

# A Literature Review on the Effect of Aerobic Exercise in Primary Dysmenorrhea

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**Abstract:** ***Background:** Dysmenorrhea is defined as symptoms associated with menstruation, such as abdominal pain, cramping and lumbago, that interfere with daily activity. Primary dysmenorrhea is painful menstrual cramps without any evident pathology and it occurs in up to 50% of menstruating females and causes significant disruption in quality of life and absenteeism. **Objective:** To review articles of effect of aerobic exercises in primary dysmenorrhea. **Methodology:** Online search engines such as Google Scholar, PubMed, and PEDro were searched. Articles from 2012 - 2022 have been included. **Result:** Out of 21 articles, 1 article shows that Frequency of exercise, Intensity of exercise, time of exercise, and type of exercise (FITT) exercise protocol is effective in reducing pain and intensity of dysmenorrhea. 1 article shows that aerobic dance is effective in reducing the symptoms of primary dysmenorrhea and helps to overcome pain alongside stress management. 5 articles show that aerobic exercise is effective in physical symptoms and quality of life. 1 article shows that high intensity aerobic exercise is effective in reducing pain along with stress management. 14 articles show that aerobic exercise is effective in reducing menstrual symptoms. **Conclusion:** This literature review analysed the effect of aerobic exercise in primary dysmenorrhea. This review used to demonstrate that aerobic exercise can be used to improve quality of life, reducing symptoms of primary dysmenorrhea, duration and intensity of pain. Regular aerobic exercise is more beneficial for primary dysmenorrhea.*

**Keywords:** Aerobic exercises, Primary dysmenorrhea

## 1. Introduction

The phrase dysmenorrhoea, which means difficulty in monthly flow in Greek, is used to describe unpleasant menstruation. In addition to nausea, headaches, lethargy, and diarrhea, dysmenorrhoea is marked by cramping lower abdomen pain that may radiate to the lower back and upper legs. It has two subtypes that can be distinguished. There are two types of dysmenorrhea: primary and secondary.<sup>1</sup>

In the absence of any specific pelvic disorders, primary dysmenorrhea, or painful menstruation, is one of the most frequent complaints among women and the most prevalent gynecological issue worldwide. It starts when young girls first experience ovulatory cycles, and its prevalence rises during adolescence (15–17 years), peaks in the 20–24 - year range, and then gradually declines after that. Pain that is caused by primary dysmenorrhea starts a few hours before or right after the start of menstruation and lasts for 24 to 48 hours. The first day of agony is the worst, and the next day's discomfort is rarely worse.<sup>2</sup>

In about 10% of teenagers and young adults with dysmenorrhea, painful menstruation linked to pelvic abnormalities is referred to as secondary dysmenorrhea. The likelihood of secondary dysmenorrhea being accompanied by dyspareunia, metrorrhagia, midcycle pain, and persistent pelvic pain is higher.<sup>3</sup>

One of the main reasons for dysmenorrhea is believed to be the uterus's secretion of prostaglandins and other inflammatory mediators. Ischemia and uterine contractions are brought on by an increase in prostaglandins. Studies have also found a connection between progesterone,

oestrogen, and vasopressin levels. The body produces more prostaglandins as a result of the decrease in progesterone at the end of the luteal phase, which stimulates the lubricating action of the enzymes and results in the release of arachidonic acid from the phospholipids and activation of the cyclooxygenase pathway, which is the cause of pain in dysmenorrhea. Increased prostaglandin production promotes uterine contraction, uterine ischemia, increased pain sensitivity, and eventually, pelvic pain. Exercise lowers blood aldosterone levels via lowering renin levels and raising oestrogen and progesterone levels, which lessens and improves physical symptoms.<sup>4</sup>

In India, adolescent girls reported a dysmenorrhea rate of 33.5%. About 5–10% of females in their late teens experience severe spasmodic dysmenorrhea, which interferes with their social and academic lives.<sup>5</sup>

Dysmenorrhea has been linked to a few risk factors. Menstrual symptoms, for instance, are inversely correlated with a woman's age, with adolescent women experiencing more severe symptoms than older women. Given that there is some evidence that women who have given birth experience less dysmenorrhea, it would suggest that non-parous women are more at risk for the condition. Dysmenorrhea and stress are linked because a woman's menstrual discomfort gets worse when she is under more stress and receives less social support from her family and friends. Additionally, there is a link between psychological diseases and dysmenorrhea because research indicates that conditions like depression or anxiety often coincide with the condition. Dysmenorrhea and socioeconomic characteristics like education and religion are associated. Furthermore, dysmenorrhea is more common in women from lower

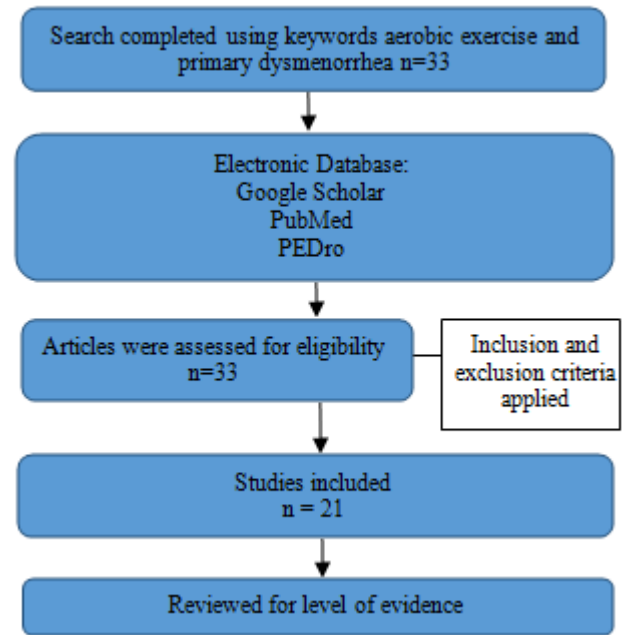
socioeconomic categories. Smoking cigarettes may lengthen dysmenorrhea, most likely because of the vasoconstriction caused by nicotine. The presence of excessive menstrual flow, a favorable family history, obesity, and alcohol use are additional risk factors for dysmenorrhea.<sup>6</sup>

Exercises like aerobics are known to maintain blood flow and synchronize metabolic processes, both of which improve the way the pelvic organs work. By triggering prostaglandin inhibitors, aerobic exercise aids in the release of endorphin chemicals, which lower pain thresholds.<sup>7</sup>

## 2. Materials and Methods

### Literature Search Methodology

Online search engines that are used to collect journals are Google Scholar and PEDro. The authors identified articles based on the keywords. The articles were collected in full text. A total of 33 articles were identified, out of which 21 articles were selected for review. [Fig - 1]



### Study selection

#### Inclusion criteria:

- 1) Articles discussing the effect of aerobic exercise were included.
- 2) Articles published only in the English language were included.
- 3) Articles from 2012 - 2022 have been taken.

#### Exclusion criteria:

- 1) Articles published in other languages were excluded.
- 2) Articles published below the year 2012 were excluded.

No	Authors & Year	Title	Sample Size	Duration	Study Design	Conclusion
1.	Asma Qamar, et al., <sup>8</sup> 2022	Effects of High - Intensity Aerobics and Pelvic Clock Exercises in Primary Dysmenorrhea	28 samples	6 months	Randomized Control Trial	High - intensity aerobics had given more effectiveness in primary dysmenorrhea and helps to reduce pain along with stress management.
2.	Chisom Anastasia Nwaezuo, et al., <sup>6</sup> 2022	Aerobic exercise as a non - medicinal option in the management of primary dysmenorrhea: A critical review	15 articles	—	Critical review	This review summarized the benefits of aerobic exercise and its benefits in relieving the symptoms of primary dysmenorrhea, of which 11 out of 15 articles support the conclusion that aerobic exercise can be used to effectively reduce the pain symptom in primary dysmenorrhea.
3.	Sandhiya M, et al., <sup>9</sup> 2022	Efficacy of Core Stability Exercise and Aerobic Exercise in Improve In Quality Of Life in Underweight Female with Primary Dysmenorrhea. - A Pilot Study	30 samples	8 weeks	A Pilot Study	Aerobic Exercise is effective in terms of improvement in QUALITY OF LIFE of primary dysmenorrhea among underweight women.
4.	Dagnanesh Kinde, et al., <sup>10</sup> 2021	Comparative Study on Ginger Supplement and Aerobic Exercise on Primary Dysmenorrhea: the Case of Debre Markos University Students, Amhara Regional State, Ethiopia	40 samples	12 weeks	Randomized Comparative Trail	This article showed that 12 weeks aerobic exercise program reduces duration and intensity of pain during and before menstruation.
5.	Stella Adaora N., et al., <sup>11</sup> 2021	A Study on Effects of Aerobic Exercises on Quality of Life in Primary Dysmenorrhea in Bangalore	60 samples	12 weeks	Experimental study	12 weeks aerobic training programs are effective to reduce pain and also improve quality of life.
6.	Asmaa M. Elbandrawy, et al., <sup>12</sup> 2021	Comparison between the effects of aerobic and isometric exercises on primary dysmenorrhea	105 samples	8 weeks	Randomized Clinical Trial	This article concluded that regular aerobic exercises are effective, non - invasive therapeutic modalities and safe in improving

						menstrual symptoms and reducing menstrual pain.
7.	Novadri Ayubi, et al., <sup>13</sup> 2021	Aerobic Exercise and Omega 3 Supplementation to Reduce Primary Dysmenorrhea (Literature Review)	12 articles	—	Literature Review	Based on this article regular aerobic exercise has the potential to reduce primary dysmenorrhea during menstruation due to increased progesterone production and decreased prostaglandins production.
8.	NightNasrullah, Khan et al., <sup>14</sup> 2021	Effects of Aerobics Versus Core Stability Exercises for the Management of Primary Dysmenorrhea	42 samples	12 weeks	Quasi - experimental Study	This study concluded that aerobic exercise is effective to reduce the intensity of pain in primary dysmenorrhea.
9.	Simge Temizkan, et al., <sup>15</sup> 2021	The Effects of Kinesiological Taping and Aerobic Exercise in Women with Primary Dysmenorrhea: A Randomized Single - Blind Controlled Trial	45 samples	4 weeks	Randomized, Controlled, and Single - blind (evaluator) trial	Aerobic exercise reduced pain in women with primary dysmenorrhea according to this study.
10.	Priya Kannan, et al., <sup>16</sup> 2020	Effect of Aerobic Exercise on Plasma Biomarkers of Pain in Women with Primary Dysmenorrhea: A Controlled Non - Randomized Pilot Trial	20 samples	4 weeks	Controlled Non - randomized Trial	This article suggested that aerobic exercise may be effective for primary dysmenorrhea via its influence on progesterone and inflammatory pain mediators.
11.	Nuzhat Parveen, et al., <sup>17</sup> 2020	Aerobic exercises and its effects on primary dysmenorrhea among women at Hail city, Saudi Arabia	302 samples	—	Cross - Sectional Study	The practice of regular aerobic exercises with moderate intensity can reduce or prevent the occurrence of primary dysmenorrhea.
12.	Rashid Heidarimoghadam (PhD), et al., <sup>18</sup> 2019	The Effect of Exercise Plan Based on FITT Protocol on Primary Dysmenorrhea in Medical Students: A Clinical Trial Study	86 samples	8 weeks	Randomized Controlled Trial	This study concluded that FITT exercises can be used in young girls to reduce the severity and duration of dysmenorrhea.
13.	Priya Kannan, et al., <sup>19</sup> 2019	Effectiveness of a treadmill - based aerobic exercise intervention on pain, daily functioning, and quality of life in women with primary dysmenorrhea: a randomized controlled trial	70 samples	7 months	Randomized Controlled Trial	According to this study aerobic exercise is useful for pain management in primary dysmenorrhea. It also improve quality of life and daily functioning.
14.	Priya Kannan, et al., <sup>20</sup> 2019	Potential mechanisms underpinning aerobic exercise - induced analgesia in primary dysmenorrhea: a controlled non - randomized pilot trial	20 samples	4 weeks	Controlled Non - randomized Pilot Trial	The findings of this study indicated a trend towards an increase in progesterone levels and decreases in inflammatory pain mediators.
15.	G. Tharani, et al., <sup>21</sup> 2018	To compare the effects of stretching exercise versus aerobic dance in primary dysmenorrhea among collegiates	30 samples	8 weeks	Experimental Study	After this study, we found that aerobic dance is effective in reducing the symptoms of primary dysmenorrhea and helps to overcome pain alongside stress management.
16.	Eda Akbaş, et al., <sup>22</sup> 2018	Effectiveness of Group Aerobic Training on Menstrual Cycle Symptoms in Primary Dysmenorrhea	37 samples	4 weeks	Prospective, Randomized Controlled Experimental Study	This study showed that four - week group aerobic training is effective in reducing premenstrual symptoms contributing to reduce menstrual symptoms and improve quality of life in females with primary dysmenorrhea.
17.	Sindhuja. K., <sup>1</sup> 2017	A study to assess the effectiveness of aerobic exercise on primary dysmenorrhoea among adolescent girls at a selected College, Coimbatore	40 samples	7 weeks	Experimental Study	The result of this study showed that aerobic exercise as physical activity has significance in reducing the symptoms of primary dysmenorrhoea during menstruation among adolescent girls.
18.	Zahra Mohebbehnav, et al., <sup>4</sup> 2017	The Effect of aerobic exercise on primary dysmenorrhea: A clinical trial study	70 samples	8 weeks	Clinical Trial Study	According to this study, aerobic exercise can be used as a preventive, therapeutic, or therapeutic approach to control dysmenorrhea and it performing regular aerobic exercise through mental and physical relaxation and improving blood flow can improve menstrual symptoms.
19.	Anuradha Sutar, et al., <sup>23</sup> 2016	Effect of aerobic exercises on primary dysmenorrhoea in college students	100 samples	12 weeks	Randomized Clinical Trial	This article concluded that aerobic exercise can be useful for reducing pain and improving physical symptoms which has a positive impact on the quality of life in primary dysmenorrhoea girls.
20.	Farideh Vazir, et al., <sup>24</sup> 2014	Comparing the Effect of Aerobic and Stretching Exercises on the	105 samples	8 weeks	Randomized Clinical	The findings of this article showed that aerobic exercise is effective in reducing the

		Intensity of Primary Dysmenorrhea in the Students of Universities of Bushehr			Trial	intensity of dysmenorrhea.
21.	Munawar, et al., <sup>25</sup> 2013	The Effect of aerobics on reducing the pain of dysmenorrhea	15 samples	8 weeks	Quasi - experimental Study	The result of this article concluded that aerobic may reduce dysmenorrhea pain in women.

### 3. Discussion

This study aimed to evaluate aerobic exercise in primary dysmenorrhea. Aerobic Exercises are known to cause the release of endorphin hormones in brain that raise the pain threshold by activating the prostaglandin synthesis inhibitors and may acts as distraction thoughts, decreasing short term depression and increase concentration and improve mood and behavior<sup>7</sup>

A study by Asma Qamar, *et al.*<sup>8</sup> showed that nausea, Low Back Pain, menstrual cramps, radiating lower leg pain, stress and anxiety showed differences in both group but high intensity aerobics showed more significant differences. This concluded that both techniques were effective for managing the patients of pain during menstruation, but patients who treated with high intensity aerobics exercise shows more significant result as compared to pelvicclock exercise group.

Aerobic exercising can be encouraged to achieve a better quality of life in women during menstruation cycle.<sup>22</sup> A study by Anuradha Sutar *et al.* showed that as the Pain is the main contributor for reduction in physical functioning, Reduction in pain plays a crucial role in improvement of all the domains of Health - Related Quality of Life Short Form - 12 viz social functioning, emotional well - being and general health perception etc.<sup>23</sup> According to Priya Kannan *et al.*<sup>11</sup> Short Form - 12 quality of life questionnaire, the Physical Component Summary and the Mental Component Summary did not show a significant effect at 1 month but statistically significant benefits were observed at 4 and 7 months.<sup>19</sup> 45 - minute, 4 - session per week for 12 weeks aerobic exercise training programs are effective not only to reduce pain but to improve quality of life as well.<sup>11</sup> A study by Sandhiya M *etal.*<sup>9</sup> shows that Core Stability Exercises is significantly effective than Aerobic Exercise in terms of improvement in quality of life of primary dysmenorrhea among underweight women.

Literature review by Chisom Anastasia Nwaezuoke *et al.*<sup>6</sup> and Novadri Ayubi *et al.*<sup>13</sup> concluded that aerobic exercise can significantly reduce primary dysmenorrhea. Aerobic exercises such as gymnastics, yoga, pilates, jogging and a treadmill which is done regularly three times a week can increase progesterone production. The three progesterone increases, the production of prostaglandins will decrease so that it has the potential to reduce primary dysmenorrhea during menstruation.<sup>13</sup> A study by Priya Kannan *et al.*<sup>16</sup> large - scale randomized controlled trial will aim to evaluate definitively the extent to which changes in progesterone, prostaglandins, and pro - inflammatory cytokines mediate the beneficial effects of aerobic exercise - induced analgesia in primary dysmenorrhea.

A study by Priya Kannan *et al.*<sup>20</sup> synthesis of PGs is influenced by the progesterone level in the late luteal phase

of the menstrual cycle (progesterone and PGs displaying an inverse relationship), the findings herein suggest that high - intensity aerobic exercise - induced analgesia in primary dysmenorrhea might occur via hormone (progesterone) mediated mechanisms.

Studies by Dagnanesh Kinde *et al.*<sup>10</sup>, Asmaa M. Elbandrawy *et al.*<sup>12</sup>, Night Nasrullah, Khan *et al.*<sup>14</sup>, Farideh Vazir *et al.*<sup>24</sup>, and Simge Temizkan *et al.*<sup>15</sup>. concluded that aerobic exercise had positive effect on primary dysmenorrhea to reduce the severity of pain. The study showed that there was statistically significant difference between regular physical exercises, average of physical activity per week and dysmenorrhea.<sup>17</sup> Adolescent girls, almost silently suffer the pain by dysmenorrhoea and the symptoms associated with it. Aerobic exercise was a one of the effective, inexpensive and non - pharmacological measure to reduce the primary dysmenorrhoea symptoms among adolescent girls.<sup>1</sup>

A study by Rashid Heidaramoghadam (PhD) *et al.*<sup>18</sup> indicated that performing sports activities based on the Frequency of exercise, Intensity of exercise, time of exercise, and type of exercise (FITT) exercise program led to a reduction in the severity and duration of dysmenorrhea. Aerobic dance can be incorporated as one of the non - pharmacological methods in treating patients with primary dysmenorrhea and according to G. Tharani *et al.*<sup>21</sup> aerobic dance showed a better reduction in pain and stress in primary dysmenorrhea when compared with stretching exercise.

### 4. Result

Out of 21 articles, 1 article showed that Frequency of exercise, Intensity of exercise, time of exercise, and type of exercise (FITT) exercise protocol is effective in reducing pain and intensity of dysmenorrhea.<sup>1</sup> article showed that aerobic dance is effective in reducing the symptoms of primary dysmenorrhea and helps to overcome pain alongside stress management.<sup>5</sup> articles show that aerobic exercise is effective in physical symptoms and quality of life.<sup>1</sup> article shows that high intensity aerobic exercise is effective in reducing pain along with stress management.<sup>14</sup> articles showed that aerobic exercise is effective in reducing menstrual symptoms.

### Conflicts of Interest

There are no conflicts of interest.

### 5. Conclusion

This literature review analysed the effect of aerobic exercise in primary dysmenorrhea. This review used to demonstrate that aerobic exercise can be used to improve quality of life, reducing symptoms of primary dysmenorrhea, duration and



intensity of pain. Regular aerobic exercise is more beneficial for primary dysmenorrhea.

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