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Evaluating the Effectiveness of Acupressure on Pain Management in Adolescent Girls with Primary Dysmenorrhea: A Study at a Nursing College in Allahabad

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ABSTRACT

Dysmenorrhea, a prevalent issue among women, especially adolescent girls, significantly impacts daily life. In India, 67.2% of adolescent girls experience dysmenorrhea, affecting their routines. This study aims to evaluate acupressure's effectiveness in alleviating dysmenorrhea pain by comparing pain levels between experimental and control groups. Employing a quasi-experimental design, 60(experimental group=30, control group=30) adolescent girls (aged 17-21) from Christian College of Nursing, Allahabad, were divided equally. Data collection involved structured questionnaires and pain rating scales. Acupressure was administered at the SP6 point, followed by post-test assessments. The experimental group, despite higher junk food consumption, showed more regular exercise habits and prior dysmenorrhea knowledge. Initially, both groups experienced moderate pain, but post-intervention, the experimental group exhibited significant improvement, with 46.66% reported no pain and 46.66% experience mild pain. Conversely, 40% of the control group still experienced moderate pain. Statistical analysis revealed a substantial reduction in mean pain scores within the experimental group from pre-test (5.53 ± 2.14) to post-test (1.03 ± 1.22), and a significantly lower post-intervention mean score (1.03 ± 1.22) compared to the control group (3.56 ± 1.99). These findings highlight acupressure's efficacy in reducing menstrual pain among adolescent girls, emphasizing its potential as a non-invasive intervention for dysmenorrhea.

Keywords: Dysmenorrhea, adolescent girls, acupressure, SP6 point, pain reduction, quasi-experimental study.

INTRODUCTION

Dysmenorrhea, characterized by painful menstruation, is a significant health issue affecting women of reproductive age, particularly adolescent girls (1). It is the leading cause of recurrent short-term school absence among this demographic and poses a considerable challenge to daily activities, including work and educational pursuits (2). Reports indicate that 10-45% of young women with dysmenorrhea experience reduced productivity due to their symptoms

(3). In India, the prevalence is notably high, with 67.2% of adolescent girls suffering from dysmenorrhea, and 60% of these individuals experiencing disrupted daily routines (4). The impact of dysmenorrhea is not only a matter of personal discomfort but also a public health concern due to its widespread effect on educational and occupational outcomes (5). Given the high prevalence and significant impact of dysmenorrhea on the daily lives of adolescent girls, there is an urgent need for effective, non-invasive, and cost-efficient treatments. Traditional pharmacological treatments often come with side effects and may not be suitable for all individuals. By exploring acupressure as a therapeutic option, this study aims to contribute to the development of accessible and effective pain management strategies for adolescent girls suffering from dysmenorrhea.

The primary objectives of this study are to evaluate the effectiveness of acupressure in alleviating pain associated with primary dysmenorrhea among adolescent girls. Additionally, the study aims to assess the difference in pain levels between the experimental and control groups and identify any associations between demographic variables and dysmenorrhea pain levels. Despite the existing studies on dysmenorrhea and its impact, there remains a significant gap in the literature regarding non-pharmacological interventions, particularly acupressure. Previous research, such as the studies conducted by Malar A. P. (2016), Nayana S. George et al. (2014), Esther Christina et al. (2016), and Dehnavi ZM et al. (2018), have demonstrated varying degrees of success in managing dysmenorrhea through different interventions (6,7,8,9). However, these studies often have limitations, including small sample sizes, lack of control groups, or short follow-up periods. Moreover, there is a need for more comprehensive evaluations of acupressure's effectiveness, especially in diverse populations and settings. This study seeks to address these gaps by employing a robust quasi-experimental design, a larger sample size, and a detailed analysis of the effects of acupressure on dysmenorrhea among adolescent girls in an Indian context.

MATERIAL AND METHOD

This quantitative correlational study utilized a quasi-experimental evaluative approach to assess the effectiveness of acupressure on primary dysmenorrhea among adolescent girls. This approach allows for the manipulation of the independent variable (acupressure) while observing its effect on the dependent variable (pain levels). The study adopted a quasi-experimental research design with a two-group pre-test and post-test setup. The design included an experimental group receiving acupressure treatment and a control group without the intervention. Both groups underwent pre-testing and post-testing to measure changes in pain levels. In this study the Independent Variable is Acupressure and Dependent Variable Pain levels in primary dysmenorrhea. The study was conducted at the Christian College of Nursing in Allahabad. The target population included adolescent girls aged 17-21 years with primary dysmenorrhea. The accessible population was from the Christian College of Nursing, Allahabad. Purposive sampling was used to select 60 adolescent girls (30 in the experimental group and 30 in the control group) based on inclusion criteria such as willingness to participate, regular menstruation, and availability during the data collection period. The Inclusion Criteria were the adolescent girls aged 17-21 years, having primary dysmenorrhea, Willing to participate, Available during data collection, Having regular menstruation. The Exclusion Criteria: Irregular menstruation, Secondary dysmenorrhea, Not experiencing dysmenorrhea

Tools for Data Collection Instruments

The investigator utilized a structured questionnaire and a standardized rating scale to gather pertinent information for the study. The questionnaire comprised two

sections: a demographic variable proforma consisting of 10 items, including age, dietary habits, family history of dysmenorrhea, exercise routines, religious background, parental education and occupation, family income, and previous knowledge of dysmenorrhea. The second section, the menstrual variable proforma, comprised 13 items capturing data on menarche, menstrual cycle duration, bleeding patterns, dysmenorrhea severity, associated symptoms, disruptions in daily activities, pain management strategies, medical consultations, and home remedies. Additionally, a standardized numerical pain rating scale was employed, with key points ranging from 0 (no pain) to 10 (worst pain), delineating varying degrees of pain severity from mild to severe. This comprehensive approach ensured a detailed exploration of relevant variables related to dysmenorrhea, facilitating a nuanced understanding of the phenomenon under investigation.

Sample size: The formula for sample size calculation used in the study is typically based on the specific research design and objectives. One commonly used formula for calculating sample size in a comparative study, such as a clinical trial or intervention study, is the formula for comparing two meanings. Assuming a two-sample t-test for independent samples, the formula is:

$$n = \frac{2(Z\alpha/2 + Z\beta)2\sigma^2}{\delta^2}$$

Where:

- n = required sample size per group
- $Z\alpha/2$ = Z-value for the desired level of significance (usually 1.96 for a 95% confidence level)
- $Z\beta$ = Z-value for desired power (typically 0.84 for 80% power)
- σ= standard deviation of the outcome variable
- δ = minimum clinically important difference or effect size

Data Collection Method

The data collection process involved meticulously gathering relevant information pertinent to the research's objectives, questions, or hypotheses. Formal written permission was first secured from the Dean of the Christian College of Nursing, Allahabad, prior to initiating data collection, which took place from February 15th to April 7th, 2021. The study's purpose was clearly communicated to participating adolescent girls, who were assured of confidentiality to encourage their cooperation. Building a rapport with the participants was crucial, and consent was obtained from each individual. Each subject spent an average of 2 hours completing the data collection process. Initial pretest pain scores were recorded for adolescent girls experiencing dysmenorrhea before any intervention. Acupressure was then administered at the SP6 point on both legs, followed by posttest pain score measurements. The control group underwent posttest assessments without intervention. Throughout the study, participants reported no difficulties, ensuring a consistent and reliable approach to data collection, thus enhancing the study's reliability and validity.

Data Analysis: Data was analyzed using both descriptive and inferential statistics. Descriptive Statistics for Frequency and percentage distribution for demographic variables and dysmenorrhea assessment. Inferential Statistics: Paired t-test to compare pre-test and post-test pain levels within the experimental group. Unpaired t-test to compare post-test pain levels between the experimental and control groups. Chi-square test to find the association of pre-test dysmenorrhea levels with demographic variables.

RESULT

Table- 1: Sociodemographic Characteristics of study sample

Socio-demographic variable	exp.group (n=30)	control.group (n=30)
	f(%)	f(%)
Age (yrs)		
17-18	02(6.66)	5(16.66)
19-21	28(93.33)	25(83.33)
Types of food		
Vegetarian	13(43.33)	12(40)
Non-vegetarian	17(56.66)	18(60)
Family history of dysmenorrhoea		
Yes	16(53.33)	21(70)
No	14(46.66)	9(30)
Do you exercise regularly		
Yes	7(23.33)	5(16.66)
No	23(76.66)	25(83.33)
Junk food habits		
Yes	26(86.66)	19(63.33)
No	4(13.33)	11(36.66)
Previous Knowledge on Dysmenorrhoea		
Yes	11(36.66)	9(30)
No	19(63.33)	21(70)
Year of Menarche		
≤ 12 yrs	3(10)	6(20)
12yrs-14 yrs	23(76.66)	14(46.66)
> 14 yrs	4(13.33)	10(33.33)
Days of menstrual cycle		
< 28days	6(20)	7(23.33)
28-30 days	16(53.33)	16(53.33)
31-35 days	8(26.66)	2(6.66)
> 35 days	0	5(16.66)
Days of bleeding in each month during menstruation		
3-5 days	27(90)	20(66.66)
6-8 days	2(6.66)	6(20)
9 days and above	1(3.33)	4(13.33)
Amount of bleeding in first 3 days		
2-3 pads/day	12(40)	13(43.33)
4-5 pads/day	13(43.33)	13(43.33)
more than 6/day	5(16.66)	4(13.22)
Other symptoms during menstruation		
Nausea and vomiting	4(13.33)	4(13.33)
fatigue	17(56.66)	8(26.66)
Head realing	6(20)	6(20)
Any other	3(10)	12(40)
Use of pain relieving measures		
antispasmodic drugs	17(56.66)	15(50)
Exercise /yoga	4(13.33)	4(13.33)
acupressure	1(3.33)	4(13.33)
Relaxation techniques	8(26.66)	7(23.33)

The table-1 compares socio-demographic and health-related characteristics between an experimental group and a control group, each consisting of 30 participants. The majority of participants in both groups are aged 19-21, with 93.33% in the experimental group and 83.33% in the control group. Dietary habits are similar, with slightly more non-vegetarians in both groups. A higher percentage of the control group (70%) has a family history of dysmenorrhea compared to the experimental

group (53.33%). Regular exercise is more common in the experimental group (23.33%) than in the control group (16.66%). Junk food consumption is notably higher in the experimental group (86.66%) compared to the control group (63.33%). Prior knowledge of dysmenorrhea is more common in the experimental group (36.66%) compared to the control group (30%). Menarche age shows variability, with most participants in the experimental group experiencing it between 12-14 years. Menstrual cycle length and days of bleeding show differences, with the control group having a higher percentage of participants with cycles over 35 days and bleeding for 6-8 days or more. Bleeding intensity during the first three days is fairly similar between groups. Symptoms like nausea, vomiting, and fatigue are more prevalent in the experimental group, while other symptoms are more reported in the control group. Pain relief methods include antispasmodic drugs, with 56.66% of the experimental group and 50% of the control group using them. Other pain relief methods like exercise, yoga, acupressure, and relaxation techniques are used to varying extents in both groups.

Table-2: The level of pain after intervention in the Experimental group and without intervention in the control group.

Level of pain before intervention	**exp.group (n=30)**	**control.group (n=30)**
	f(%)	**f(%)**
no pain(0)	0	0
mild pain(1-3)	9(30)	6(20)
moderate pain(4-6)	16(53.33)	21(70)
severe pain(7-9)	4(13.33)	3(10)
worst pain(10)	1(3.33)	0
Level of pain after intervention		
no pain(0)	14(46.66)	4(13.33)
mild pain(1-3)	14(46.66)	14(46.66)
moderate pain(4-6)	2(6.66)	12(40)
severe pain(7-9)	0	0
worst pain(10)	0	0

The table-2 presents data on the levels of menstrual pain experienced by participants in an experimental group and a control group, both before and after an intervention. Prior to the intervention, a majority of the experimental group (53.33%) reported moderate pain (4-6), while the control group had an even higher percentage (70%) experiencing moderate pain. Severe pain (7-9) was reported by 13.33% of the experimental group and 10% of the control group, with a very small portion (3.33%) of the experimental group experiencing the worst pain (10). Post-intervention, significant pain relief is evident in the experimental group: 46.66% reported no pain, and another 46.66% reported mild pain (1-3), with only 6.66% still experiencing moderate pain and none reporting severe or worst pain. In contrast, the control group showed less improvement; 13.33% reported no pain, 46.66% had mild pain, and 40% still experienced moderate pain, with no severe or worst pain reported. This suggests that the intervention was effective in reducing pain levels more significantly in the experimental group compared to the control group.

Table-3: Paired 't' test was used to compare the pre-test and post-test level of pain among the experimental group.

Experimental Group	**Mean ±SD**	**t value**	**df**	**Inference**
Pre-test	5.53± 2.14	10.22	29	Highly Significant
Post-test	1.03±1.22			

Table-4: Unpaired 't' test was used to compare the post-test level of pain among the experimental group and the control group

Groups	Mean ±SD	t value	df	Inference
Experimental Group	1.03±1.22	8.16	58	Highly Significant
Control Group	3.56±1.99			

The table-3 presents the mean and standard deviation (Mean ± SD) for pre-test and post-test scores of the experimental group, along with the statistical analysis results. Before the intervention, the pre-test mean score was 5.53 with a standard deviation of 2.14. After the intervention, the post-test mean score significantly decreased to 1.03 with a standard deviation of 1.22. The t-test value for the difference between pre-test and post-test scores is 10.22, with 29 degrees of freedom (df), indicating a highly significant result. This substantial reduction in scores from pre-test to post-test suggests that the intervention was highly effective in achieving its intended outcomes.

The table-4 presents a comparison of the mean scores between an experimental group and a control group, each consisting of 30 participants. The experimental group has a mean score of 1.03 with a standard deviation of 1.22, while the control group has a higher mean score of 3.56 with a standard deviation of 1.99. The t-value for this comparison is 8.16, with 58 degrees of freedom, indicating a highly significant difference between the two groups. This suggests that the intervention or conditions applied to the experimental group had a substantial impact, leading to a significantly lower mean score compared to the control group.

DISCUSSION

The study compared socio-demographic and health-related characteristics, pain levels, and intervention outcomes between an experimental group and a control group, each with 30 participants. The experimental group had a slightly higher rate of junk food consumption and prior knowledge of dysmenorrhea but more regular exercisers. Pain levels before intervention showed a majority in both groups experiencing moderate pain, but post-intervention, the experimental group showed significant pain reduction, with 46.66% reported no pain and 46.66% reported mild pain. In contrast, the control group had less improvement, with 40% still experiencing moderate pain. Statistical analysis revealed a highly significant decrease in the experimental group's mean pain scores from pre-test (5.53 ± 2.14) to post-test (1.03 ± 1.22), with a t-value of 10.22. Additionally, the experimental group's post-intervention mean score (1.03 ± 1.22) was significantly lower than the control group's (3.56 ± 1.99), indicated by a t-value of 8.16. These findings suggest the intervention was highly effective in reducing menstrual pain.

The studies discussed underscore the significance of non-pharmacological interventions, particularly acupressure, in managing dysmenorrhea among adolescents. Dysmenorrhea, characterized by cyclic pelvic pain during menstruation, affects a substantial portion of young women globally, contributing to school or work absenteeism. The findings from these studies shed light on the effectiveness of various interventions and their implications for nursing management practices. The study by Laishram at.al compared socio-demographic variables, pain levels, and intervention outcomes between an experimental and control group of adolescent girls. The experimental group exhibited higher rates of junk food consumption and prior dysmenorrhea knowledge but had more regular exercisers. Pain levels before intervention showed a majority experiencing moderate pain in both groups. However, post-intervention, the experimental group demonstrated significant pain reduction, with 46.66% reported no pain and 46.66% experience mild pain. Statistical analysis revealed a

highly significant decrease in the experimental group's mean pain scores from pre-test to post-test. These findings indicate the intervention's effectiveness in reducing menstrual pain (10). In a randomized controlled trial, Abhijna J, and Shetty V., compared the effects of acupuncture and neutral hip baths on primary dysmenorrhea symptoms among 70 females. Both interventions resulted in significant reductions in symptoms, suggesting their equal effectiveness in managing primary dysmenorrhea. This study highlights the potential of neutral hip baths as a non-pharmacological intervention for reducing pain severity and associated symptoms in young females (11). Similarly, Nehal et.al investigated the impact of Spleen 6 point acupressure on pain intensity among late adolescent nursing students with primary dysmenorrhea. The study, conducted at Alexandria University's Nursing Faculty, revealed a highly significant decrease in pain intensity following SP6 acupressure intervention. These findings underscore the potential of acupressure as an effective intervention for alleviating menstrual pain among adolescents and advocate for its integration into nursing management practices for this demographic (12). Moreover, a systematic review of literature on acupressure's impact on menstrual pain highlighted the significant reduction in pain intensity across multiple studies. The review emphasized the role of acupressure in increasing endorphin levels, which helps alleviate menstrual pain. These findings reinforce the potential of acupressure as a practical, non-pharmacological method to manage dysmenorrhea effectively (13). Collectively, these studies contribute to our understanding of effective interventions for managing dysmenorrhea among adolescents. Acupressure emerges as a promising non-pharmacological approach, demonstrating significant reductions in pain intensity and associated symptoms. These findings have implications for nursing practice, emphasizing the importance of integrating such interventions into routine care to improve the quality of life for adolescents experiencing menstrual pain. Further research is warranted to explore the long-term effects and optimal strategies for implementing these interventions in clinical settings.

CONCLUSION

In conclusion, the present study demonstrates the substantial benefits of acupressure in reducing dysmenorrhea pain among adolescent girls. Given the significant improvements in pain levels observed in the experimental group, acupressure should be considered a viable alternative or complementary treatment for managing dysmenorrhea. The lack of association between socio-demographic variables and pain levels suggests that acupressure's effectiveness is broadly applicable, making it an accessible and practical intervention for adolescents experiencing menstrual pain. Future research should continue to explore the mechanisms underlying acupressure's effectiveness and its long-term benefits for dysmenorrhea management.

Declaration by Authors

Ethical Considerations: This study followed the ethical guidelines set by the Institutional Review Board of VISWASS School and College of Nursing, Bhubaneswar, Odisha. It ensured participants' rights, privacy, and confidentiality. Informed consent was obtained, explaining the study's nature, risks, benefits, and the right to withdraw without consequences. Participant data was anonymized and securely stored. The study protocol underwent IRB review and approval, complying with ethical standards. Any conflicts of interest were disclosed and managed. The researchers conducted the study with integrity and transparency, prioritizing participant welfare.

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