (0.6)	ERr 731 = placebo at week 48 (p=0.7201) or 96 (p=0.9727)
Heger et al., 2006 [61]		Decrease in palpitations severity from baseline to day 84 in ERr 731 group vs. placebo (-1.5 (1.1) vs. -0.1 (0.4), [95% CI -1.753, -1.139])	Sig more reduction in palpitations severity in ERr 731 group vs. placebo group (p<0.0001)

Kaszkin-Bettag et al., 2009 [62]		Reduction in palpitations severity -1.1 (0.9) ERr 731 group vs. -0.2 (0.9) placebo group at 84 days	Less severity in palpitations in ERr 731 group at 84 days vs. placebo ($p<0.0001$)
Supplementary treatments – *Salvia officinalis* or sage (n=3)			
Bommer et al., 2011 [63]		Mean ↓: 0.9 (1.0) to 0.7 (0.9), (pre-post tx [8 weeks tx], p= 0.0022)	NA
Dadfar & Bamdad, 2019 [64]		Mean ↓: 1.9 (0.175) to 1.73 (0.126) (pre-post tx [4 weeks tx], p=0.06)	NA
Zeidabadi et al., 2020 [65]		Mean score of palpitations ↓ by 0.4 units in *Salvia officinalis* extract group vs. placebo group ($p<0.001$); after 3-month tx, lower mean score in tx group 0.58 (0.26) vs control group 1.38 (1.29), $p<0.001$.	More mean ↓ and less score in the *Salvia officinalis* extract group vs. placebo group $p<0.001$.
Supplementary treatments – other (n=4)			
Fatima et al., 2017 [66]	Prevalence reduced by 71.8% in *Tribulus terrestris* L. group and 40.6% in the placebo group from baseline to one month post tx.	Severity before to after 8-week tx in *Tribulus terrestris* L. group (2.70 (0.79), 0.76 (0.73)) vs. placebo group (2.46 (1.20), 1.49 (1.01).	↓ in prevalence and severity: *Tribulus terrestris* L. > placebo over time, $p < 0.0001$
Modi et al., 2012 [67]		Among women with palpitations (n=25), mean ↓: 0.49 to 0.08 (84% ↓), (pre-post tx [3 months tx], $p<0.01$)	NA
Nayak et al., 2011 [68]	The percentage of women with palpitations ↓ from 68.16% (152/223) pre-tx to	Among women with palpitations, mean ↓: (n=152) 1.31 (0.46) to (n=26) 1.04 (0.20) (pre-post tx at 1 year, p=0.001)	NA

	11.66% (26/223) post tx	
Park & Kim, 2016 [69]	Palpitation severity at 12 weeks *Schisandra chinensis* 0.50 (0.71) vs. placebo 1.06 (0.75); about 50% reduction in palpitation score from baseline to 12 weeks in tx group.	Significant greater ↓ in palpitation severity over time in *Schisandra chinensis* vs. placebo group (p=0.015)
Psychological intervention (n=2)		
Alder et al., 2006 [70]	Mean ↓: 1st baseline 1.4 (1.7), 2nd baseline 1.7 (2.1); to 0.8 (0.6) ($p < 0.01$); (average pre-post tx [3 months tx], p=0.007)	NA
Qian et al., 2010 [71]	Mean ↓: 2.74 (1.65) to post tx 0.34 (0.45) (pre-post, $p < .05$) after 6-month tx with both. No Δ after treatment with herbal alone and psychological alone ($p>0.05$)	Herbal + psychological > herbal alone or psychological alone
Acupressure (n=1)		
Kung et al., 2011 [72]	Mean↓: 1.9 (0.3) to 0.7 (0.3) (pre-post tx [4 weeks tx], p=0.02)	NA

Blank cells indicate not applicable; > indicates that one intervention is superior to another one; = indicates no effect difference between interventions and/or placebos.

HT = hormonal therapy, NS = non-significant, tx = treatment, NA = not applicable due to no comparison group, ERr 731 = a special extract of *Rheum rhaponticum*.

[a] had 25 women in untreated group.

[b] study with two phases.

↓, mean severity decreased; no Δ: unchanged mean severity; ↑: mean severity worsened.

Four articles were not included in this table due to palpitations being assessed only as an adverse effect of treatments: Bhattacharya 2010 [37], Callegari et al., 2019 [51], Freeman et al., 2017 [52], and Kornstein 2015 [53].

Supplement B. Assessment of bias in reviewed articles (n=37).

Author, year	*Bias Rating*	*Source of Bias*					
		No confounders in analysis	*Selection bias*	*No palpitations-specific inclusion*	*No adherence analysis*	*No dropout analysis*	*No specific measurement recall period*
DRUG THERAPIES (n=19)							
Hormonal agents (n=15)							
Anarte et al., 1998 [36]	Critical	+	+	+	+	-	+
Bhattacharya & Jha, 2010 [37]	Critical	NA	+	+	+	-	+
Carmignani et al., 2010 [38]	Critical	+	+	+	-	-	+
Checa et al., 2005 [39]	Critical	+	+	+	+	-	+
Chittacharoen et al., 2004 [40]	Critical	+	+	+	+	+	+
Elfituri et al., 2005 [41]	Critical	+	?	+	+	-	+
Fluck et al., 2002 [49]	Critical	+	+	+	+	-	+
Kim et al., 2019 [42]	Critical	-	+	+	+	-	+
Moyer et al., 2018 [43]	Critical	+	?	+	+	-	+
Nevinny-Stickel, 1983 [50]	Critical	+	?	+	+	-	+
Polo-Kantola et al., 1998 [44]	Critical	+	-	+	+	-	+
Pornel 1996 [45]	Critical	+	+	+	+	+	+
Takamatsu et al., 2001 [46]	Critical	+	+	+	+	-	+
Tit et al., 2017 [47]	Critical	+	+	+	+	-	+
Glaser et al., 2011 [48]	Critical	+	+	+	+	+	+

Non-hormonal drug therapies – SSRI/SNRI and antihypertensives (n=4)							
Callegari et al., 2019 [51]	Critical	NA	+	+	+	-	+
Freeman et al., 2017 [52]	Critical	NA	+	+	+	+	+
Kornstein et al., 2015 [53]	Critical	NA	?	+	+	-	+
Kujala et al., 2014 [54]	Critical	+	?	+	+	+	+
NON-DRUG THERAPIES (n=18)							
Supplementary treatments – isoflavones and other phytoestrogens (n=5)							
Agosta et al., 2011 [55]	Critical	+	+	+	+	-	+
Ahsan & Mallick, 2017 [56]	Critical	+	+	+	+	-	+
Auerbach et al., 2012 [57]	Critical	+	?	+	+	-	+
Costa et al., 2017 [58]	Critical	+	-	+	+	+	+
Davinelli et al., 2017 [59]	Critical	+	?	+	+	-	+
Supplementary treatments – *Rheum rhaponticum* (n=3)							
Hasper et al., 2009 [60]	Critical	+	+	+	+	-	+
Heger et al., 2006 [61]	Critical	+	+	+	+	+	+
Kaszkin-Bettag et al., 2009 [62]	Critical	+	+	+	-	+	+
Supplementary treatments – *Salvia officinalis* or sage (n=3)							
Bommer et al., 2011 [63]	Critical	+	-	+	+	+	+
Dadfar & Bamdad, 2019 [64]	Critical	+	+	+	+	-	+
Zeidabadi et al., 2020 [65]	Critical	+	+	+	+	+	+
Supplementary treatments – other (n=4)							

Fatima et al., 2017 [66]	Critical	-	?	+	+	-	+
Modi et al., 2012 [67]	Critical	+	+	+	+	+	+
Nayak et al., 2011 [68]	Critical	+	+	+	+	+	+
Park & Kim, 2016 [69]	Critical	+	+	+	+	-	+
Psychological intervention (n=2)							
Alder et al., 2006 [70]	Critical	+	+	+	+	+	+
Qian et al., 2010 [71]	Critical	+	+	+	+	+	+
Auricular acupressure (n=1)							
Kung et al., 2011 [72]	Critical	+	+	+	+	-	+

+ high risk of bias; - low risk of bias; ? unclear
NS = non-significant, NA = not applicable due to palpitations as an adverse effect, SSRI = selective serotonin reuptake inhibitor, SNRI = serotonin-norepinephrine reuptake inhibitor.