Original Article

DOI: 10.7860/JCDR/2025/79063.21560

Role of Pelvic Floor Exercises and Dietary Supplementation in Primary Dysmenorrhoea among Adolescents: A Systematic Review

Physiotherapy Section

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ABSTRACT

Introduction: Primary Dysmenorrhoea (PD) is a common condition characterised by chronic pelvic pain related to menstruation. It affects 70-91% of teenagers, starting before menstruation and lasting 8-72 hours. Limited literature is available on sustainable physiotherapeutic non pharmacological interventions for PD, along with Dietary Supplementation (DS).

Aim: To evaluate the effectiveness of Pelvic Floor Exercises (PFE) and DS in managing PD among adolescents.

Materials and Methods: A systematic review was conducted at the Department of Physiotherapy, Galgotias University, Greater Noida, Uttar Pradesh, India, from May 2024 to September 2024. The review was registered with the International Platform of Registered Systematic Review and Meta-analysis Protocols INPLASY (INPLASY-202440098). A comprehensive search was conducted in online databases, including Google Scholar, PubMed, Scopus and Mendeley. Keywords related to "PFE," "diet," and "PD" were used. Only Randomised Controlled Trials (RCTs) published in English from 2014 to 2024 were included. The studies were screened using the Physiotherapy Evidence Database (PEDro) scale and only those with a score above five were selected.

Results: Six articles met the inclusion criteria, demonstrating that PFE and certain DS can alleviate menstrual pain in adolescents with PD. Significant results showed that PFE reduces pain intensity, while DS improves Quality of Life (QOL) and reduces pain levels.

Conclusion: The present systematic review highlights the potential role of PFE and DS in managing PD among adolescents. Incorporating these non pharmacological interventions into comprehensive treatment plans can provide a holistic approach to addressing menstrual pain and improving QOL for adolescents with PD.

Keywords: Chronic pelvic pain, Exercise therapy, Menstruation, Non pharmacological

INTRODUCTION

Pelvic Floor Dysfunction (PFD): Pelvic Floor Dysfunction (PFD) is a group of disorders that can disturb one's QOL and includes urinary incontinence, pelvic organ prolapses and chronic pelvic pain [1,2]. These conditions are prevalent in women, as they relate to various risks, including age, obesity and a history of childbirth [3]. Beyond physical health, the implications of PFD encompass psychological health and functionality, leading towards a comprehensive approach to the ailments in a primary healthcare environment [4]. The relationship between pelvic floor health and overall well-being is increasingly recognised as a matter of primary health care concern [5].

The PFEs, later referred to as Kegel exercises, play a critical role in strengthening the muscles supporting the pelvic organs, thereby enhancing urinary and reproductive functions [6,7]. Concurrently, DS has become an adjunctive approach to achieving optimal pelvic health and circumventing possible nutritional deficiencies that may limit muscle function and regeneration [8,9]. The present study aimed to investigate the synergistic effects of PFEs and DS on primary health outcomes, exploring how these interventions can be integrated into routine care to improve QOL for individuals dealing with PFD [10,11]. By analysing current literature and practices in clinical work, this study aims to form evidence-based recommendations for all healthcare practitioners and patients, emphasising the need for a holistic approach in pelvic health management.

The present systematic review aimed to evaluate the effectiveness of PFE in managing PD among adolescents.

Research questions

1. How effective are PFEs in reducing the severity and duration of pain associated with PD in adolescent females?
2. How effective are DSs in alleviating PD symptoms in adolescents?
3. How helpful is the combination of PFE and DS in managing the symptoms of PD in adolescents?

MATERIALS AND METHODS

Search strategy: The electronic databases searched for the present study were Google Scholar, PubMed, Mendeley and Scopus. The author used a combination of the Medical Subject Headings (MeSH) keywords: "pelvic floor, exercise therapy, DSs, diet, dysmenorrhoea, adolescent," utilising Boolean operators (AND/NOT/OR) as shown in [Table/Fig-1].

Name of the database	Keywords searched
Google Scholar	Pelvic floor, adolescent, dysmenorrhoea, Dietary Supplements (DS), diet, menstrual pain, physical therapy, teenage girls
PubMed	("Pelvic Floor"{MeSH} OR "Pelvic Floor") AND ("Exercise Therapy"{MeSH} OR "Exercise" OR "Physical Therapy") AND ("Dietary Supplements"{MeSH} OR "Supplements" OR "Nutrition") AND ("Diet"{MeSH} OR "Dietary Intervention") AND ("Dysmenorrhoea"{MeSH} OR "Menstrual Pain") AND ("Adolescent"{MeSH} OR "Teenagers" OR "Young Women")
Mendeley	Pelvic Floor Exercises, PD a, Adolescents, Exercise Therapy, Dietary Supplements, Teen Health and Menstrual Pain
Scopus	("Pelvic Floor" OR "Pelvic Floor Muscle Training" OR "PFMT") AND ("Exercise Therapy" OR "Physical Therapy Modalities") AND ("Dietary Supplements" OR "Nutritional Supplementation" OR "Micronutrients") AND ("Primary Dysmenorrhoea" OR "Menstrual Pain") AND ("Adolescents" OR "Teenage Girls" OR "Adolescent Females")

[Table/Fig-1]: Electronic databases and searched keywords.

The Population (P) under study includes adolescent females with PD, who have been involved in Randomised Controlled Trials (RCTs) featuring PFE and DS Interventions (I), compared to no intervention or standard Care (C), with the aim of measuring Outcomes (O) through changes in pain and QOL. Reviewers independently evaluated abstracts and titles from the search results to ensure they met the

inclusion criteria {Population, Intervention, Comparison, Outcomes and Study (PICOS)}, as shown in [Table/Fig-2] [12,13]. All titles and abstracts accepted for inclusion underwent full-text assessment. SB and MS conducted independent evaluations of the full texts to establish study eligibility. Any discrepancies between reviewers' assessments were resolved through a consensus approach.

Variables	Inclusion criteria	Exclusion criteria
Population (P)	Studies constituted of only adolescents, typically aged between 10 and 19 years [12,13]	Studies with participants outside the defined age range for adolescents
Intervention (I)	Studies that assess the impact of PFE and DS on PD	Exclude studies that focus on interventions unrelated to PFE and DS
	Study published in English and articles available in full text only	Language other than English, not full text available
Comparison (C)	PEDro score >5	PEDro score <5
Outcome (O)	The studies in which VAS scale is used	The studies in which VAS scale is not used
Type of study (S)	RCTs	All other studies

[Table/Fig-2]: Inclusion and exclusion criteria of selection of articles [12,13].

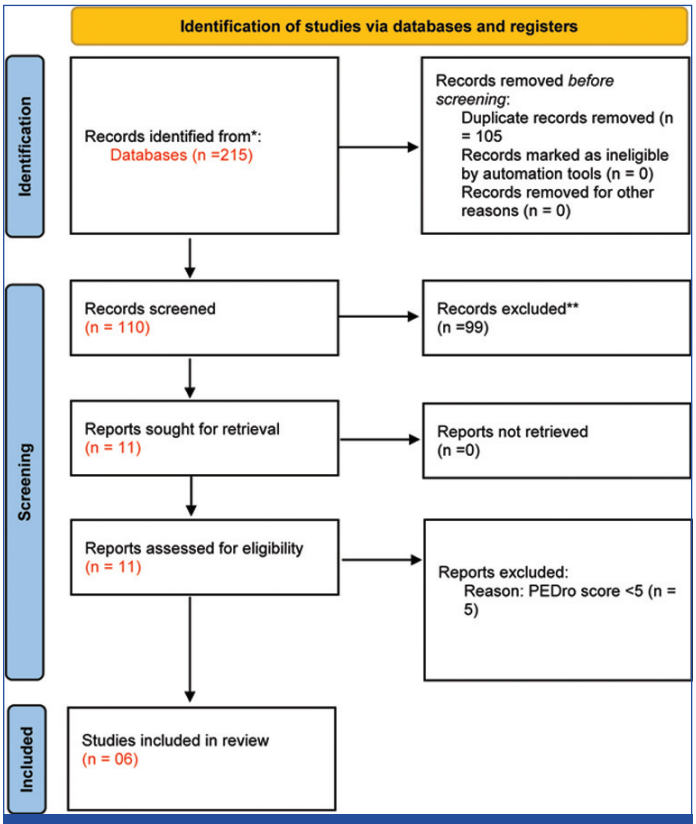
Data Screening and Extraction

Two reviewers (AC and YS) extracted data from the included studies and a third independent reviewer (JS) verified their findings. Point estimation was double-verified at the RCT analysis level. Each database search and the strategies used are listed in [Table/Fig-3].

S. No.	Databases	Total articles found
1.	Google Scholar	132
2.	Scopus	47
3.	PubMed	23
4.	Mendeley	13

[Table/Fig-3]: Data search through various databases using MeSH terminology.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) tool was used for the identification, screening and inclusion of articles, as shown in [Table/Fig-4]. Methodological quality was assessed using the PEDro scale, developed by the Centre



[Table/Fig-4]: PRISMA chart.

for Evidence-based Physiotherapy at the George Institute for Global Health. The PEDro scale provides a systematic and quantitative method for evaluating the internal validity and interpretability of clinical trials, facilitating the synthesis of high-quality evidence in systematic reviews and meta-analyses [14]. The methodological quality assessment of the included studies via PEDro is listed in [Table/Fig-5] [12,14-19].

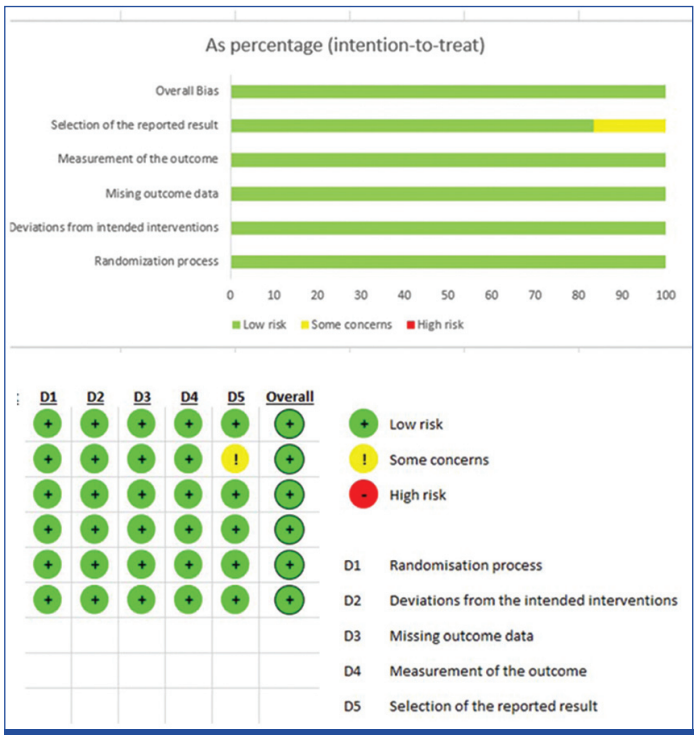
Authors	1	2	3	4	5	6	7	8	9	10	11	Score
Motahari tabri N et al., [15]	1	1	1	1	-	-	-	1	1	1	1	7/10
Saleh SH and Mowafy EH [16]	1	1	1	-	-	-	-	1	1	1	1	6/10
Mohamed HAA and Hafez AM [17]	1	1	1	1	-	-	-	1	1	1	1	7/10
Sandhiya M et al., [18]	1	1	-	1	-	-	-	1	1	1	1	6/10
Karacin O et al., [19]	1	1	1	1	-	-	-	1	1	1	1	7/10
Badran GMA [12]	1	1	-	1	1	1	1	1	1	1	1	9/10

[Table/Fig-5]: Methodological quality assessment of included studies via PEDro scale [12,14-19].

Risk of Bias Assessment

The RoB was evaluated using the Cochrane Risk of Bias Assessment Tool (ROB 2.0) [20]. The assessments were conducted separately by two reviewers (JS and MS) and their independent evaluations were compared. The researchers collaborated to address any discrepancies. Evaluating the risk of bias is essential to ensure the reliability and validity of studies investigating PFE and DS for PD in adolescents.

The domains assessed for the articles were: Randomisation process (D1), Deviations from intended interventions (D2), Missing outcome data (D3), Measurement of the outcome (D4) and Selection of the reported result (D5). Key sources of bias include selection, performance, detection, attrition and reporting biases, with green indicating a low risk of bias, yellow indicating some concern (moderate risk of bias) and red indicating a high risk of bias [Table/Fig-6].



[Table/Fig-6]: Risk of Bias (ROB 2.0) assessment through Cochrane tool.

RESULTS

All the databases extracted study titles and abstracts were reviewed after the initial search. After assessing the complete research texts deemed eligible in the final round of evaluation, six studies met

the inclusion criteria and quality standards based on the PEDro scale with a low risk of bias. The characteristics of all the included studies are listed in [Table/Fig-6]. A total of 1,141 adolescents were evaluated in the selected studies; however, six studies included those who met the inclusion criteria, which varied in sample size from 50 to 683 female adolescents. Individuals from various age groups and geographical locations participated in the selected RCTs, with studies conducted in Iran, India, Turkey and Egypt. The included articles were qualitatively assessed using the PEDro scale and risk of bias was assessed through the Cochrane ROB tool 2.0. The results from all studies indicate that PFE and DS had positive effects on PD among adolescents, as shown in [Table/Fig-6,7]. PFE helps in decreasing pain intensity, while DS enhances the efficacy of PD [12,15,16,18,19].

Pain Intensity

In most of the included trials, patient groups that engaged in pelvic rocking exercises showed a statistically significant decrease in pain intensity. The experimental group's pain intensity scores considerably reduced after the intervention throughout the first and second menstrual cycles, compared to the control group [17]. Pain was primarily assessed using the Visual Analogue Scale (VAS) score. The results revealed that physical exercise was more effective than control or other interventions for reducing pain intensity. Based on these findings, we believe there is substantial evidence supporting the efficacy of physical activity in alleviating discomfort. PFE significantly reduces pain intensity.

Duration of pain: The duration of pain was not measured in all studies; from the six RCTs, only three studies measured this variable and found a major decrease in pain duration [12,15,16,18].

Authors (year)	Study design	Participants	Pain intensity	Objective of study	Intervention	Duration of the study	Duration and frequency of exercise and diet	Outcome measure	Result	Conclusion
Motahari-Tabari N et al., (2017) [15]	RCT convenience sampling	122 females exercise group n=61 mefenamic acid group n=61	Stretching exercise help in decrease pain intensity.	This study examined the impact of mefenamic acid and stretching exercises on the improvement of pain and menstrual symptoms in patients with PD.	Exercise group 5-minute warm-up, 6 belly and pelvic stretching exercises The mefenamic acid group-received 250 mg capsules	Over 5 months	15 minutes, three times a week for 8 weeks 250 mg capsules every 8 hours for 8 weeks	The pain was assessed by VAS Questionnaire	Major pain was more common in the exercise group only in the first cycle. The difference in pain relief in the second cycle was greater in the exercise group than in the mefenamic group	Mefenamic acid was found to be ineffective in treating PD compared to stretching exercises. The results indicate that exercise has a cumulative beneficial effect on reducing menstrual pain.
Saleh SH and Mowafy EH (2016) [16]	RCT convenience sampling	126 females Group-A active stretching – 44 Group-B core strengthening - 44 Group C control group - 38	Stretching exercise help in decrease pain intensity.	To demonstrate that physical activity can effectively treat PD, two types of exercises—stretching and core strengthening—will be used.	Group-A (stretching exercises) - pelvic bridging, plank Group-B (core strengthening)- cat and camel, curl up	16 months	Group-A - For 8 weeks, 3 days a week and 3 times a day for 10 minutes each. Group-B - 3 times a week for 20 minutes, 4 days a week	A self-design questionnaire VAS for pain intensity	The exercise groups' pain intensity and duration were considerably reduced when compared to the control group	
Mohamed HAA and Hafez AM (2017) [17]	RCT A quasi-experimental research convenience sampling	100 adolescent's girls Group-A experimental n=50 Group-B control group n=50	Experimental group's pain intensity scores considerably reduced after the intervention throughout the first and second cycles as compared to the control group, which engaged in pelvic rocking exercises.	The objectives of the study are to determine how pelvic rocking exercises affect PD in teenage girls and to lessen pain and the need for analgesics.	Experimental group – Pelvic rocking exercise and analgesic tablets Control group-follow their routine care	More than 2 months	Not clearly mentioned	Self-administered questionnaire VAS for pain intensity measurement Follow-up sheet	In the first and second cycles after intervention experimental group's pain intensity decreased in comparison to the control group and reduced the length of menstrual flow, the number of analgesic tablets and the duration of discomfort between groups	It can be stated that applying pelvic rocking exercises to teenage girls with PD Therefore, one non pharmacological way to treat PD is to perform pelvic rocking exercises.
Sandhiya M et al., (2021) [18]	RCT	60 females Group-A strengthening n=30 Group-B stretching n=30	PFE along with stretching exercise help in decrease pain intensity.	The study's objective is to evaluate how PFME affects women QOL with PD.	Group-A - Seated Transverse repeated 10 times with 5 sets per day. Approximation Exercise Perform 25 times Pelvic Tilt 10 seconds Repeat for 25 times Group-B Pelvic Stretching -Repeat 5 times. Pelvic Rocking -repeat 5 times Kegel Exercise - 3 reps 3 times a day	2 months	25 repetitions with 5-10 seconds per repitition. Approximately 5 repetitions of each exercise type for 3-5-10 min	VAS McGill pain questionnaire Pelvic Floor Distress Inventory Questionnaire (PFDI)	It was discovered that PFE with stretching exercises, significantly improved the QOL and reduced pain in females with PD	The QOL for women with PD is enhanced by both of the combined training of the PFM However, Group-A strengthening group receives a more effective combined exercise routine.

Karacin O et al., (2016) [19]	RCT opaque envelopes Cohort	683 women Group-A dysmenorrhoea n= 184 Group-B control n= 184	-	By measuring serum 25-hydroxyvitamin D3 levels in a cohort of young Turkish women with PD and healthy controls, this study seeks to determine if vitamin D insufficiency may play a role in PD.	Group-A dysmenorrhoea – asked about the intake of dairy products like milk, butter, yogurt and cheese daily. Group-B control group- healthy female without dysmenorrhoea	1 year	1 cup of milk or yogurt, 2 tablespoons of butter, or 2 tablespoons (or ¼ cup) of cheese	VAS A chemilum-inescent test 25- hydroxy-vitamin D3. Intra-assay and inter-assay Coefficients of Variation (CVs) for vit D Intra-assay and inter-assay CVs for parathormone	Compare all the characteristics of both groups. Group-A has more bleeding, patients with dysmenorrhoea had a negative correlation between their menarche age and serum 25-hydroxyvitamin D3 levels and a positive and significant correlation between their VAS ratings and Body Mass Index (BMI).	The substantial decline in the serum vitamin D levels of dysmenorrhoea patients suggests a potential role for vitamin D deficiency in PD, as does the large and positive connection between vitamin D levels and VAS ratings.
Badran GMA (2022) [12]	RCT Double-blind	50 female college students experimental group n=25 control group n=25	The results were more favourable in the Calcium-vitamin D group in terms of pain intensity.	The current study aims to investigate the relationship between vitamin D and the severity of dysmenorrhoea and menstrual blood loss.	The experimental group - 300,000 IU of vitamin D (six pills, 50,000 IU), The control group- six doses of placebo taken orally.	2 months	6 pills, 5 days before menstrual cycle	VAS Four-point Likert scale Verbal multidimensional scoring system (VMS) The Pictorial Blood Assessment Chart (PBLAC) Serum concentrations of calcium and 25(OH)D.	The experimental group's mean scores on the VAS and VMS during the first and second menstrual cycles significantly decreased as a result of the intervention, but not the means score on the PBLAC.	The findings suggest that taking a vitamin D supplement could lessen the intensity of PD and the requirement for analgesics. On the other hand, vitamin D supplementation had no discernible impact on menstrual-related blood loss.

[Table/Fig-7]: Characteristics of included studies [12,15-19].

Vitamin D

The findings from [12] suggest that taking a vitamin D supplement could lessen the intensity of PD and the need for analgesics. However, vitamin D supplementation had no discernible impact on menstrual-related blood loss. The experimental group's mean scores on both the VAS and VMS during the first and second menstrual cycles significantly decreased as a result of the intervention, but the mean score on the PBLAC did not change. The substantial decline in serum vitamin D levels in dysmenorrhoea patients indicates a potential role for vitamin D deficiency in PD, supported by the strong positive correlation between vitamin D levels and VAS ratings. Following the intervention, patients with dysmenorrhoea exhibited a negative correlation between their age at menarche and serum 25-hydroxyvitamin D3 levels, as well as a positive and significant correlation between their VAS ratings and BMI [19]. [Table/Fig-7-9] provide a summary of the studies included in the review [12,13,15-19,21-35].

Pelvic Floor Exercises (PFE)	Procedure
Pelvic rocking exercise	Place your hands and knees on the ground. Lie on the back with the feet flat on the floor and tilt the hips. The muscles in the buttocks and lower abdomen need to be tightened. While pressing the back onto the floor. Relax 30 seconds and repeat 5 times [13].
Kegel exercises	Make sure your bladder is empty, then sit or lie down. Tighten your PFM. Hold tight and count for 3 to 5 seconds. Relax the muscles and count for 3 to 5 seconds. with 10-15 repetitions 3 times a week [21]
Flutter exercises	Squeeze the pelvic muscles and relax them as quickly as possible for 10 contractions. It is recommended 3 times a day [22]
Pelvic tilt	The patient is in flexed supine position. Ask them to raise the pelvis off the plinth with arm positioned by the side. Preserve this position for 10 seconds Repeat for 25 times [18]
Pelvic bridging	The subject lie supine with the knee flexed then enhanced the pelvic upward until comfort then kept that for 5 sec, repetition had been 10 instances [16]

[Table/Fig-8]: Various Pelvic Floor Exercises (PFE) was found in interventional studies through a literature review [13,16,18,21,22].

Vitamin	Result
Vitamin D	Vit D has anti-inflammatory properties via regulating prostaglandin levels [23,24] Vitamin D may be beneficial for the positive effect on dysmenorrhoea with several mechanisms [31] A systematic review examines the effectiveness of vitamin D supplementation in any form or dose to reduce the severity of PD [25]
Vitamin B1	Vitamin B1 influences haematopoiesis, the body's neural activity, muscle tone and carbohydrate metabolism [26] Many studies show that vitamin B1 and fish oil reduce symptoms of dysmenorrhoea separately and have limited side effects compared with other drugs [27]
Vitamin K	(Vit K) has been used to treat dysmenorrhoea with success, resulting in quicker pain alleviation and an improved QOL [28]
Vitamin E	Numerous investigations to date have demonstrated that vitamin E supplementation can both lessen blood loss and ease dysmenorrhoea [29] According to the research result, it was shown that the vitamin E group reduced pain, reduced intensity and reduced PBLAC score [30]
Vitamin A	The findings of one study indicate a strong relationship between the existence of PD and serum vitamin A, high-sensitivity C-reactive protein and prooxidant-antioxidant balance [31]
Dark chocolate	Copper is a mineral found in chocolate that the body requires to make neurotransmitters like endorphins and collagen. Natural tranquilisers and analgesics, endorphins can lessen the severity of pain, including menstrual discomfort Because of its increased cocoa content, dark chocolate in particular is thought to have anti-inflammatory qualities that may help relieve pain [32]

Ginger tea	Ginger tea has the ability to reduce the severity of menstrual cramps, as well as ease the discomfort associated with ovulation and the menstrual cycle and muscular spasms. Ginger remedies are recognised to be the most effective home remedies for dysmenorrhoea. Menstrual cramps seem more intense and ginger helps reduce prostaglandin-induced inflammation [33]
Red fruit extract capsules	It is thought that this fruit contains tocopherols, a form of vitamin E. Carotenoids, beta-carotene, tocopherol, alpha tocopherol and fatty acids are among the components of red fruit that function as anti-free radical substances to prevent a variety of ailments [34]
Dry fig	Numerous studies have shown that eating dried figs helps reduce different kinds of discomfort The findings demonstrated that consuming dried figs during period reduced menstrual symptoms, pain intensity and duration [35]

[Table/Fig-9]: Various Diet Supplements (DS) were found in interventional studies through literature review [23-35].

DISCUSSION

The research demonstrates that PFE and DS are effective in reducing PD among adolescents by alleviating pain intensity and duration. Pelvic exercises, including pelvic rocking, bridging and pelvic tilt, have shown exceptional contributions to reducing menstrual cramps and other related symptoms, while vitamin and herbal tea supplements play a beneficial role in pain alleviation [18-22]. Such complex solutions addressing PFD in young women can significantly improve their QOL by reducing physical symptoms, minimising absenteeism and enhancing social interactions [23]. PFD encompasses a range of disorders, including urinary incontinence and pelvic organ prolapse, which can severely impact daily activities and social life [24].

Effective management through physiotherapy and Pelvic Floor Muscle Training (PFMT) has shown promising results in alleviating symptoms and improving overall well-being [25]. Research has proven time and again that Pelvic Floor Exercises (PFEs), including Kegel exercises, are helpful in reducing the symptoms of dysmenorrhoea [26]. These exercises have been found to decrease pain intensity and increase QOL for those who suffer from dysmenorrhoea. Studies have shown that PFEs can lead to a considerable reduction in both pain intensity and duration, making them a useful non pharmacological intervention for managing pelvic pain [22]. For females aged 18 to 25 years, PFEs significantly reduce pain and females with painful menstruation have reported increased QOL when performing PFEs [26].

The implications of these findings are significant for both clinical practice and adolescent health management. Incorporating PFEs into routine care can provide adolescents with a practical and effective method to manage dysmenorrhoea without relying solely on medication [27]. Furthermore, the use of Dietary Supplements (DSs) offers an additional layer of support, potentially enhancing overall treatment outcomes. These interventions could lead to improved QOL and reduced absenteeism from school and other activities due to menstrual pain [28].

In a study conducted by Ortiz MI et al., it was demonstrated that regular practice of strengthening, stretching, muscle relaxation techniques and jogging can effectively reduce symptoms of dysmenorrhoea. However, the control group in this study was given a placebo, so a combination of all these exercises produced positive outcomes [29].

In terms of dietary supplements, the present review found substantial evidence supporting the use of omega-3 fatty acids, magnesium, vitamins (E, A, B1, D and K) and herbal remedies like ginger and dried figs. These supplements have been shown to reduce inflammation, improve blood flow and modulate pain pathways. For instance, a study [36] found that omega-3 fatty acids and vitamin B1 significantly reduce menstrual pain intensity, corroborating the present findings [30]. Similarly, vitamin E alleviated pain and reduced menstrual blood loss and the results are consistent with our review, indicating that dietary supplements can be effective in managing dysmenorrhoea [31].

A notable study within the present review demonstrated a significant correlation in the VAS scores throughout the study, showing varying pain levels in patients using ginger tea and vitamin E capsules. This suggests that dietary supplements can effectively reduce the severity of dysmenorrhoea pain. Specifically, the anti-inflammatory and antioxidant properties of ginger and vitamin E may contribute to alleviating menstrual pain, supporting their potential as complementary treatments in managing pelvic pain. Dark chocolate has also been shown to reduce pain compared to standard treatments [32]. Chocolate improves mood due to its copper content, which releases endogenous morphine that suppresses pain perception. This makes chocolate a non pharmacological option for reducing dysmenorrhoea [33].

Red fruit extract from *Pandanus conoideus Lamk* appears to be an effective and safe natural remedy for reducing menstrual pain among adolescent girls. It holds potential as an alternative or complementary approach to conventional treatments, contributing to improved menstrual health management in this population [34].

The most popular non pharmacological self-management techniques [Table/Fig-4,5] indicate that fewer than one in 10 young women in the included trials employed heat, exercise, or herbal treatment. Heat and exercise, particularly low-intensity exercises like yoga or stretching, are useful self-management techniques for pelvic pain and can be a helpful addition to or substitute for analgesic drugs, especially for women who do not respond well to them [35].

Limitation(s)

Articles published before 2014 were not considered for the present study. Only RCTs were included and the sample sizes were small. Additionally, no studies published in languages other than English were included.

CONCLUSION(S)

In conclusion, the present systematic review indicates that PFE and dietary supplements can be effective in managing pelvic pain among adolescents. PFEs help in reducing both the intensity and duration of menstrual pain by strengthening pelvic muscles, improving blood flow and promoting relaxation. Dietary supplements, including dark chocolate, red fruit extract, dried figs, ginger tea and vitamins A, E, K, D and B1, have shown promise in alleviating symptoms due to their anti-inflammatory and muscle-relaxant properties. However, further research with larger sample sizes and longer follow-up periods is recommended to confirm these findings and establish standardised guidelines for these non pharmacological interventions in managing pelvic pain.

REFERENCES

[1] Grimes WR, Stratton M. Pelvic floor dysfunction. 2020. [Updated 2023 Jun 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK559246/.
[2] Gaddam R, Gangadharan K, Shivaraju P, Basappa P. Prevalence of pelvic floor dysfunction in women attending obstetrics and gynaecology OPD at PES Institute of Medical Sciences asnd Research, Kuppam. Int J Reprod Contracept Obstet Gynecol. 2020;9(12):5087.
[3] Peinado-Molina RA, Hernández-Martínez A, Martinez-Vázquez S, Rodríguez-Almagro J, Martínez-Galiano JM. Pelvic floor dysfunction: Prevalence and associated factors. BMC Public Health. 2023;23:2005.
[4] Kenne KA, Wendt L, Jackson JB. Prevalence of pelvic floor disorders in adult women being seen in a primary care setting and associated risk factors. Dent Sci Rep. 2022;12(1):9878.
[5] Liu J. Pelvic floor dysfunction BT - MRI of gynaecological diseases: Illustrations and cases. In: Zhang G, editor. Singapore: Springer Nature Singapore; 2023. p. 255-61.
[6] Ayubi N, Padmasari DF, Komaini A, Putri DRS, Syafawi A, Mario DT, et al. The effectiveness of pelvic floor muscle training on decreasing urinary incontinence in pregnant or postnatal women: A systematic review. Retos. 2024;54:506-12.
[7] Hassan HE. Kegels Exercises: A crucial issue during woman's lifespan. American Research Journal of Public Health. 2020;3(1):01-05.
[8] Choi JS, Kim HY. Nutritional treatment: New strategy for management of chronic pelvic pain. Kosin Med J. 2013;28(1):07-12.

[9] Yanuaristi HS, Idhar SM, Rahman MN. Effect of Vitamin D supplementation in women with pelvic floor dysfunction: A systematic review. Obgynia. 2024;7(2):137.
[10] Hauwaert R, Tomé A, Almeida R, Vilela F, Coutinho AL, Alpoim D, et al. Physical Exercise and Pelvic Floor Muscle Training. Advances in Educational Technologies and Instructional Design Book Series. 2024; Pp. 169-202.
[11] Nobile V, Villa R, Micieli M, Amone F, D'Ambrosio E, Pulitano G, et al. Pilot evaluation of collagen and magnesium supplementation combined with pelvic floor muscle training exercises in women with urinary incontinence: Results of a double blind, randomized, clinical trial. Uro. 2025;5:7. Available from: https://www.preprints.org/frontend/manuscript/3f115bf6b092ea223fc48b65fbb59527/download_pub.
[12] World Health Orgnisation. Adolescent Health and Development. Available from: https://www.who.int/india/health-topics/adolescent-health-and-development#:~:text=WHO%20defines%20'Adolescents'%20as%20individuals,age%20range%2010%2D24%20years.
[13] Beautily V, Laila Khatoon. Assess the effectiveness of pelvic rocking exercise on dysmenorrhea among adolescent's girls. Int J Midwifery Nurs Pract 2021;4(2):88-91. Doi: 10.33545/26630427.2021.v4.i2b.96.
[14] de Morton NA. The PEDro scale is a valid measure of the methodological quality of clinical trials: A demographic study. Aust J Physiother. 2009;55(2):129-33. [cited 2025 May 2]. Available from: https://pubmed.ncbi.nlm.nih.gov/19463084/.
[15] Motahari-Tabari N, Shirvani MA, Alipour A. Comparison of the effect of stretching exercises and mefenamic acid on the reduction of pain and menstruation characteristics in primary dysmenorrhea: A randomized clinical trial. Oman Med J. 2017;32(1):47-53.
[16] Saleh SH, Mowafy EH. Stretching or core strengthening exercises for managing primary dysmenorrhea. J Womens Health Care. 2016;05(01):295.
[17] Mohamed HAA, Hafez AM. Effect of practicing pelvicrocking exercises on primary dysmenorrhea among adolescent girls: A randomized controlled trial. Egyptian Journal of Health Care. 2017;8(2):241-55.
[18] Sandhiya M, Kumari P, Arulya A, Selvam PS, Abraham M, Palekar TJ. The Effect of pelvic floor muscles exercise on quality of life in females with primary dysmenorrhea. Ann Rom Soc Cell Biol. 2021;25(6):3111-17.
[19] Karacin O, Mutlu I, Kose M, Celik F, Kanat-Pektas M, Yilmazer M. Serum vitamin D concentrations in young Turkish women with primary dysmenorrhea: A randomized controlled study. Taiwan J Obstet Gynecol. 2018;57(1):58-63.
[20] Sterne JAC, Savovic´ J, Page MJ, Elbers RG, Blencowe NS, Boutron I, et al. RoB 2: A revised tool for assessing risk of bias in randomised trials. BMJ. 2019;2019:l4898.
[21] Khan S, Ihsan S, Sehgal S, Hashmi A, Neelam Muneeb H, Alias Akash NK, et al. Effects of myofascial release versus pelvic floor muscle exercises in women with primary dysmenorrhea. Pakistan BioMedical Journal. 2022;5(5):220-25.
[22] Nasri M, Barati AH, Ramezani A. The effects of aerobic training and pelvic floor muscle exercise on primary dysmenorrhea in adolescent girls. J Clin Nurs Midwifery. 2016;5(3):53-61.
[23] Abdi F, Amjadi MA, Zaheri F, Rahnemaei FA. Role of vitamin D and calcium in the relief of primary dysmenorrhea: A systematic review. Obstet Gynecol Sci [Internet]. 2021;64(1):13-26. [cited 2024 Jan 8]. Available from: http://ogscience.org/journal/view.php?doi=10.5468/ogs.20205.
[24] Fang F, Ni K, Cai Y, Shang J, Zhang X, Xiong C. Effect of vitamin D supplementation on polycystic ovary syndrome: A systematic review and meta-analysis of randomized controlled trials. Complement Ther Clin Pract. 2017;26:53-60.
[25] Anagnostis P, Karras S, Goulis DG. Vitamin D in human reproduction: A narrative review. Int J Clin Pract [Internet]. 2013;67(3):225-35. [cited 2024 Jan 13]. Available from: https://www.researchgate.net/publication/234085140_Vitamin_D_in_human_reproduction_A_narrative_review.
[26] Abdollahifard S, Koshkaki AR, Moazamiyanfar R. The effects of vitamin B1 on ameliorating the premenstrual syndrome symptoms. Glob J Health Sci. 2014;6(6):144-53.
[27] Hosseinlou A, Alinejad V, Alinejad M, Aghakhani N. The effects of fish oil capsules and vitamin B1 tablets on duration and severity of dysmenorrhea in students of high school in Urmia-Iran. Glob J Health Sci [Internet]. 2014;6(7 Spec No):124-29. [cited 2024 Jan 13]. Available from: https://pubmed.ncbi.nlm.nih.gov/25363189/.
[28] Wade C, Wang L, Zhao WJ, Cardini F, Kronenberg F, Gui SQ, et al. Acupuncture point injection treatment of primary dysmenorrhoea: A randomised, double blind, controlled study. BMJ Open. 2016;6(1):e008166.
[29] Ortiz MI, Cortés-Márquez SK, Romero-Quezada LC, Murguía-Cánovas G, Jaramillo-Díaz AP. Effect of a physiotherapy program in women with primary dysmenorrhea. European journal of obstetrics, gynecology, and reproductive biology. 2015;194:24–29. Available from: https://doi.org/10.1016/j.ejogrb.2015.08.008.
[30] Ziaei S, Zakeri M, Kazemnejad A. A randomised controlled trial of vitamin E in the treatment of primary dysmenorrhoea. BJOG [Internet]. 2005;112(4):466-69. [cited 2024 Jan 13]. Available from: https://onlinelibrary.wiley.com/doi/full/10.1111/j.1471-0528.2004.00495.x
[31] Bahrami A, Bahrami-Taghanaki H, Khorasanchi Z, Timar A, Jaberi N, Azaryan E, et al. Menstrual problems in adolescence: Relationship to serum vitamins A and E, and systemic inflammation. Arch Gynecol Obstet [Internet]. 2020;301(1):189-97. [cited 2024 Jan 13]. Available from: https://pubmed.ncbi.nlm.nih.gov/31734759/.
[32] Ferina F, Hadianti DN, Fatimah YU. Dark chocolate as a non-pharmacological alternative to reduce dysmenorrhea in adolescents. Healthc Low Resour Settings [Internet]. 2023;11(2):11809. [cited 2024 Feb 25]. Available from: https://pagepressjournals.org/index.php/hls/article/view/11809.
[33] Crasta S, Fernandes P, Paul S. Ginger tea on dysmenorrhoea among nursing students. Journal of Health and Allied Sciences NU. 2019;09(02):64-75.
[34] Situmorang CC, Dewi NNSA. The administration of red fruit extract (Pandanus Conoideus Lamk.) To reduce menstrual pain among adolescent girls. Journal of Midwifery [Internet]. 2021;5(2):72-80. [cited 2024 Feb 18]. Available from: http://jom.fk.unand.ac.id/index.php/jom/article/view/316.
[35] Amanak K. Effects of dry figs on primary dysmenorrhea symptoms, perceived stress levels and the quality of life. P R Health Sci J [Internet]. 2020;39(4):319-26. [cited 2024 Feb 18]. Available from: https://prhsj.rcm.upr.edu/index.php/prhsj/article/view/2223
[36] Wilson ML, Murphy PA. Herbal and dietary therapies for primary and secondary dysmenorrhoea. Nurs Times. 2001;97(36):44.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Mar 12, 2025
- Manual Googling: Jun 25, 2025
- iThenticate Software: Jun 27, 2025 (11%)

ETYMOLOGY: Author Origin

EMENDATIONS: 6

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? No
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Mar 02, 2025**
Date of Peer Review: **Apr 27, 2025**
Date of Acceptance: **Jun 29, 2025**
Date of Publishing: **Oct 01, 2025**