



## Comparison of Pranayama Yoga and Surya Namaskar Yoga Towards Dysmenorrhea in Adolescent Girl

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### ABSTRACT

Dysmenorrhea is a symptomatic phenomena that includes pains in the abdomen, back discomfort, and gastrointestinal issues including nausea and diarrhea that happen with menstruation. Some non-pharmacological therapies that can overcome dysmenorrhea include Pranayama yoga and Surya Namaskar yoga. This study aimed to compare how Pranayama yoga and Surya Namaskar yoga affected dysmenorrhea in adolescent girls. In this study, a randomized control trial was used. A total of 44 participants were divided into two groups; the first group received yoga instruction in pranayama, and the second group received instruction in Surya Namaskar. The research was conducted in January-March 2022. Analysis data, The Wilcoxon test was used to compare the pretest and post-test results for each group and to analyze the difference after receiving the procedure in both groups, the Mann Whitney test was conducted, because the data weren't spread normally. Results the analysis test used Mann-Whitney Z value = -2.119 with p-value = 0.03 there is a difference in giving Pranayama yoga and Surya Namaskar yoga in reducing dysmenorrhea pain. The conclusion, there is a difference in the effectiveness of Pranayama yoga with Surya Namaskar yoga in reducing the level of dysmenorrhea pain where Pranayama yoga intervention is more effective than Surya Namaskar yoga.

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### Kata kunci:

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### ABSTRAK

Dismenore adalah fenomena gejala yang meliputi nyeri di perut, ketidaknyamanan punggung, dan masalah gastrointestinal termasuk mual dan diare yang terjadi saat menstruasi. Beberapa terapi nonfarmakologi yang dapat mengatasi dismenore antara lain yoga Pranayama dan yoga Surya Namaskar. Penelitian ini bertujuan untuk membandingkan pengaruh yoga Pranayama dan yoga Surya Namaskar terhadap dismenore pada remaja putri. Dalam penelitian ini, uji coba kontrol acak digunakan. Sebanyak 44 peserta dibagi menjadi dua kelompok; kelompok pertama menerima pelajaran yoga di pranayama, dan kelompok kedua menerima pelajaran di Surya Namaskar. Penelitian dilaksanakan pada bulan Januari-Maret 2022. Analisis data, uji Wilcoxon digunakan untuk membandingkan hasil pretest dan posttest masing-masing kelompok dan untuk menganalisis perbedaan setelah dilakukan prosedur pada kedua kelompok dilakukan uji Mann Whitney, karena data tidak menyebar secara normal. Hasil uji analisis menggunakan Mann-Whitney nilai Z = -2,119 dengan p-value = 0,03 ada perbedaan pemberian yoga Pranayama dan yoga Surya Namaskar dalam menurunkan nyeri dismenore. Kesimpulannya, ada perbedaan efektivitas yoga Pranayama dengan yoga Surya Namaskar dalam menurunkan tingkat nyeri dismenore dimana intervensi yoga Pranayama lebih efektif dibandingkan yoga Surya Namaskar.

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## INTRODUCTION

Menstruation is one of the signs experienced by young women after experiencing puberty (Ravi et al., 2017). Menstruation is a physiological process, but menstrual problems often occur in young women, affecting their lives and activities (Varghese et al., 2019). The most common menstrual problem is dysmenorrhea (Bahrami et al., 2020; Singh et al., 2019). Dysmenorrhea is an important public health problem, because it significantly reduces women's quality of life (Carroquino-Garcia et al., 2019; Fernández-Martínez et al., 2019; Rahmawati et al., 2022). Dysmenorrhea is a phrase from the Greek meanings dys (difficult), mens (months), and rhoia (flow), meaning difficult menstrual flow (Sima et al., 2022). Dysmenorrhea (period pain) is a disorder that occurs during menstruation characterized by lower abdominal pain. spreads to the thighs or lower spine, may be accompanied by vomiting, headache, backache, diarrhea, fatigue, etc (Barcikowska et al., 2020).

The pathophysiology of dysmenorrhea is not known with certainty, but according to (Bezuidenhout & Mahlaba, 2018; Hewitt, 2020; Petraglia et al., 2017), there is hyperproduction of prostaglandins in the uterus, mainly PGF<sub>2a</sub> and PGF<sub>2</sub>, leading to an increase in uterine tone and contractions of great magnitude. Women with dysmenorrhea have higher levels of prostaglandins, and they are highest during the first two days of menstruation (Iacovides et al., 2015).

The prevalence of dysmenorrhea worldwide is 90% of adolescents experiencing dysmenorrhea, the prevalence in Indonesia is 64.25%, and the prevalence in Bali is estimated at 29,505 people with most cases being found in adolescents, aged 17-24 years (Rebecca Mutia et al., 2019; Widyantini et al., 2021). Handling dysmenorrhea needs to be done to avoid reproductive health problems in the future (Gandotra & Mahajan, 2020). The handling efforts that can be done are conventional and complementary traditional. Giving conventional therapy such as analgesic drugs namely ibuprofen, mefenamic acid, mefenal, mefinter, and hormonal therapy with non-steroidal anti-prostaglandin drugs (Kusumayanti et al., 2020), however, several studies prove the increasing effectiveness of complementary traditional methods being applied (Barcikowska et al., 2020). Complementary methods are an option because they are cheap, easy, do not cause side effects, and can be done at home as a treatment that allows clients and families to make efforts to treat pain symptoms and management (Aboualsoltani et al., 2020), including doing warm water compresses, exercise, drinking herbal medicine, massage or massage, adequate rest, knee-chest position, guided imagery techniques, and deep breathing relaxation techniques such as yoga (Carroquino-Garcia et al., 2019; Widyantini et al., 2021).

Yoga is not only for treating, but can be therapy in preventing mental and physical health problems. Yoga is an ancient health therapy as well as a traditional spiritual practice including body movements, breathing exercises, meditation, philosophical lectures, and lifestyle (Cramer et al., 2016, 2019; Tellhed et al., 2019). Yoga can be used as a complementary medicine, through the union of mind and body, which is effective in reducing stress, anxiety, depression, and pain (Gothe et al., 2019; Jean et al., 2022; Sarla, 2020).

Yoga breathing or Pranayama is a breathing exercise with slow and deep breathing techniques, using the diaphragm muscle so that it allows for the abdomen to be lifted slowly and the chest to be fully expanded (Kupershmidt & Barnable,

2019). Several studies have shown that Pranayama yoga can help reduce anxiety, depression, and pain (Chandrababu et al., 2019; Kuppasamy et al., 2020).

Surya Namaskar is part of modern yoga practice although it is not considered an asana or part of traditional Yoga (Prasanna Venkatesh & Vandhana, 2022). Surya Namaskara or Sun Salutation (lit. "salute to the sun"), is a general sequence of Hatha yoga asanas (Solanki, 2022). Surya Namaskar is an elegant combined series of twelve positions along with keeping pace breathing and relaxation (Assistant, 2020; Nikam, 2020). The purpose of this study is to compare Pranayama yoga and Surya Namaskar yoga on dysmenorrhea in adolescent girls.

## METHODS

The research scheme was a randomised control trial (Pocock, 2013), with a total sample of 44 respondents. The sample was divided into 2 treatment groups, 1 group was given Pranayama yoga treatment and 1 group was given Surya Namaskar yoga treatment. This research was conducted at Senior High School Semarapura, in January-March 2022

### Research implementation:

Researchers used 44 respondents who experienced dysmenorrhea. Before being given the intervention, the two groups who were willing to become respondents were divided into 2 groups by random method, the first group was given Pranayama Yoga, and the second group was given Surya Namaskar yoga. Each group was collected and taught yoga techniques according to the intervention. The pretest will be carried out when the respondent experiences his first menstruation before being given the intervention, by filling out the Numeric Rating Scale (NRS) Observation sheet. Each group according to the division will do yoga 8 times, with details 1 time a week, with a duration of 10 minutes. The posttest will be carried out during the first menstruation after the 8th intervention, by filling out the Numeric Rating Scale (NRS) Observation sheet. Researchers are assisted by enumerators, in conducting research and monitoring. This research has obtained description of ethical approval No : 194/EA/KEPK-BUB-2021 by the health research ethics committee STIKES Bina Usada Bali.

### Data Analysis

#### Descriptive Analysis

Analysis of research data to obtain the frequency and mean distribution of age, age of menarche, pain scale before and after the intervention was given in both groups.

#### Inferential Analysis

To analyze the difference in pain scale changes before and after the treatment of Pranayama yoga and Surya Namaskar yoga in each group using the Wilcoxon test, while to compare the results of the posttest between the two groups, using Mann Whitney analysis, because the data is not normally distributed. Data analysis used 95% confidence level or otherwise different if, \*P < 0.05. Calculation of

statistical tests using a computerized system of data analysis SPSS version 17.0

**Table 1. Characteristics of respondents in the Pranayama yoga and Surya Namaskar yoga groups**

Variable	Group	n	Mean	Min	Max	SD	*p
Age	1	22	15.27	15	16	0.456	0.81
	2	22	15.23	14	16	0.528	
Menarche	1	22	12.68	11	14	0.780	0.63
	2	22	12.32	11	14	0.839	
Dysmenorrhea before intervention	1	22	5.09	4	7	0.811	1.00
	2	22	5.09	4	7	0.811	

Source: Primary Data, 2022  
 Description: Group 1: Pranayama yoga  
 Group 2: Surya Namaskar yoga

**RESULTS AND DISCUSSION**

Respondent characteristics based on age, age of menarche and dysmenorrhea in both groups can be seen in the table 1. Based on the results of statistical tests based on the age of the two groups, the average was 15 years, with a significance value of 0.813 ( $p > 0.05$ ), which means that there was no difference in age between the group given Pranayama yoga and Surya Namaskar yoga, with the average age of the two groups being 15 years. Primary dysmenorrhea appears several months to 2-3 years after the first menstruation. This is to research (Gunawati & Nisman, 2021), that the most age who experience dysmenorrhea is in the age range of 13-15 years because the hormonal secretion is not perfect. The older a person is, the more often the person experiences menstruation and the cervix dilates, so the secretion of the hormone prostaglandin will decrease. In addition, primary dysmenorrhea can be reduced due to aging due to decreased nerve function in the uterus.

The results of statistical tests based on the age of menarche of respondents obtained an average of 12 years, with a significance value of 0.635, which means that there is no difference in age of menarche between the group's given Pranayama yoga and Surya Namaskar yoga. The age of menarche was grouped into 12 years classified as fast, 13-14 years classified as normal and 15 years classified as long. According to (Romlah & Agustin, 2020), menarche that occurs at an early age of 12 years can cause dysmenorrhea because the reproductive organs are not ready to develop

and there is still a narrowing in the cervix, besides that, adolescents who experience early menarche are not mentally ready because they still don't understand how to deal with menstruation.

The table above shows that the average dysmenorrhea pain before intervention in both groups had an average value of 5.09 and a significance value of 1.00, which means that there was no difference in dysmenorrhea pain before intervention was given to the pranayama yoga and Surya Namaskar yoga groups.

**Table 2. Normality test of pretest and posttest data in the Pranayama yoga and Surya Namaskar yoga groups in each group**

Variable	Group	Shapiro-Wilk	
		Statistics	p*
Pretest	Pranayama yoga	0.86	0.05
	Surya Namaskar yoga	0.86	0.05
Posttest	Pranayama yoga	0.85	0.00
	Surya Namaskar yoga	0.87	0.00

\*p value > 0.05: normal distribution data

From the table above, it was found that the results of the Normality test using the Shapiro Wilk test obtained that the pretest and post-test data in each intervention group showed abnormal data ( $p < 0.05$ ), so that the analysis is carried out further using non-parametric.

**Table 3. Differences in the scale of dysmenorrhea pain before and after the procedure was given to the group given Pranayama yoga.**

Group	n	Wilcoxon test				*P
		Mean	Min	Max	SD	
Pretest Pranayama yoga	22	5.09	4	7	0.811	0.00
Posttest Pranayama yoga	22	2.09	0	4	1.192	

Source: Primary Data, 2022

In accordance with the table above, it is known that the results of the comparison test before and after the Pranayama yoga procedure have obtained a p-value of 0.00

meaning showed the intensity of dysmenorrhea pain before and after Pranayama yoga differs.

**Table 4. Differences in the scale of dysmenorrhea pain before and after the procedure was given to the group given Surya Namaskar yoga**

Group	n	Wilcoxon test				*P
		Mean	Min	Max	SD	
Pretest Surya Namaskar yoga	22	5.09	4	7	0.811	0.00
Posttest Surya Namaskar yoga	22	2.82	1	4	0.907	

Source: Primary Data, 2022

According to the aforementioned table, it was discovered that the Wilcoxon test's results for the comparison test between the results before and after receiving the Surya Namaskar yoga intervention obtained a p-value of 0.00, indicating that there is a difference in the level of pain associated with dysmenorrhea between the two times.

Based on the results of statistical analysis using the Wilcoxon test for dysmenorrhea pain, before and after the intervention was given to each group, the results obtained p value = 0.00 ( $p < 0.05$ ) which means that there is a difference in dysmenorrhea pain before and after being given Pranayama yoga and Surya Namaskar yoga in each -each group. This is in line with the results of research conducted by (Shakeela & Sugumar, 2020; Yonglitthipagon et al., 2017), that yoga can reduce dysmenorrhea pain, and improve health and quality of life, other than that according to (Estevo, 2022), yoga is beneficial for mental and physical health, such as balancing hormones, reducing stress levels, reducing inflammation.

**Table 5. Comparison of dysmenorrhea pain between the two groups after the intervention**

Group	Mann-Whitney			
	N	Average	Z	P
Pranayama yoga	22	2.09	-2.119	0,03
Surya Namaskar yoga	22	2.82		

Source: Primary Data, 2022

The analysis test used Mann-Whitney to compare the intervention in the two groups. The obtained Z value = -2.119 with p-value = 0.03 which means that there is a significant difference between giving Pranayama yoga and Yog, Suryanaskar in reducing dysmenorrhea pain. In this study, the mean value of the group given Pranayama yoga was 2.09 lower than the group given Surya Namaskar yoga, which was 2.82, so it can be interpreted that Pranayama yoga is more effective in reducing dysmenorrhea pain than Surya Namaskar yoga.

The average value of dysmenorrheal pain in the group given Pranayama yoga was lower in this study because the physiology of Pranayama is when the body inhales, it extracts prana contained in the human astral body in the Sushumna nasi canal, then spreads it to every cell of the body. Mastering the breath is the same as mastering the emotions, mind, and finally the body, with gentle and regular breathing, the mind will become calmer, the emotions will be filled with tranquility, and the body will become more relaxed (Widiastini & Karuniadi, 2020, 2021), Pranayama yoga postures in asanas also stimulate the release of endorphins the feel good hormone which can create a sense of comfort in the body and relieve pain (Sindhu, 2015), Although there is a difference between yoga intervention and Surya Namaskar yoga, both of them are very good and effective in reducing dysmenorrhea pain levels. Besides being effective, several advantages can be obtained from the two interventions, namely that these two interventions do not require a lot of money, take a long time, and can be carried out independently.

Based on the researcher's assumptions, it is concluded that yoga therapy creates a calm, relaxed, safe, and pleasant atmosphere so that it makes the atmosphere comfortable so can maximize the decrease in the intensity of dysmenorrhea pain

## LIMITATION OF THE STUDY

Limitations in this study, the number of samples is small and monitoring in reducing dysmenorrhea pain is not long enough

## CONCLUSIONS AND SUGGESTIONS

Based on findings from analysis and discussion of the differences between Pranayama yoga and Surya Namaskar yoga in reducing dysmenorrhea pain at Senior High School Semarang, it can be concluded as follows:

1. There is a significant decrease in dysmenorrhea pain before (pretest) and after (posttest) the Pranayama yoga intervention which proved that this intervention was effective in reducing dysmenorrhea.
2. There is a significant decrease in dysmenorrhea pain before (pretest) and after (posttest) the Surya Namaskar yoga intervention performed and this intervention was also effective in reducing the intensity of dysmenorrhea pain.
3. There is a difference in the effectiveness of Pranayama yoga with Surya Namaskar yoga in reducing the level of dysmenorrhea pain where Pranayama yoga intervention is more effective than Surya Namaskar yoga.

As for suggestions for further researchers, this research can be combined with other therapies so that they can be more effective in pain reduction.

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## ETHICAL CONSIDERATIONS

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### Conflict of Interest Statement

The author(s) declare no conflict of interest in this research

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