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Role of Yoga and Lifestyle in Women's Reproductive Health

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Dr. Sweta Kumari

TGT Yoga Teacher

Kendriya Vidyalaya, Sec 24, Noida

Orcid id: https://orcid.org/0009-0002-7378-1613

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Abstract : Menstrual irregularities and premenstrual symptoms are prevalent among reproductive women and depend on the body weight, stress, sleeping time and nutrition. Yoga is a widespread practice in India and is recommended for women's health. However, community evidence of association between yoga and reproductive health is limited. This cross-sectional study included 300 women aged 20-40 and compared women who practiced yoga regularly (n=100), occasionally (n=90) and never practiced yoga (n=110). Menstrual irregularities during last six months, pain during menstruation on visual analogue scale, premenstrual symptoms (PSST) and lifestyle were measured. Menstrual irregularities were reported by 16.0%, 28.9% and 47.3% of women with regular, occasional and non-practice of yoga, correspondingly (χ^2 = 24.17, p <0.001). The mean pain scores were 3.0, 4.3 and 5.5, correspondingly (p <0.001), and lifestyle scores increased with more practice of yoga (p <0.001). After adjustment, the regular practice of yoga was associated with lower odds of menstrual irregularities (adjusted OR 0.33, 95% CI 0.17–0.64), while overweight, short sleep and stress were associated with increased odds. Yoga practice and healthy lifestyle are associated with better reproductive health, and community programs combining yoga practice with sleep, body weight and stress management are recommended.

Keywords: yoga; lifestyle; reproductive health; menstrual irregularities; dysmenorrhea; premenstrual symptoms; women

Introduction

Reproductive health is one of the major aspects of the health condition of women. During the reproductive years, women frequently have issues related to the processes of menstruation such as menstrual irregularities, painful menstruation and premenstrual symptoms. These disorders negatively affect the quality of life and even absence from the working process, and also may indicate underlying diseases such as polycystic ovary syndrome. According to epidemiological literature reviews, menstrual patterns are affected by age, body weight, nutrition, physical activity and stress (Harlow & Ephross, 1995).

Life style of women has changed dramatically in recent years. Particularly, women living in the city spend a lot of time sitting, have poor sleep, nutrition and high level of stress due to their work and responsibilities at home. These changes may influence hormonal regulation of the menstrual cycle. At the same time, there is a growing interest in the practices affecting the psychological state

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and physical activity, and the practice of yoga is one of them.

Several potential ways of the positive impact of yoga on reproductive health have been suggested. Yoga may help to decrease the stress and stress hormones, sleep better, increase the flexibility and blood supply in the pelvis region, and encourage healthy diet and healthy way of life. Several trials have investigated the effectiveness of yoga in the treatment of dysmenorrhea and polycystic ovary syndrome. However, less is known about the association between the pattern of yoga practice and life style in ordinary communities and reproductive health of women.

This study investigates the association between yoga practice and life style of women and menstrual irregularities, pain and premenstrual symptoms in women of reproductive age. Specifically, the aim of this study is to assess whether the regular practice of yoga is associated with the lower frequency of menstrual irregularities, menstrual pain and premenstrual symptoms and to investigate whether any association persists after adjustment for the body weight, sleep, stress, diet and age.

Literature Review

The disorders of the menstrual cycle have been classified in the international guidance. The classification by FIGO describes the cycle length, the duration and the volume of bleeding, and the criteria of abnormal uterine bleeding (Fraser et al., 2011), which is the standard allowing to evaluate the irregularity of the menstrual cycle. The premenstrual symptom screening tool developed by Steiner et al. (2003) allows classifying the symptoms as mild, moderate and severe and is a widely used questionnaire in surveys.

Trials of the use of yoga for menstrual pain yield encouraging results. Rakhshaee (2011) found that a program including three yoga postures (cobra, cat and fish) practiced for three months decreases pain intensity and duration among the women with primary dysmenorrhea. Yang and Kim (2016) found that a yoga program reduces menstrual cramps and menstrual distress among the university students with primary dysmenorrhea. A systematic review of the self-care and life style interventions found that exercise and heat are associated with the decreased pain, although the quality of the evidence is of variable level (Armour et al., 2019).

The research on the polycystic ovary syndrome confirms this finding. Nidhi et al. (2012) investigated the adolescent girls with polycystic ovary syndrome and found that yoga program is associated with the improved glucose metabolism and lipid level, which influence the menstrual regularity. These results show that yoga can affect the reproductive health through metabolic pathway too.

However, the effect of yoga on the stress and mood is better established. A systematic review of randomized trials found that yoga decreases the stress parameters and improves mood (Pascoe & Bauer, 2015), and the comparison with other types of physical activity showed that yoga is as effective as the others for several health outcomes (Ross & Thomas, 2010). Woodyard (2011) summarized the therapeutic effects of yoga and its ability to increase the quality of life. Since the stress is known to disrupt the menstrual cycle, this effect provides a plausible ground for improving reproductive health.

However, there are two major gaps in this research field. First of all, most of the evidence concerning the yoga and reproductive health outcomes comes from small trials investigating single outcome. Second of all, there are very few community studies which investigate the regular practice of yoga and other lifestyle parameters simultaneously. Additionally, there are few studies from India comparing different patterns of yoga practice adjusted for the confounders. This study attempts to fill these gaps.

Research Methodology

Design and participants

A community-based cross-sectional survey was carried out among the women aged 20-40 in an urban area during three months. Women were eligible to participate in the survey if they were having menstruation regularly for at least two years and resided in the area for at least one year. Women were excluded from participation if they were pregnant, breastfeeding, using hormonal contraception or drugs which influence the cycle, or have gynecological or endocrine diseases. The sample size was calculated for the comparison of the proportions between the extreme groups, with a medium effect size (Cohen, 1988), 80% power and two-sided alpha of 0.05, increased for non-response to 300 women. Participants were recruited from the list of

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households by stratified random sampling. Written consent was obtained and institutional ethics committee approved the study.

Exposure: yoga practice

Women were classified as regular practitioners of yoga if they practiced yoga for at least three days a week for at least six months, as occasional practitioners if they practiced yoga but less often or for a shorter period, and as non-practitioners if they did not practice yoga. The information about the practice was recorded by interviewing, with the recording of the type, the duration and the frequency of the sessions.

Outcomes and covariates

Menstrual irregularities were considered as positive outcomes when women reported, during last six months, the cycles shorter than 21 days or longer than 35 days or varied from the month to the month for more than seven days according to the FIGO recommendations (Fraser et al., 2011). The pain during menstruation was assessed on visual analogue scale from 0 (no pain) to 10 (worst pain). Premenstrual symptoms were assessed with the premenstrual symptoms screening tool (Steiner et al., 2003), and women with moderate to severe symptoms were considered cases. The lifestyle score from 0 to 100 reflected the quality of sleep, diet, physical activity, screen time and the avoidance of the consumption of tobacco and alcohol. The body mass index was calculated from height and weight measurements, and perceived stress was classified as high and low according to the median value of the standard stress scale. Age, sleeping hours and junk food consumption frequency were recorded.

Statistical analysis

The categorical variables are presented as frequencies and percentages with Wilson 95% confidence intervals. Differences in the proportions across the groups were tested by chi-square test and presented as Cramer's V and odds ratio with Woolf confidence interval. The continuous variables were compared using one-way ANOVA with Tukey-Kramer comparisons. The logistic regression was used to estimate the adjusted association between yoga and menstrual irregularities. P value below 0.05 was regarded as statistically significant.

Results

Characteristics of the participants

All 300 women took part in the survey. The characteristics of the sample are presented in Table 1. The mean age of the participants is 28.7 years, and 41% of women are overweight or obese (body mass index 25 kg/m² or more).

Table 1. Characteristics of the participants (N=300)

Characteristic	Category	n	%
Age group	20–29 years	172	57.3
	30–40 years	128	42.7
Body mass index	<25 kg/m²	177	59.0
	≥25 kg/m²	123	41.0
Sleep	≥6 hours	196	65.3
	<6 hours	104	34.7
Perceived stress	Low	151	50.3
	High	149	49.7
Yoga practice	Regular	100	33.3
	Occasional	90	30.0
	None	110	36.7

Menstrual irregularities

Menstrual irregularities were reported by 94 out of 300 women (31.3%). The prevalence was decreasing with the increase in the yoga practice (Table 2, Figure 1; $\chi^2 = 24.17$, df = 2, $p < 0.001$; Cramer's V = 0.28). Comparing to the women without practice of yoga, regular practitioners had 0.21 times the odds of menstrual irregularities (95% CI 0.11-0.41), and occasional practitioners had 0.45 times the odds (95% CI 0.25-0.82).

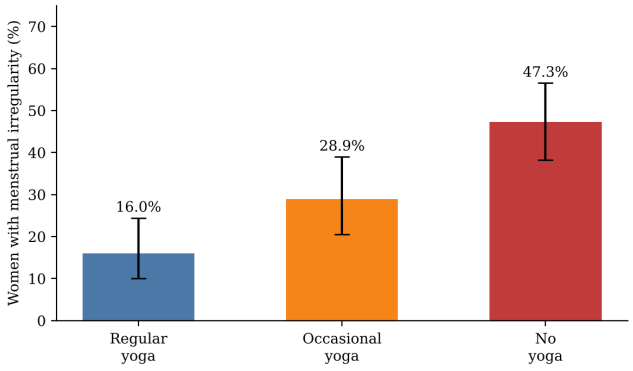
Table 2. Menstrual irregularities by yoga practice

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Yoga practice	n	Irregularity, n	% (95% CI)	Crude OR (95% CI)
Regular yoga	100	16	16.0 (10.1–24.4)	0.21 (0.11–0.41)
Occasional yoga	90	26	28.9 (20.5–39.0)	0.45 (0.25–0.82)
No yoga	110	52	47.3 (38.2–56.5)	1.00 (reference)
Total	300	94	31.3 (26.3–36.8)	

Figure 1. Menstrual irregularities (with 95% confidence intervals) by yoga practice.



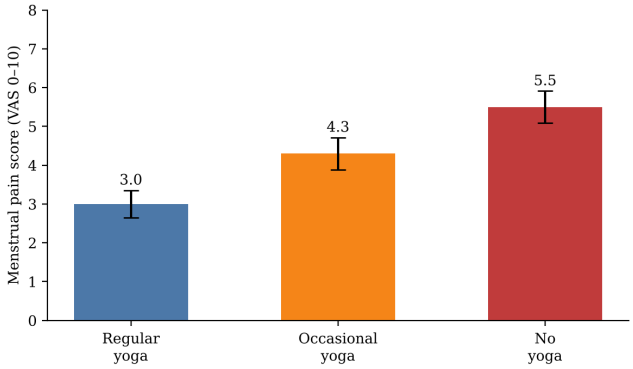
Menstrual pain, premenstrual symptoms and lifestyle

The differences in the mean pain scores among the groups were statistically significant ($F(2, 297) = 40.4$, $p < 0.001$, $\eta^2 = 0.21$). Regular practitioners had lower pain scores than women without yoga practice (the difference is 2.5; Tukey-Kramer $p < 0.001$). The moderate to severe premenstrual symptoms were reported by 14.0% of regular practitioners, 30.0% of occasional practitioners and 44.5% of women without yoga practice ($\chi^2 = 23.27$, $p < 0.001$). The lifestyle score increased with the increasing practice of yoga ($F(2, 297) = 64.1$, $p < 0.001$), from 55.1 in non-practitioners to 72.4 in regular practitioners (Table 3, Figure 2).

Table 3. Pain, premenstrual symptoms and lifestyle score by yoga practice

Yoga practice	Pain score (VAS), mean ± SD	Moderate–severe PMS, n (%)	Lifestyle score, mean ± SD
Regular yoga	3.0 ± 1.8	14 (14.0)	72.4 ± 10.0
Occasional yoga	4.3 ± 2.0	27 (30.0)	63.8 ± 11.0
No yoga	5.5 ± 2.2	49 (44.5)	55.1 ± 12.0

Figure 2. Menstrual pain score (with 95% confidence intervals) by yoga practice.



Adjusted association

In the multivariate logistic regression (Table 4, Figure 3), regular practice of yoga was still associated with the lower odds of menstrual irregularities (adjusted OR 0.33, 95% CI 0.17-0.64), and occasional practice showed a smaller association (adjusted OR 0.58, 95% CI 0.31-1.06) which is of border significance. Overweight (adjusted OR 2.03), sleeping less than 6 hours (1.79) and high perceived stress (2.10) were associated with the higher odds. The frequent junk food and age were not statistically significant.

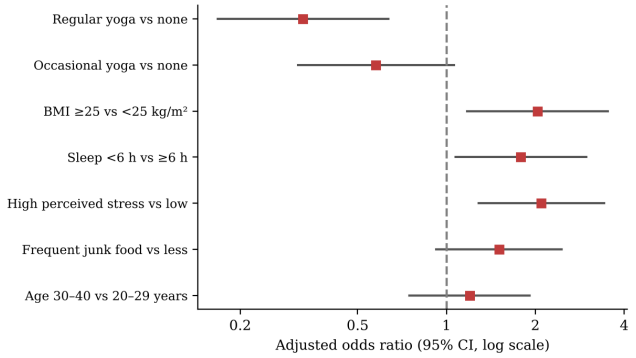
Table 4. Multivariate logistic regression of menstrual irregularities (N=300)

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Variable	Adjusted OR	95% CI	p value
Regular yoga vs none	0.33	0.17–0.64	<0.001
Occasional yoga vs none	0.58	0.31–1.06	0.076
BMI ≥25 vs <25 kg/m²	2.03	1.17–3.52	0.011
Sleep <6 h vs ≥6 h	1.79	1.07–2.97	0.026
High perceived stress vs low	2.10	1.28–3.42	0.003
Frequent junk food vs less	1.51	0.92–2.46	0.101
Age 30–40 vs 20–29 years	1.20	0.75–1.92	0.453

Figure 3. Adjusted odds ratios for menstrual irregularities.



Reproductive health complaints

Among the 300 women, painful periods were the most common complaints, followed by the premenstrual mood changes and bloating (Table 5).

Table 5. Reproductive health complaints reported (N=300)

Complaint	n	%
Painful periods (dysmenorrhea)	188	62.7
Mood changes before periods	142	47.3
Abdominal bloating	126	42.0
Heavy bleeding	64	21.3
Scanty or delayed periods	71	23.7
Mid-cycle spotting	38	12.7

Discussion

Women with regular yoga practice had considerably lower frequency of menstrual irregularities and pain than women without yoga practice, and the association with menstrual irregularities persisted after adjustment for the body weight, sleep, stress, diet and age. This pattern is consistent with the trials showing the reduction of the menstrual pain after yoga practice (Rakhshaee, 2011; Yang & Kim, 2016) and the evidence of metabolic improvement in the women with polycystic ovary syndrome (Nidhi et al., 2012). The gradient from regular to occasional to non-practice suggests the presence of dose-response relationship.

The role of the lifestyle is also evident. The overweight, short sleep and high stress were associated with the menstrual irregularities, which is consistent with the established knowledge about the influence of the body weight, sleep and stress on the regulation of the menstrual cycle (Harlow & Ephross, 1995). Women practicing yoga more had higher lifestyle scores, which shows that yoga is a part of the wider lifestyle pattern, and the association between yoga and good reproductive health outcomes may result from both direct effect and accompanying habits. The decrease of stress and the improvement of mood shown in the trials of yoga (Pascoe & Bauer, 2015; Ross & Thomas, 2010) is a plausible explanation.

The results should be interpreted with caution, since the cross-sectional design of the study does not allow drawing conclusions on causality. Women with regular menstrual cycles and less pain may find it easier to practice yoga regularly, and the women practicing yoga may be different from the non-practitioners in other unmeasured ways such as health consciousness. Although the adjusted analysis reduces, but does not eliminate, this bias, the results are relevant for the program development. They suggest that promotion of the yoga practice can be done together with advice on sleep, body weight and stress management, and these aspects can be included in women's health counseling programs (Armour et al., 2019).

Limitations

The cross-sectional design does not allow determining the direction of the association. Menstrual irregularities, pain and yoga practice were self-reported and based on the recall during six months, so the recall bias can be present. The hormonal and ultrasound assessments were not done, so the underlying conditions such as polycystic ovary syndrome cannot be diagnosed. The type and the intensity of the yoga practice varied and

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was not analyzed. The sample was recruited from one urban area and may not represent rural women.

Conclusion

Regular practice of yoga and healthy lifestyle were associated with lower menstrual irregularities, lower menstrual pain and fewer premenstrual symptoms among the women of reproductive age, and the association with menstrual irregularities persisted after adjustment (adjusted OR 0.33). Short sleep, overweight and high stress were independent risk factors. The community health programs should include the yoga practice together with advice on sleep, body weight and stress management. The prospective studies and clinical trials in community settings are necessary to confirm the association and to identify the most effective practices.

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