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ORIGINAL RESEARCH ARTICLE

Effect of Cold Hip Bath among Young Females Suffering with Primary Dysmenorrhea

P. Prema Latha[1], S. Prashanth[2], R. N. Rani[3]*, N. Manavalan[4]

[1]Assistant Medical Officer/Lecturer Grade II, Department of Biochemistry, International Institute of Yoga and Naturopathy Medical Sciences, Chengalpattu, Tamil Nadu, India.
[2]Assistant Medical Officer/Lecturer Grade II, Department of Yoga Philosophy, Government Yoga and Naturopathy Medical College and Hospital, Chennai, Tamil Nadu, India.
[3]Assistant Medical Officer/Lecturer Grade II, Department of Microbiology, Government Yoga and Naturopathy Medical College and Hospital, Chennai, Tamil Nadu, India.
[4]Principal and Head, Department of Naturopathy, Government Yoga and Naturopathy Medical College and Hospital, Chennai, Tamil Nadu, India.

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ABSTRACT

Background: Dysmenorrhea, a common condition affecting 45–95% of women worldwide, is particularly prevalent among teenagers, with 94% reporting it and one-third experiencing severe pain. This study aims to evaluate the effectiveness of a cold hip bath (CHB) in treating primary dysmenorrhea (PD), a metabolic and non-communicable disease.

Methods: A randomized controlled trial was conducted at Government Yoga and Naturopathy Medical College and Hospital, Chennai, involving 30 participants in a study group and 30 in a control group. The study group received a CHB, while the control group received no intervention. Data were analyzed statistically.

Results: The study group showed significant changes compared to the control group. In the study group, the Visual Analog Scale (VAS) value changed from 8.56 ± 3.23 to 4.60 ± 3.98 ($P < 0.04$), the MSQ value from 53.90 ± 12.88 to 38.88 ± 10.65 ($P < 0.01$), and in the control group, the VAS value from 8.24 ± 2.60 to 8.60 ± 2.90 ($P < 0.43$) and MSQ value from 52.82 ± 14.78 to 54.88 ± 12.42 ($P < 0.43$).

Conclusion: The present study suggests that CHB may be effective in reducing the intensity of pain and symptoms in PD, which is a simple management method for PD without any side effects. The results may be validated in the future with a larger sample size.

1. INTRODUCTION

Dysmenorrhea is a common condition[1] that affects 45–95% of women globally who are of reproductive age and the most typical symptoms are uterine cramps[1,2] and lower abdomen pain.[2] The global prevalence of menstrual pain, known as dysmenorrhea, among teenagers, is high, with 94% reporting it, with one-third experiencing severe pain. Over 20.1% of menstruating adolescents miss school due to dysmenorrhea, which affects their ability to study and concentrate.[3] Dysmenorrhea in teenagers can negatively impact their health, happiness, school attendance, leisure activities, and employment.[4] It can be primary or secondary and is often misdiagnosed and untreated despite its widespread prevalence.[1] Primary dysmenorrhea (PD) is a painful abdominal cramping during menstruation, typically occurring before or at the onset without an organic cause, most severe on the 1st day and lasting several days. Secondary dysmenorrhea is menstrual pain linked to underlying pelvic pathology such as endometriosis, chronic pelvic inflammatory disease, fibroids, ovarian cysts, congenital anomalies, and intrauterine contraceptive device complications, which may not always coincide with menstrual onset.[1] PD is a physiological process that involves muscle, inflammatory, and hormonal components. Reduced estrogen and progesterone following when pregnancy is not achieved cause an inflammatory reaction including prostaglandins,

Corresponding Author:
R. N. Rani,
Assistant Medical Officer/Lecturer Grade II, Department of Microbiology, Government Yoga and Naturopathy Medical College and Hospital, Chennai – 600 106, Tamil Nadu, India. Phone: +91 7299779638.
Email: r.navisrani@gmail.com

chemokines, and cytokines.[5] This inflammatory inflow is thought to be the source of ischemia and vasoconstriction. It is believed that painful and unpleasant cramps are caused by myometrial contractions in combination with this hypoxic environment.[5] PD is caused by a multitude of risk factors, including biological, psychological, social, and lifestyle variables.[6] Yoga and Naturopathy is a drugless medical approach that treats a range of ailments with non-invasive techniques. Metabolic and other non-communicable diseases are considered the most appropriate complementary and alternative medicine because they are safe and have not been demonstrated to have any harmful side effects.[7] Techniques include diet, fasting, lifestyle management, stress management, and natural therapies such as hydrotherapy, mud therapy, and heliotherapy.[8] A hip bath is a hydrotherapeutic technique where the lower abdomen and upper thigh are immersed in water at different temperatures, and cold hip bath (CHB) is typically used for treating gastrointestinal and urogenital dysfunctions.[9] Hence, this study aims to evaluate the efficacy of a CHB on primary dysmenorrhea.

2. METHODS

2.1. Participants

A total of sixty female subjects were included based on their symptoms and confirming there were no underlying pathological issues by pelvis ultrasound scan. The included subject's mean age was 19.8 years, weight (56.06 kg), and body mass index (BMI) (23.13 kg/m^2). The subjects who gave willing consent are included in the study. The study was conducted at Government Yoga and Naturopathy Medical College Hospital, Chennai.

2.2. Inclusion

The nulliparous female subjects included must be of reproductive age with a regular menstrual cycle history and experiencing dysmenorrhea for more than 1 year. And those whores are willing to participate and given written consent are included in the study.

2.3. Exclusion

After careful examination and pelvic ultrasound report, the female subjects are excluded if they are suffering from secondary dysmenorrhea or any other systemic illness and BMI above 28 and women with irregular menstrual cycles (<21 days or more than 30 days).

2.4. Design

Comparative study was done as a randomized controlled trial, by simple randomization, the subjects were divided into two groups: Thirty subjects in the study group (n = 30) and thirty in the control group (n = 30). They were assessed with a menstrual symptom questionnaire (MSQ), Visual Analog Scale (VAS), and BMI pre- and post of intervention.

2.5. Intervention

The intervention is given for the subject, from the 6th day of the menstrual cycle till the start of the next cycle. After the pre-assessment CHB at 55° F to 65° F temperature for 5–8 min per day, the patients were regular, and after completing the intervention, post-assessment was taken. The procedure of CHB is as follows: When the patient sits in the tub, enough water is added to cover the hips and reach the upper navel. It could be required to use four to six buckets of water. It is necessary to verify the hip bath's temperature. A wooden or plastic stool outside the tub supports both of the legs. The patient should next enter the bath half-reclining, half-seated, and firmly massage the entire abdomen with a moist cloth, moving from the navel downward and over the body.[10]

2.6. Assessment

The subjects were assessed with VAS and MSQ before and after the intervention. The score for pain intensity, each woman's menstrual pain level was assessed using a 10-cm VAS, with zero representing no pain and 10 representing the most severe discomfort. Because the pain in PD persisted over the first 3 days of menstruation, the subjects were requested to record the pain severity levels on the pain diary for the 1st, 2nd, and 3rd days of menstrual cycles.[11] MSQ – menstrual symptoms were evaluated using the MSQ. The MSQ is a self-reporting evaluation consisting of 24 items, with a score ranging from 1 (never) to 5 (always). A higher number denotes a more severe set of symptoms.[11] Three values are noted and the average value is considered for analysis.

2.7. Data Extraction

The data were entered and extracted using a Microsoft Excel sheet, and the average value among the three values was considered for data analysis.

2.8. Data Analysis

Data expressed mean ± SD. The comparison of mean between the groups was analyzed by paired t-test and unpaired t-test. R statistical software version 4.0.2 was used for the statistical analysis, and the $P < 0.05$ was set as significant.

3. RESULTS

The study group showed significant changes when compared to the control group. In the study group, the VAS value changed from 8.56 ± 3.23 to 4.60 ± 3.98 ($P < 0.04$), the MSQ value from 53.90 ± 12.88 to 38.88 ± 10.65 ($P < 0.01$), and in the control group, the VAS value from 8.24 ± 2.60 to 8.60 ± 2.90 ($P < 0.43$) and MSQ value from 52.82 ± 14.78 to 54.88 ± 12.42 ($P < 0.43$); the details are given in Table 1.

4. DISCUSSION

This study has demonstrated the effectiveness of a CHB on PD, and the results were significant. Muscle discomfort and pain are reduced by hydrotherapy. This might happen as a result of how temperature and pressure affect nerve endings. It causes a rise in plasma levels of methionine-enkephalin while suppressing levels of prolactin, corticotropin, and plasma-β endorphin.[12] A recently published study (Ajmi, J. S., 2024) revealed that cold temperatures can be useful in treating PD. By acting on thermal receptors, the pressure and temperature of hydrotherapy treatments can block nociceptors and improve spinal segmental processes, both of which are beneficial in the treatment of pain.[13] The cold friction hip bath helps women with sub-involution of the uterus and adnexa, constipation with weak, relaxed bowel muscles, and accelerating the absorption of residual thickening post-pelvic inflammations.[10] It has been demonstrated that a CHB that causes shivering increases the synthesis of irisin an adipokine that promotes metabolism and helps white adipose tissue imitate brown adipose tissue's activities.[14] The sympathetic nervous system (SNS) is activated, blood levels of β-endorphin and noradrenaline are raised, and blood flow to the underlying tissues is increased when a small surface area is exposed to cold. As a result of the skin's high density

of cold receptors, which transmit electrical signals from peripheral nerve endings to the brain, taking a cold shower can lower depression, without any negative effects or dependency, they have a strong analgesic effect.[13] A recent review (Kunutsor 2024) suggests that by enhancing brown adipose tissue, increasing energy expenditure, and improving cardiometabolic risk factors, cold water therapy may be able to lower the risk of cardiometabolic disorders. In addition, it releases catecholamines, endorphins, and stress hormones that improve mood and alertness and may even help treat mental health issues. Cold water treatment improves immunological function, lowers inflammation, encourages sleep, and speeds up the healing process following physical activity. While the ideal temperature and duration for the greatest effects are unknown, shorter exposure times and lower temperatures could be more advantageous.[15] Through the SNS, the pathophysiology of cold treatments directly triggered alpha receptors. Either a direct or indirect application of cold can have an analgesic effect. The reduction in the activity of the NA-K pump in the free nerve terminals causes a decrease in repolarization and excitability as well as an increase in the pain threshold, in addition, by altering the conduction characteristics of peripheral nerves with large-scale A-A fibers, the nerve conduction velocity is delayed.[13] The limitations may be due to few assessment tools and the strength of the study is significant results, and patients were regular and did not experience any side effects or difficulties during the therapy.

6. CONCLUSION

The present study suggests that CHB may be effective in reducing the intensity of pain and symptoms in PD. It is a simple management for PD without any side effects. The results may be validated in the future with a larger sample size.

7. ACKNOWLEDGMENT

Nil.

8. AUTHORS' CONTRIBUTIONS

All the authors contributed equally to the design and execution of the article.

9. FUNDING

Nil.

10. ETHICAL APPROVALS

Ethical approval (IEC/GYNMC-461511002) was taken from the institutional ethics committee of Government Yoga and Naturopathy Medical College and Hospital, Chennai. A signed informed consent form was obtained from each participant before collecting the baseline data.

11. CONFLICTS OF INTEREST

Nil.

12. DATA AVAILABILITY

This is an original manuscript and all data are available for only review purposes from principal investigators.

13. PUBLISHERS NOTE

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Table 1: Results; comparison of variables between study and control group

Variable	Study group		*P*-value	Control group		*P*-value
	Pre	Post		Pre	Post	
VAS score	8.56±3.23	4.60±3.98	0.04	8.24±2.60	8.60±2.90	0.43
MSQ- Sum (24 items)	53.90±12.88	38.88±10.65	0.01	52.82±14.78	54.88±12.42	0.43