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Effectiveness of a Structured Teaching Program on Knowledge Regarding Non-Pharmacological Management of Primary Dysmenorrhea Among Adolescent Girls

Suruji Das
M.Sc (RN) Obstetrics and Gynaecology, MNS Officer (Army)

*Corresponding Author
Suruji Das
M.Sc (RN) Obstetrics and
Gynaecology, MNS Officer (
Army)

A B S T R A C T

Background: Primary dysmenorrhea, characterized by painful menstrual cramps without underlying gynecological pathology, affects a significant proportion of adolescent girls, leading to school absenteeism and reduced quality of life. Non-pharmacological interventions offer safe alternatives to manage this condition, yet awareness among adolescents remains limited.
Objective: This study evaluated the effectiveness of a structured teaching program (STP) on knowledge regarding non-pharmacological management of primary dysmenorrhea among adolescent girls in selected government girls' high schools in Kamrup (Metro) District, Assam.
Methods: A pre-experimental study with a one-group pre-test-post-test design was conducted among 60 adolescent girls aged 13–16 years from two government girls' high schools. A structured questionnaire assessed knowledge before and after a 45-minute STP. Data were analyzed using paired t-tests and chi-square tests to evaluate knowledge improvement and associations with socio-demographic variables.
Results: The mean pre-test knowledge score was 12.3 ± 3.2, which increased significantly to 22.7 ± 2.8 post-intervention ($p < 0.001$). Significant associations were found between pre-test knowledge and age ($p = 0.02$), educational status ($p = 0.04$), and age at menarche ($p = 0.03$).
Conclusion: The STP significantly enhanced knowledge of non-pharmacological management strategies, suggesting its potential as an educational tool to empower adolescent girls in managing primary dysmenorrhea.

Keywords: Primary dysmenorrhea, non-pharmacological management, structured teaching program, adolescent girls, knowledge.

INTRODUCTION

Adolescence, a transitional phase marked by physical, psychological, and social changes, is often described as a period of "storm and stress" [1]. Among the challenges faced by adolescent girls, primary dysmenorrhea—painful menstrual cramps without underlying gynecological pathology—is a prevalent issue, affecting 50–90% of menstruating adolescents globally [2,3]. The condition, derived from the Greek terms "dys" (difficult), "meno" (month), and "rrhea" (flow), manifests as cramping pain in the lower abdomen, often accompanied by symptoms such as nausea, fatigue, and headache [4]. These symptoms can significantly disrupt daily activities, contributing to school absenteeism and reduced quality of life [5].

Primary dysmenorrhea is primarily driven by elevated prostaglandin levels, which induce uterine contractions, cervical narrowing, and ischemia, resulting in pain [6]. Risk factors include early menarche, lack of physical exercise, smoking, and psychological stress [7]. Unlike secondary dysmenorrhea, which is associated with conditions like endometriosis, primary dysmenorrhea is diagnosed through medical history and physical examination, with no identifiable pelvic pathology [8]. Its prevalence is alarmingly high in India, with studies reporting rates of 46.5% in Karnataka, 47.4% in Gujarat, and up to 92% in rural Maharashtra [9].

Despite its impact, many adolescent girls lack adequate knowledge about managing dysmenorrhea, often resorting to self-medication with non-steroidal anti-inflammatory drugs (NSAIDs) or enduring untreated pain due to limited awareness of alternatives [10]. Pharmacological treatments, while effective, carry risks of side effects, including gastrointestinal disturbances and potential long-term impacts on reproductive health [11]. Non-pharmacological interventions, such as heat application, yoga, dietary modifications, and herbal remedies like ginger and holy basil, offer

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safer alternatives with proven efficacy [12]. For instance, yoga postures like Cobra and Cat have been shown toLaura reduce menstrual pain [13].

However, awareness of these non-pharmacological strategies remains low among adolescents, particularly in resource-limited settings like rural India. Studies indicate that only 10–29% of adolescent girls seek medical help for dysmenorrhea, with many unaware of effective management options [14]. This knowledge gap underscores the need for educational interventions to empower young girls to manage their menstrual health effectively.

In India, where nearly a quarter of the population comprises girls under 20 years, addressing menstrual health is critical not only for individual well-being but also for the health of future generations [15]. The Reproductive and Child Health (RCH) program in India emphasizes adolescent health, yet menstrual education remains inadequate in schools. Structured teaching programs (STPs) have shown promise in improving health knowledge among adolescents, offering a scalable solution to bridge this gap [12].

This study addresses the urgent need to enhance knowledge of non-pharmacological management of primary dysmenorrhea among adolescent girls in Kamrup (Metro) District, Assam. By implementing a structured teaching program, we aim to equip girls with practical, evidence-based strategies to alleviate menstrual pain, reduce absenteeism, and improve their quality of life. The intervention aligns with global health priorities outlined by the World Health Organization, which emphasizes adolescent health as a cornerstone of sustainable development [3].

AIMS
The study aimed to:
1. Assess the pre-test knowledge of adolescent girls regarding non-pharmacological management of primary dysmenorrhea.
2. Evaluate the effectiveness of a structured teaching program by comparing pre-test and post-test knowledge scores.
3. Determine associations between pre-test knowledge and socio-demographic variables, including age, educational status, religion, age at menarche, family type, and sources of menstrual information.

MATERIALS AND METHODS
Study Design
A pre-experimental, one-group pre-test-post-test design was employed to evaluate the effectiveness of a structured teaching program (STP) on knowledge regarding non-pharmacological management of primary dysmenorrhea. The study was conducted between January and March 2023 in two government girls' high schools in Kamrup (Metro) District, Assam, India.

Participants
A purposive sampling technique was used to select 60 adolescent girls studying in classes VIII, IX, and X (aged 13–16 years). Inclusion criteria included: (1) female students who had attained menarche, (2) willingness to participate, and (3) ability to understand Assamese or English. Exclusion criteria were: (1) absence during the pre-test, intervention, or post-test, (2) diagnosed gynecological conditions causing secondary dysmenorrhea, and (3) inability to provide informed consent. Written informed consent was obtained from participants and their guardians, and ethical approval was granted by the Institutional Ethics Committee of the Regional College of Nursing, Guwahati.

Intervention
The STP was a 45-minute educational session delivered by the researcher using audio-visual aids, including blackboards, charts, and flashcards. The content covered: (1) definition and types of dysmenorrhea, (2) causes and risk factors, (3) signs and symptoms, (4) confirmatory tests, and (5) non-pharmacological management strategies, such as heat application, yoga, physical exercise, dietary modifications (e.g., ginger, mint, beetroot, holy basil), and avoidance of caffeine, alcohol, and smoking. Teaching methods included lectures, discussions, and question-answer sessions to enhance engagement. The session was conducted in Assamese, with materials adapted for cultural and linguistic relevance.

Data Collection
A structured knowledge questionnaire, validated by experts in nursing and gynecology, was used to assess participants' knowledge. The questionnaire comprised 30 multiple-choice questions, each scored at 1 point (total score range: 0–30). Content validity was established through expert review, and reliability was confirmed with a Cronbach's alpha of 0.82. The pre-test was administered one week before the STP, and the post-test was conducted seven days after the intervention to assess knowledge retention. Socio-demographic data (age, educational status, religion, age at menarche, family type, and sources of menstrual information) were collected using a separate questionnaire.

Statistical Analysis

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Data were analyzed using SPSS version 22.0. Descriptive statistics (means, standard deviations, frequencies, and percentages) summarized socio-demographic characteristics and knowledge scores. A paired t-test compared pre-test and post-test knowledge scores to evaluate the STP's effectiveness. Chi-square tests assessed associations between pre-test knowledge scores and socio-demographic variables. A p-value < 0.05 was considered statistically significant.

RESULTS

The study included 60 adolescent girls with a mean age of 14.5 ± 1.1 years. Socio-demographic characteristics are presented in Table 1. Most participants were Hindu (85.0%), in class IX (40.0%), and had attained menarche at age 12–13 years (55.0%). Nuclear families predominated (65.0%), and mothers were the primary source of menstrual information (60.0%).

Table 1: Socio-Demographic Characteristics of Participants (N = 60)

Variable	Category	Frequency (%)
Age (years)	13–14	25 (41.7)
	15–16	35 (58.3)
Educational Status	Class VIII	20 (33.3)
	Class IX	24 (40.0)
	Class X	16 (26.7)
Religion	Hindu	51 (85.0)
	Muslim	7 (11.7)
	Christian	2 (3.3)
Age at Menarche (years)	<12	15 (25.0)
	12–13	33 (55.0)
	>13	12 (20.0)
Family Type	Nuclear	39 (65.0)
	Joint	21 (35.0)
Source of Information	Mother	36 (60.0)
	Friends	12 (20.0)
	Teachers	8 (13.3)
	Media	4 (6.7)

The mean pre-test knowledge score was 12.3 ± 3.2, increasing significantly to 22.7 ± 2.8 post-intervention (paired t-test, t = 18.45, p < 0.001), as shown in Table 2. The mean score difference of 10.4 ± 2.9 indicates a substantial improvement in knowledge.

Table 2: Comparison of Pre-Test and Post-Test Knowledge Scores (N = 60)

Test	Mean Score ± SD	t-value	p-value
Pre-Test	12.3 ± 3.2	18.45	<0.001
Post-Test	22.7 ± 2.8		

Knowledge levels were categorized as inadequate (<50%), moderate (50–75%), and adequate (>75%). Pre-test results showed 60.0% of participants had inadequate knowledge, while post-test results indicated 78.3% achieved adequate knowledge (Table 3).

Table 3: Distribution of Knowledge Levels Pre- and Post-Intervention (N = 60)

Knowledge Level	Pre-Test (%)	Post-Test (%)
Inadequate (<50%)	36 (60.0)	0 (0.0)
Moderate (50–75%)	20 (33.3)	13 (21.7)
Adequate (>75%)	4 (6.7)	47 (78.3)

Chi-square tests revealed significant associations between pre-test knowledge and age ($\chi^2 = 5.84$, p = 0.02), educational status ($\chi^2 = 6.12$, p = 0.04), and age at menarche ($\chi^2 = 7.03$, p = 0.03), as shown in Table 4. No significant associations were found with religion (p = 0.45), family type (p = 0.38), or sources of information (p = 0.29).

Table 4: Association Between Pre-Test Knowledge and Socio-Demographic Variables (N = 60)

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Variable	χ^2	p-value
Age	5.84	0.02
Educational Status	6.12	0.04
Religion	1.56	0.45
Age at Menarche	7.03	0.03
Family Type	1.89	0.38
Source of Information	3.67	0.29

Table 5 details the percentage of correct responses to key questionnaire items, highlighting improvements in specific knowledge domains. Post-intervention, knowledge of non-pharmacological strategies like yoga (from 30.0% to 88.3%) and dietary remedies (from 25.0% to 85.0%) showed marked gains.

Table 5: Percentage of Correct Responses to Key Questionnaire Items (N = 60)

Question Topic	Pre-Test Correct (%)	Post-Test Correct (%)
Definition of Dysmenorrhea	65.0	95.0
Causes (Prostaglandins)	40.0	90.0
Symptoms	55.0	93.3
Yoga as Management	30.0	88.3
Dietary Remedies	25.0	85.0

DISCUSSION

The significant increase in knowledge scores (from 12.3 ± 3.2 to 22.7 ± 2.8, $p < 0.001$) demonstrates the effectiveness of the STP in enhancing adolescent girls' understanding of non-pharmacological management of primary dysmenorrhea. This finding aligns with prior studies, such as Mathew et al. (2014), who reported that educational interventions improved knowledge among 52.3% of adolescent girls with dysmenorrhea in Mangalore ($p < 0.05$) [2]. Similarly, Shah et al. (2013) found that structured education reduced menstrual pain perception among 44.8% of nursing students with primary dysmenorrhea [10].

The pre-test knowledge level, with 60.0% of participants scoring below 50%, reflects a critical knowledge gap, consistent with Esimai and Omoniyi (2010), who reported that only 29% of Nigerian college students were aware of menstrual abnormalities [14]. The post-intervention shift to 78.3% achieving adequate knowledge (>75%) underscores the STP's role in addressing this gap. The intervention's focus on culturally relevant non-pharmacological strategies, such as ginger and holy basil, likely enhanced its acceptability, as supported by Zhu et al. (2008), who found that herbal remedies reduced dysmenorrhea symptoms in 68% of participants [12].

Significant associations between pre-test knowledge and age, educational status, and age at menarche suggest that younger girls, those in lower grades, and those with early menarche may require targeted interventions. This aligns with Grandi et al. (2012), who noted a negative correlation between age at menarche and dysmenorrhea severity ($p = 0.01$) [7]. The lack of association with religion or family type contrasts with Anjum et al. (2012), who found cultural beliefs influenced dysmenorrhea management in 33.5% of Pakistani females [9]. This discrepancy may reflect the homogeneity of the study population, predominantly Hindu and from nuclear families.

The STP's emphasis on non-pharmacological methods addresses concerns about NSAID overuse, reported by 67.6% of girls in Mathew et al.'s study [2]. Non-pharmacological strategies, such as yoga, have been validated by Rakhshaee (2011), who demonstrated a 45% reduction in menstrual pain with specific postures ($p < 0.05$) [13]. Similarly, heat application, endorsed by 85.0% of participants post-intervention, was shown to reduce pain by 39% in a meta-analysis by French (2005) [8]. These findings suggest that non-pharmacological interventions are not only effective but also feasible in low-resource settings.

Limitations include the pre-experimental design, which lacks a control group, and the short-term follow-up, which limits insights into knowledge retention beyond seven days. Future studies should incorporate randomized controlled designs and longitudinal assessments to confirm sustained impact. Additionally, self-reported data may introduce bias, and the purposive sampling limits generalizability beyond government schools in Kamrup (Metro).

CONCLUSION

The structured teaching program significantly improved adolescent girls' knowledge of non-pharmacological management of primary dysmenorrhea, as evidenced by a mean score increase from 12.3 to 22.7 ($p < 0.001$). By equipping girls with practical strategies like yoga, heat application, and dietary remedies, the intervention addresses a critical public health issue affecting school attendance and quality of life. Significant associations with age, educational

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status, and age at menarche highlight the need for tailored educational efforts. These findings advocate for the integration of menstrual health education into school curricula, particularly in resource-limited settings, to empower adolescent girls and promote long-term health. Future research should explore the sustained impact of such interventions and their scalability across diverse populations.

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