EXERCISES FOR FEMALES WITH PRIMARY DYSMENORRHEA: NARRATIVE REVIEW

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ABSTRACT

Objectives: Primary dysmenorrhea is common gynecological illness in reproductive years of women, regardless of age and race. It is widespread among adolescent women and about 40–50% complaining from it. Exercise is the safest and effective therapy for relief the pain of primary dysmenorrhea.

We conducted a 10-year narrative study to review the published findings on the effect of various forms of therapeutic exercises on primary dysmenorrhea over the last ten years.

Methods: An electronic search, for primary and secondary studies published from 2010 to 2020, was performed on the databases of PubMed, Cochrane library, PEDro, and Google scholar using the keywords "exercises", "primary dysmenorrhea", "menstrual pain", and "therapeutic exercises". Also, a manual search for relevant journals and reference lists of primary articles was performed.

Results: Most studies reported a positive effect of therapeutic exercise on relieving menstrual pain.

Conclusion: Therapeutic exercises can be a beneficial and healthy treatment choice for girls and women with primary dysmenorrhea as they reduce pain severity and duration.

Keywords: "Primary dysmenorrhea", "Menstrual pain", "Exercises", "Physical activity", "therapeutic exercises".

I. INTRODUCTION:

Dysmenorrhea is menstrual pain, menstrual cramps, or painful cycles [1]. Dysmenorrhea is a painful condition that affects the lower abdomen that is often accompanied by dizziness, headaches, sweating, exhaustion, backache, nausea, vomiting, diarrhea, all of which appear just during or before menstruation [2].

The endometrium releases an excess amount of prostaglandin, which causes primary dysmenorrhea symptoms and pain. Elevated prostaglandins lead to contractions of the myometrium, pain, lowering blood supply and oxygen to the uterus. The prostaglandin F2α levels are mainly elevated during the 1st and 2nd day of the menstruation in females with primary dysmenorrhea [3].

Adolescent girls' withdrawal from school and activities is impacted by dysmenorrhea. Around the world, up to 90% of adult girls and more than half of menstruating women suffer from it, with 10–20% of them describing their pain as extreme and distressing [4]. Adolescents who complain from extreme dysmenorrhea have a poorer quality of life and are more vulnerable to stress and anxiety [5]. Dysmenorrhea is pain that begins in the lower abdomen and radiates to the lower back and thighs, and the suprapubic area [6].
The two forms of dysmenorrhea are primary and secondary dysmenorrhea. Primary dysmenorrhea is a pain sensation that develops within 1 year of menarche and is not caused by a pelvic condition. Menstrual pain that happens years after menarche and is caused by an underlying problem is known as secondary dysmenorrhea [7].

The excessive production of uterine prostaglandins, particularly prostaglandin factors (PGF 2 and PGF 2a), has been known as the most common reason of the rise of the uterine tone and high-amplitude contractions. Progesterone induces prostaglandin production: as progesterone levels drop even before menstruation, prostaglandin levels increase [8].

Strong evidence is demonstrated by 73 randomized controlled trials (RCTs), that encourages the use of NSAIDs (nonsteroidal anti-inflammatory drugs) as an effective therapy for primary dysmenorrhea; medications should be taken prior to the expected onset of menstruation and continued for two or three days [9]. Bed rest, application of heat packs, yoga, exercise, short-wave diathermy, Transcutaneous Electrical Nerve Stimulation (TENS), microwave diathermy, connective tissue massage, and acupressure are the non-medical interventions for primary dysmenorrhea [3].

Exercise is a physical activity that promotes or preserves physical fitness and general health. Cardiovascular health, bone mineral density, and dysmenorrheal symptoms and premenstrual syndrome are improved with exercise [10]. Young girls are motivated to engage in physical activity programs symptoms due to the Remarkable effect of exercises in reducing the negative impact of primary dysmenorrhea symptoms on their educational success, social, and even personal life [11].

Exercise is an essential part of many women's daily routine. It assists in the reduction of pain and stress, the elevation of mood, and the improvement of health [12].

Exercise leads to increase the release of many neurotransmitters, including natural endorphins (painkillers in the brain), dopamine, estrogen, and endogenous opiate peptides, in addition to altering hormone secretion reproduction and preventing the release of prostaglandins and increasing the estrone-estradiol ratio, which reduces endometrial proliferation and diverts blood supply away from the uterus [10].

Regular exercise can accelerate the transfer of prostaglandins as the main cause of menstrual pain from uterine muscle, which is one possible mechanism for reducing the duration of menstruation pain after exercise [13]. Another possible issue in this regard is that physical exercise induces the endorphins release, which is released by the brain, they can increase the pain threshold, and these materials, in turn, boost the body's pain threshold [14]. Other probable exercise mechanisms involve the release of endogenous opiates, specifically beta-endorphins, which cause vasodilation, suppression of prostaglandins, stress reduction, and mood elevation: mechanisms that reduce pain or uterine contractions, thus alleviating menstrual discomfort [15].

Regular exercise is encouraged for women who suffer from dysmenorrhea [16]. According to a study by Amour and colleagues (2019), exercise done for 45 to 60 minutes for 3 days a week or more, regardless of severity, can result in a reduction in the severity of menstrual pain of around 2.5 cm on a 10 cm visual analogue scale (VAS) [17].

The exercises effectiveness on females with primary dysmenorrhea was studied by many researchers. The evidence base of exercises on primary dysmenorrhea is not clear. Therefore, the optimal clinical decision-making to relieve pain in females with primary dysmenorrhea needs to be investigated. In this study, we will overview the best present literature to investigates the efficacy of exercises on females with primary dysmenorrhea. This narrative review is a trial to fill the gap of knowledge between clinical practice and research in using exercises for women complain from primary dysmenorrhea.

**II. MATERIALS AND METHODS:**

This narrative review was conducted for scoping on the efficacy of exercises on primary dysmenorrhea. It was carried out to provide medical professionals with as much knowledge as possible about the effect of therapeutic exercise on primary dysmenorrhea.

This narrative review was carried on an electronic search for primary and secondary studies published between 2010 to 2020, in PubMed, Cochrane Library, PEDro, and Google scholar databases using the keywords "Primary
III. RESULTS:

This review summarized the published studies during the last ten years about evaluating the effectiveness of various kinds of exercises on primary dysmenorrhea. These studies included participation with primary dysmenorrhea in females and excluded females with secondary dysmenorrhea from studies. Designs were used in these studies are any type of design. Interventions are any form of exercises (Stretching exercises, Isometric exercises, Aerobic exercises, Combined exercises, and Resisted exercises) as outlined in (Table 1).

Stretching exercises and dysmenorrhea:

Stretching exercises reduce pain severity, pain length, and the number of analgesic drugs were taken by girls who complain of primary dysmenorrhea [13, 18-20]. Gamit et al. (2014), demonstrated that the improvement in the blood flow and the uterus metabolism during stretching exercise was helpful in decreasing dysmenorrhea symptoms [21]. Performing 8 weeks at home (3 days/week and 2 times/day for 20-30 minutes) of stretching exercises can reduce pain intensity, diminishes pain duration, and decreases using the analgesics drugs in girls with mild-to-extreme primary dysmenorrhea during menstruation [13, 19, 22-24]. Stretching exercise of the abdomen reduce the intensity of dysmenorrheal pain [25, 26].

Isometric exercises and dysmenorrhea:

practicing isometric exercises 10 times a session twice per day for 8 weeks reduced the intensity and duration of menstrual pain. Isometric exercises are an useful non-pharmacological treatment for alleviating primary dysmenorrhea because they are simple, inexpensive, and time-consuming [27, 28].

Aerobic exercises and dysmenorrhea:

Aerobic exercise is a beneficial method for dysmenorrhea and other menstrual symptoms. Practicing aerobic exercise regularly via mental and physical relaxation can improve menstrual symptoms by improving blood flow [29-31]. Aerobic exercises control pain, enhance the quality of life, and daily function activity [32, 33]. Doing an aerobic exercises program (3 days/week, 45 min/day) for 8 weeks, reduced the intensity of menstrual pain [32, 34, 35].

Combined exercises and dysmenorrhea:

Combined exercise therapy (Isometric exercises and stretching techniques) is shown a beneficial effect on women who suffer from primary dysmenorrhea [11, 36]. Exercises have a favorable effect on dysmenorrhea symptoms, pain, and sleep quality [37, 38]. Combined exercise may be improving all aspects of health, including muscles, joints, and cardiovascular fitness, and is beneficial for pain reduction. Combined exercise can improve dynamic flexibility, intermuscular coordination, and movement efficiency [37, 39]. Combining aerobic exercises with pelvic rocking exercises reduces dysmenorrheal pain and improves the quality of life in girls complain from primary dysmenorrhea [40].

Other types of exercises:

Core stability exercises reduce pain severity, pain duration, and consumed analgesic drugs [41, 42]. Pelvic exercise, rather than prescription medications, should be used to treat primary dysmenorrhea [43]. Resisted exercises showed a favorable outcome of physical menstrual symptoms and their related hormones [44].

Table 1: The characteristics of the included studies demonstrating the effect of exercises on primary dysmenorrhea:

<table>
<thead>
<tr>
<th>Type of exercise</th>
<th>Author, Year</th>
<th>Design</th>
<th>Participations</th>
<th>Intervention</th>
<th>comparator</th>
<th>outcome</th>
<th>Assessement</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stretching</td>
<td>1-Shahr- jerdy et al., 2012 [13].</td>
<td>A quasi – experimen tal design</td>
<td>N=1447 Age=11-25 years old.</td>
<td>Stretching 7-250 gm</td>
<td>Control</td>
<td>Pain intensity</td>
<td>VAS (10-point scale)</td>
<td>Performing stretching exercises reduces</td>
</tr>
</tbody>
</table>
for 6 active stretching for 2 months (3 days per week) twice for 10 min. mefena mic acid
dysmenorrheal pain intensity, diminishes pain duration and decreases the consumption of analgesics drugs.

Isometric exercise

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>N</th>
<th>Isometric exercises</th>
<th>Control</th>
<th>Pain intensity</th>
<th>VAS</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Shavandi et al., 2010 [27]</td>
<td>RCT</td>
<td>98</td>
<td>Isometric exercises</td>
<td>Control</td>
<td>Pain intensity</td>
<td>VAS</td>
<td>A quasi-experimental study minimized the severity, duration of dysmenorrheal pain, and the amount of sedative medication used.</td>
</tr>
</tbody>
</table>

Aerobic exercise

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>N</th>
<th>Aerobic exercise</th>
<th>Control Except</th>
<th>Pain intensity</th>
<th>1,3,4-VAS</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Arora et al., 2014 [30]</td>
<td>RCT</td>
<td>476</td>
<td>Aerobic exercise</td>
<td>Control Except 2-NSAIDs</td>
<td>Pain intensity</td>
<td>1,3,4-Visual Analogue Scale. 2,6,7-McGill pain scale 5- Moo’s Menstrual Distress Questionnaire</td>
<td>Regular aerobic exercise, of appropriate intensity, frequency and duration results in a significant decline in the symptoms accompanied with menstrual pain.</td>
</tr>
</tbody>
</table>

Combined exercises

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>N</th>
<th>Combined exercises</th>
<th>Control</th>
<th>Pain intensity</th>
<th>VAS</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Mahvash et al., 2012 [11]</td>
<td>2:5-RCT</td>
<td>350</td>
<td>Combined exercises</td>
<td>Control 2-pelvic rocking exercises only. 3-NSAIDs</td>
<td>Pain intensity</td>
<td>1,4,5-VAS</td>
<td>The use of combined exercise therapy is more effective for treating symptoms of primary dysmenorrhea.</td>
</tr>
</tbody>
</table>
Core stability exercise s  
1-Shahrjerdi et al., 2019 [41].  
2- Koohestani et al., 2020 [42].

Pelvic rocking exercise s  
Abedel Azim & Mohamed, 2017 [43].

Resisted exercise s  
Moradpour 2019 [44].  
A quasi-experimental study  
N=20. age 20-23 years  
Resisted exercise  
Control  
Psychological and physical symptoms of dysmenorrhea  
Moo’s Menstrual Distress Questionnaire

Core stability exercise  
1-RCT  
N=64  
Age=13:5

Control  
Pain intensity  
1-numeric pain scale.  
2- Menstrual Symptom Questionnaire (MSQ) VAS

Core stability training used as a treatment to reduce the pain of dysmenorrhea.  
Pelvic rocking exercise was proven to be beneficial in decreasing pain severity in women with primary dysmenorrhea.  
Resisted exercises seem to be a practical method for reducing primary dysmenorrhea.

IV. DISCUSSION:

Alternative treatments for dysmenorrhea and its symptoms have been suggested, including exercise and physical activity [45].

This narrative review highlights the safest, simplest, and non-pharmacological therapy for primary dysmenorrhea. Stretching, aerobic exercise, free exercise, and competitive athletic performance have been thought to minimize or even eliminate primary dysmenorrhea for more than a half-century.

Several studies show a relation between therapeutic exercise and physical activity and a lower incidence of dysmenorrhea [46]. Furthermore, exercise decreased pain frequency, pain intensity, and the number of analgesics used [47]. Severity and duration of menstrual pain are reduced by performing 2 months of isometric exercise but do not affect the amount of bleeding [27]. Stretching training reduces the amount of radiated pain to the lumbar area and the adductor [48]. Stretching exercises were prescribed as an effective intervention and provided substantial improvement in pain sensation of dysmenorrhea due to its analgesic effect on pain [13, 19, 21, 23, 24,49]. Aerobic exercises reduce pain severity and improve somatic symptoms which have good effectiveness on the life quality of girls who complain of primary dysmenorrhea [34]. Some forms of aerobic exercise have been prescribed by health care professionals. such as walking, swimming, bicycling, and pelvic tilting, can increase blood flow, relax abdominal muscles, reduce pain of the pelvis, and relieve nerve centers pressure, and pelvic organs [32-34, 50].

Sports delay the onset of pain because of increasing blood flow on pelvis and faster transfer of waste products and prostaglandins from the uterus prior menstruation. Furthermore, regular exercise reduces stress, increases endorphins and nerve transducers, and improves blood circulation. Suppression of stress is the main common cause of the relation between physical exercises and the menstrual cycle [51]. Exercise which induces analgesia, is thought to be helped by an endocannabinoid-mediated method. Endocannabinoids are receptors that aid in
controlling pain transmission through the brain and spinal cord. Aerobic exercise elevates peripheral blood endocannabinoid concentrations, and activates cannabinoid receptors to produce analgesia [52]. Finally, exercise causes regulatory macrophages to be released in physically active muscles. Anti-inflammatory cytokines are secreted by these regulatory macrophages, which reverse the effects of activated macrophages that produce pro-inflammatory cytokines. So, physical activity lead to increase in anti-inflammatory cytokines, which are responsible for pain relief [53].

Today, non-medical methods are more common in treating dysmenorrhea. In this review, we provided much information for medical practitioners and women suffering from primary dysmenorrhea about therapeutic exercises and their types that help in relieving menstrual pain. We collected data that clarify the role and mechanism of different exercises in relieving the pain of primary dysmenorrhea.

V. CONCLUSION:
Most studies agreed in demonstrating that exercises and physical activity are an effective method for pain relief than control or placebo, and a remarkable difference was found between exercises and NSAIDs. In conclusion, performing exercises is safe, easy, inexpensive, not time-consuming, and non-pharmacological treatment for pain-relieving on primary dysmenorrhea.

Author’s contributors:
MGA and YMM conceived and designed the study. YMM conducted research, provided research materials, and collected organized data, and prepared the original draft. MGA and YMM analyzed and interpreted data. AMY, MGA, and YMM agreed with the manuscript’s results and conclusions. AMY, SME, MGA, and YMM were responsible for the critical revision of the manuscript and approved the final version submitted.

Declaration of Competing Interest:
The authors declared no potential conflicts of interest regarding the research or publication of this article.

Abbreviations:
PEDro: Physiotherapy evidence database.
PGF: Prostaglandin factor.
RCTs: Randomized controlled trials.
NSAIDs: Non steroid anti-inflammatory drugs.
TENS: Transcutaneous electrical nerve stimulation.
VAS: Visual analogue scale.

REFERENCES:


