

A Study on the Impact of Exercise Habits on Dysmenorrhea and Anxiety among Female College Students

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Abstract

For a long time, dysmenorrhea has been one of the problems troubling women. With social development, the degree of dysmenorrhea has greatly affected women's learning and work efficiency as well as emotional instability and other issues. After summarizing previous literature on female menstrual pain, exercise habits, and anxiety, it was found that studies on the correlation among female menstrual pain, exercise habits, and anxiety are relatively scarce. Therefore, the purpose of this study is to explore the improvement of anxiety and female menstrual pain through enhancing exercise habits. In the experiment, the effects of exercise habits on women's daily emotions, study and work, and menstrual pain were investigated. Through practical research involving questionnaire distribution and data analysis, this study analyzed how improving exercise habits can improve anxiety and help alleviate female menstrual pain. Results: Exercise habits can improve anxiety and dysmenorrhea in women. Conclusion: Data on the relationship between exercise habits and dysmenorrhea relief show that exercise habits are significantly correlated with dysmenorrhea relief in female college students. Among the surveyed population, female college students who regularly participated in exercise (especially aerobic exercise such as cycling, running, rope skipping, and net-confrontation sports such as badminton and table tennis) had significantly lower dysmenorrhea severity than the control group without exercise habits. This result may be related to the physiological mechanisms by which exercise promotes endorphin release, improves local uterine blood perfusion, and inhibits excessive prostaglandin secretion. Effect of exercise habits on improving anxiety: Data analysis showed that female college students who maintained regular exercise habits (1-2 times per week) had significantly lower anxiety scale scores than the insufficient exercise group, indicating that exercise participation

frequency is negatively correlated with anxiety levels. This result suggests that regular exercise behavior may help female college students maintain a more stable emotional state by regulating neuroendocrine function, such as reducing cortisol levels or enhancing psychological resilience. Suggestion: This study requires multi-party collaboration to scientifically establish a female health promotion system and effectively improve female emotional health.

I. INTRODUCTION

Dysmenorrhea is one of the most common menstrual symptoms troubling women. Its impact is far from limited to the physiological level but profoundly affects multiple dimensions such as psychology, social interaction, and quality of life. According to pathophysiology, dysmenorrhea can be divided into primary and secondary types. Primary dysmenorrhea refers to discomfort such as lower abdominal pain, abdominal distension, and backache before, after, or during menstruation, without organic lesions in the reproductive organs. It is mainly caused by increased secretion of prostaglandins by the uterus, which leads to uterine hypoxia, causing women with dysmenorrhea to experience pain similar to angina pectoris and resulting in a disabling state. Secondary dysmenorrhea is mostly induced by pelvic lesions such as endometriosis. Its pain is more severe and worsens with age, with more diverse pain manifestations such as spasms, colic, dull pain, distending pain, and even severe stabbing pain [1]. For a long time, dysmenorrhea and premenstrual syndrome not only cause physical suffering but also profoundly affect women's learning efficiency, work performance, and emotional stability [2].

At the same time, cyclical fluctuations in hormone levels during the menstrual cycle often cause women to experience negative emotions such as depression, irritability, anxiety, and anger in the premenstrual period. Anxiety is a manifestation of emotional disorders. When an individual's emotions remain in a negative state for too long, the activities of various body systems become disordered and lead to illness, and the occurrence of various diseases in turn aggravates menstrual pain [3]. Anxiety causes subjective feelings such as tension, uneasiness, worry, and concern. The resulting emotional

reactions stimulate the autonomic nervous system and cause physiological changes such as palpitations, sweating, and dyspnea. Some scholars have pointed out that pain is not only a sensory experience but also an emotional event. Pain increases an individual's psychological distress, and likewise psychological distress aggravates pain [4]. Therefore, dysmenorrhea and anxiety often reinforce each other, forming a vicious cycle of "pain → anxiety → aggravated pain."

Exercise, as a non-pharmacological intervention, has received increasing attention in recent years. Long-term, low-to-moderate load, planned physical exercise can establish good systemic blood circulation conditioned reflexes, effectively reduce the degree of uterine congestion during menstruation, and shorten uterine contraction time [5]. In 1914, Mosler proposed the hypothesis that exercise can assist the expulsion of menstrual blood from the uterus and is a feasible way to treat dysmenorrhea. Some studies compared the pain-relieving effects of stretching exercise intervention and analgesics. After an intervention lasting two menstrual cycles, equivalent to two months, both groups had significant pain relief, and there was no difference between the groups, indicating that the pain-relieving effect of exercise can be comparable to that of taking analgesics [6]. Recent studies have also confirmed that physical activity can reduce psychological stress, alleviate pain, and reduce prostaglandin secretion [7,8].

II. RESEARCH SUBJECTS AND METHODS

2.1 Research Subjects

This study selected female students from various majors at Huizhou University by

random sampling, and 300 female students were selected as subjects. Using a college student exercise habits questionnaire as the screening basis, the subjects were divided into an exercise group (with exercise habits) and a non-exercise group (without exercise habits). A total of 124 female college students with exercise habits and 81 female college students without exercise habits were selected, for a total of 205 subjects.

2.2 Research Methods

2.2.1 Literature Review Method

The research topics of this paper are dysmenorrhea and the influence of anxiety. The literature was mainly sourced from CNKI, the CNKI database (China Journal Net), and the Taiwan doctoral and master's thesis CNKI. The publication years ranged approximately from 1989 to 2025. Using "exercise habits," "dysmenorrhea," and "anxiety" as keywords for Chinese searches, more than 30 journal articles and master's/doctoral theses were collected. The data indicate that maintaining good exercise habits has a positive effect on improving anxiety and relieving dysmenorrhea.

2.2.2 Random Sampling Method

Questionnaires were randomly distributed, and 300 female college students at Huizhou University were selected by random sampling as the research subjects.

2.2.3 Questionnaire Survey Method

This study used the Beck Depression Inventory, the Menstrual Distress Questionnaire, the Premenstrual Syndrome Scale, and the Short-Form McGill Pain Questionnaire for investigation. The Beck Depression Inventory is a self-report psychological assessment tool mainly used to evaluate an individual's affective symptoms, cognitive symptoms, and somatic symptoms. The total score of this scale does not exceed 63 points, with a minimum score of 0. The Menstrual Distress Questionnaire, Premenstrual Syndrome Scale, and Short-Form McGill Pain Questionnaire use a 4-point scoring standard: 0 indicates "no discomfort at all," 1 indicates "mild discomfort," 2 indicates "moderate discomfort," and 3 indicates "severe discomfort." The lower the score, the milder the degree of menstrual discomfort.

2.2.4 Data Analysis Method

The survey data were screened and organized using Excel, and then the processed data were analyzed by independent samples t-test using SPSS 22.0 software, in order to evaluate the important influence of exercise habits on improving anxiety and relieving female dysmenorrhea.

III. RESULTS AND ANALYSIS

3.1 Effect of Exercise Habits on Improving Anxiety

According to the research results (Table 1), the Beck Depression Inventory score of the exercise habit group was significantly lower, with a mean of 5.98 and a standard deviation of 5.23. The non-exercise habit group had a higher score, with a mean of 13.94 and a standard deviation of 8.83. There was a statistically significant difference in Beck Depression Inventory scores between the two groups ($p < 0.01$). According to the research results (Tables 3 and 4), the exercise frequency of female college students was mainly low-intensity (1-2 times) exercise, accounting for 44.71%, while the proportion of high-intensity exercise was less than 2.5%. As shown in Table 4, among diverse choices, female college students had a high proportion of participation in aerobic exercises such as cycling, running, rope skipping, and net-confrontation ball sports such as badminton and table tennis.

Table 1 Beck Depression Inventory scores of female college students with different exercise habits

	Exercise habit group**	Non-exercise habit group**	t value
Beck Depression Inventory	5.98±5.230	13.94±8.831	-7.312

** Statistically significant difference ($p < 0.01$)

Table 2 Distribution of weekly exercise frequency among female college students (N=205)

Exercise frequency (times/week)	Frequency (N)	Percentage (%)
None	81	38.94%
1-2 times	93	44.71%
3-4 times	29	13.94%
5-7 times	3	1.44%
>7 times	2	0.96%
Total	205	100%

Table 3 Statistics of sports participation among female college students (N=205)

Sport	Frequency (N)	Percentage (%)
Badminton	70	34.15%
Table tennis	71	34.63%
Volleyball	4	1.95%
Tennis	4	1.95%
Football	6	2.93%
Basketball	33	16.10%
Aerobics	30	14.63%
Dancesport	3	1.46%
Gymnastics	4	1.95%
Running	71	34.63%
Swimming	11	5.37%
Sanda	5	2.44%
Cycling	73	35.61%
Rope skipping	52	25.37%
Wushu, Tai Chi	7	3.41%

Different sports have different effects on anxiety in female college students, which may be determined by their own participation motivation and interests. The effects of aerobic exercise and ball sports on anxiety are significantly better than those of mind-body exercise [9]. Different exercise modes and exercise intensities differ in the degree of improvement in college students' mental health. Compared with aerobic exercise and ball sports, mind-body exercise requires a better mood state and proficient routines, places relatively high

demands on students' psychological state, and lacks relatively high participation. Its effect on anxiety in the short term is lower than that of other exercise types, and it may have better effects for older adults or after longer-term participation [10].

High-intensity exercise can effectively reduce state anxiety, and its mechanism may be related to an increase in body temperature and increased endorphin secretion in the central nervous system; therefore, higher-intensity exercise may have a greater impact on anxiety [11]. However, at present, for safety reasons, high-intensity exercise is widely used in competitive sports training but is rarely used in the general population and disease populations [12].

In summary, through the analysis of different exercise frequencies and sports, it can be preliminarily inferred that regular exercise can reduce the probability of anxiety among female college students. However, individual differences exist, and more measures are still needed to help female college students relieve anxiety.

3.2 Effect of Exercise Habits on Improving Menstrual Distress

According to the research results (Table 4), the menstrual distress score of the exercise habit group was significantly lower, with a mean of 5.29 and a standard deviation of 4.402. The non-exercise habit group had a higher score, with a mean of 12.37 and a standard deviation of 8.095. There was a significant difference in the degree of menstrual distress between the two groups ($p < 0.01$). The menstrual distress score of the exercise habit group was significantly lower than that of the non-exercise habit group.

Table 4 Menstrual distress levels of female college students with different exercise habits

	Exercise habit group※※	Non-exercise habit group※※	t value
Menstrual Distress Questionnaire	5.29±4.402	12.37±8.095	-7.206

※※ Statistically significant difference ($p < 0.01$)

Common discomfort symptoms during menstruation include physiological and psychosocial aspects. Physiologically, they include colicky pain in the lower abdomen resembling labor pain and radiating to the back and thighs, as well as headache, backache, fatigue, insomnia, nausea, vomiting, edema, and other symptoms [13]. In severe cases, pallor, cold sweats, cold hands and feet, and syncope may also occur. These symptoms appear several hours before the onset of menstruation or together with menstrual discharge and may last 48–72 hours. Psychosocially, they include emotional instability, decreased attention, and social impairment [4]. As a means of intervention, exercise is effective in improving the degree of menstrual distress in women. As shown in Table 4, the sports most frequently chosen by female college students are running and rope skipping among aerobic exercises, and badminton and table tennis among ball sports. For women, these are all good choices, as they can not only relieve dysmenorrhea but also promote health. It is necessary to diversify exercise forms; having many different forms of exercise can prevent loss of interest in exercise and discontinuation of exercise. Moderate exercise intensity, duration, and frequency are also very important [14].

In summary, regular exercise can relieve menstrual distress in women. Most current studies believe that exercise can reduce female menstrual distress, but they have not identified specific sports. More research is needed in the future to further confirm the improvement of female menstrual distress by specific sports.

3.3 Effect of Exercise Habits on Improving Premenstrual Syndrome

According to the research results (Table 5), the exercise habit group had significantly lower scores for negative emotions during menstruation and impacts on social activities, with a mean of 8.79 and a standard deviation of 5.421. The non-exercise habit group had higher scores, with a mean of 15.91 and a standard deviation of 7.986. There was a significant difference in the degree of menstrual distress between the two groups ($p < 0.05$). The exercise habit group scored significantly lower than the

non-exercise habit group in negative emotions during menstruation and impacts on social activities.

Table 5 Premenstrual Syndrome Scale scores of female college students with different exercise habits

	Exercise habit group**	Non-exercise habit group**	t value
Premenstrual Syndrome Scale	8.79±5.421	15.91±7.986	-7.038

** Statistically significant difference ($p < 0.01$)

Due to changes in sex hormones, pituitary gonadotropins, and other factors during the menstrual period, women usually exhibit emotional fluctuations and abnormalities such as restlessness, irritability, anxiety, depression, and fatigue in the premenstrual and menstrual periods [15]. Pain during menstruation not only affects emotions but also affects personal social activities. Negative emotions during menstruation and dysmenorrhea symptoms are two major conditions that are interrelated and mutually influential. On the one hand, discomfort such as pain produces negative emotions such as fear, aversion, and anxiety; on the other hand, negative emotions in turn indirectly or directly affect pain receptors and aggravate dysmenorrhea symptoms [16]. Scientific exercise can effectively improve physical fitness and regulate hormones, thereby regulating emotions [15].

Exercise is widely used as a way to reduce daily stress and control chemical changes in the immune system. Listening to music, meditation, self-hypnosis, and other methods are also used as stress management relief methods. Exercise can reduce sympathetic nerve activity and increase parasympathetic nerve activity at rest. Through activity, stress is reduced, menstrual symptoms are alleviated, and social activities during menstruation are greatly improved [17]. According to the analyzed data, the exercise habit group had better conditions of negative emotions during menstruation and impacts on social activities than the non-exercise habit group. Therefore, exercise can be used as a therapy to regulate and improve negative

emotions during menstruation, thereby effectively relieving negative emotions and improving social activities.

In summary, exercise can be used as a means to relieve negative emotions during menstruation and improve social activities. However, at present, most students have insufficient awareness of negative emotions during menstruation and do not recognize the dangers of negative emotions during menstruation. Moreover, individual differences exist, and further exploration is needed regarding the effects of specific exercise methods on female emotions during menstruation.

3.4 Effect of Exercise Habits on Relieving Female Dysmenorrhea

According to the research results (Table 6), the menstrual pain score of the exercise habit group was significantly lower, with a mean of 3.44 and a standard deviation of 4.019. The non-exercise habit group had a higher score, with a mean of 10.22 and a standard deviation of 8.210. There was a significant difference in the degree of menstrual distress between the two groups ($p < 0.01$). The menstrual pain score of the exercise habit group was significantly lower than that of the non-exercise habit group.

Table 6 Menstrual pain scores of female college students with different exercise habits

	Exercise habit group**	Non-exercise habit group**	t value
Short-Form McGill Pain Questionnaire	3.44±4.019	10.22±8.210	-6.910

** Statistically significant difference ($p < 0.01$)

Exercise training has been used as one of the alternative treatments for dysmenorrhea and its symptoms. The results of many studies indicate that exercise is associated with the alleviation of dysmenorrhea [2]. During pain, exercise causes waste products and prostaglandins (PG) to be transferred from the uterus more quickly. On the other hand, regular exercise helps improve blood circulation, increases endorphins and neural receptor sensitivity, and plays an important role in

reducing stress. Stress inhibition is one of the most common reasons for the relationship between exercise and menstruation [8]. Exercise duration is also closely related to dysmenorrhea relief. However, in addition to duration, the type and intensity of exercise also affect the results. Some studies have found that moderate exercise can effectively reduce physical symptoms related to menstruation [18].

In summary, exercise has a positive effect on the relief and improvement of menstrual pain in women. However, dysmenorrhea is divided into primary dysmenorrhea and secondary dysmenorrhea, and further case classification research and optimized exercise prescription are needed.

IV. CONCLUSION

Through systematic design, this study deeply explored the correlations of exercise habits with anxiety and menstrual pain in female college students. By integrating the analysis of the effects of exercise on menstrual pain, negative emotions, anxiety, and menstrual distress in women with the relevant literature review, the following conclusions are drawn:

The research data on the relationships between exercise habits and menstrual pain, premenstrual syndrome, and menstrual distress show that the associations between exercise habits and menstrual pain, premenstrual syndrome, and menstrual distress in female college students all reached statistical significance. Among the surveyed population, female college students who regularly participated in exercise (especially aerobic exercise such as cycling, running, rope skipping, and net-confrontation sports such as badminton and table tennis) had significantly lower menstrual distress than the control group without exercise habits. This result may be related to the physiological mechanisms by which exercise promotes endorphin release, improves local uterine blood perfusion, and inhibits excessive prostaglandin secretion.

Effect of exercise habits on improving anxiety: data analysis showed that female college students who maintained regular exercise habits (1-2 times per week) had significantly lower anxiety scale scores than

those without exercise habits, and there was a significant correlation between anxiety and exercise among female college students. This indicates that exercise participation frequency may be negatively correlated with anxiety levels. This result suggests that regular exercise behavior may help female college students maintain a more stable emotional state by regulating neuroendocrine function, such as reducing cortisol levels or enhancing psychological resilience.

V. RECOMMENDATIONS

Based on the above findings, the following recommendations are proposed: First, universities should make full use of sports clubs as a vehicle, rely on existing badminton, table tennis, running and other clubs, and carry out menstrual health education and scientific exercise guidance for female students, thereby breaking the traditional misconception that “exercise is not appropriate during menstruation.” Second, future research can design phased exercise intervention programs according to the characteristics of the menstrual cycle, and develop intelligent monitoring systems that use wearable devices to track exercise intensity and emotional changes in real time. At the same time, individualized exercise prescriptions should be developed according to individual differences, including exercise habits, stress levels, and dysmenorrhea severity. Third, at the university level, publicity and education on female health knowledge should be strengthened, a female health promotion system should be scientifically established, and female college students should be helped to develop correct concepts of exercise during menstruation, so as to effectively implement the work of improving female emotional health.

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