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The effects of yoga on the menstrual distress and menstrual pain of women with primary dysmenorrhea: a systematic review and meta-analysis.

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Abstract

The purpose of this study was to conduct a systematic review and meta-analysis of the effectiveness of yoga on the menstrual distress and menstrual pain of women with primary dysmenorrhea. Literature search was conducted by using PubMed, CINAHL, CENTRAL, EM-BASE, KISS, and RISS. Data were combined by using random effect models. Standardized mean differences (SMDs) and 95% confidence intervals (CIs) were calculated. Jadad scale was used to assess the risk of bias. Nine studies were included representing 697 participants. It was found that yoga was effective in alleviating menstrual distress (SMD=-1.40, 95% CI: -2.76 to -0.04) and menstrual pain intensity (SMD=-1.59, 95% CI: -2.29 to -0.89). The effects were robust against the randomization bias, but not against the blinding and dropout bias. The finding provides objective evidence for yoga on the menstrual distress and menstrual pain of women with primary dysmenorrhea as a useful complementary and alternative medicine.

Keywords: Yoga, Menstrual distress, Menstrual pain, Dysmenorrhea.

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Introduction

Primary dysmenorrhea is a cramping sensation of the lower abdomen that periodically appears with menstruation, and it is one of the most common gynecologic problems occurring in 55.4% to 72.7% of young women [1,2]. Pain in the lower abdomen can be accompanied by headache, dizziness, diarrhea, swollen feeling, nausea, vomiting, back pain, and leg pain [3]. These symptoms negatively affect the daily activity and quality of life of women who are experiencing primary dysmenorrhea [4,5]. In addition, it decreases their work capacity, causes absenteeism at school or at work, and increases their visits to medical institutions, thereby becoming an economic burden [6]. Yoga, which has been practiced in India for thousands of years, is now considered as an exercise in many countries, including the United States and Europe, and many studies have been conducted on yoga as a complementary alternative therapy for health. Yoga mainly consists of physical postures (asana), breathing technique (pranayama), and meditation (dyana) [7]. Previous studies that systematically investigated the effects of yoga related to women's menstruation included a systematic review on the quality of life of women with primary dysmenorrhea [8], a meta-analysis on postmenopausal symptoms [9], and a systematic review on adults with acute and chronic health conditions [10]. However, these previous studies have limitations in validating the effects of yoga on the menstrual distress and menstrual pain of women with primary dysmenorrhea. This study aims to provide a basis for the effects of yoga on menstrual distress and menstrual pain via systematic review and meta-analysis of yoga programs applied to women with primary dysmenorrhea.

Materials and Methods

This study was carried out in accordance with the systematic review reporting guidelines proposed by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [11]. Among the selection criteria, the study subjects were women who complained of primary dysmenorrhea. The intervention is a yoga program, which was administered to them. The subjects to be compared were those who did not undergo a yoga intervention. The outcome variables included menstrual distress, menstrual pain intensity, and menstrual pain duration. The study types were randomized controlled trials (RCTs) and quasi-experimental studies, which have a control group.

Extensive searches were conducted for studies published between the first available year and August 30, 2018. The electronic databases used for literature search included PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Central Register of Controlled Trials (CENTRAL), Excerpta Medica Database (EM-BASE), Korean studies Information Service System (KISS), KoreaMed, and Research Information Sharing Service (RISS). The main keywords used for the search were dysmenorrhea,

menstrual disorder, menstruation, yoga, yogasanas, pranayama, alternative therapy, complementary therapy, pain relief, somatoform symptoms, menstrual cramps, menstrual distress, etc. In terms of language, studies were limited to those published in English and Korean.

The quality of the articles was evaluated by using the Jadad scale [12]. The effect size and homogeneity of yoga intervention were analyzed by using the RevMan 5.2 program of the Cochrane Library. The standardized mean difference (SMD) was used for the effect size. The homogeneity was tested by using Cochrane's chi-square test and I^2, and the publication bias was tested by using a funnel plot.

Results

A total of 1,991 articles were searched through the databases at the first stage, and 9 articles were selected after finally reviewing the full text of the articles (Figure 1).

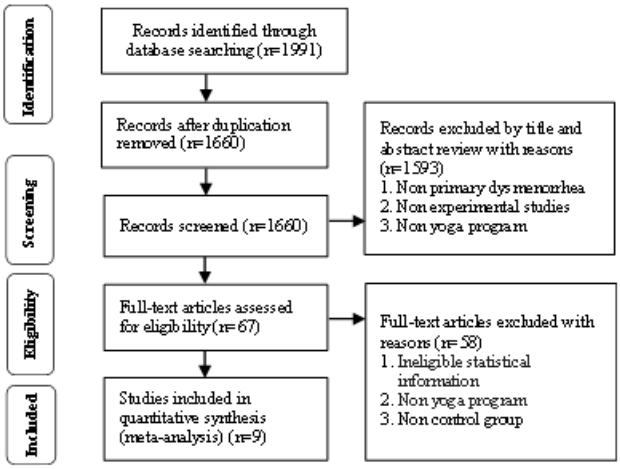

Figure 1. *Flow diagram of the study selection process.*

The total number of subjects was 697,366 in the experimental group and 331 in the control group (Table 1). The overall effect size of yoga on primary dysmenorrhea was -1.35 (95% confidence interval [CI]: -1.87 ~ -0.83), and the homogeneity of the effect sizes was I^2=92% (χ^2=160.35, df=13, p0.001). The effect size on menstrual distress was -1.40 (95% CI: -2.76 to -0.04), the effect size on menstrual pain intensity was -1.59 (95% CI: -2.29 to -0.89), and the effect size on menstrual pain duration was -0.33 (95% CI: -0.68 to 0.02) (Figure 2).

Discussion

The meta-analysis result on a total of 9 articles in this study showed that the degrees of menstrual distress and menstrual pain intensity were reduced in the yoga intervention group, and the effect size was large. It is difficult to directly compare the results of this study with those of the other studies since there is no meta-analysis on women with primary dysmenorrhea. However, the results of this study were similar to those of a study that reported a statistically significant reduction in menstrual pain after yoga intervention in a systematic review on the associations between primary dysmenorrhea and yoga [8]. The cause of dysmenorrhea is not clearly known because various causes are intertwined, but it is presumed to be related to psychological influences, such as hormones and stress associated with vasopressin or prostaglandin [13]. In addition, it has been reported that poorer peripheral blood circulation and more unbalanced pelvis shape would result in an exacerbated dysmenorrhea [14].

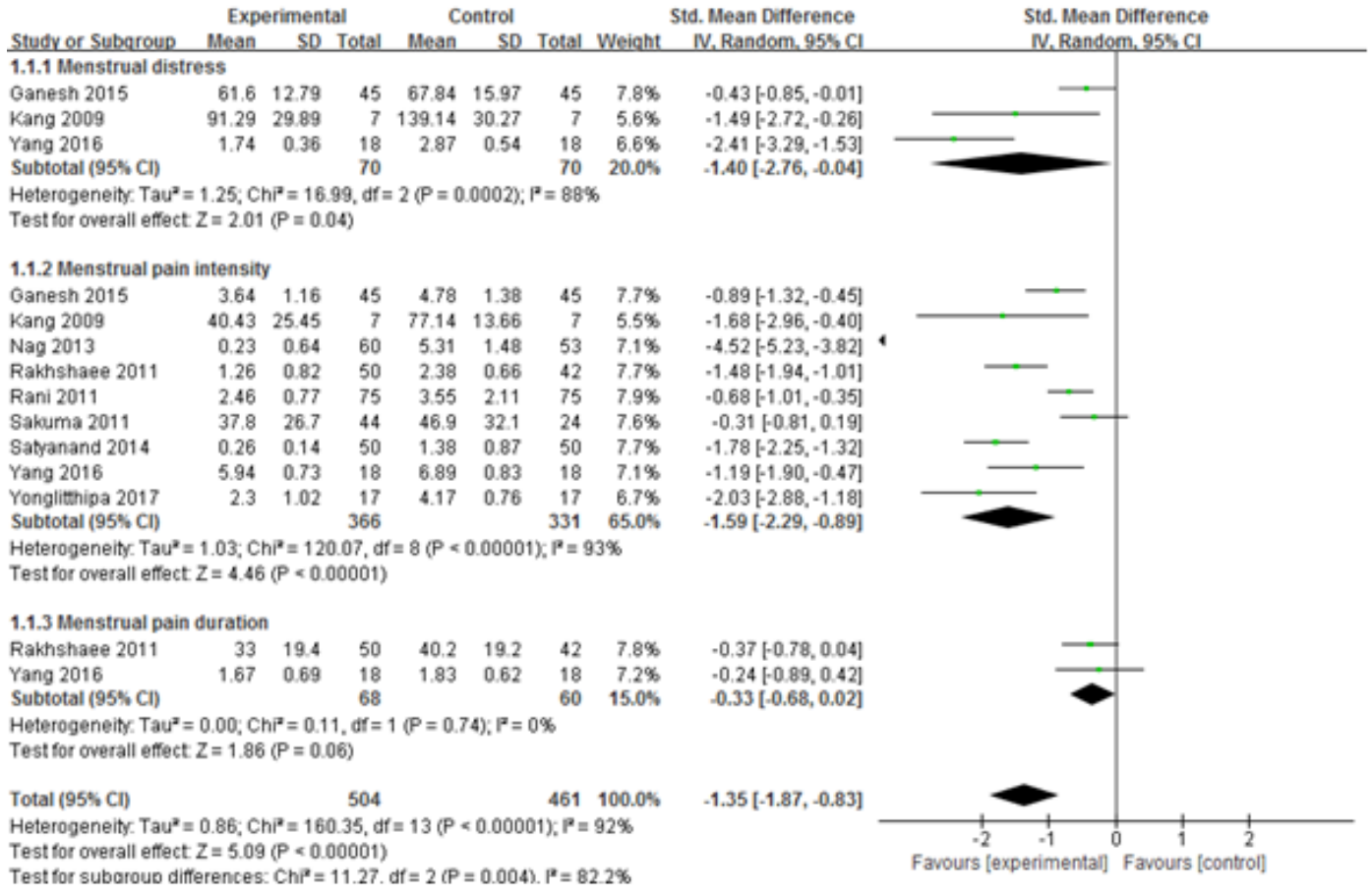

Figure 2. *The effect of yoga on primary dysmenorrhea.*

The quality evaluation score of the articles was 2 or higher in the score range of 0-5 points, and the articles evaluated to have a high quality were 44.4% (Table 1).

A previous study has shown that yoga improves muscular flexibility and strength, and it enhances blood circulation and hormone function by regulating respiration and taking specific postures [15]. Moreover, the proper balance of muscle tension and relaxation reduces the excitability of the sympathetic nervous system and increases the activation of parasympathetic nerves, thereby reducing stress and providing psychological stability [16]. These effects of yoga seem to result in a significant effect in alleviating primary dysmenorrhea, in which physical and mental causes are complexly intertwined.

Looking at the items with a high risk of bias in the methodological quality evaluation of the articles included in the systematic review, approximately 45% of the articles did not present specific methods for the generation of the random assignment sequence. Furthermore, approximately 67% of the articles did not present the number of dropouts and the reasons for the dropouts. In order to identify the net effect of the yoga intervention program, the use of the protocol, which is an important element of interventional fidelity or description on the intervention and subjects, is needed [17]. Therefore, future studies should precisely describe the subject management, in addition to the contents on random assignment from the time of research design, in order to perform high quality studies.

Conclusion

In summary, yoga had a large effect size in reducing the menstrual distress and menstrual pain intensity of women with primary dysmenorrhea. Therefore, this study suggests that primary dysmenorrhea management should not be limited to hospital treatment or pharmacotherapy, but instead, yoga should be actively utilized as a complementary and alternative medicine. However, this study has some limitations. First, since only the articles published in English and Korean were reflected in the systematic review process, there is a possibility that the information of a cultural area using other languages has been excluded. Second, the long-term effects of yoga were not examined because meta-analysis was conducted by using the statistics measured right after the intervention to test the effectiveness of yoga.

Third, attention should be paid on interpretation because the effect size may have been overestimated or underestimated. When considering that only 9 articles presented statistics that are necessary to analyze the effect size, and the heterogeneity of the effect sizes was also high. In order to improve the clinical significance of yoga, various meta-analyses should be

performed based on the evidence accumulated through repeated intervention studies in the future.

Table 1. Characteristics of Included Studies.

First author and year	Study design	Participants			Interventions				Comparisons	Outcome measures	Scale	Risk-of-bias
		Total N (eN/cN)	Age	Inclusion criteria	Type	Dur.	Freq./week	Min				
Ganesh 2015	RCT	90(45/45)	18-25	Having menstrual pain	Slow pranayama	2MC	7	10	fast pranayama	MD, MPI	MDQ,NPS	1
Kang 2009	RCT	14(7/7)	20.78 ±3.01	No regular exercise for 3M, ≥ 70 menstrual distress, VAS ≥5 menstrual pain	Hatha	1MC	3	50	NT	MD, MPI	MDQ, VAS	1
Nag 2013	NRCT	113(60/53)	18-23	Single, primary dysmenorrhea	Yoga, pranayama, meditation	3MC	7	40	NT	MPI	NPS	0
Rakhshaee 2011	RCT	92(50/42)	18-22	Single, regular MC, no medical history of other gynecological diz, hormonal treatment, nonpharmacological methods	Yoga Poses	3MC	at least 14 days of MC	20	NT	MPI, MPD	VAS, QMC	2
Rani 2011	RCT	150(75/75)	18-45	Having menstrual irregularities	Yoga nidra	6M	5	35	NT	MPI	SCAN	5
Sakuma 2011	RCT	68(44/24)	20-64	No serious medical conditions or orthopedic problems, no pregnant	Pranayama, yogasanas	4W	7	15	NT	MPI	VAS	3
Satyanand 2014	RCT	100(50/50)	21.01 ±1.54	No having gynecological surgeries, pregnancy, pelvic inflammatory diz, thyroid problems, poly cystic ovarian diseases or hereditary problems	Yogasanas	3MC	7	45	Medications	MPI	VAS	1
Yang 2016	RCT	36(18/18)	18-25	VAS ≥6 menstrual pain, 20-40 days menstrual cycle duration, BMI 18-25	Surya nemaskara, three yoga poses, yoga nidra	12W	1	60	NT	MD, MPI, MPD	SF-MDQ, VAS, QMC	5
Yonglitthipagon 2017	RCT	34(17/17)	18-22	VAS 4-7 menstrual pain, no pregnant and serious comorbidities	Yoga	12W	2	30	NT	MPI	VAS	3

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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