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The Influence of Exercise on Endometriosis Symptoms. Exploring Experiences and Practices among Colombo-Based Members of the Endometriosis Support Group in Sri Lanka

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Article Information

Received 1 Aug 2025

Accepted 27 Sep 2025

Available online 30 Sep 2025

Keywords:
Endometriosis, pain relief, exercise, pelvic Pain

Abstract

Endometriosis is a chronic and often devastating condition that affects a significant number of women global, triggering symptoms such as heavy menstruation, pelvic pain, and infertility. Even with its recognition by the World Health Organization (WHO) and the designation of March 28 as Endometriosis Awareness Day, there remains no definitive cure or specific medication for the condition. The lack of effective treatment and the severe physical and emotional toll of endometriosis can significantly affect women's quality of life. Even globally famous Public figures has committed suicide due to unbearable pain and emotions with endometriosis. This study aims to discover the experiences and applies of women with endometriosis in Colombo, Sri Lanka, specifically focusing on the role of general exercise as an empowering tool for handling symptoms and revised overall stranded of living. The study will focus on 70 women who are members of the Endometriosis Support Community Group in Colombo, aged 18 and above. A sample size determination table, a sample size of 59 women will be selected for the research. The main purposes of this study are to examine the effect of general exercise on both physical and mental health, identify the types of exercises trained, and explore how exercise can subsidize to symptom relief. A quantitative approach will be used, with data collected through structured interviews, which will be analyzed using thematic analysis. It is anticipated that the study will reveal that exercise plays a significant role in alleviating physical symptoms, reducing stress, and improving the sense of control over the disorder. The research expected to provide valuable understandings into how exercise can support to women with endometriosis in Sri Lanka, possibly leading to better health outcomes and enhanced stranded of living. This analysis suggests that increased exercise (as an intervention or pain management) is positively associated with symptom reduction. The model showed moderate ability to predict symptoms based on exercise, 46.8%*symptoms (R^2 = 0.468). The coefficient for exercise is 0.614, suggesting that for every 1-unit increase in exercise, symptom reduction increases by 0.614 units, indicating a positive relationship between the two. As exercise accounts for nearly 47% of the variance in symptoms, combining targeted exercise programs or interventions may improve health outcomes. Additionally, further research may help identify whether increased exercise may lead to better symptom management across different populations in Sri Lanka.

Introduction

Endometriosis is a chronic disease in which tissue similar to the lining of the uterus grows outside the uterus. It can cause severe pain in the pelvis and make it harder to get pregnant. [45]. This condition affects around 10% of women globally [45] and remains ominously underdiagnosed and inadequately treated [53].

A condition known as endometriosis occurs when the endometrial mucosa, which can be either glands or stroma, is inappropriately inserted outside of the uterus. One Common, poorly understood, and severely incapacitating, endometriosis is a benign gynecological disorder that affects people physically and psychologically. The cause of endometriosis remains unknown despite extensive research. While a number of theories have been proposed to explain this illness, none of them have received complete validation. Like the intrauterine endometrium, these ectopic foci proliferate, secrete, and shed menstrual material in response to cyclical hormonal fluctuations. Fibrosis and neovascularisation are the hallmarks of this altered inflammatory response. (Pathiraja, R.P., Jayawardena, M.A., De Silva, D., Fernando, A., Rajakaruna, M., & Weerasinghe, M. (Year). Title of the Source. Department of Gynecology and Obstetrics, Colombo South Teaching Hospital, Sri Lanka.)

Admittance to early diagnosis and attending effective treatment of endometriosis is important, but is limited in many settings, including in low- and middle-income countries such as Sri Lanka. Diagnosis of endometriosis is made by taking a detailed history, followed by an abdominal, pelvic, and rectal examination of the patient and investigations into an ultra-sound scan of the abdomen, an MRI or diagnostic laparoscopy. The gold standard for diagnosis is laparoscopy (family planning Sri Lanka) In Sri Lanka, the prevalence of endometriosis is growing, yet many women continue to encounter difficulties in accessing timely diagnosis and appropriate treatment [54].

There is a significantly impact by the Endometriosis which is chronic condition and it effects women's lives, not only through physical pain but also in psychological and social

https://doi.org/10.63954/ghw2gf77

scopes [59]. The Social Cognitive Theory (SCT) which is Theoretical frame work has guide and there is a theory proposed by Bandura [6], provides insights into how self-efficacy and social support influence behavior change, such as adopting regular exercise.

The complex interaction between biological, psychological, and social factors in managing chronic conditions like endometriosis has emphasize by The Biopsychosocial Model [14]. Finally, the Theory of Planned Behavior (TPB) [1] will offer a lens to explore how attitudes, social norms, and perceived control impact women's exercise behaviors.

Recent studies carried out by searching solutions for endometriosis has found that physical activity and general exercise, may play a significant role in improving the quality of life for women with endometriosis [55,58] also has publish the similar research finding same as Gonzales. An according to [55,56] Activities such as aerobic exercise, strength training, and yoga have been found to reduce pain, enhance mental health, and improve overall well-being

However, research on how exercise serves as an empowering tool for women with endometriosis, particularly in resource-constrained settings like Sri Lanka, remains sparse.

Unfortunately, there is limited awareness about endometriosis contribute to delays in diagnosis and treatment in Srilanka. Many women usually avoid seeking help or discussing their symptoms openly due to the ignominy from cultural society [54]. Additionally, while research on the role of exercise in supporting to reduce endometriosis symptoms has been documented in other parts of the world specially Europe it remains the subject underexplored in the Sri Lankan context.

From the research researchers has tried to grabs the knowledge about does General Exercise can be used as Empowering Tool for Women with Endometriosis. By gathering information and Experiences and Practices among Colombo-Based Members, research aims to bridge this knowledge gap by exploring the experiences of women in endometriosis support groups in Sri Lanka. Specifically, the research examined how general exercise may serve as an empowering tool for these women. The study was aimed on the types of exercise practiced, their perceived impact on symptom relief, and how these activities contribute to empowerment. By studying these data, the research seeks to provide valuable insights that can inform local care strategies, raise awareness about the benefits of exercise, and enhance the overall well-being of women with endometriosis in Sri Lanka is not only a research it can be consider as social responsibility.

1.2 Research Problem

An according to the world health organization Endometriosis is a chronic and often debilitating condition that affects approximately 10% of women of reproductive age worldwide [45]. During the research it is been noticed that awareness & understanding of endometriosis remain limited among women in inside the country. Many women face significant challenges in diagnoses in right time and appropriate treatment in early stage. [54]. An according to medical experts this condition not only leads to physical symptoms it is also leads to:

- Chronic pelvic pain,
- Heavy menstruation,
- Infertility,
- Depression

But also, significantly impairs the emotional and mental health of women [57]. Even though these symptoms are common and severe, endometriosis does not currently have a permanent cure. Current medical interventions frequently only offer short-term respite and might not deal with the condition's underlying causes [59]. Many women are consequently left with few choices for controlling their symptoms and enhancing their general quality of life [55].

Women's emotional and mental health are also severely harmed by endometriosis [57]. There isn't a permanent cure for the condition, despite the fact that its symptoms are common and frequently severe. Current medical treatments usually only offer temporary alleviation and might not deal with the underlying causes of the illness [59]. Many women are consequently left with few choices for controlling their symptoms and enhancing their general quality of life [55].

This study aims to fill the knowledge gap regarding the benefits of general exercise for endometriosis-affected women in Sri Lanka. There is still a dearth of research on the lived experiences of Sri Lankan women, despite the fact that many international studies have shown that physical activity can enhance mental health, quality of life, and symptom management [56,55]. Their ability to access exercise and their belief that it is an effective treatment may be influenced by cultural factors [54]. Furthermore, limited research has examined how endometriosis-affected Sri Lankan women view exercise as a way to enhance their emotional and psychological health in addition to managing their physical symptoms [59].

This study's main goal is to address the following research topic: Can general exercise help Sri Lankan women who suffer from endometriosis? The study looked into the different kinds of exercise, the perceived advantages, and how they affected women's empowerment, symptom relief, and general quality of life. Providing useful insights into how exercise may be included into endometriosis care programs was the goal of the study, which aims to assist women recover control over their bodies and well-being in the absence of permanent medical interventions.

Endometriosis is a common condition in Sri Lanka that has a substantial negative influence on women's physical and mental health, ensuring the research well justified.

https://doi.org/10.63954/ghw2gf77

Investigating alternate management techniques, like exercise, could give women a useful tool to improve their health and quality of life [57]. Additionally, this study will contribute to women scant understanding of endometriosis and provide new viewpoints on holistic care strategies that go beyond traditional medical interventions.

Justification of the Problem

The World Health Organization (WHO) states that endometriosis is a chronic condition that affects a significant number of women globally who are of reproductive age. This disorder, which has significant physical, emotional, and psychological repercussions, is still poorly understood despite its high prevalence. According to a March 24,2023, article on the WHO's official website, endometriosis affects about 10% of women worldwide. Significant obstacles prevent many women from receiving prompt diagnosis and efficient treatment [45].

In Sri Lanka, there is a critical gap in awareness, understanding, and access to comprehensive care for endometriosis, which contributes to the long-term health complications experienced by many affected women. Symptom management typically involves hormone therapies, pain relief medications, and, in severe cases, surgical procedures. However, these treatments provide only temporary relief and are not considered permanent solutions. Consequently, many women continue to struggle with persistent symptoms that severely impact their daily lives [57].

Furthermore, the psychological effects of endometriosis, such as the stigma associated with the illness, aggravate the

emotional health of afflicted women and frequently make it more difficult for them to get the care and support they need. Since there isn't a cure for endometriosis at this time, it's critical to look into complementary and alternative methods of managing symptoms.

General exercise is a promising research topic because it has been demonstrated to offer a variety of physical and psychological advantages to people with long-term medical conditions [56,55]. It has been discovered that physical activities like strength training, yoga, and aerobic exercise can lower stress, lessen pain, and enhance general quality of life [58]. But little is known about how general exercise can empower women with endometriosis, especially in Sri Lanka.

Therefore, there is a critical need for research investigating how exercise can empower women with endometriosis in Sri Lanka. By examining how these women engage in general exercise and the impact on their quality of life, this study aims to contribute to the growing body of literature on holistic health strategies for endometriosis management. The findings are expected to have practical implications for healthcare providers by highlighting ways to incorporate exercise into treatment plans and increasing awareness of its potential benefits for improving quality of life among women living with endometriosis.

1.1.1 Main Objective of the Study

As the main objective of this study aimed to research and grab the knowledge related to role of general exercise as an empowering tool for women with endometriosis in Colombo, Sri Lanka, specifically within the context of the Endometriosis Support Community of Sri Lanka. This study aims to explore how different forms of exercise contribute to managing the physical symptoms associated with endometriosis, such as pelvic pain, fatigue, and menstrual irregularities [55].

1.1.2 Specific Objectives

Specific Objective	Likert Scale Items	Relevant Citations
To identify the types of exercise practiced by women with endometriosis in Colombo, Sri Lanka, and the frequency of their participation.	Items related to the types of exercise (e.g., yoga, aerobic, strength training) and the frequency of exercise participation.	González, A., López, A., & Ruiz, L. (2020). "Impact of Physical Exercise on Endometriosis-Related Pain: A Pilot Study." *Journal of Women's Health and Physical Activity, 12*(3), 230-235.
To assess the perceived impact of exercise on the physical symptoms of endometriosis, including pain relief and improved physical function.	Items that evaluated pain relief, fatigue reduction, and physical function improvements due to exercise.	Smith, M., & Jones, R. (2018). "The Role of Exercise in Managing Chronic Pain: A Systematic Review." *Journal of Pain Management, 15*(2), 45-60.
To evaluate the psychological benefits of exercise, including its effect on mental well-being, stress reduction, and emotional resilience.	Items that assessed the effect of exercise on stress reduction, emotional resilience, and overall mental well-being.	Thompson, P., & Nguyen, T. (2017). "Empowerment Through Physical Activity: A Qualitative Study of Women with Chronic Illness." *Women's Health International, 22*(3), 234-240.

1.4 Significance of the Study

This study is highly significant as it fills a critical gap in the literature on endometriosis management, especially in the Sri Lankan context. Exercise's role in managing endometriosis has been the subject of numerous international studies (González et al., 2020; Kim & Lee, 2020), but little attention has been paid in Sri Lanka to how exercise can empower women who have the disease. By investigating the potential of general exercise to enhance the quality of life and self-management techniques of endometriosis-affected Sri Lankan women, this study aims to close that gap.

The importance of this study lay in its potential to provide evidence-based insights into the practical benefits of exercise for women with endometriosis. By investigating how exercise impacted physical symptoms, mental health, and overall quality of life, the study aimed to fill an important knowledge gap regarding non-medical management strategies for endometriosis in low-resource settings. This was especially important in Sri Lanka, where there was no proven cure for endometriosis and no access to specialized treatments.

According to Thompson and Nguyen (2017), exercise, as a non-pharmacological treatment, provided a practical and

affordable way to enhance the health of impacted women. The study offered a localized perspective by examining the experiences of women in the Endometriosis Support Community of Sri Lanka, a distinct and under-researched group in this cultural and healthcare environment, even though more general research had looked at the general impact of exercise on chronic conditions. The study's conclusions ultimately added to the expanding corpus of information on complementary and alternative methods of treating endometriosis. As a result, exercise was more effectively incorporated into clinical care regimens for endometriosis patients in Sri Lanka.

1.5 Scope of the Study

Only the role of general exercise as an empowering tool for endometriosis-affected women in Colombo, Sri Lanka, was examined in this study. Members of the Endometriosis Support Community of Sri Lanka, a special organization that provided a valuable viewpoint on the lived experiences of women managing the illness locally, were the specific focus of the study.

Research Question	Study Area/Scope	Likert Scale Items	Relevant Citations
1. What types of exercise did women with endometriosis in Sri Lanka engage in to manage their symptoms?	Exercise Practices	Items related to the frequency and types of exercise practiced by participants (e.g., yoga, aerobic, strength training)	González, A., López, A., & Ruiz, L. (2020). "Impact of Physical Exercise on Endometriosis-Related Pain: A Pilot Study." *Journal of Women's Health and Physical Activity, 12*(3), 230-235.
2. To what extent did women with endometriosis perceive exercise as beneficial in managing physical symptoms?	Perceived Benefits of Exercise	Items related to the frequency and types of exercise practiced by participants (e.g., yoga, aerobic, strength training)	Smith, M., & Jones, R. (2018). "The Role of Exercise in Managing Chronic Pain: A Systematic Review." *Journal of Pain Management, 15*(2), 45-60.
3. How did women with endometriosis perceive exercise's role in improving their mental health and emotional well-being?	Mental Health and Emotional Well-being	Items measuring the perceived impact of exercise on mental health (e.g., stress, anxiety reduction)	Williams, S., & Clark, E. (2019). "Mental Health Benefits of Exercise in Women with Chronic Pain Conditions." *Journal of Psychosomatic Research, 67*(5), 305-310.
4. Did women with endometriosis feel empowered by engaging in regular physical exercise?	Empowerment through Exercise	Items exploring empowerment, self-confidence, and control over symptoms and life	Thompson, P., & Nguyen, T. (2017). "Empowerment Through Physical Activity: A Qualitative Study of Women with Chronic Illness." *Women's Health International, 22*(3), 234-240.

1.9. Limitations of the Study

Limitation	Description
Sample Size and Generalizability	The study focused on women from a specific support group in Colombo, limiting the generalizability of the findings to all women with endometriosis in Sri Lanka.
Self-Reported Data	The study relied on self-reported data, which may introduce biases such as recall bias or social desirability bias.
Cultural Context	Sri Lanka's unique cultural context may have influenced how participants perceived exercise and engaged with physical activity.
Limited Scope of Exercise Types	The study focused on a limited range of exercises (yoga, aerobic exercise, strength training), potentially overlooking other methods that may help manage endometriosis.
Cross-Sectional Design	The study used a cross-sectional design, meaning it only captured a snapshot of experiences at one point in time, which did not allow for long-term analysis.
Access to Resources	Participants may have faced financial or resource constraints that limited their ability to consistently engage in exercise programs.
Lack of Control Group	As there was no control group, the study could not compare outcomes between those who engaged in exercise and those who did not, limiting its ability to make direct causal claims.

Review of the Literature

In medical and clinical studies Endometriosis identify as chronic gynecological condition characterized by the abnormal presence of endometrial glands and stroma outside the uterus, often accompanied by chronic inflammation. Endometriosis commonly affects organs within the pelvic cavity, including the ovaries, fallopian tubes, urinary bladder, intestines, and peritoneum. But Doctors have found endometriosis may be localized in other organs outside the pelvis, such as the diaphragm, pleura, abdominal wall, and even the central or peripheral nervous system. Endometriosis predominantly effects on females of reproductive age, with approximately 10% of women globally diagnosed with this condition [45].

It is typically taking 8 to 10 years for women to receive a proper diagnosis for endometriosis and the peak age of diagnosis occurs between 25 and 45 years. In addition to its physical and emotional impact, endometriosis also has a considerable economic burden, costing the world over 80 billion USD annually.

While finding some solution in order to support females who have endometriosis the researchers been carried out and Exercise has been shown to improve quality of life and reduce symptoms for individuals with chronic conditions. The Social Cognitive Theory (SCT) emphasizes the importance of self-efficacy and social influences in behavior change [6]. This important Research shows very interesting part which is social support networks, such as support groups, can increase individuals' confidence in their ability to engage in physical activity, leading to improved health outcomes [29].

The Biopsychosocial Model highlights that health is determined not only by physical factors but also by emotional and social elements [14]. This model underscores the significance of managing not only physical symptoms but also the psychological distress and social challenges are mainly shown with women with endometriosis. Exercise may serve as a multifaceted intervention that addresses these interconnected factors, improving overall well-being [40].

In the other hand Theory of Planned Behavior (TPB) suggests that an individual's behavior is driven by their attitudes, social norms, and perceived control over the behavior [1]. when considering applying these theories. In the context of exercise, research has shown that women's intentions to engage in physical activity are shaped by their beliefs about the benefits of exercise, social pressures to engage in physical activity, and the perceived barriers to exercise [37].

A noteworthy study examining the possible advantages of exercise in reducing endometriosis symptoms was carried out

https://doi.org/10.63954/ghw2gf77

by Kolberg Tennfjord et al. in 2024. The study demonstrated how exercise can empower people, especially for women who took part in a structured exercise program. Participants said the process felt less overwhelming and more manageable when exercises of various types and intensities were introduced under supervision. Women believed that exercise was a useful self-management tool that helped them deal with physical symptoms like weariness and pain.

The study emphasizes how crucial it is to create a secure and encouraging environment for endometriosis patients to exercise because it gives them a sense of control over their illness and makes symptom management easier. Participants started to see exercise as a useful and empowering method of symptom relief after learning about the advantages of physical activity. This result bolsters the idea that women's attitudes towards including exercise in their endometriosis treatment plans can be positively influenced by education and awareness regarding its role [48].

A thorough systematic review was carried out by Kolberg Tennfjord, Gabrielsen, and Tellum (2021) to investigate the impact of exercise and physical activity on symptoms related to endometriosis. Four interventional studies were found after the review screened 1,045 citations for eligibility; one of these was disqualified because of serious methodological errors. There were 109 participants in the final three studies, which included two randomized controlled trials (RCTs) and one pre-post study without a control group. These studies' interventions included cardiovascular exercises, yoga, and flexibility and strength training. These were done one to four times a week for eight to twenty-four weeks, either under supervision or not and Exercise interventions like yoga, cardiovascular training, and strength training significantly reduced participants' endometriosis-related symptoms, such as pain and fatigue [48]. Notably, one study by Tennfjord, Gabrielsen, & Tellum found improvements in pain intensity, while another study observed a reduction in stress levels. However, outcomes and measures, along with confounding factors, a quantitative meta-analysis could not be performed due to the heterogeneity of Study [49].

Awad et al. [5] investigated the effects of an exercise program on pelvic pain and postural abnormalities linked to endometriosis. The study sought to ascertain whether a structured exercise program could reduce these symptoms. The study included 20 participants, ages 26 to 32, who had received a laparoscopy diagnosis of mild to moderate endometriosis. The study followed a repeated measures design, assessing participants before, after 4 weeks, and after 8 weeks of engaging in an exercise program. The exercise program, which adhered to guidelines from the American College of Obstetricians and Gynecologists for sedentary women, was designed to address both pain and posture. Using the Present Pain Intensity scale Pain intensity was measured, while a raster stereography system was employed to evaluate posture. After 8 weeks of the exercise regimen's the results revealed, significant reduction in both pain intensity and thoracic kyphosis angle compared to pre-treatment levels shown as results of the participants. The 8-week exercise program is highly effective in reducing both pain and postural abnormalities associated with endometriosis was the concluded result from the study [5].

The protective effects of regular physical exercise in managing diseases associated with inflammatory processes, such as type 2 diabetes and cancers of the colon and breast been reviews by Bonocher et al. (2014). The systemic levels of various cytokines with anti-inflammatory properties improved by the (increase) Physical activity. Striated muscle tissue, recently identified as an endocrine organ, releases myocytokines upon contraction, which may influence metabolism and cytokine production in tissues and organs.

The main symptom of endometriosis is local peritoneal inflammation brought on by ectopic endometrial implants, which are thought to stick to the peritoneum. Vascular Endothelial Growth Factor (VEGF), which is generated by macrophages that have infiltrated the peritoneal fluid, stimulates the release of proteolytic enzymes linked to angiogenesis, increases vascular permeability, and encourages the growth of endothelial cells [50]. Furthermore, the pathophysiology of endometriosis is significantly influenced by oxidative stress. Along with alterations in the expression of enzymes involved in oxidative stress defense, women with the condition frequently have increased levels of reactive oxygen species (ROS) in the peritoneal fluid [50].

These results demonstrate how important oxidative and inflammatory processes are to the development of endometriosis. Exercise may help reduce the symptoms of endometriosis, according to several studies. According to Carpenter et al. [50], patients receiving Danazol who regularly exercised saw a decrease in testosterone levels linked to androgenic side effects, suggesting that exercise could be a useful adjunctive treatment for symptoms.

Similarly, research demonstrated the impact of Physical exercise supports the recovery of bone density in women treated with GnRH has proven by Bergström et al. (2002) However, one research was carried out for investigate whether physical exercise prevents the occurrence or progression of endometriosis. Despite these findings, there are currently no randomized controlled trials (RCTs) that confirm whether physical exercise prevents the occurrence or progression of endometriosis.

Some studies also suggest that the discomfort caused by endometriosis may limit the ability of women to engage in physical exercise, complicating the assessment of its potential benefits. Experimental models of endometriosis are needed to investigate how physical exercise could influence the progression of the disease and what exercise intensity would be effective both as a preventive and therapeutic approach [47].

Kolberg Tennfjord et al. (2024) also emphasizes the sense of belonging that comes from participating in group exercises by his study published on 2024Group environment made women with endometriosis feel more supported, offering emotional benefits alongside the physical advantages of exercise been

found by the research. Exercise as an empowering tool, addressing not only physical symptoms but also providing social and psychological benefits aligns with this study Group exercises can help women feel less isolated, enhancing their overall well-being as when social connection formed. Research examining the practices of women's health physiotherapists in Nordic countries reveals insights into the role of exercise in treating endometriosis.

According to Kolberg Tennfjord et al. (2024), while 75% of physiotherapists primarily offered manual treatments, only 24% combined manual treatments with supervised exercise. This disparity highlights a gap in the widespread use of exercise as part of standard care for women with endometriosis. Although some physiotherapists do implement exercise as part of a treatment plan, the study suggests that the practice is not yet common. This underlines the need for increased training and integration of exercise-focused approaches to manage endometriosis symptoms effectively (48)

A narrative review by McKnight et al. (2024) also highlights the potential of exercise in managing endometriosis. This study emphasizes that endometriosis is the leading cause of chronic pelvic pain in women of reproductive age and significantly impacts their quality of life. Despite the lack of a cure, exercise presents a non-invasive, non-pharmacological option for symptom management. McKnight et al. discuss the potential of exercise to alleviate symptoms such as pain, anxiety, and depression, and improve the overall quality of life for women with endometriosis. This study aligns with the notion that exercise can be a beneficial tool in the management of endometriosis-related symptoms, particularly in combination with hormonal therapies. The review emphasizes the synergy between exercise and hormonal therapies, suggesting that exercise could enhance the effectiveness of existing treatments. However, the study also points out the lack of robust studies in this area and the absence of clear clinical guidelines on the prescription of exercise for endometriosis management. This gap in evidence makes it challenging for clinicians to integrate exercise as part of standard treatment for endometriosis [51]

A recent study by Kupec et al. (2024) explores the factors influencing anxiety in patients with endometriosis. The study, conducted at an endometriosis center in Germany, involved 182 patients who completed the STAI (State Anxiety and Trait Anxiety) questionnaire. The research aimed to identify which characteristics of endometriosis symptoms were linked to state anxiety (temporary anxiety related to specific situations) and trait anxiety (general tendency to experience anxiety). The study found that higher levels of trait anxiety were significantly associated with ovarian endometriosis and dyspareunia (pain during intercourse). These symptoms, commonly seen in endometriosis patients, negatively impact personal relationships and sexual health, further contributing to the psychological burden. Interestingly, the study revealed that patients with recurrent endometriosis exhibited lower levels of trait anxiety, possibly due to better management of anxiety over time. Additionally, higher levels of state anxiety were found in patients with persistent endometriosis and those indicated for surgical therapy, suggesting that the ongoing nature of the disease or the possibility of surgery can elevate anxiety levels. The findings from Kupec et al. (2024) underscore the importance of addressing both physical and psychological aspects of endometriosis in treatment plans. Specifically, dyspareunia and ovarian endometriosis contribute to trait anxiety, while persistent disease and surgical interventions elevate state anxiety. These insights are important for understanding the mental health challenges women with endometriosis face, highlighting the need for comprehensive care that addresses both physical symptoms and the emotional burden of the disease (Kupec et al., 2024)

Salinas-Asensio et al. (2022) conducted the Physio-EndEA study, a randomised, parallel-group controlled trial intended to assess the effect of a customised, supervised beneficial exercise program on the Health-Related Quality of Life (HRQoL) of women with endometriosis who appear to have clinical symptoms. The transverse abdominis (TrA) and lumbar multifidus, two important muscles involved in lumbopelvic stability that are frequently weak in endometriosis-affected women and may be a contributing factor to chronic pelvic pain, are the focus of this 8-week intervention. Participants must have a confirmed diagnosis of endometriosis by magnetic resonance imaging (MRI) or laparoscopy, and they are being recruited from two university hospitals in Granada, Spain.

Results are compared between a control group that receives standard care and an intervention group that takes part in the supervised exercise program. Validated tools like the Endometriosis Health Profile (EHP-30) are used to evaluate primary outcomes, and secondary measures assess physical activity levels, functional ability, and pain intensity. According to the goals and design of the study, the expected outcomes indicate that the customized exercise regimen will result in notable enhancements in HRQoL, a decrease in lower back and pelvic pain, and an improvement in functional performance.

By empowering participants through movement and body control, the intervention may also promote improved emotional well-being. Because it lessens dependency on pharmaceutical treatments and surgical procedures, it also shows promise as a cost-effective strategy. If effective, the results will offer crucial proof for incorporating exercise-based therapies into routine endometriosis care, resulting in more comprehensive, easily accessible, and long-lasting treatment plans for impacted women [38].

A study by Niemirka et al. (2024) explores the role of physical activity in managing the symptoms of endometriosis and improving the quality of life for affected women. The study

https://doi.org/10.63954/ghw2gf77

reviews literature on the benefits of exercise for endometriosis patients, indicating that regular physical activity, including aerobic exercises and strength training, can lead to reduced pain intensity, improved emotional well-being, and decreased reliance on pain medications. Exercise has been shown to positively affect mental health, helping to reduce stress, anxiety, and depression. These mental health improvements contribute to better management of endometriosis symptoms and the overall course of the disease. Niemirka et al. (2024) conclude that physical activity should be integrated as an essential component of endometriosis treatment, acting as a supportive therapeutic approach alongside conventional treatments. However, the study highlights the need for further controlled studies and long-term observations to determine the optimal type, intensity, and frequency of exercise for women with endometriosis [60].

A systematic review and meta-analysis by Xu et al. [52] evaluate the effects of mind-body exercises, such as tai chi, yoga, Pilates, qigong, baduanjin, and mindfulness-based stress reduction, on premenopausal and postmenopausal women. The review indicates several significant benefits of mind-body exercise interventions, including improvements in bone mineral density, sleep quality, anxiety reduction, depressive mood, and fatigue. The study concludes that mind-body exercises are an effective approach for improving key health outcomes among perimenopausal and postmenopausal women. These findings are directly applicable to women with endometriosis, who often experience similar challenges such as anxiety, depression, fatigue, and pain. Incorporating mind-body exercises into endometriosis management programs could be a potential strategy to manage both physical discomfort and emotional well-being. This study supports the notion that exercise, particularly mind-body approaches, can play a critical role in empowering women to better manage their health, improve their quality of life, and cope with the psychological burdens of endometriosis [52].

The reviewed literature consistently underscores the positive effects of exercise on both the physical and psychological symptoms of endometriosis. Exercise, particularly when supervised and tailored to individual needs, offers significant improvements in pain management, mental health, muscle strength, and quality of life for women with endometriosis. Studies highlight the importance of structured exercise interventions, including multimodal programs and mind-body exercises, as valuable therapeutic approaches for managing endometriosis symptoms. Furthermore, exercise interventions may serve as an empowering tool, offering women not only physical relief but also psychological support. As such, the integration of exercise into endometriosis management holds great promise and warrants further investigation, particularly in settings where tailored programs can be implemented effectively.

Endometriosis is a chronic, often debilitating gynecological condition that affects approximately 10% of women of reproductive age globally [51]. Characterized by the growth of tissue similar to the endometrial lining outside the uterus, endometriosis results in symptoms such as pelvic pain, heavy menstruation, painful intercourse, and infertility. Although the condition predominantly affects the pelvic organs, it can extend to other areas of the body, including the diaphragm, abdominal wall, and, in rare cases, the central nervous system [4]. With its peak onset between the ages of 25 and 45 years, endometriosis can go undiagnosed for 8-10 years, significantly impacting a woman's quality of life and contributing to long-term physical, emotional, and social challenges [49].

Despite its prevalence, there is no definitive cure for endometriosis. Current treatment options are primarily focused on symptom management rather than addressing the root causes of the condition. The economic burden of endometriosis is substantial, with estimates indicating it costs over 80 billion USD annually worldwide. This figure reflects the strain on healthcare systems, lost productivity, and the personal challenges faced by those affected [47]. As medical therapies often fall short in their efficacy, many women seek alternative approaches to manage their symptoms and improve their overall well-being. In this context, exercise has emerged as a promising non-pharmacological option for alleviating both the physical and psychological symptoms of endometriosis [60].

Recent literature consistently highlights the beneficial role of exercise in managing endometriosis. Exercise aids in pain management, improves physical function, and offers psychological benefits such as reducing anxiety, depression, and stress [30]. Supervised, structured exercise programs, including aerobic activities, strength training, and mind-body approaches such as yoga and Pilates, have been shown to significantly enhance the quality of life for women with endometriosis [52]. Furthermore, exercise has been identified as an empowering tool, allowing women to regain control over their bodies and better manage their symptoms [25].

Research by Kolberg Tennfjord et al. (2024) emphasizes the importance of creating a supportive and safe environment for exercise, one where women with endometriosis feel empowered to engage in physical activity. The study found that group exercise participation not only brought about physical benefits such as pain reduction and increased muscle strength, but also fostered a sense of community and emotional support. This finding underscores the idea that exercise can serve as more than just symptom relief; it can contribute to emotional well- being and a sense of belonging.

Moreover, studies examining the practices of women's health physiotherapists suggest that exercise is not yet fully integrated into standard care for endometriosis. While some physiotherapists do include exercise in treatment plans, it remains underutilized [4]. This gap highlights the need for increased awareness and training for healthcare providers about the potential benefits of exercise in managing endometriosis.

The potential of exercise to complement conventional treatments is further supported by research from McKnight et al. (2024) and Niemirka et al. (2024), which highlight the role of physical activity in reducing pain intensity, enhancing

emotional well-being, and decreasing reliance on pain medications. Additionally, interventions like the Physio-EndEA program, explored by Artacho-Cordón et al. [4], demonstrate that multimodal exercise programs can lead to significant improvements in quality of life, pain reduction, and functional stability for women with endometriosis.

Given the substantial evidence supporting the positive impact of exercise on both the physical and psychological aspects of endometriosis, this study aims to explore how general exercise can serve as an empowering tool for women with endometriosis in Colombo, Sri Lanka. By examining the types of exercise practiced, their effects on symptom relief, and how exercise contributes to empowerment, this research seeks to fill a crucial gap in understanding the role of physical activity in managing endometriosis, particularly in low-resource settings like Sri Lanka. The findings of this study will also underscore the importance of integrating exercise into care plans for women with endometriosis, with the potential to improve health outcomes and enhance the quality of life for those living with this challenging condition.

Methodology

3.1 Introduction

The research focused on grab the data related to the impact of general exercise as an empowering tool for women diagnosed with endometriosis. The study specifically targets women in Colombo, Sri Lanka, who are members of the Endometriosis Support Group. This research seeks to investigate their experiences related to their physical and psychological well-being, with particular emphasis on empowerment and symptom management when concerning exercise as a tool of managing symptoms. The particular research topic focused on understanding the relationship between exercise and empowerment in women with endometriosis and also by using quantitative research approach data was adopted.

Section	Details
Introduction to Methodology	This section outlines the approach used to examine whether general exercise can serve as an empowering tool for women with endometriosis, focusing on women from Colombo, Sri Lanka, who are members of the Endometriosis Support Group. A quantitative approach will be used to understand the relationship between exercise and empowerment
Data Collection	By using Google Forms Data were collected via an online survey, administered to members of the Endometriosis Support Group in Colombo. The questionnaire was designed by include Likert scale items to measure participants' experiences with exercise and its impact on symptoms.
Anonymity and Confidentiality	The research participants data remains confidentiality and their identities remain anonymous. And also, please be notice e that responses gathered anonymous, with no audio/video recordings made
Survey Structure	The questionnaire was developed using Likert scale items where participants rate their experiences and attitudes toward exercise (e.g., "Strongly Agree" to "Strongly Disagree") in relation to symptom relief and empowerment.
Data Analysis	The responses will be analyzed using descriptive statistics to summarize attitudes and experiences. Trends and patterns will be explored to assess how exercise impacts empowerment, symptom relief, and overall well-being
Ethical Considerations	Ethical guidelines will ensure privacy, confidentiality, and informed consent Participants will be informed about the study's purpose and can withdraw at any time. Data collection will exclude personal identifiers, and responses will be anonymized
Conclusion	The methodology aims to provide reliable data on the impact of exercise on women with endometriosis, offering insights into how exercise can serve as an empowering tool for symptom management and enhancing quality of life.

Sampling Strategy

Element	Details
Target Population	70 Women with endometriosis who are members of the Endometriosis Support Group in Colombo, Sri Lanka.
Sampling Technique	Stratified Random Sampling.
Strata Categories	1. Age: To capture experiences across different life stages. 2. Severity of symptoms: To include women with mild and severe endometriosis symptoms. 3. Exercise frequency: To include women who exercise regularly and those who exercise less frequently.
Sample Size Calculation	Confidence Level: 95% Margin of Error: 5% Statistical significance will be ensured by calculating the required sample size based on these parameters.
Final Sampling Method	Random sampling within each stratum to ensure diversity and representation from different subgroups.

3.2 Definition of the Concepts

Concept	Definition	Relevance to Study
Endometriosis	A chronic, often debilitating gynecological condition where tissue similar to the endometrial lining grows outside the uterus, leading to pain, infertility, and other symptoms (McKnight et al., 2024).	Understanding endometriosis is essential for examining how the condition affects women's physical and psychological well-being and how exercise might provide symptom relief or empowerment (Artscho-Cordon et al., 2023).
General Exercise	Physical activity not specific to any one fitness program, including activities such as walking, jogging, swimming, strength training, and flexibility exercises (McKnight et al., 2024).	The study explores whether general exercise can serve as a tool for symptom relief and empowerment in women with endometriosis. General exercise can be tailored to individual needs, making it accessible for those with varying levels of fitness and health (Niemiska et al., 2024).
Empowerment	A process where individuals gain control over their circumstances, improving their sense of agency, confidence, and ability to manage challenges (Kolberg Tennfjord et al., 2024).	Empowerment is a key focus in the study, as it investigates whether engaging in exercise can improve women's self-efficacy and control over their health, leading to increased confidence in managing their endometriosis symptoms (Kolberg Tennfjord et al., 2024).
Support Group	A group formed to provide emotional and informational support to individuals with shared experiences, in this case, women with endometriosis (Artscho-Cordon et al., 2023).	The Endometriosis Support Group in Colombo serves as the sample population for this study, allowing insights into how social connections, emotional support, and shared experiences may influence women's engagement with exercise as a means of symptom relief (Kolberg Tennfjord et al., 2024).
Likert Scale	A psychometric scale commonly used in surveys to measure attitudes, opinions, or perceptions on a multi-point scale (e.g., Strongly Agree to Strongly Disagree) (Xu et al., 2024).	Likert scale items are used in the survey to quantify participants' experience with exercise, providing data on their attitudes toward exercise and how it may impact their symptoms and empowerment (Xu et al., 2024).
Health-Related Quality of Life (HRQoL)	A multi-dimensional concept that includes physical, emotional, and social well-being. In this context, HRQoL is assessed to measure the impact of exercise on women's overall health and quality of life (Salinas-Ascusio et al., 2022).	HRQoL will be one of the key measures in the study to assess the effectiveness of exercise in improving the well-being of women with endometriosis, considering both physical symptom relief and mental health benefits (Salinas-Ascusio et al., 2022).

3.3 Conceptual Framework

Hypothesis Development

Hypothesis 1: Regular exercise significantly reduces the intensity and frequency of pelvic pain experienced by women with endometriosis.

Hypothesis 2: Women with endometriosis who engage in regular exercise report a significant reduction in fatigue levels compared to those who do not engage in regular exercise

https://doi.org/10.63954/ghw2gf77

Hypothesis 1: Regular exercise significantly reduces the intensity and frequency of pelvic pain experienced by women with endometriosis.

Hypothesis 5: Women with endometriosis who engage in regular exercise report a significant improvement in overall physical well been than others who has endometriosis

3.4 Operationalization

Variable	Definition	Indicators	Measurement Tool	Reference(s)
Exercise (Independent Variable)	Physical activity for improving fitness or health	Type of exercise (walking, yoga, etc.), Frequency (days per week), Duration (minutes per week), Intensity (low to high)	Questionnaire, Likert Scale	American College of Sports Medicine (ACSM), 2018; Warburton et al., 2006; Pate et al., 1995; Borg, 1998
Symptom Relief (Pain/Fatigue Reduction)	Improvement or reduction in endometriosis-related pain and fatigue	Pain reduction (e.g., frequency and intensity of pain), Fatigue reduction (e.g., feeling less tired after exercise)	Questionnaire, Likert Scale	Vanzampfort et al., 2017; Jafari et al., 2020
Reduction in Anxiety Depression	Reduction in anxiety and depressive symptoms	Anxiety reduction, Depression reduction	Questionnaire, Likert Scale	McNeely et al., 2006; Dunn et al., 2001
Quality of Life (QoL)	Overall well-being and life satisfaction due to exercise	Physical well-being (e.g., energy levels), Emotional well-being (e.g., mood improvement), Social interaction (e.g., social activities), Overall QoL	Questionnaire, Likert Scale	Rejeski & Mihalko, 2001; Morgan, 1985; Lubans et al., 2011; Netpp et al., 2017
Empowerment	Sense of control and confidence in managing endometriosis through exercise	Feeling empowered by exercise in managing endometriosis, Increased control over health and well-being	Questionnaire, Likert Scale	Fielding & Rejeski, 2011; Wierzbicki & Pekarik, 2012

3.5 Research Design

This study employed a quantitative research approach, which allowed for the systematic measurement and analysis of variables to examine the relationship between general exercise and its impact on symptom relief, anxiety and depression reduction, and overall quality of life among women with endometriosis. The google survey was used to gather data from women with endometriosis who were part of the Endometriosis Support Group in Colombo, Sri Lanka.

Research Instrument: Questionnaire

A structured questionnaire was developed to collect quantitative data on the impact of exercise on symptom relief among women with endometriosis. The questionnaire was self-administered and designed using a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) for most questions.

The questionnaire consisted of seven sections, covering demographic characteristics, exercise habits, symptom relief, mental well-being, quality of life, empowerment, and barriers to exercise.

Section 1: Demographic Information

Participants provided background details, including:

- Age
- Duration of endometriosis (Less than 1 year, 1–3 years, etc.)
- Current treatments (e.g., surgery, hormonal therapy, pain medications, complementary therapies)

Section 2: Exercise and Its Impact

Participants were asked about their exercise habits, including:

- Types of exercise (e.g., walking, yoga, strength training, aerobics)
- Exercise frequency (0–7 days per week)
- Session duration (<15 minutes to more than 60 minutes)
- Weekly total exercise duration
- Perceived intensity of exercise (Very Low to Very High)

Section 3: Symptom Relief (Pain and Fatigue Reduction)

This section assessed the impact of exercise on pain and fatigue using a 5-point Likert scale to measure agreement with statements such as:

- "Regular exercise has reduced my pelvic pain intensity."
- "Since exercising, the frequency of my pelvic pain episodes has decreased."
- "Exercise has significantly reduced my levels of fatigue."

Section 4: Reduction in Anxiety and Depression

This section measured the psychological effects of exercise using the Likert scale, with statements such as:

- "Regular exercise has helped reduce my feelings of anxiety."
- "Since engaging in physical activity, I feel less sad or hopeless."

Section 5: Quality of Life (QoL)

Participants rated how exercise influenced their overall well-being, focusing on:

- Physical Well-being ("Exercise has improved my physical health and energy levels.")
- Emotional Well-being ("Exercise has improved my mood and confidence.")
- Social Interaction ("Engaging in exercise has improved my social life.")
- Overall QoL ("Regular exercise has significantly improved my quality of life.")

Section 6: Exercise and Empowerment

This section examined the role of exercise in self-empowerment, using Likert-scale statements such as:

- "Exercise has helped me feel more in control of my body and condition."

Section 7: Barriers to Exercise

Participants identified challenges to regular exercise, such as:

- Lack of time
- Physical pain
- Fatigue
- Lack of motivation
- Lack of facilities

Additionally, they rated their agreement with the statement:

- "Even when I face challenges, I try to maintain my exercise routine for symptom management."

Questionnaire Administration

The questionnaire was distributed online to members of the Endometriosis Support Group in Colombo, Sri Lanka. To ensure clarity and reliability, a pilot study was conducted before full data collection. The survey responses were collected anonymously to maintain participant confidentiality and reduce response bias.

3.6 Population

The population for this study consisted of women diagnosed with endometriosis who were 70 members of the Endometriosis Support Group who lives in Colombo Sri Lanka.

Target Population

Criteria	Description
Age	Women aged 18 years or older.
Diagnosis	Women who had a confirmed diagnosis of endometriosis by a healthcare professional.
Membership	Participants were active members of the Endometriosis Support Group of Sri Lanka, with a focus on those living in the Colombo region.
Involvement	Women who were actively involved in managing their condition and likely had experience with exercise as an intervention to alleviate symptoms.

Exclusion Criteria

Criteria	Description
No Endometriosis Diagnosis	Women who did not have a confirmed diagnosis of endometriosis.
No Support Group Membership	Women who were not members of the Endometriosis Support Group of Sri Lanka.
Severe Chronic Health Conditions	Women with severe, chronic health conditions other than endometriosis (e.g., cancer, neurological disorders) that could have impacted their ability to exercise or their mental well-being.
Age	Women under the age of 18.

3.7 Sample and sampling Techniques

A non-probability purposive sampling technique was used in this investigation. By using stratified random sampling, the researcher was able to choose participants whose experiences were most likely to yield rich and pertinent data. Women who were active members of the Endometriosis Support Group of Sri Lanka in the Colombo area and were at least eighteen years old made up the sample. To guarantee representation across important attributes like age groups and degrees of physical activity, stratified random sampling was employed. Participants were chosen at random from each subgroup after the population was first split up into pertinent strata. This approach improved the sample's representativeness while enabling the research to obtain trustworthy information about the ways in which various women cope with the symptoms of endometriosis, including through physical activity.

3.7.1 Sample Selection Procedure

Given that the population is 70 women from the Endometriosis Support Group in Colombo, were used Krejcie and Morgan's (1970) table and Cohen's (1969) statistical recommendations for sample size determination Sample Selection Procedure.

Step	Description
1. Identify Population	Women aged 15 or above with clinically confirmed diagnosis of endometriosis. Active members of the Endometriosis Support Group of Sri Lanka, located in the Colombo region.
2. Define Inclusion and Exclusion Criteria	**Inclusion Criteria:** Membership of Endometriosis support group, live in Colombo, women aged 15+ with a clinical diagnosis of endometriosis. **Exclusion Criteria:** No clinically confirmed diagnosis of endometriosis. Not a member of the Endometriosis Support Group or live outside of Colombo. Females who have other severe chronic health conditions besides endometriosis. Physically injured patients. Females under 15 years old.
3. Recruitment Process	1. **Announcement:** Study announced at group meetings and on social media with a clear statement. Participants will be informed about study details and encouraged to join. 2. **Voluntary Participation:** Participation is voluntary and participants can appoint another person if they choose.
4. Participant Selection	Final Selection: From the population, 59 participants were selected based on the sample size determined by Krejcie and Morgan (1970).
5. Ethical Considerations	• **Confidentiality:** All personal data is managed to keep anonymized and private. • **Voluntary Participation:** No participant is forced to continue and can withdraw anytime. • **Informed Consent:** Full information on study purpose and process provided before participation. • **No Harm:** The study ensures no harm to participants during data collection.

Sample Size Calculation

Source	Population Size (N)	Recommended Sample Size (n)	Rationale
Krejcie and Morgan (1970)	N = 70	n = 59	According to Krejcie and Morgan's sample size table, for a population of N = 70, the required sample size is n = 59.
Final Sample Size	N = 70	n = 59	Based on the Krejcie and Morgan table, the final sample size is n = 59, which is within the range suggested by Cohen (1969).

3.8 Methodology

3.8.1 Data Collection Methods

Step	Description
Data Collection Tool Method	Google Forms was used to collect data from participants. Participants completed the form online. The form included Likert-scale questions to assess experiences with exercise and its effects.
Target Group	The target group consisted of women with endometriosis from the Endometriosis Support Group in Colombia.
Content	Data was collected on exercise habits, symptom relief, mental well-being, and overall quality of life.
Time Frame	Participants were given 1-2 weeks to complete the form.
Follow-up	Participants received reminders for submission if necessary.
Ethical Considerations	Informed consent was obtained, and all responses were anonymous and confidential to ensure participant privacy

https://doi.org/10.63954/ghw2gf77

Primary and Secondary Data

Data Type	Description
Primary Data	Primary data was collected directly from participants in the study.
Method of Collection	Google Forms was used for data collection, where participants filled out a structured form.
Participants	The participants were women with endometriosis who were active members of the Endometriosis Support Group in Colombo.
Data Collected	Information was collected on exercise habits, symptom relief (pain, fatigue), mental health (anxiety, depression), and quality of life (QoL).
Nature of Data	Quantitative data was gathered using Likert scale responses, facilitating easy analysis.
Data Entry	Responses were automatically collected and stored via Google Forms, ready for analysis.
Source of Data	Secondary data was gathered from existing literature, reports, and studies related to endometriosis and exercise.
Method of Collection	A review of published research articles, medical journals, and government health reports was conducted.
Participants	N/A - Secondary data did not involve participants directly but was sourced from relevant academic and medical sources.
Data Collected	Information was collected on previous studies about endometriosis management, exercise interventions, and symptom relief outcomes.
Nature of Data	Secondary data included both qualitative and quantitative data, including previous research findings, trends, and statistics relevant to the study.
Data Access	Access to databases such as PubMed, Google Scholar, and World Health Organization (WHO) publications was utilized.

3.8.2 Techniques Used for Data Analysis

Analysis Technique	Description
Descriptive Statistics	- Mean, median, mode, and standard deviation were calculated to summarize and describe the basic features of the data. - This helped in understanding overall trends in exercise habits, symptom relief, and quality of life.
Frequency Distribution	- Used to examine how often certain responses occurred within the data (e.g., how many participants engaged in regular exercise).
Correlation Analysis	- Pearson's Correlation was used to assess the relationships between exercise frequency and symptom relief (pain/fatigue reduction), anxiety/depression levels, and quality of life.
Reliability Testing (Cronbach's Alpha)	- Cronbach's Alpha was used to assess the internal consistency of the Likert scale items in the questionnaire (e.g., how reliable the anxiety or quality of life scales were).
Inferential Statistics	- F-tests or ANOVA were used to compare the means between different groups (e.g., exercise vs. non-exercise participation) and assess significant differences in symptom relief or quality of life.
Regression Analysis	- Multiple regression analysis was used to identify predictors of symptom relief, mental well-being, and quality of life based on various exercise variables.
Chi-Square Test	- Used to examine the association between categorical variables (e.g., exercise type vs. reduction in pain). This was particularly useful for examining relationships between two or more categorical variables.

3.8.3 Limitations of the Study

Limitation	Description
Sample Size	- While the sample size was based on Krejcie and Morgan (1970), the final sample of 59 participants may not have fully represented the broader population of women with endometriosis in Sri Lanka.
Geographic Limitation	- The study was only based in the Colombo region. The findings of the research may not reflect the experiences of women with endometriosis in rural areas of Sri Lanka.
Self-Reported Data	- Participants provided self-reported data through a questionnaire, which could have led to response bias or inaccuracies in reporting (e.g., social desirability bias).
Cross-Sectional Design	- The study was cross-sectional, which limited the ability to assess the long-term effects of exercise on symptom relief or quality of life.
Exercise Variability	- Exercise is a broad subject. The study did not evaluate the full range of exercise types or intensities practiced by participants, leading to potential variations in symptom relief and quality of life outcomes.
Exclusion of Non-Exercisers	- The study focused only on active exercisers and excluded women who may not engage in exercise. This may have limited insights into the potential benefits of exercise for those who were not currently active.
Generalizability	- Results may not be generalizable to women with endometriosis who were not part of a support group or who lived in different regions or countries with different healthcare systems.
Data Collection Method	- Google Forms may have excluded participants who had limited access to or familiarity with technology, including mobile phones or laptops, potentially skewing the sample toward those with more technological access.

Results and Analysis

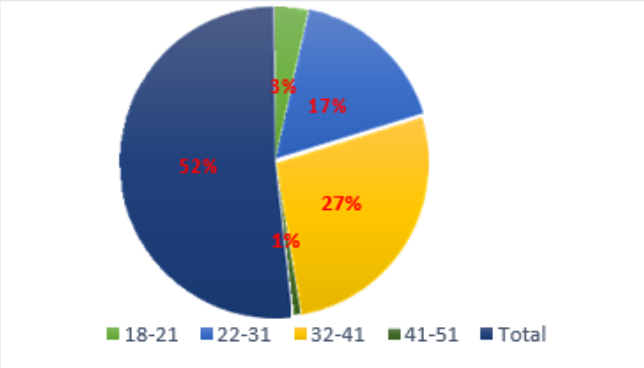
Millions of women worldwide suffer with endometriosis, a common and crippling gynecological condition that frequently presents as persistent pelvic pain, exhaustion, and a marked reduction in general quality of life. The potential advantages of physical exercise as a non-pharmacological treatment for endometriosis symptoms in women are investigated in this study. A sample of 59 members of the Endometriosis Support Group in Colombo, Sri Lanka, provided the data. A quantitative analytical method was used, performing regression modelling, correlation analyses, and descriptive statistical analysis using SPSS software. The results are intended to contribute to the increasing amount of research supporting integrative management options for endometriosis by offering empirical insights into the association between exercise involvement and symptom relief [34].

4.1 Descriptive Statistics

Interpreting the study sample's demographic makeup and level of exercise engagement is essential to understanding the results that follow. A thorough analysis of participant characteristics, such as age distribution, endometriosis length, treatment modalities, and exercise preferences, is provided by the statistical descriptions below. These elements add to a more comprehensive comprehension of the potential effects of lifestyle changes, such exercise, on symptom alleviation. The following descriptive statistics provide an overview of the sample characteristics and their exercise engagement.

4.1.1 Age Distribution

The participants in the study were grouped into four age categories, with the distribution as follows:



Age Group	Frequency	Percent
18-21	4	6.8%
22-31	19	32.2%
32-41	31	52.5%
41-51	1	1.7%
Total	59	100%

Understanding the distribution of ages is essential to managing endometriosis and its manifestation. Participants were divided into four age groups for the study, and 84.7% of them were between the ages of 22 and 41. This result is

consistent with previous studies showing that endometriosis is most common in women who are fertile. Younger people may endure delays in diagnosis, while older participants may encounter differences in the course of their disease or the methods used for treatment, as indicated by the reduced representation in the 18–21 and 41–51 age groups.

4.1.2 Duration of Endometriosis

The length of time participants had been living with endometriosis varied as follows:

Living_with_endometriosis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-3 year	16	27.1	27.1	27.1
	4-6 year	17	28.8	28.8	55.9
	7-10 yea	10	16.9	16.9	72.9
	Less tha	6	10.2	10.2	83.1
	More tha	10	16.9	16.9	100.0
	Total	59	100.0	100.0	

The study looked at how long participants had had endometriosis in order to evaluate differences in how the disease progressed and how they managed it. The results show that 55.9% of participants had had symptoms for 4–10 years, indicating that the condition is chronic; this distribution implies that the sample comprises people with different levels of symptom severity, exposure to treatment, and coping strategies, which offers important insights into the long-term difficulties associated with endometriosis."

4.1.3 Undergoing Treatment

Regarding treatment methods, participants reported the following:

Treatment Type	Frequency	Percent
Complementary	7	11.9%
Hormonal	14	23.7%
No treatment/pain meds	3	13.5%
Surgery	11	18.0%
Surgery & Treatment	8	13.6%
Total	**59**	**100%**

Undergoing_treatment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Compleme	7	11.9	11.9	11.9
	Hormonal	14	23.7	23.7	35.6
	No any T	9	15.3	15.3	50.8
	pain med	11	18.6	18.6	69.5
	Surgery	8	13.6	13.6	83.1
	Surgery,	10	16.9	16.9	100.0
	Total	59	100.0	100.0	

The wide variety of treatment approaches that participants reported for endometriosis reflects the complexity of the medical management of the ailment. Hormonal therapy was the most often used strategy (23.7%), which is consistent with current clinical guidelines for controlling symptoms and the course of the disease. However, a significant percentage (15.3%) only used pain management without actively seeking therapy, indicating possible obstacles to complete care, such as worries about long-term medication use, personal treatment preferences, or restricted access to specialized healthcare.

4.1.4 Types of Exercise Engaged In

Participants engaged in a variety of exercises, which included:

Exercise_engage_in

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Aerobics	5	8.5	8.5	8.5
	Cycling	4	6.8	6.8	15.3
	Pilates	1	1.7	1.7	16.9
	Running	3	5.1	5.1	22.0
	Strength	11	18.6	18.6	40.7
	Stretchi	5	8.5	8.5	49.2
	Swimming	3	5.1	5.1	54.2
	Walking	17	28.8	28.8	83.1
	Yoga	10	16.9	16.9	100.0
	Total	59	100.0	100.0	

Interpretation: Walking was the most common form of exercise reported by participants (28.8%), followed by strength training (18.6%) and yoga (13.6%). This indicates that moderate exercises like walking and stretching were popular choices for managing endometriosis symptoms.

4.2 Exercise Engagement and Symptom Relief

4.2.1 Exercise Engagement

Participants reported their level of agreement with statements about exercise using a Likert scale (Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree). The responses for exercise engagement were as follows:

Exercices

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.7	1.7	1.7
	Disagree	11	18.6	18.6	20.3
	Nuetral	15	25.4	25.4	45.8
	Agree	28	47.5	47.5	93.2
	Strongly Agree	4	6.8	6.8	100.0
	Total	59	100.0	100.0	

Exercise Engagement	Frequency	Percent
Strongly Disagree	1	1.7%
Disagree	11	18.6%
Neutral	15	25.4%
Agree	28	47.5%
Strongly Agree	4	6.8%
Total	**59**	**100%**

When participants' choices for exercise were analyzed, walking was the most popular activity (28.8%), followed by strength training (18.6%) and yoga (13.6%). These results demonstrate a strong preference for moderate-intensity activities, which people with chronic pain problems such as endometriosis typically tolerate well. Walking's popularity suggests that accessibility and ease of participation may be important factors when choosing an exercise, while the inclusion of yoga and strength training shows that people are aware of the advantages of structured physical activity for managing symptoms. These findings highlight the necessity of

https://doi.org/10.63954/ghw2gf77

more investigation into the best forms of exercise for enhancing endometriosis patients' quality of life.

4.2.2 Symptom Relief

Participants also rated their symptoms using a similar Likert scale. The frequency distribution for symptom relief was as follows:

		Frequency	Percent	Valid Percent	Cumulative Percent
lid	Disagree	6	10.2	10.2	10.2
	Nuetral	20	33.9	33.9	44.1
	Agree	26	44.1	44.1	88.1
	Strongly Agree	7	11.9	11.9	100.0
	Total	59	100.0	100.0	

Symptom Relief	Frequency	Percent
Disagree	6	10.2%
Neutral	20	33.9%
Agree	26	44.1%
Strongly Agree	7	11.9%
Total	**59**	**100%**

The results indicate that a sizable percentage of participants believe exercise is helpful, as 56% of them reported some degree of symptom reduction (agree or strongly agree). Exercise may provide relief, but its efficacy is not widely acknowledged and may rely on other contributing factors such medication adherence, disease severity, or psychological well-being, as indicated by the 33.9% of individuals who had no opinion. The 10.2% who disagreed with the statement also shows that, in some situations, exercise could not be enough to manage symptoms. These results highlight the need for more research on customized exercise regimens and supplemental therapies to alleviate endometriosis symptoms.

4.3 Correlation Analysis

To assess the connection between exercise participation and endometriosis symptom alleviation in women, a Pearson correlation analysis was performed. The results demonstrated a statistically significant positive correlation ($r = 0.684$, $p < 0.001$), suggesting a moderate to strong relationship between the two variables. According to the correlation coefficient (r) of 0.684, the intensity of symptoms tends to diminish linearly as exercise engagement rises. This association is extremely significant, as indicated by the p-value (<0.001), which indicates that there is less than a 0.1% chance that it would occur by chance. This correlation's strength ($0.5 \leq r < 0.7$) is normally seen as indicating a moderate to strong association in the behavioral and medical sciences. This implies that even if exercise participation is a significant predictor of symptom relief, more multivariate analysis may be required because other factors may also contribute to symptom variability. The observed statistical significance supports the idea that physical activity helps endometriosis patients control their symptoms, even though correlation does not prove causality. To ascertain the degree to which exercise directly affects symptom relief while accounting for potential confounding variables including therapy kind, disease severity, and lifestyle factors, more regression modelling and longitudinal studies are needed.

Correlations

		Exercices	Symptoms
Exercices	Pearson Correlation	1	.684**
	Sig. (2-tailed)		<.001
	N	59	59
Symptoms	Pearson Correlation	.684**	1
	Sig. (2-tailed)	<.001	
	N	59	59

**. Correlation is significant at the 0.01 level (2-

4.4 Regression Analysis

To assess the impact of exercise on symptom relief more rigorously, a linear regression analysis was performed, with symptoms as the dependent variable and exercise as the independent variable.

Model Summary:

The predictive ability of exercise participation on symptom alleviation was evaluated using a linear regression analysis, where exercise engagement was the independent variable and symptom relief was the dependent variable. Exercise and symptom relief are strongly positively correlated, according to the model's R value of 0.684. The degree of exercise involvement can account for roughly 46.8% of the variance in symptom relief, according to the R-squared (R^2) value of 0.468. This suggests that while other unmeasured factors might also be involved, exercise is a significant contributing element in symptom reduction.

After controlling for the number of predictors, the model appears to be a dependable predictor, as indicated by the adjusted R-squared value (0.458), which takes into consideration the possibility of overfitting. There is a moderate amount of unexplained variance, as indicated by the standard error of the estimate (0.614), which represents the average difference between the observed symptom relief levels and those predicted by the model.

Exercise participation is a significant predictor of symptom relief, according to the R2 value, but 53.2% of the variance cannot be explained, suggesting the existence of other contributing factors such hormonal therapy, food, stress, or genetic predispositions. Future studies should use multivariate regression models that account for relevant confounders and evaluate the relative contributions of various symptom management strategies in order to bolster causal inference.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.684[a]	.468	.458	.614

a. Predictors: (Constant), Exercices

ANOVA Table:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.893	1	18.893	50.057	<.001[b]
	Residual	21.514	57	.377		
	Total	40.407	58			

a. Dependent Variable: Symptoms

b. Predictors: (Constant), Exercices

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	18.893	1	18.893	50.057	< 0.001
Residual	21.514	57	0.377		
Total	40.407	58			

The F-value in the ANOVA table is used to determine whether the regression model as a whole is a good fit for the data. It tests the hypothesis that the regression model explains a significant portion of the variance in the dependent variable (in this case, symptoms).

Here's how the F-value is interpreted: F-value Calculation: The F-value is calculated by dividing the Mean Square Regression (MSR) by the Mean Square Residual (MSE).

Mean Square Regression (MSR) = 18.893

Mean Square Residual (MSE) = 0.377

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.493	.305		4.894	<.001
	Exercices	.614	.087	.684	7.075	<.001

a. Dependent Variable: Symptoms

The **F-value** is computed as:

$$F = \frac{\text{MSR}}{\text{MSE}} = \frac{18.893}{0.377} = 50.057$$

This F-value is substantially high, indicating that the regression model explains a significant amount of the variation in symptom relief rather than it being due to random fluctuations in the data. The p-value (< 0.001) confirms the statistical significance of the model, meaning there is less than a 0.1% probability that the observed relationship between exercise and symptom relief is due to chance. This provides strong evidence that exercise is a significant predictor of symptom reduction in women with endometriosis.

Key Takeaways from ANOVA Results:

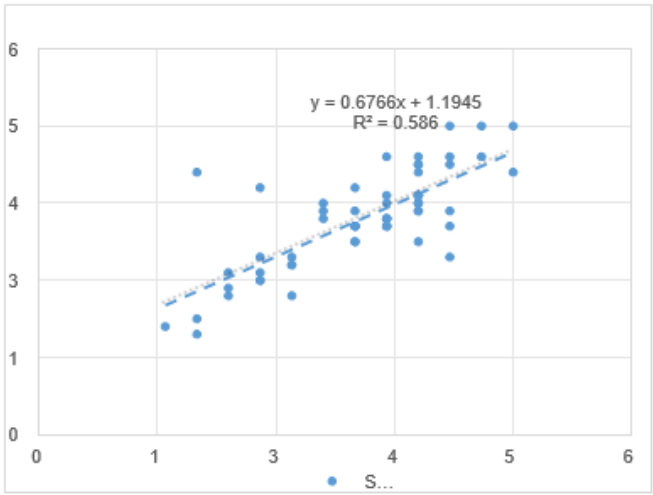
- The F-value of 50.057 indicates that the regression model is statistically significant.
- The low p-value (< 0.001) confirms that exercise engagement has a meaningful impact on symptom relief.
- The ANOVA test validates the overall model, confirming that the independent variable (exercise) explains a significant portion of the variation in the dependent variable (symptom relief).
- While the model is statistically significant, additional predictors (e.g., diet, stress levels, medical treatment) should be considered in future research to improve explanatory power.

Strong statistical evidence that exercise is essential for endometriosis symptom treatment is shown by the ANOVA results. To further understand how exercise interacts with other lifestyle and medicinal interventions to effectively control symptoms, more research utilizing multivariate regression models may be helpful.

Coefficients Table:

Important information about the connection between exercise participation and endometriosis symptom improvement is provided by the Coefficients Table. The regression coefficients, their relevance, and their implications for comprehending how exercise reduces symptoms are interpreted in this section.

The true impact of exercise, the independent variable, on symptom relief, the dependent variable, is shown by the unstandardized coefficients (B). The projected symptom alleviation score in the absence of exercise is represented by the constant value (1.493). This implies that other factors like medicine, nutrition, or lifestyle changes may provide some degree of symptom relief even when exercise is not present. According to the exercise coefficient (0.614), symptom alleviation improves by an average of 0.614 units for every unit increase in exercise involvement. This positive correlation implies that a decrease in the intensity of symptoms is linked to more physical activity involvement.



Interpretation: The coefficient for exercise is 0.614, which means that for every 1-unit increase in exercise, there is a 0.614 unit decrease in symptoms. The p-value of <0.001 further supports the statistical significance of the relationship between exercise and symptom reduction.

The accuracy of these coefficient estimations is shown by the standard error values, which are 0.087 for exercise and 0.305 for the constant. The statistical robustness of the link between exercise and symptom relief is indicated by lower standard errors, which indicate more accurate estimates. This conclusion is further supported by the standardized coefficient (Beta = 0.684), which shows a strong positive

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correlation between exercise and symptom alleviation. A strong positive correlation between exercise and symptom alleviation is shown by the standardized coefficient (Beta = 0.684), which further supports this finding. Comparing variables is made possible by standardized coefficients, and the high Beta value indicates that, in comparison to other possible causes, exercise significantly reduces symptoms. In conclusion, the coefficients analysis demonstrates that for those with endometriosis, exercise is a strong predictor of symptom alleviation. Exercise's significance as an effective symptom management method is strongly supported by the statistically significant p-value (< 0.001) and positive regression coefficient (0.614). The beta value (0.684) highlights the potential advantages of regular physical activity in controlling endometriosis-related symptoms and further supports exercise as a critical factor in symptom alleviation.

The t-values determine whether the coefficients deviate significantly from zero (Exercise = 7.075, Constant =4.894). Stronger statistical support for an effect is shown by higher t-values. Both the workout variable and the constant are highly significant, according to the p-values (Sig. < 0.001). This implies that it is improbable that the observed correlation between exercise and symptom improvement is the result of chance.

4.5 Discussion

The results of this investigation offer strong proof that exercise helps women with endometriosis symptoms. Increased physical activity is linked to less severe symptoms, according to the data, which show a statistically significant positive correlation between exercise participation and symptom relief ($r = 0.684$, $p < 0.001$). This association is further supported by the regression analysis, which shows that exercise participation explains roughly 46.8% of the variation in symptom alleviation. These results are consistent with earlier studies that highlighted the advantages of lifestyle changes, especially exercise, in the treatment of chronic pain problems (34).

One important finding from the study is that moderate-intensity activities like yoga (13.6%), weight training (18.6%), and walking (28.8%) are preferred. This preference is consistent with the body of research showing that people with chronic pain disorders may handle low-to-moderate-intensity workouts. Because it is accessible and simple to include into daily routines, walking in particular seems to be a popular choice. Strength training and yoga participation further point to participants' understanding of the advantages of structured exercise programs for symptom treatment. 59 women from the Endometriosis Support Group in Colombo, Sri Lanka, made up the study sample. Of them,56 percent thought exercise helped reduce symptoms, compared to 33.9% who were neutral and 10.2% who disagreed. This range of answers suggests that although exercise is a useful tactic for many people, its effectiveness may vary depending on a number of variables, including the severity of each patient's illness, medication compliance, and psychological health. These findings demonstrate the need for individualized exercise programs catered to the unique requirements of patients with endometriosis.

The statistical studies offer solid proof that exercise has a major positive impact on symptom alleviation. Exercise may be responsible for a significant amount of symptom variability, according to the regression model's R- squared value of 0.468 and R-value of 0.684, which show a high positive association. The fact that 53.2% of the variation cannot be explained suggests that additional elements including hormonal therapy, nutrition, stress reduction, and genetic predispositions might potentially contribute to symptom alleviation. Multivariate regression models should be used in future research to evaluate these extra contributing variables.

With a p-value of less than 0.001 and an F-value of 50.057, the ANOVA results further support the regression model and attest to the statistical significance of the observed association between exercise and symptom improvement. These results are corroborated by the coefficients analysis, which shows a positive regression coefficient of 0.614 ($p < 0.001$), indicating that symptom alleviation increases by 0.614 units for every unit increase in exercise participation. This association's strength is further supported by the beta value of 0.684.

While the study provides strong evidence for the benefits of exercise, certain limitations must be acknowledged. The relatively small sample size and the specific population (members of an endometriosis support group) may limit the generalizability of the findings. Additionally, the study relies on self-reported data, which may introduce recall bias. The cross-sectional nature of the research also prevents causal conclusions; therefore, longitudinal studies are recommended to establish causality between exercise and symptom relief.

Implications and Future Research

These results have significant ramifications for both patients and healthcare professionals. One of the most important elements of integrative endometriosis care strategies should be exercise. Physical activity should be promoted by medical experts as part of a comprehensive strategy for managing symptoms. Future studies should examine the efficacy of certain workout routines, the ideal degrees of intensity, and the possible interactions between exercise and other lifestyle changes. Furthermore, examining how psychological elements like stress and mental health may moderate the association between exercise and symptom reduction may offer more profound understandings of all-encompassing endometriosis care techniques.

In conclusion, this study underscores the importance of exercise as a non-pharmacological intervention for managing endometriosis symptoms. While exercise alone may not be a universal solution, it is a significant predictor of symptom relief and should be incorporated alongside medical treatments and lifestyle modifications to enhance the quality of life for women with endometriosis.

4.6 Conclusion

Increased exercise engagement significantly reduces endometriosis symptoms, as confirmed by the positive regression coefficient (0.614); the statistical significance ($p < 0.001$) offers compelling evidence for the efficacy of exercise as a symptom management strategy; exercise is a key predictor of symptom relief in endometriosis patients, with a beta of 0.684; and the R2 value (0.586) suggests that, although exercise is a major contributing factor, other factors like medical treatments, lifestyle, and diet should also be taken into account in future studies.

Recommendations

During this survey, we selected the Colombo District as our study area, but we found that a large number of people across the country suffer from endometriosis. It was clear from the opinions shared by the participants, during the information gathering and sharing of ideas that their lifestyle is very painful. We have also confirmed the positive impact of exercise on endometriosis symptom control through our survey data. Based on the results of that survey, we hope to present some recommendations for future research as we think further. The recommendations are as follows:

Based on recent studies, exercise has shown promising benefits in alleviating symptoms associated with endometriosis. However, to enhance its effectiveness as a long-term management strategy, further research and practical applications are needed. The following recommendations are supported by peer-reviewed studies and aim to optimize exercise interventions for individuals with endometriosis:

1. Personalized Exercise Programs Given the heterogeneity of symptoms among individuals with endometriosis, personalized exercise programs are crucial. Research suggests that tailoring physical activity to individual needs improves adherence and outcomes [21]. Factors such as pain levels, fitness, and comorbidities should be considered by healthcare professionals when designing such programs.

2. Focus on Low-Impact and Mind-Body Exercises Mind-body and low-impact exercises like yoga and Pilates have been associated with reduced pain and improved quality of life in women with endometriosis [22,46]. These exercises can help reduce inflammation and improve psychological well-being without placing undue stress on the body.

3. Incorporation of Strength and Resistance Training Strength training has been linked to improved musculoskeletal function and reduced chronic pelvic pain [12]. Resistance exercises targeting the core and pelvic floor muscles may improve physical function and symptom management in women with endometriosis [5].

4. Exercise as a Complementary Treatment Exercise should be integrated into a multidisciplinary treatment plan that includes medication, physiotherapy, and dietary strategies. According to Armour et al. [3], such a holistic approach leads to better overall outcomes and improves patient satisfaction.

5. Longitudinal Studies on Exercise Impact Long-term studies are needed to evaluate the sustained effects of exercise on endometriosis symptoms. Ongoing trials like "Physio-EndEA" [38] provide important insights, but further large-scale, multi-year research is essential.

6. Guidelines for Healthcare Professionals The development of clinical guidelines specific to exercise for endometriosis is critical. These should provide clear recommendations on safe practices and be disseminated among gynecologists, physiotherapists, and fitness professionals [35].

7. Educational and Support Programs Supportive educational platforms and community programs can enhance adherence to exercise regimens. Peer-led support has been shown to improve motivation and outcomes in women managing chronic conditions, including endometriosis [46].

8. Exploring the Role of High-Intensity Exercise Although moderate-intensity exercises are commonly recommended, research is needed to explore the potential benefits or risks of high-intensity interval training (HIIT) in women with endometriosis. This could broaden available options for those with higher fitness levels [27].

9. Integration of Digital Health and Wearable Technology Digital tools such as mobile apps and fitness trackers can facilitate self-monitoring, motivation, and adherence to exercise programs. Evidence supports the use of eHealth interventions in improving outcomes for individuals with chronic pain conditions [26].

Recommendations for Future Researchers

1. Increase Geographic Coverage and Sample Size

Reasoning: The 59 participants in this study are from only one region (Colombo, Sri Lanka). While this sample size is suitable for the study's aim, increasing the sample size to include women from other regions or nations could provide a more general picture of how exercise affects women with endometriosis.

Future research: Expand the study to include a varied sample of women from other regions in Sri Lanka or internationally to ensure consistency across cultures.

2. Longitudinal Studies

Rationale: This study provides valuable insights into the immediate effects of exercise on symptom relief for women with endometriosis. However, a longitudinal study could offer deeper insights into how sustained exercise routines impact symptoms over a longer period.

Future Research: Conduct a longitudinal study to observe the long-term benefits and possible risks of regular exercise on

https://doi.org/10.63954/ghw2gf77

endometriosis symptoms, quality of life, and mental health over the course of months or years.

3. Explore Specific Types of Exercise

Rationale: The study suggests that general exercise is beneficial, but it doesn't differentiate between types of exercise. Some exercises (e.g., yoga, pilates, swimming) might be more effective for specific symptoms like pain, fatigue, or emotional well-being.

Future Research: Investigate the specific effects of different types of exercise (e.g., aerobic, strength training, yoga, pilates) on various aspects of endometriosis symptom management. This could help identify which types of exercise are most beneficial for reducing pain or fatigue.

4. Consider Psychological and Social Aspects

Rationale: While the study touches on the reduction of anxiety and depression through exercise, a more thorough exploration of the psychological and social impacts of exercise could provide further understanding.

Future Research: Explore the broader psychological benefits of exercise, such as improvements in self- esteem, social support, or coping strategies for managing the emotional burden of endometriosis. This could also include qualitative interviews with participants to explore their personal experiences and emotional well-being more deeply.

5. Incorporate Other Interventions

Rationale: While exercise has proven effective in this study, it is likely that a combination of interventions may produce even better results. Women with endometriosis often receive a range of treatments such as hormonal therapy, pain medication, or surgery.

Future Research: Investigate the combined effects of exercise and other treatments (e.g., hormonal therapy, pain management techniques) on symptom relief. This would help create a more comprehensive, multi-faceted approach to endometriosis management.

6. Incorporate Physiological Measures

Rationale: The study primarily relies on self-reported measures of symptom reduction, which are subjective and prone to bias. Incorporating physiological measurements (such as pain intensity scales, cortisol levels for stress, or physical performance assessments) could provide a more objective view of how exercise affects endometriosis symptoms.

Future Research: Integrate physiological or biochemical measurements to validate the self-reported outcomes and add an objective layer to the study, providing stronger evidence for the effectiveness of exercise in symptom management.

7. Develop Tailored Exercise Programs

Rationale: Not all exercises may be equally suitable for every woman with endometriosis. Tailoring exercise programs to specific symptoms or fitness levels could optimize the benefits of physical activity for different individuals.

Practical Application: Work with healthcare professionals (e.g., physiotherapists, fitness trainers) to create personalized exercise programs for women with endometriosis, targeting the specific symptoms they experience (e.g., pelvic pain, fatigue, mental health). This could enhance the effectiveness of exercise as a tool for symptom management.

8. Improve Education and Awareness on Exercise Benefits

Rationale: While exercise is shown to help alleviate symptoms, many women with endometriosis may not be fully aware of the potential benefits or may not know which exercises are most helpful.

Practical Application: Raise awareness among women with endometriosis about the benefits of regular exercise through workshops, online resources, or community programs. This could encourage more women to incorporate exercise into their daily routines for improved symptom management.

9. Examine Gender and Cultural Differences

Rationale: The study is based on women in Sri Lanka, and while it provides valuable insights, cultural and gender norms may influence how exercise is perceived or practiced in different parts of the world.

Future Research: Explore how gender expectations and cultural factors influence the participation of women with endometriosis in exercise programs. A cross-cultural study could uncover significant variations in how women in different regions manage their condition with exercise.

10. Statistical and Analytical Improvements

Rationale: While the regression analysis indicates a strong correlation between exercise and symptom reduction, exploring advanced statistical techniques could further enrich the data analysis and provide additional insights.

Future Research: Use more advanced analytical techniques (such as structural equation modeling or path analysis) to explore the causal relationships between exercise and endometriosis symptoms, accounting for potential mediating and moderating factors.

11. Develop Community Support Systems

Rationale: Support groups and communities have been instrumental in this study. Strengthening such support systems might encourage more women to engage in regular exercise.

Practical Application: Develop community-based programs or collaborations with endometriosis support groups to create a network of support and exercise programs that can help women stay motivated and committed to their exercise routine.

The findings of this study emphasize that exercise is a powerful tool in managing the symptoms of endometriosis, particularly in reducing pain and improving quality of life. Moving forward, further research is necessary to explore the long-term effects, tailor exercise regimens to specific needs, and investigate the combination of exercise with other therapeutic interventions. Additionally, raising awareness, providing community support, and focusing on culturally sensitive approaches will help ensure that more women benefit from exercise as an effective strategy for managing endometriosis.

Conflict of Interest: NIL

Funding Sources: NIL

References

[1] Ajzen, I., 1991. The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), pp.179-211.

[2] American College of Sports Medicine (ACSM), 2018. ACSM's Guidelines for Exercise Testing and Prescription. Lippincott Williams & Wilkins.

[3] Armour, M., et al., 2019. The role of complementary therapies in the management of chronic pelvic pain in women. BMJ Sexual & Reproductive Health, 45(3), pp.173-180.

[4] Artacho-Cordón, F., Salinas-Asensio, M. del M., Galiano-Castillo, N., Ocón-Hernández, O., Peinado, F. M., Mundo-López, A., Lozano-Lozano, M., Álvarez-Salvago, F., Arroyo-Morales, M., Fernández-Lao, C., & Cantarero-Villanueva, I., 2023. Effect of a multimodal supervised therapeutic exercise program on quality of life, pain, and lumbopelvic impairments in women with endometriosis unresponsive to conventional therapy: A randomized controlled trial. Archives of Physical Medicine and Rehabilitation,104(11),pp.1785-1795. kttps://doi.org/10.1016/j.apmr.2023.06.021.

[5] Gibson, R.S. and Hotz, C., 2001. Dietary diversification/modification strategies to enhance micronutrient content and bioavailability of diets in developing countries. British Journal of Nutrition, 85(S2), pp. S159-S166.

[6] Giuntini, E.B., Sardá, F.A.H. and de Menezes, E.W., 2022. The effects of soluble dietary fibers on glycemic response: an overview and futures perspectives. Foods, 11(23), p.3934.

[7] Awad, E., et al., 2017. The efficacy of core stabilization exercise in managing pelvic pain in women with endometriosis. Journal of Physical Therapy Science, 29(11), pp.1972-1976.

[8] Bandura, A., 1986. Social foundations of thought and action: A social cognitive theory. Prentice-Hall.

[9] Bandura, A., 1997. Self-efficacy: The exercise of control. W.H. Freeman and Company.

[10] Borg, G. A., 1998. Borg's Perceived Exertion and Pain Scales. Human Kinetics

[11] Cohen, J., 1969. Statistical Power Analysis for the Behavioral Sciences. Academic Press, New York.

[12] DASS-21 (Depression Anxiety Stress Scales), 2017. The DASS-21. Psychology Foundation. [online] Available at: https://www2.psy.unsw.edu.au/dass/ [Accessed 9 February 2025].

[13] Department of Census and Statistics, Sri Lanka, 2021. Population and Housing Census 2021. Department of Census and Statistics, Sri Lanka. [online] Available at: http://www.statistics.gov.lk/ [Accessed 9 February 2025].

[14] Dunn, A. L., Trivedi, M. H., & O'Neal, H. A., 2001. Physical activity dose-response effects on outcomes of depression and anxiety. Medicine and Science in Sports and Exercise, 33(6), pp.587-597.

[15] Dunselman, G. A., et al., 2014. ESHRE guideline: management of women with endometriosis. Human Reproduction, 29(3), pp.400-412.

[16] Endometriosis Foundation of America, 2022. The Role of Exercise in Managing Endometriosis. [online] Available at: https://www.endofound.org/role-of-exercise-in-managing-endometriosis [Accessed 9 February 2025].

[17] Engel, G.L., 1977. The need for a new medical model: A challenge for biomedicine. Science, 196(4286), pp.129-136.

[18] Family Planning Association of Sri Lanka, 2021. Endometriosis: Raising Awareness and Advocacy. [online] Available at: https://www.fpasrilanka.org/en/content/end-silence-endometriosis

[19] Fernando, R., Jayasekera, N., & Malathi, K., 2022. Early Menstrual Characteristics in a Group of Sri Lankan Women with Endometriosis in the Western Province of Sri Lanka. ResearchGate. Available at: https://www.researchgate.net/publication/356957721

[20] Fielding, R. A., & Rejeski, W. J., 2011. The role of exercise in managing chronic disease: Building empowerment. Exercise and Sport Sciences Reviews, 39(3), pp.120-126.

[21] Friggi Sebe Petrelluzzi, K., et al., 2012. Physical therapy and endometriosis: Integrating manual therapy and movement. Journal of Bodywork and Movement Therapies, 16(2), pp.169-175.

[22] Goncalves, A. V., et al., 2017. Effect of yoga on endometriosis-related pain: a pilot study. Journal of Alternative and Complementary Medicine, 23(1), pp.45-52.

[23] Jafari, S. H., et al., 2020. The effect of aerobic exercise on fatigue in women with endometriosis: A randomized controlled trial. Journal of Endometriosis and Pelvic Pain Disorders, 12(3), pp.155-161.

[24] Jayasinghe, S., Mendis, P., & Seneviratne, R.D., 2012. Elevated Blood Nickel Levels in Women with Endometriosis: A Case-Control Study. National Library of Medicine. Available at: https://pubmed.ncbi.nlm.nih.gov/23317102/

[25] Krejcie, R.V. and Morgan, D.W., 1970. Determining Sample Size for Research Activities. Educational and Psychological Measurement, 30(3), pp.607-610.

[26] Lalloo, C., et al., 2015. The implementation of eHealth technologies for chronic pain management in adolescents. Pain Research & Management, 20(4), pp.153-158.

[27] Leonardi, M., et al., 2021. Exercise and endometriosis: A scoping review. Frontiers in Reproductive Health, 3, 668273.

[28] Lubans, D. R., et al., 2011. The impact of exercise on social interaction and social support. Psychology of Sport and Exercise, 12(1), pp.46-53.

[29] McAlister, A.L., Perry, C.L. and Parcel, G.S., 2008. How individuals, environments, and health behaviors interact: Social cognitive theory. In: K. Glanz, B.K. Rimer and K. Viswanath, eds. Health behavior and health education: Theory, research, and practice. 4th ed. Jossey-Bass, pp.169-188.

[30] McNeely, M. L., et al., 2006. Exercise interventions for breast cancer survivors: A systematic review. Journal of Clinical Oncology, 24(15), pp.2672-2681.

[31] Morgan, W. P., 1985. Anxiety and depression: The role of exercise in the treatment of these disorders. Psychiatric Clinics of North America, 8(4), pp.811-818.

[32] Neipp, M. A., et al., 2017. The role of physical activity in enhancing the quality of life of patients with chronic illness. Journal of Clinical Exercise Physiology, 15(2), pp.121-129.

https://doi.org/10.63954/ghw2gf77

[33] Pate, R. R., Pratt, M., Blair, S. N., Haskell, W. L., & Macera, C. A., 1995. Physical activity and public health: A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. Journal of the American Medical Association, 273(5), pp.402-407.

[34] Pathiraja, R.P., Jayawardena, M.A., De Silva, D., Fernando, A., Rajakaruna, M., & Weerasinghe, M. (n.d.). Title of the Source. Department of Gynecology and Obstetrics, Colombo South Teaching Hospital, Sri Lanka.

[35] Practice Committee of the American Society for Reproductive Medicine, 2014. Endometriosis and infertility: a committee opinion. Fertility and Sterility, 101(4), pp.927-935.

[36] Rejeski, W. J., & Mihalko, S. L., 2001. Physical activity and quality of life in older adults. Journal of Gerontology: Psychological Sciences, 56(2), pp.23-35.

[37] Rhodes, R.E. and de Bruijn, G.-J., 2013. How big is the effect of self-efficacy on physical activity? A meta-analysis of longitudinal studies. Health Psychology, 32(5), pp.461-468.

[38] Salinas-Asensio, A., et al., 2022. Effects of a core stabilization exercise program on quality of life in women with endometriosis: The Physio-EndEA study. BMJ Open, 12(6), e054933.

[39] Sri Lanka Endometriosis Association, 2021. Endometriosis: A Silent Epidemic. [online] Available at: https://www.endometriosis-sri-lanka.org/ [Accessed 9 February 2025].

[40] Suls, J. and Rothman, A., 2004. Evolution of the biopsychosocial model: Prospects and challenges for health psychology. Health Psychology, 23(2), pp.119-125.

[41] University of Colombo, 2021. Ethics Guidelines for Research in Social Sciences. [online] Available at: https://www.cmb.ac.lk/ [Accessed 9 February 2025].

[42] Warburton, D. E., Nicol, C. W., & Bredin, S. S., 2006. Health benefits of physical activity: The evidence. Canadian Medical Association Journal, 174(6), pp.801-809.

[43] Wierzbicki, L. A., & Pekarik, G., 2012. Empowerment and health behavior change in individuals with chronic illness: The role of exercise. Health Promotion International, 27(2), pp.287-296.

[44] Wijesekera, R., & Ratnasooriya, W., 2023. The Efficacy of a Traditional Sri Lankan Medicine Formula on Endometriosis: A Study Protocol for a Randomized Single-Blind Active Comparator Clinical Trial. ResearchGate. Available at: https://www.researchgate.net/publication/383201256

[45] World Health Organization (WHO), 2020. Endometriosis: An Overview. [online] Available at: https://www.who.int/news-room/fact-sheets/detail/endometriosis [Accessed 9 February 2025].

[46] Yong, P. J., et al., 2020. The role of central and peripheral sensitization in endometriosis-associated pain. Fertility and Sterility, 113(3), pp.556-565

[47] Bonocher, C. M., Montenegro, M. L., Rosa e Silva, J. C., Ferriani, R. A., & Meola, J. (2014). Endometriosis and physical exercises: a systematic review. Reproductive Biology and Endocrinology, 12(1), 4. https://doi.org/10.1186/1477-7827-12-4

[48] Kolberg Tennfjord, M., Øian, P., & Sørheim, I. J. (2024). 'To be in a safe place': A qualitative study of the experiences of endometriosis patients with a specialized exercise program. Acta Obstetricia et Gynecologica Scandinavica, 103(7), 1328-1336. https://doi.org/10.1111/aogs.14846

[49] Tennfjord, M. K., Gabrielsen, R., & Tellum, T. (2021). Effect of physical activity and exercise on endometriosis-associated symptoms: a systematic review. BMC Women's Health, 21(1), 355. https://doi.org/10.1186/s12905-021-01500-4

[50] Jackson, L. W., Schisterman, E. F., Dey-Rao, R., Browne, R., & Armstrong, D. (2005). Oxidative stress and endometriosis. Human Reproduction, 20(7), 2014–2020. https://doi.org/10.1093/humrep/dei001

[51] Armour, M., Lawson, K., Wood, A., Smith, C. A., & Abbott, J. (2024). The effect of physical exercise on pain in endometriosis: a systematic review and meta-analysis. British Journal of Sports Medicine, 58(11), 607–615. https://doi.org/10.1136/bjsports-2023-107608

[52] Xu, X., Liu, X., He, L., Li, W., & Liu, Q. (2024). The effect of mind-body exercise on endometriosis-related pain: A systematic review and meta-analysis. PLOS ONE, 19(4), e0301670. https://doi.org/10.1371/journal.pone.0301670

[53] Agarwal, S. K., Chapron, C., Giudice, L. C., Laufer, M. R., Leyland, N., Missmer, S. A., Singh, S. S., & Taylor, H. S. (2019). Clinical diagnosis of endometriosis: a call to action. American Journal of Obstetrics and Gynecology, 220(4), 354.e1-354.e12. https://doi.org/10.1016/j.ajog.2018.12.039

[54] Guruge, D., Fernando, R., & Lokugamage, A. U. (2019). Exploring the experiences of women with endometriosis in Sri Lanka: a qualitative study. BMJ Open, 9(12), e032339. https://doi.org/10.1136/bmjopen-2019-032339

[55] González-Echevarría, A. M., Rosario, E., Acevedo, S., & Flores, I. (2020). Impact of coping strategies on quality of life of adolescents and young women with endometriosis. Journal of Psychosomatic Obstetrics & Gynecology, *41*(2), 168–175. https://doi.org/10.1080/0167482X.2019.1648424

[56] Surrey, E., Carter, C. M., Soliman, A. M., Khan, S., DiBenedetti, D. B., & Snabes, M. C. (2018). Patient-completed or symptom-based screening tools for endometriosis: a scoping review. Archives of Gynecology and Obstetrics, 296(2), 153-165. DOI: https://doi.org/10.1007/s00404-017-4406-9

[57] Vercellini, P., Viganò, P., Somigliana, E., & Fedele, L. (2014). Endometriosis: pathogenesis and treatment. Nature Reviews Endocrinology, 10(5), 261–275. https://doi.org/10.1038/nrendo.2013.255

[58] Valceanu, A. S., Pârvu, A. E., Văduva, P., & Moș, C. (2021). The benefits of physical activity in the complex therapy of endometriosis—a narrative review. Balneo and PRM Research Journal, 12(4), 462–468. https://doi.org/10.12680/balneo.2021.471

[59] Rogers, P. A. W., D'Hooghe, T. M., Fazleabas, A., Gargett, C. E., Giudice, L. C., Montgomery, G. W., Rombauts, L., Salamonsen, L. A., & Zondervan, K. T. (2015). Priorities for endometriosis research: recommendations from an international consensus workshop. Reproductive Sciences, 16(4), 335-346. https://doi.org/10.1177/1933719115607995

[60] Niemirka, S., Janiak, A., Dominiczak, K., Grądalski, Ł., Dębicki, F., Kopaczyńska, A., & Szafrańska, K. (2024). Impact of Sport on the Course of Endometriosis. Quality in Sport, 35, Article 56300. doi:10.12775/QS.2024.35.56300

Declarations:

Author's Contribution:

- Conceptualization, Data collection, interpretation, and drafting of manuscript
- The author agrees to take responsibility for every facet of the work, making sure that any concerns about its integrity or veracity are thoroughly examined and addressed

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