

Effect of Pilates vs. Chair Aerobics on Sleep Quality in Desktop Working Women with Dysmenorrhea

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Received: 10th Mar, 2026 | Revised: 18th Mar, 2026 | Accepted: 22nd Mar, 2026 | Available Online: 28th Mar, 2026

ABSTRACT

BACKGROUND: Dysmenorrhea is an extremely prevalent gynaecological medical condition within women of reproductive age marked by excruciating monthly pain that can adversely affect routines and sleep quality. Due to sedentary behaviour at work, it is more common in desktop working women; its incidence ranges from 50-90 % worldwide. Exercises based therapies like chair aerobics , a type of low impact aerobic exercises and Pilates , which focuses on core stabilization , posture and breathing control have demonstrated considerable improvements. Complementary data on how well they work for women with dysmenorrhea in terms of sleep quality is still very limited. The aim of the study is to evaluate the effect of Pilates vs. chair aerobics on sleep quality in working women with Dysmenorrhea. **Methodology :** An interventional study was conducted on desktop working women with dysmenorrhea which included 23 participants in each group who fulfilled the inclusion as well as the exclusion criteria for duration of 4 weeks using simple random sampling method .The materials needed for the study included mat, chair, consent form, Numerical Pain Rating Scale and Pittsburgh Sleep Quality Index. The Data was analysed using paired t-test / Wilcoxon signed rank test for within group comparison and unpaired t-test / Mann Whitney test for between group comparisons. **Results:** Post-intervention analysis demonstrated statically significant improvement in both groups for all outcome measures ($p < 0.001$) .In Group A (Pilates), NPRS reduced from 7.09 ± 0.73 to 2.70 ± 0.56 , PSQI improved from 12.39 ± 1.03 to 5.30 ± 0.70 . In Group B (Chair Aerobics) NPRS reduced from 7.04 ± 0.77 to 4.43 ± 0.51 , PSQI improved from 12.04 ± 0.77 to 8.43 ± 0.51 . Comparative analysis showed that Group A demonstrated greater improvement than Group B across all parameters. **Conclusion:** The study showed that with desktop working women with dysmenorrhea, Chair Aerobics and Pilates are both beneficial in lowering pain and enhancing sleep quality. However Pilates found to be more effective than Chair Aerobics.

Keywords: Dysmenorrhea, Pilates, Chair Aerobics, Sleep Quality, Desktop Working Women, NPRS, PSQI

How to cite this article: Samrudhi Upasak Awhad¹ Dr. Amrutkuvar Rayjade^{2*} Dr. Rama Ramdurgkar³. Effect of Pilates vs. Chair Aerobics on Sleep Quality in Desktop Working Women with Dysmenorrhea. Int J Drug Deliv Technol. 2026;16(82s):734-738. DOI: 10.25258/ijddt.16.82s.83.

INTRODUCTION

Dysmenorrhea which is additionally known as painful menstruation, is represented by a severe, painful and cramping sensation felt in the lower abdomen that is frequently accompanied by other symptoms like perspiration , headache , nausea , vomiting , diarrhea and shaking that happens either prior or throughout the menstrual cycle ⁽¹⁾. A more practical and realistic definition, however includes menstrual discomfort that is severe enough to interfere with day-to-day activities ⁽³⁾.

Dysmenorrhea is categorized into two distinct types Primary Dysmenorrhea and Secondary Dysmenorrhea based on whether identifiable etiology is present. ⁽²⁾

Primary Dysmenorrhea is characterized by lower abdominal pain that travels to the thigh and lower back and lacks and evident pelvic disease.⁽³⁾

Secondary Dysmenorrhea is marked by dull ache often accompanied by dyspareunia, infertility and menstrual disorders.⁽⁴⁾

While the exact cause of primary dysmenorrhea is unknown, uterine muscle ischemia a state that is brought by excessive contraction of the muscles

during menstruation is thought to be the pathophysiological cause of this condition.⁽⁵⁾

Decreased in progesterone hormone throughout the luteal phase and excess production of prostaglandins and inflammatory factors are believed as the result of ischemia and hypoxia of the uterus causing dysmenorrhea individuals to experience aggravated pain.⁽⁵⁾

In addition, some researches suggests that women who experience dysmenorrhea have difficulties related to sleep.⁽⁷⁾ Women suffer sleep disturbances during first few days of menstruation and 28% says that menstrual pain interferes with their potential to sleep, according to the National Sleep Foundation's Women and Sleep Poll.⁽⁶⁾ So, there is an adverse relationship between pain and sleep.⁽⁷⁾

It has been reported that young women who suffers with dysmenorrhea have disrupted normal sleep because of dysmenorrhea related back and abdominal pain that negatively impacts sleep, although a typical sleep period is anticipated to be 9-10 hours.⁽⁷⁾

There aren't many research on dysmenorrhea in working women, though. Dysmenorrhea in working women is co related with workplace related characteristics, such as working hours that correlates with the menstrual symptoms and productivity and job related stressors such as lack of job control, fewer peer support and insecure employment at work.⁽¹⁴⁾ In some research, dysmenorrhea and monthly pain are treated interchangeably, with prevalence rates ranging from 15% to 95% and menstrual pain varied from minor to inhibiting day-to-day functioning.⁽¹⁴⁾ Pilates which is referred as mind body workout emphasizes breathing and while promoting appropriate posture, muscle strength, flexibility and trunk stability.⁽⁵⁾ Through controlled movement performed on a mat, Pilates promotes flexibility and strengthens muscles boosting both mental and physical wellbeing.⁽¹²⁾ Throughout each Pilates exercise, the abdominal area is constantly used, acting as the technique's main strength core.⁽⁸⁾ Pilates exercises have a positive effect on female sex hormones and enhance physical fitness and health by improving muscular strength, endurance, flexibility and cardio respiratory endurance.⁽¹²⁾

Exercises can have a hormonal influence on the uterus lining or elevate the amount of endorphins in the bloodstreams.⁽⁹⁾ Exercise is referred to increase the brain's endorphin production which raises the threshold towards pain and has been observed to elevate the mood of those who engage in it.⁽¹⁰⁾

Chair aerobics exercise is a type of physical activity that is done while seated, and it mainly relies on the process of aerobic energy generation.⁽¹¹⁾

Enhanced blood circulation from aerobic activity relieves pain.⁽⁴⁾

Chair based exercises are particularly beneficial as a training approach since they minimize load bearing, improve balance in those with profoundly limited mobility and stabilize the lower spine by offering a fixed foundation. Furthermore, they provide for a wider range of motion by offering support and leverage points.⁽¹³⁾

For people who lead sedentary lifestyles or are employed in sedentary surroundings, chair aerobics is a great substitute to active exercise.⁽¹³⁾

MATERIALS AND METHODS

The study was carried out for six months at the D.Y.Patil College of Physiotherapy, Kadamwadi, Kolhapur. In accordance with the inclusion and exclusion criteria, patients were selected.

Inclusion criteria

Working women aged 24-35 years, desktop workers for at least six hours every day and 5 days per week and diagnosed with dysmenorrhea.

Exclusion criteria

Patients with secondary dysmenorrhea associated with conditions such as endometriosis, pelvic inflammatory diseases, ovarian cysts, fibroids and infection such as urinary tract infection and sexually transmitted diseases.

PROCEDURE

The institution's ethical committee granted ethical approval, The participants prior written consent was acquired. Prior to the examination, pre assessment values were recorded. The participants had been divided up into two Groups, Group A and Group B, each of which had 23 participants. The condition and method of the exercise were thoroughly described to the participants.

Group A carried out with for 4 weeks, and Group B carried out Chair Aerobics exercises for 4 weeks.

Data collected on all study variables was entered MS Excel to prepare the Master sheet.

Pre and post assessment of pain and sleep quality was done for each participant of each group using Numerical Pain Rating Scale (NPRS), Pittsburgh Sleep Quality Index (PSQI). The parameters were assessed before and after the intervention period for all participants.

Group A (PILATES):

The exercises will be performed on a mat under supervision.

- 1The Hundred
- 2Single leg stretch
- 3Leg circles
- 4Bridging
- 5Spine stretch
- 6Swan
- 7Double leg stretch
- 8Roll up

Each exercises will be demonstrated to the

Parameters		Assessment Period	Mean	Std. Deviation	p-value
Numerical Pain Rating Scale	A	Pre	7.09	0.73	<0.001*
		Post	2.70	0.56	
	B	Pre	7.04	0.77	<0.001*
		Post	4.43	0.51	

participants and they will be instructed perform movements slowly with controlled breathing.

Group B (CHAIR AEROBICS) :

Participants in Group B will perform Chair Aerobics exercises which are low impact aerobic exercises performed while sitting on a chair. Chair Aerobics help improve blood circulation, increase physical activity, and reduce muscular tension associated with dysmenorrhea.

Exercises will be performed using a chair for support.

1Knee Lift

2Diagonal toe touch

3Lunges

4Punches

5Flick Kicks

6Half Jack

7Criss Cross

Each exercises will be explained and demonstrated to the participants before performing.

RESULT

The comparative study of effect of Pilates exercises and Chair Aerobics Exercises on sleep Quality in desktop working women in Dysmenorrhea shows that both exercises were equally effective in reducing pain and improving sleep quality using outcome measures (NPRS and PSQI). Therefore, Pilates exercises is been more effective than chair Aerobics in reducing pain and improving Sleep Quality in Desktop working women.

Table No. 1 Age Distribution

	Minimum	Maximum	Mean	Std. Deviation
Age	24	35	27.87	2.491

Here the minimum age of the desktop working women is considered to be 24 years old where as maximum age to be considered is 35 years old .

The Standard Deviation is 2.491 .

Table No. 2 Group wise comparison of Numerical Pain Rating Scale

The group-wise comparison of the Numerical Pain Rating Scale demonstrates that both Group A and Group B experienced a statistically significant reduction in pain following the intervention. In Group A, the mean pain score decreased markedly from 7.09 ± 0.73 in the pre-assessment to 2.70 ± 0.56 in the post-assessment. Similarly, Group B showed a reduction from 7.04 ± 0.77 to 4.43 ± 0.51 . The p-value for both groups was <0.001 , indicating that the improvements observed were highly significant and not due to chance. However, the magnitude of pain reduction was greater in Group A compared to Group B, suggesting that the intervention applied to Group A was more effective in alleviating pain among the participants.

Table No. 3 Group wise comparison of Pittsburgh Sleep quality index

Parameter		Assessment Period	Mean	Std. Deviation	p-value
Pittsburgh Sleep quality index	A	Pre	12.39	1.03	<0.001*
		Post	5.30	0.70	
	B	Pre	12.04	0.77	<0.001*
		Post	8.43	0.51	

The group-wise comparison of the Pittsburgh Sleep Quality Index (PSQI) indicates that both Group A and Group B showed a statistically significant improvement in sleep quality following the intervention. In Group A, the mean PSQI score decreased from 12.39 ± 1.03 in the pre-assessment to 5.30 ± 0.70 in the post-assessment. Similarly, Group B demonstrated a reduction from 12.04 ± 0.77 to 8.43 ± 0.51 . The p-value for both groups was <0.001 , indicating that the improvements were highly significant. However, the reduction in PSQI scores was greater in Group A compared to Group B, suggesting that the intervention applied to Group A was more effective in improving sleep quality among the participants.

DISCUSSION

The present study was carried out to compare the effectiveness of Pilates exercises and Chair aerobics exercises on pain and sleep quality in desktop working women with dysmenorrhea. A total of 46 participants aged between 24-35 years were equally split in two groups, in which Group A received Pilates exercises were as Group B received Chair Aerobics exercises for

a duration of 4 weeks. Outcome measures included were Numerical Pain Rating Scale (NPRS) and Pittsburgh Sleep Quality Index (PSQI).

One of the most prevalent gynecological condition affecting women of reproductive age is dysmenorrhea, which has a major effect on routine tasks productivity at work and sleep quality. Globally the prevalence varies greatly from 15% to 95%. (1,14). Severe dysmenorrhea is often associated with absenteeism and reduced functional capacity in women (7). Additionally menstrual pain has shown to be negatively influencing sleep patterns, with many women reporting sleep disturbances during menstruation. (6,7).

In the present study, both groups demonstrated statistically significant improvements in pain and sleep quality ($p < 0.001$), indicating that exercise based intervention are effective non pharmacological approaches for managing dysmenorrhea. The findings are consistent with the previous studies suggesting that physical activity helps reduce menstrual pain by increasing endorphin levels, improving blood circulation and regulating hormonal balance (9,10).

Group A (Pilates) showed significant reduction in pain compared to Group B (Chair aerobics). The mean NPRS score in Group A decreased from 7.09 to 2.70, whereas in Group B it decreased from 7.04 to 4.43. The superior effectiveness of Pilates may be attributed to its focus on core stabilization, controlled breathing, posture correction, and muscle strengthening. These findings align with studies by Soni et al. (2021) and Song & Kim (2023), which reported significant reductions in pain and improvements in quality of life among women with dysmenorrhea following Pilates interventions (5,9). Additionally, Pilates has been shown to positively influence muscular endurance, flexibility, and hormonal regulation (12).

Sleep quality also improved significant in both groups; however, greater improvement was observed in Pilates group. The PSQI score in Group A reduced from 12.39 to 5.30, whereas in Group B it reduced from 12.04 to 8.43. Sleep disturbances are commonly associated with dysmenorrhea due to pain and discomfort (7). Pilates, being a mind body exercise, promotes relaxation, reduces stress and enhances parasympathetic activity, thereby improving sleep quality. These findings are supported by previous research indicating that Pilates improves both psychological wellbeing and sleep quality in women with dysmenorrhea (5).

Chair Aerobics exercises also demonstrated significant benefit in reducing pain and improving sleep quality. The improvements may be attributed to enhanced blood circulation, reduction in muscle stiffness and increased endorphin release. (4,11). Chair Aerobics is particularly beneficial for individuals with sedentary lifestyles, as it is low-impact, safe, and easy to perform, making it suitable for desktop working women (13). Previous studies have also reported that aerobic exercises are effective in reducing menstrual pain and improving overall quality of life (10,11).

The comparison between the two groups revealed statistically significant differences favoring the Pilates group ($p < 0.001$). This suggests that although both intervention are effective, Pilates provide greater benefits due to its comprehensive approach, which combines physical strengthening, flexibility, breathing control and mental relaxation.

The overall improvements observed in both groups' highlights the importance of regular exercise in the management of dysmenorrhea. Exercise is known to reduce prostaglandin level, increase endorphin production and improve uterine blood flow, all of which contribute to decreased pain perception and enhanced well-being. (10).

The results of this study are in the line with earlier comparative research by Bhatt et al. (2024), which found that Chair aerobics and Pilates are both beneficial for lowering menstruation symptoms, with Pilates producing better results. (3).

Therefore the current study indicates that chair aerobics exercises and Pilates are both useful non pharmacological treatments for dysmenorrhea in women who work at desktops. Pilates, on the other hand, proved to be more successful in lowering pain and enhancing the quality of sleep, making it a better intervention for this group.

CONCLUSION

The present study was conducted to compare the effect of Pilates and Chair Aerobics on sleep quality in desktop working women with dysmenorrhea. The Findings of the study revealed that both intervention were effective in improving sleep quality and reducing pain among the participants. However on comparison between both the groups, Pilates exercises demonstrated greater effectiveness in improving sleep quality and reducing pain levels as it is been compared with the Chair Aerobics. This may be attributed to the emphasis of Pilates on core strengthening, controlled

breathing and mind body coordination, which collectively contributes to better physiological and psychological outcomes.

Thus, it can be concluded that while both Pilates and Chair aerobics are beneficial and can be used as non-pharmacological intervention for managing dysmenorrhea, Pilates appears to be more effective in enhancing the overall outcome in desktop working women.

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