Journal of Chemical Health Risks
www.jchr.org
JCHR (2026) 16(2), 2609-2614 | ISSN:2251-6727

Pre-Experimental Study to Assess the Effectiveness of Billig's Exercise in Reducing Dysmenorrhea Among Early Adolescent Girls in Selected Schools of Metropolitan City."

Ms. Shivani Narayan Mate[1] Mrs. Jasmine Monica[2*]

1. M.Sc. Nursing Terna Nursing College, Nerul, Navi Mumbai, Maharashtra, India.
2. Associate Professor Terna Nursing College, Nerul, Navi Mumbai, Maharashtra.

*Correponding Author- **Mrs. Jasmine Monica**

(Received: 16 January 2026 Revised: 25 February 2026 Accepted: 30 March 2026)

KEYWORDS:

Dysmenorrhea, Early Adolescent Girls, Billig's Exercise, Menstrual Pain, WaLIDD Scale

ABSTRACT:

Introduction: Puberty marks a critical transition from childhood to adolescence, with menarche initiating the menstrual cycle in girls. Dysmenorrhea, or painful menstruation, is a prevalent condition affecting 40–90% of adolescent girls globally, leading to school absenteeism, reduced physical activity, and emotional distress. While pharmacological treatments provide relief, they may cause side effects. Non-pharmacological interventions, such as exercise, are increasingly recognized as effective in alleviating menstrual pain. Billig's Exercise, developed in 1943, involves stretching the pelvic ligaments, hip flexors, and inner thigh muscles, promoting pain relief and improving overall well-being.

Aim: The study aimed to assess the effectiveness of Billig's Exercise in reducing dysmenorrhea among early adolescent girls in selected schools of a metropolitan city.

Methodology: A pre-experimental one-group pre-test post-test design was adopted, involving 100 early adolescent girls selected through purposive sampling. Data were collected using a structured demographic proforma and the WaLIDD scale, which assesses dysmenorrhea based on working ability, pain location, intensity, and duration. The intervention consisted of performing Billig's Exercise twice daily for 20 minutes on the first and second days of menstruation. Pre-test assessment was conducted on day one, followed by post-test assessment on day two. Reliability of the tool was established ($r = 0.97$), and a pilot study confirmed feasibility.

Results: Pre-test findings indicated that 44% of participants experienced moderate and 56% severe dysmenorrhea. Post-test results showed a marked reduction, with 81% experiencing mild dysmenorrhea, 14% moderate, and 5% reporting no pain. Paired t-test analysis revealed a significant decrease in mean scores from 7.8 (SD = 1.7) to 3.0 (SD = 1.5), $t(99) = 32.4$, $p < 0.001$. Significant associations were found between dysmenorrhea and flow of menstruation ($p = 0.011$) and nature of menstrual pain ($p = 0.002$).

Conclusion: Billig's Exercise is highly effective in reducing dysmenorrhea, enhancing comfort, daily functioning, and overall quality of life among early adolescent girls.

INTRODUCTION

Puberty is a critical phase of human development, marking the transition from childhood to adolescence through physical , psychological, and emotional changes. In girls, one of the major physiological milestones is the onset of menarche, initiating the menstrual cycle. Menstruation, while a normal and essential biological process, is often accompanied by discomfort, pain, and various physical symptoms that can interfere with daily life, academic performance, and social activities. Dysmenorrhea, defined as painful menstruation, is a common condition among adolescent girls, affecting 40–90% globally. Primary dysmenorrhea, which occurs without underlying pelvic pathology, is the most prevalent type, causing cramping, back pain, nausea, headaches, and fatigue. These symptoms are mediated by prostaglandins, which trigger uterine contractions during menstruation.

Severe dysmenorrhea can lead to school absenteeism, decreased participation in social or sports activities, and poor academic performance. While pharmacological interventions, such as analgesics or oral contraceptives,

Journal of Chemical Health Risks
www.jchr.org
JCHR (2026) 16(2), 2609-2614 | ISSN:2251-6727

provide relief, they may cause side effects and are not universally effective. Non-pharmacological interventions, including physiotherapy, yoga, TENS, and exercise, have demonstrated potential benefits in alleviating menstrual pain. Exercise, in particular, increases endorphin release, improves blood flow, reduces prostaglandin-induced contractions, and promotes overall well-being. Billig's exercise regimen, developed in 1943, involves stretching the pelvic ligaments, hip flexors, and inner thigh muscles, offering significant symptom relief.

Considering the high prevalence of dysmenorrhea among adolescent girls and its negative impact on quality of life, early interventions focusing on education, lifestyle modification, and non-pharmacological management are essential. Promoting awareness about safe exercises during menstruation can empower girls to manage pain effectively, maintain daily activities, and reduce dependence on medications, thus supporting both physical and mental health.

NEED OF THE STUDY

Dysmenorrhea is a universal concern affecting adolescent girls and young women worldwide. Studies indicate that 70–90% of menstruating girls experience menstrual pain, with 20–30% reporting severe discomfort that limits daily activities or leads to school absenteeism. In India, over 80% of young women report painful menstruation, while globally, more than two-thirds of young women face similar challenges. Menstrual pain not only disrupts physical functioning but also negatively affects academic performance, social interactions, and psychological well- being.

Pharmacological approaches, including painkillers like ibuprofen and paracetamol, are widely used but carry risks of side effects, dependence, or incomplete pain relief. Observational studies among adolescent students in India, Saudi Arabia, and Nepal reveal that dysmenorrhea leads to absenteeism, reduced concentration, fatigue, and emotional disturbances, highlighting the need for alternative, non-invasive interventions. Lifestyle factors, such as sedentary behavior, stress, poor dietary habits, and lack of exercise, exacerbate menstrual discomfort.

Evidence supports exercise-based interventions as effective non-pharmacological strategies. Exercise enhances endorphin release, improves circulation, reduces prostaglandin-induced cramps, and provides overall pain relief without adverse effects. Billig's exercise regimen, which focuses on stretching pelvic ligaments, hip flexors, and inner thigh muscles, has demonstrated significant efficacy in reducing dysmenorrhea. Implementing such interventions can help girls maintain daily routines, improve quality of life, and minimize dependence on medication.

Given the prevalence and impact of dysmenorrhea, especially among students, there is a pressing need for structured, evidence-based interventions that are safe, accessible, and cost- effective. Educating adolescent girls about exercise-based pain management can empower them to take control of their menstrual health, reduce absenteeism, and promote physical, academic, and psychosocial well-being. Early intervention programs can also help dispel myths and improve awareness regarding menstrual hygiene and self-care practices.

AIM OF STUDY: Pre-experimental study to assess the effectiveness of Billig's exercise in reducing dysmenorrhea among early adolescent girls in selected schools of metropolitan city

METHODOLOGY

A quantitative research approach was adopted to evaluate the effectiveness of Billig's Exercise on reducing dysmenorrhea among early adolescent girls in selected schools of a metropolitan city. The study employed a pre-experimental one-group pre-test post-test design, which allowed assessment of the intervention's effect over a specified period. The target population included early adolescent girls experiencing dysmenorrhea, while the accessible population comprised girls studying in 7th, 8th, and 9th standards in the selected schools. A sample of 100 participants was selected using non-probability purposive sampling. Inclusion criteria were girls who had attained menarche, experienced dysmenorrhea, were available during data collection, and willing to participate. Exclusion criteria included girls with irregular menstrual cycles, undergoing treatment for menstrual disorders such as PCOD, or unwilling to participate. Withdrawal criteria allowed participants to exit the study at any time.

Data were collected using a structured tool consisting of two sections: Section A, demographic variables (age, education, height, weight, BMI, food habits, religion, age at menarche, menstrual pattern, and medication use); and Section B, the WaLIDD scale, which measures dysmenorrhea across working ability, pain

Journal of Chemical Health Risks
www.jchr.org
JCHR (2026) 16(2), 2609-2614 | ISSN:2251-6727

location, intensity, and duration, scoring from 0 to 12 (0 = no pain, 1–4 = mild, 5–7 = moderate, 8–12 = severe). The intervention involved administering Billig's Exercise on the 1st and 2nd day of menstruation, twice daily for 20 minutes. Pre-test assessment was conducted on the first day of menstruation, followed by the exercise intervention, and post-test assessment was performed on the second day using the same WaLIDD scale.

The tool's content validity was established through expert review, and reliability was confirmed via test-retest method, yielding a Pearson correlation coefficient of 0.97. A pilot study with 10 participants confirmed feasibility and clarity of the tool.

RESULT

Section A: Analysis of Demographic Data

A total of 100 early adolescent girls from selected schools in the metropolitan city participated in the study. The majority of participants were 14 years old, studying in 8th standard, underweight, non-vegetarian, Hindu, had menarche at 12 years, experienced menstruation for 4–5 days, had a menstrual frequency of 29–30 days, moderate flow of menstruation, and experienced pricking, cramping, and squeezing pain. None of the participants used medication during menstrual pain.

SECTION B I: : Distribution of assess the level of dysmenorrhea before giving Billig's Exercise among early adolescent girls in selected schools of metropolitan city.

Table No. 1: Pre-test level of dysmenorrhea among early adolescent girls in selected schools of metropolitan cityN=100

Dysmenorrhea	Pretest	
	Frequency	%
Without Dysmenorrhea (0)	0	0%
Mild Dysmenorrhea (1-4)	0	0%
Moderate Dysmenorrhea (5-7)	44	44%
Severe Dysmenorrhea (8-12)	56	56%

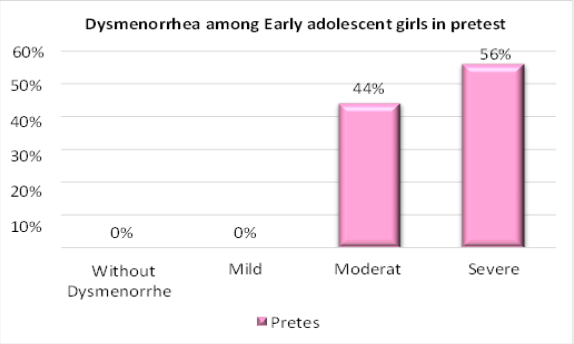

Figure No. 1: Pre-test level of dysmenorrhea among early adolescent girls

Before the intervention, 44% of participants reported moderate dysmenorrhea, and 56% reported severe dysmenorrhea.

SECTION B II: Distribution of assess the level of dysmenorrhea after giving Billig's Exercise among Early adolescent girls in selected schools of metropolitan city

Table No. 2: Post-test level of dysmenorrhea among early adolescent girls in selected schools of metropolitan city.

Dysmenorrhea	Post test	
	Frequency	%
Without Dysmenorrhea (0)	5	5%
Mild Dysmenorrhea (1-4)	81	81%
Moderate Dysmenorrhea (5-7)	14	14%
Severe Dysmenorrhea (8-12)	0	0%

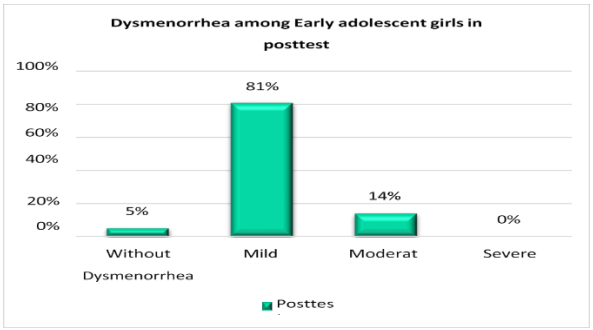

Figure No. 2: Post-test level of dysmenorrhea among early adolescent girls

Journal of Chemical Health Risks
www.jchr.org
JCHR (2026) 16(2), 2609-2614 | ISSN:2251-6727

Following the implementation of Billig's Exercise, 81% of participants experienced mild dysmenorrhea, 14% moderate dysmenorrhea, and 5% reported no dysmenorrhea. No participants reported severe pain post-intervention.

Section B – III:Analysis of data related to the comparison of pre-test and post-test level of dysmenorrhea among early adolescent girls in selected schools of metropolitan city. Paired t-test analysis demonstrated a significant reduction in dysmenorrhea scores from pre- test (Mean = 7.8, SD = 1.7) to post-test (Mean = 3.0, SD = 1.5), $t(99) = 32.4$, $p < 0.001$. This indicates that Billig's Exercise was highly effective in reducing dysmenorrhea among early adolescent girls.

SECTION B IV: Association between pre-test level of dysmenorrhea among early adolescent girls in selected schools of metropolitan city with demographical variables

Fisher's exact test revealed significant associations between pre-test dysmenorrhea levels and certain demographic factors. Specifically, flow of menstruation ($p = 0.011$) and nature of menstrual pain ($p = 0.002$) were significantly associated with dysmenorrhea. Other variables, including age, education, BMI, food habits, religion, age at menarche, duration, and frequency of menstruation, showed no significant association ($p > 0.05$).

DISCUSSION

Dysmenorrhea is a prevalent condition affecting a significant proportion of adolescent girls, often limiting their daily activities and overall quality of life. The present study aimed to evaluate the effectiveness of Billig's Exercise in reducing dysmenorrhea among early adolescent girls in selected schools of a metropolitan city. A pre-experimental one-group pre-test post-test design was employed, with a sample of 100 participants selected through non- probability purposive sampling. The pre-test assessment using the WaLIDD Scale revealed that the majority of participants experienced moderate to severe dysmenorrhea.

The intervention consisted of performing Billig's Exercise twice daily for 20 minutes on the first and second days of menstruation. The post-test results demonstrated a marked reduction in dysmenorrhea, with mean scores decreasing from 7.8 in the pre-test to 3.0 in the post-test. This significant reduction indicates that Billig's Exercise is highly effective in alleviating menstrual pain, thereby potentially improving comfort, functional ability, and overall well- being among early adolescent girls.

These findings are consistent with previous studies. Talang et al. (2023) conducted a similar study among 60 nursing students in Guwahati, Assam, using a pre-experimental one-group pre- test post-test design and the Numerical Pain Rating Scale. The study reported a mean difference of 2.55 between pre-test and post-test scores, with a paired t-value of 13.471 ($p<0.001$), confirming the effectiveness of Billig's Exercise in reducing dysmenorrhea. Furthermore, the association analysis revealed significant correlations between age, interference of study due to dysmenorrhea, and family history of dysmenorrhea with pre-test pain levels.

Similarly, Subakeerthi and Renuka (2022) conducted a study among 50 early adolescent girls in Puducherry using a pre-experimental design and Dysmenorrhea Scale. The pre-test and post- test mean scores were 6.36 and 2.02, respectively, with statistical analysis confirming significant improvement following the intervention.

Comparing these studies with the present research, all employed a pre-experimental one-group pre-test post-test design, targeted early adolescent girls, and concluded that Billig's Exercise significantly reduces dysmenorrhea.

CONCLUSION

The present study was conducted to assess the effectiveness of Billig's Exercise in reducing dysmenorrhea among early adolescent girls in selected schools of a metropolitan city. A pre- experimental one-group pre-test post-test design was employed, with a sample of 100 participants selected through non-probability purposive sampling. The level of dysmenorrhea was measured using the WaLIDD Scale before and after the intervention. The pre-test findings revealed that the majority of participants experienced moderate to severe dysmenorrhea, with a mean score of 7.8 (SD = 1.7).

Following the intervention, Billig's Exercise was administered twice daily for 20 minutes on the first and second days of menstruation. Post-test results demonstrated a substantial reduction in dysmenorrhea, with the mean score decreasing to 3.0 (SD = 1.5). Statistical analysis using paired t-test yielded a t-value of 32.4 with 99 degrees of freedom, and the

corresponding p- value was less than 0.05, indicating statistical significance. The null hypothesis was therefore rejected.

The findings clearly indicate that the dysmenorrhea score in the post-test was significantly lower than in the pre-test, confirming the effectiveness of Billig's Exercise in alleviating menstrual pain among early adolescent girls. This study highlights the potential of Billig's

Exercise as a non-pharmacological, cost-effective, and easily implementable intervention to improve comfort, daily functioning, and overall quality of life for adolescent girls experiencing dysmenorrhea. The results provide strong evidence for incorporating structured exercise programs in school health initiatives to address menstrual discomfort and promote holistic well-being in this population.

Conflict of Interest

The authors certify that they are not involved in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this paper.

Funding Source

There is no funding Source for this study

REFERENCES

1. Anusha, L., & Radhika, M. (2015). On pubertal changes among pre-adolescent girls. *International Journal of Applied Research, 1*(2), 679–682. https://www.allresearchjournal.com
2. The World Bank. (2022, May 12). Menstrual health and hygiene. https://www.worldbank.org/en/topic/water/brief/menstrual-health-and-hygiene
3. Gupta, K., & Kiruba Mary, A. J. (2023). Assessment of the effectiveness of aerobic exercise versus Billig's exercise among nursing students with dysmenorrhea in selected nursing colleges in Bangalore. *RGUHS Journal of Nursing Sciences, 13*(1), 54–61. https://journalgrid.com/view/article/rjns/12433551
4. Subakeerthi, V., & Renuka, K. (2022). Effectiveness of Billig's exercise on dysmenorrhea among early adolescent girls in selected schools at Puducherry. *International Journal of Scientific Research, 11*(06), 72–74. https://www.worldwidejournals.com/international-journal-of-scientific-research-(IJSR)/fileview/effectiveness-of-billigs-exercise-on-dysmenorrhea-among-early-adolescent-girls-in-selected-schools-at-puducherry_June_2022_6765125446_6802730.pdf
5. Nationwide Children's Hospital. (2024, March 1). Endometriosis in teens and adolescents: More than just cramps. https://www.nationwidechildrens.org/family-resources/education/700childrens/2018/03/endometriosis-in-teens-and-adolescents
6. Dixon, S., Taghinejadi, N., Holloway, F., Papanikitas, A., & Vincent, K. (2024, May 30). Supporting teenagers with period pain in general practice: Clinical review. *British Journal of General Practice, 74*(743), 283–285. https://pmc.ncbi.nlm.nih.gov/articles/PMC11147464/
7. Franjić, S. (2019). Menstrual pain. *Journal of Gynaecological Research and Obstetrics, 5*(2), 31–33. https://www.peertechzpublications.org/articles/JGRO-5- 167.php
8. Sharawi, G., & Yakout, S. M. (2023). Prevalence, impact and self-care practice of dysmenorrhea among female university students in Saudi Arabia. *Journal of Population Therapeutics & Clinical Pharmacology, 30*(4), 573–592. https://jptcp.com/index.php/jptcp/article/view/2274
9. The Conversation. (2019, June 28). Period pain: Don't let it stop you exercising. https://theconversation.com/period-pain-dont-let-it-stop-you-exercising-118785
10. Ogden Clinic. (2020, January 8). Does exercise really help with menstrual cramps? https://www.ogdenclinic.com/blog/2020/january/does-exercise-really-help-with- menstrual-cramps-/
11. Talang, M.-A., Monika, N., & Yambem, S.

(2024). Effect of Billig's exercise in reducing dysmenorrhea among nursing students in a selected nursing institute, Guwahati, Assam. *Journal of Emerging Technologies and Innovative Research*, 11(8), 629–634. https://doi.org/10.36106/ijsr/6802730.

12. *Subakeerthi, V., & Renuka, K. (2022). Effectiveness of Billig's exercise on dysmenorrhea among early adolescent girls in selected schools at Puducherry.* International Journal of Scientific Research*, 11(6), 72–74. https://doi.org/10.36106/ijsr/6802730*