

# Prevalence and Risk Factors of Primary Dysmenorrhea Among Female College Students in Shandong Province, China and Its Association with Academic Performance: Basis for Targeted Intervention Framework

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## ABSTRACT

Primary dysmenorrhea (PD) is a prevalent issue among young women, impacting academic performance due to frequent school absenteeism and reduced class concentration. This study focuses on college students in Shandong Province, China, aiming to determine PD prevalence, menstrual patterns, and associated risk factors. Cross-sectional study with a stratified sampling of 1297 participants from five universities. The cross-sectional approach will assess socio-demographic profiles, lifestyle habits, medical histories, and their correlation with academic outcomes. By identifying these factors, the study seeks to develop a targeted intervention framework to enhance pain management for affected students. Insights from this research are crucial for shaping effective strategies that address the multifaceted challenges posed by PD, ultimately aiming to mitigate its detrimental effects on educational attainment and student well-being.

## KEYWORDS

Primary dysmenorrhea; College students; Intervention Strategies

## 1. INTRODUCTION

Dysmenorrhea refers to the pain experienced during the menstrual cycle, typically manifesting as discomfort in the lower abdomen that may radiate to the inner thighs and back (Nagy et al., 2023). It is one of the most prevalent gynecological issues affecting females of reproductive age, often leading to physical distress and diminished quality of life (Itani et al., 2022). Dysmenorrhea is classified into two types based on its underlying cause: Primary Dysmenorrhea (PD) and Secondary Dysmenorrhea (SD). PD occurs in the absence of identifiable pelvic pathology and is primarily attributed to the excessive production of prostaglandins during endometrial shedding, leading to heightened uterine contractions and intense pain. In contrast, SD is associated with gynecological conditions such as endometriosis and fibroids, which contribute to persistent menstrual pain beyond the typical discomfort of PD.

Despite its widespread occurrence, PD remains largely overlooked, particularly among adolescent and young adult females who may not seek medical intervention. Global prevalence rates range between 45% and 95% among women of childbearing age, with severe pain affecting 2% to 29% of this population (Itani et al., 2022). The incidence is particularly high among younger women, with estimates ranging from 70% to 90%. Alarming, PD is often dismissed as a normal part of

menstruation, leading many affected individuals to forgo treatment, which in turn negatively impacts their academic performance and daily activities. Recognizing this, the World Health Organization (WHO, 2022) has emphasized the importance of addressing menstrual health and breaking the silence surrounding menstrual disorders.

Current medical treatments for dysmenorrhea primarily rely on prostaglandin synthase inhibitors and sex hormone-based medications, which provide temporary relief but often come with significant side effects. These pharmacological interventions do not prevent the recurrence of dysmenorrhea, underscoring the need for alternative preventive and therapeutic approaches. As such, identifying the factors closely associated with PD—ranging from lifestyle habits and psychological well-being to physical activity levels and genetic predisposition—is crucial. Medical professionals and researchers continue to seek more effective, holistic strategies to prevent and manage PD, particularly among adolescent and young adult women.

This study aims to investigate the incidence of PD and its predisposing factors among young female college students in China, with a particular focus on Shandong Province. Traditional Chinese Medicine (TCM) posits that exposure to cold temperatures, frequent consumption of cold foods, and prolonged habitation in damp environments may contribute to or exacerbate dysmenorrhea (Cong et al., 2024). Given that Shandong Province is characterized by a cold winter climate, hot and humid summers, and a cultural preference for cold beer, it presents a unique setting to examine the environmental and dietary influences on PD. By conducting a comprehensive questionnaire survey, this study seeks to establish the relationship between PD and various risk factors, including lifestyle choices, dietary habits, psychological state, physical activity levels, medical history, and genetic predisposition. Ultimately, the findings from this study will inform the development of targeted interventions aimed at enhancing pain management and mitigating the adverse effects of PD among young women in Shandong Province and beyond.

## **2. STUDY OBJECTIVES**

The study aims to analyze the risk factors and management of primary dysmenorrhea among college students in selected universities in Shandong province for a targeted intervention framework. Specifically, the study aims to:

- (1) To determine the prevalence of primary dysmenorrhea among the respondents;
- (2) To identify the risk factors of primary dysmenorrhea among the respondents in terms of:
  - a. Socio-demographic information (age, height, weight, marital status, and parental status)
  - b. Lifestyle habits (smoking, alcohol consumption, exercise, and weight management efforts)
  - c. Medical and medication history (existing medical conditions and medication use)
- (3) To determine the menstrual pattern and dysmenorrhea characteristics of the participants.
- (4) To determine the academic performance of female college students with dysmenorrhea under investigation.
- (5) To create a targeted intervention framework for the management of primary dysmenorrhea based on the study's findings.

## **3. STUDY DESIGN**

This study employed an analytical cross-sectional design over a three-month period to examine the risk factors, prevalence, and management of primary dysmenorrhea among college students in selected universities in Shandong Province. A cross-sectional study is a quantitative, non-

experimental approach that collects data at a specific point in time, allowing for the identification of patterns and associations between various factors and primary dysmenorrhea. The study was conducted across five universities in Jinan, Qingdao, and Binzhou, representing diverse regional and economic backgrounds.

The study aimed to determine the prevalence of primary dysmenorrhea among respondents and identify its risk factors by examining key variables, including sociodemographic characteristics (age, height, weight, marital status, and parental status), lifestyle habits (smoking, alcohol consumption, physical activity, and weight management), and medical history (existing conditions and medication use). Additionally, it assessed the menstrual patterns and dysmenorrhea characteristics of the participants, focusing on menarche age, cycle duration, symptom severity, and pain onset.

To understand the broader impact of primary dysmenorrhea, the study has also evaluated its effect on academic performance, specifically examining how menstrual pain influences study habits, class attendance, concentration, and overall academic outcomes. Based on the findings, the research has developed a targeted intervention framework to enhance the management of primary dysmenorrhea among college students. The short duration of data collection aligns with the nature of a cross-sectional study, making it an effective approach for capturing a comprehensive snapshot of the condition and its effects within the study population.

## **4. STUDY LOCALE**

The study participants have been recruited from various parts of Shandong Province, China universities. These universities included Shandong University, Binzhou Medical College, Qingdao University, Shandong Normal University, and the Shandong University of Traditional Chinese Medicine.

## **5. RESULTS**

### **5.1. The Incidence of Dysmenorrhea Among Female College Students in Shandong Province**

Data collection for this study began on September 12, 2024 and ended on September 30, 2024. A total of 1,319 questionnaires were distributed and retrieved in this study. After verification, collation and elimination of 22 invalid questionnaires, a total of 1,297 valid questionnaires were ultimately obtained, with an effective rate of 98.33%. Among the surveyed individuals, 1169 (90.13%) experienced dysmenorrhea, while 128 (9.87%) did not experience dysmenorrhea.

### **5.2. The Risk Factors for Dysmenorrhea in College Women**

Sociodemographic and dysmenorrhea profiles of the participants

Among them, 1,001 were of the medical professional type, accounting for 77.18% of the total surveyed. The age range was 13 - 28 years old, with an average age of  $18.55 \pm 1.24$  years old. Among them, the number of females aged 18 and 19 accounted for 81.77% of the total. The marital and reproductive status was mainly unmarried, accounting for 99.11%; the proportion of those not pregnant was 99.76%.

Data such as age, height, and weight of the respondents were collected. The body mass index (BMI) was calculated using the formula:  $BMI = \text{weight (kg)} / \text{height (m}^2\text{)}$ . The BMI status was evaluated in accordance with the "Guide for the Prevention and Control of Overweight and Obesity in Chinese Adults": the underweight group ( $BMI < 18.5 \text{ kg/m}^2$ ) ( $n = 363, 27.99\%$ ); the normal group ( $BMI$  ranging from 18.5 to 24  $\text{kg/m}^2$ ) ( $n = 711, 54.82\%$ ); the overweight and obese group ( $BMI \geq 24.0$ ) ( $n$

= 223, 17.19%). The results indicated that a normal BMI value was predominant, with an average BMI of  $20.9 \pm 3.79$  kg/m<sup>2</sup>. The results are shown in Table 1.

**Table 1.** Socio-demographic profile of the participants

Demographic Variables	Freque nc (Constituent Ratio)	
	Non-dysmenorrhea	Dysmenorrhea
Major type		
• Medical category	95(74.22%)	961(82.21%)
• Non-medical category	33(25.78%)	208(17.79%)
Age		
• 17 years old	6(4.69%)	44(3.76%)
• 18 years old	70(54.69%)	758(64.84%)
• 19 years old	26(20.31%)	218(18.65%)
• 20 years old	18(14.06%)	80(6.84%)
• 21 years old	3(2.34%)	32(2.74%)
• 22 years old	5(3.91%)	22(1.88%)
• ≥23 years old	1(0.78%)	15(1.28%)
Marital status		
• Unmarried	128(100%)	1165(99.66%)
• Married	0(0%)	4(0.04%)
Fertility Situation		
• none	128(100%)	1167(99.83%)
Total	128(100%)	1169(100%)

## 6. CONCLUSION

To sum up, primary dysmenorrhea is the result of multiple risk factors such as eating habits, physical exercise, genetic factors and so on, which are interrelated and influence each other. It is necessary to develop good living habits, strengthen exercise, reasonable diet, maintain good BMI index, maintain good interpersonal relations, and strengthen self-recognition. The school and the society should strengthen the publicity and education to the female college students to relieve the students' bad mental emotions to control the occurrence and development of primary dysmenorrhea of female college students has a great role. This study can provide a reference for the health department of Shandong Province to revise the prevention methods and diagnosis and treatment standards of primary dysmenorrhea, which is of great significance for the health promotion of female college students.

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