

Effects Of Billig's Exercise on Dysmenorrhea Among Adolescent Girls in Selected Schools

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Abstract: The purpose of the study is to assess the effectiveness of billig's exercise on dysmenorrhea among adolescent girls in selected schools at Tenkasi district. The changes are more frequent in girls. For instance, the rapid growth and change in the physical structure after the attainment of puberty. In this study, pre-experimental, one group pre-test and post-test research design was adopted, in which the Modified Ernestine Wiedenbach's helping art of clinical nursing theory was used as a conceptual frame work. Totally, 80 Adolescent girls were selected and purposive sampling technique was executed, whereas a pilot study was also conducted with 10 adolescent girls. The tool used for data collection was modified semi structure dysmenorrhea assessment questionnaire. The reliability of the tool was established by carl's Pearson correlation coefficient formula ($r = 0.09$). The results of the present study shows that there was a significant reduction in dysmenorrhea score ($t = 10.398$ and $p = < 0.05$). Taken together, the current study concludes that providing billig's exercise was very effective in improving the level of dysmenorrhea and has brought self-awareness among adolescent girls. Indeed, the present study suggest that more importance should be given for billig's exercise to reduce the level of dysmenorrhea among adolescent girls, particularly in urban areas.

Keywords: School students, Adolescent girls, Dysmenorrhea, Billg's exercise and Health issues. .

INTRODUCTION

Adolescence is the period of indicating her capability for procreation. Adolescence is divided into three phases like early, middle and late adolescence. Early adolescence means 10-13 years, middle adolescence means 14-16 years and late adolescence means 17-20 years of age group. One billion adolescents are there in this world equal to one fifth of world's population. Puberty is one of the many physical signs that a girl is turning into woman, and is the period in life of all women generally between the age of 10 to 17 years. During this stage, girls experience fast changes in body size, physiologic and mental and social work. The prevalence of menstrual disorders has been recorded as high as 87%. Menstruation can be defined as the periodic physiologic discharge of blood, mucous and other cellular debris from uterine mucosa (Kaur et al., 2018). Menstrual pain has always been such a big problem for girls everywhere, and dysmenorrhea occur without pelvic pathology affecting about 50% of women. It occurs more frequently in unmarried women (Harlow and Campbell., 2013). India is a highly populated country in the world and has 21% of adolescents. A national study directed among adolescent girls demonstrated that 40% of the understudies regularly missed their school due to their severe menstrual spasms. Typically, it is known that the pain associated with women's menstruation is called dysmenorrhea occurs for 1 to 2 days each month, which keeps them from doing their normal activities for several days a month. The three most common symptoms present on both days, that is day before and first day of menstruation were lethargy and tiredness (first),

depression (second) and inability to concentrate in work (third) whereas the ranking of the stoppage of menstruation showed depression as the first common symptoms (Agarwal and Agarwal, 2010). In school going girl students, pain during menstruation is one of the most important causes of school absenteeism amongst adolescent girls, because it affects their academic performance, school and sports activities (Banikarim et al., 2000; Syed and Rao, 2020). During this period, most of the girls have (severe) common symptoms such as anxiety, irritability, fatigue, feeling of depression, breast tenderness, abdominal bloating, backache, forgetfulness and weight gain.

Dysmenorrheal is the most common gynaecological disorder among female adolescents, with a prevalence of 60% to 93% affected women experience sharp, intermittent spasm of pain usually concentrated in the supra pubic area (Chaudhuri et al., 2013). Dysmenorrhea is a very common problem among adolescent girls, and they experience a number of physical and emotional symptoms in their body. It has been estimated to be the greatest cause of time lost from work and school among the adolescent girls. It is reported that the true incidence and prevalence of dysmenorrhea has not been clearly established in India and for Indian girls and women (Agarwal and Agarwal, 2010). In recent years, many guidelines, techniques and practices are established to control, reduce and prevent the abnormal feelings during the menstruation and dysmenorrhea. While exercising subsequently developed a series of stretching in the abdomen and pelvic muscle, which claimed a high rate of symptoms relief. There are some alternative methods

for treating dysmenorrhoea, such as pharmacological and non-pharmacological treatments. But prevention is the best management for treating dysmenorrhoea. Billig's exercise is one of the big pluses for adolescents to relieve menstrual discomforts, which stretches the connective tissue around the pelvic, hip flexors, and muscle of the abdomen (Reyhani, 2013). The Billig's exercises is a highly valuable practices in keeping up quality in the low back and fortifies the Para-spinal muscles. Further, it helps hamstring muscles in the rear of the thighs, abs and gluteal muscles. The benefits of Billig's exercises are to strengthen the muscles of the pelvic floor in young, adult and aged adults. There many are steps proposed in Billig's exercises such as 1. Easy pose, 2. Butterfly stretch, 3. Regular crunches, 4. Reverse Crunches and 5. Pelvic tilt by Billig (1943) (See, Table 1). Preventive

measures include physical exercises, massages, and meditation has been suggested as a non-medical approach for managing the symptoms of dysmenorrhea (Priya and Malarpriya, 2022). In recent years, due to varieties of technological advancement, many practices have been used to prevent and control the pain occurs during the menstrual periods in adolescent girls and women. The current study was aimed to assess 1) the effectiveness of billig's exercise on dysmenorrhea, 2) compare the pre-test and post-test level of dysmenorrhea, and 3) associate the post-test level of dysmenorrhea among adolescent girls using with their selected demographic variables, clinical variables and school absenteeism due to dysmenorrhea were studied separately as experimental and control groups.

Types and benefits of Billig's exercise for 5 Mins

Exercise - I	Exercise – II	Exercise - III	Exercise - IV	Exercise - V
Easy pose	Butterfly stretch	Regular crunches	Reverse Crunches	Pe Pelvic tilt
1. Sit down on the floor.	Do the butterfly yoga pose: First, sit on the floor with the back straight.	Lie down on the floor (They can use a floor mat to rest on). Bend the knees and then hold the hands below the neck. Now, while exhaling, lift the upper part of the body.	1. Start the exercise by lying flat on the back, with the head on the floor and the arms behind the neck.	1. Lie on flat. Bend the knees. Both hands to be the sides of the body. Strengthen the abdominal muscle, force the back towards the floor and raise the pelvis. Continue this position for 5 seconds and relax.
2. Cross your legs.	Slowly bring the soles of the feet together.	Remember, do not tuck the chin in the chest, the chin must be in a straight direction.	2. Raise the feet to the air, keeping your knees slightly bent and then crossing the feet at the ankles. Lift your hips off the floor, keeping the back as straight as possible on the floor, hold at the top position, squeeze in the abdominal muscle for added effect, and then lower the hips back to the floor and repeat.	2. After the exercise relax 5 min.
3. Clasp your hands around the knees.	Hold on to the ankles, and let the knees drop as close as they can to the floor. The legs should form a little diamond shape in front.	Then while inhaling, go in the downward direction.		Re Relaxation (5 Min)
	Don't force your knees down or pull the feet in toward the groin.			After the exercise, they should take rest for 5 min. Lie flat, both hands keep sides of the body and the legs are extended and slightly turned outward. Close eyes and concentrate the breath and completely relax the body and mind.
	Close your eyes and take 5 deep breathes.			Soon after exercise don't take bath.
				Regular exercise for 40 min daily and morning is more preferred for exercise.

METHODOLOGY

Research design

Quasi experimental pre- and post-test and control groups research design was adopted for this study as shown in Table 2.

Table 2. Schematic representation of research design.

Group	Pre-test	Intervention	Post-test
Experimental group	O1	X	O2
Control group	O3	-	O4

Keys

- O1 - Pre-test level of dysmenorrhea among adolescent girls in experimental group.
- O2 - Post-test level of dysmenorrhea among adolescent girls in experimental group.
- X - Administration of billig's exercise for experimental group.
- (-) - No intervention for control group.
- O3 - Pre-test level of dysmenorrhea among adolescent girls in control group.
- O4 - post-level of dysmenorrhea among adolescent girls in control group.

Variables

For this study, four different variables such as independent variable, dependent variable, demographic variables, and clinical variables were examined among the adolescent girls. Here, the independent variable and dependent variable were classified as billig's exercise and level of dysmenorrhea, respectively. On the other hand, the demographic variables namely age, education, religion, dietary pattern, type of family, father and mother occupation, family monthly income, and source of information, and the clinical variables includes age at menarche, duration of menstruation, frequency of menstruation, duration of menstrual pain, nature of menstrual pain, location of menstrual pain, previous history of taking medication during menstrual period, and school absenteeism due to dysmenorrhea were used as variables in this study. The clinical variables of the study include age at menarche, duration of menstrual days, frequency of menstruation, duration of menstrual hours, nature of menstrual pain, location of menstrual pain, previous history of taking medication during menstrual period, and school absenteeism due to dysmenorrhea.

Students and study areas

The target population of the study was the adolescent girls having mild, moderate and severe dysmenorrhea with the age group of 13-16 years, who were studying in 8th, 9th, 10th, and 11th standards in the government higher secondary schools. First, we have chosen the government higher secondary school, Kadayannallur, which was situated 43 kms from Sri. K. Ramachandran Naidu College of Nursing, Paruvakudi, Tamil Nadu, India. In this, 750 adolescent girls out of 1360 students were studied. Among them, 220 adolescent girls had menstruation and out of them 54 had dysmenorrhea. The pre-test was done with Mc Caffery numerical pain scale. 54 samples and scoring were done in that 14 of them no pain, none of them mild dysmenorrhea, 16 moderate dysmenorrhea and 24 severe dysmenorrhea. Based on the pre-test scores, and inclusive and exclusive criteria, we assigned 40 samples to the experimental group by non-probability purposive sampling technique. Secondly, the Rukkumani higher secondary school, Mangalapuram was selected for experimental group. It was situated 45 kms from Sri. K. Ramachandran Naidu college of nursing, Paruvakudi, Tamil Nadu, India. In this school, the total strength was 1335, out of them 635 were adolescent girls. In these 635 girls, only 225 adolescent girls had menstruation. Out of them 48 of them had dysmenorrhea. The pre-test was done with Mc Caffery numerical pain scale the 48 samples and scoring was done in that 14 of them no pain, 12 of them mild dysmenorrhea, 28 moderate dysmenorrhea and none of them severe dysmenorrhea. Based on the pre-test scores and inclusive and exclusive criteria. The researcher assigned 40 samples to the experimental group by non-probability purposive sampling technique. The sample size included for this study was consists of 80 adolescent girls among them 40 was allotted for experimental group and 40 allotted for control group with the following inclusive and exclusive criteria. The inclusive criteria consist of 4 options such as a) adolescent girls who are having dysmenorrhea, b) age group between 13-16 years, c) available during the period of data collection, d) willing to participate in this study and normal menstruation. On the other hand, the exclusive criteria include a) adolescent girls who are above 16 years below 13 years, b) not willing to participate, c) undergoing treatment, and not having pain during menstruation.

Mc Caffery numerical pain scale

The Mc Caffery numerical pain scale used to assess the level of dysmenorrhea among adolescent girls. It consists of no pain, mild pain, moderate pain, and severe pain. A report of 0-No pain, 1-3 indicates mild pain, 4-6 moderate pain, 7-10 severe pain (Table 3). These scales work best when assessing pain intensity before and after therapeutic intervention.

Table 3. Scoring interpretation for Mc Caffery numerical pain rating scale

S. No	Level of pain	Score
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1.	No pain	0
2.	Mild pain	1-3
3.	Moderate pain	4-6
4.	Severe pain	7-10

Semi structured dysmenorrhea assessment questionnaire

The dysmenorrhea symptoms assessment questionnaire was consisting of 25 questions, which includes dysmenorrhea affect the daily activities of adolescent girls work or studies ([Table 4](#)).

Table 4. Scoring interpretation for level of dysmenorrhea

S. No	Level of dysmenorrhea	Score
1.	Mild dysmenorrhea	1-33
2.	Moderate dysmenorrhea	34-67
3.	Severe dysmenorrhea	68-100

Data collection procedure

Data pertaining to demographic variables was collected by the researcher for experimental group. The investigator selected the adolescent girls 13-16 years for 7 days of study 40 samples were selected and pre-test was conducted by using Mc Caffery numerical pain rating assessment scale and semi structured dysmenorrhea assessment questionnaire. The investigator provided billig's exercise for 40 minutes once a day in morning 10 am. After the intervention researcher assessed the post-test level of dysmenorrhea in 8th day for experimental and control group. Both descriptive and inferential statistics was use and result was interpreted and communicated.

RESULTS AND DISCUSSION

Dysmenorrhea is one of the most common gynaecological complaints in young women and teenage girls ([Saikia et al., 2024](#)). The present study was aimed assessing the effectiveness of Billig's exercise in reducing dysmenorrhoea among adolescent girls. The data were collected with the help of questionnaire and numerical pain intensity scale. This is quasi experimental study design; non equalled control group, pre-test and post-test intended to assess the effectiveness of Billig's exercise in reducing menstrual pain among adolescent girls. In this study, the frequency and percentage distribution of demographic variables of people with respect such as age, education, religion, dietary pattern, type of family, father and mother occupation, family monthly income, and source of information are given in [Table 5](#). Likewise, the clinical variables such as age at menarche, duration of menstrual days, frequency of menstruation, duration of menstrual hours, nature of menstrual pain, location of menstrual pain, previous history of taking medication during menstrual period, and school absenteeism due to dysmenorrhea are provided in [Table 6](#). In this study, the association between the levels of dysmenorrhoea among adolescent girls with selected demographic and clinical variables revealed that there were no association between the level of dysmenorrhoea with selected demographic variables such as age in years, education, religion, BMI, age at menarche, duration of pain, frequency of menstruation, duration of menstruation, flow of menstruation, interference, location of pain, associated symptoms, psychological disturbance among adolescent girls in experimental and control groups.

The findings of current study are consistent with and supported by [Steven et al., \(2013\)](#) conducted a study to assess the effect of Billig's exercise on dysmenorrhoea among adolescent girls in India. 70 adolescent girls were selected for the study by randomized sampling technique. The result found that the variables such as age of the adolescent girls, duration of menstrual flow and body mass index had no significant association with the pain score. The results of the study strongly agree with the findings in 200 nursing students aged between 18-20 years at St Johns Nursing College, Bengaluru ([Karanth and Liya, 2018](#)). The level of frequency and percentage distribution of demographic variables and clinical variables of 80 individuals has reported in this study.

Table 5. Frequency and percentage distribution of demographic variables of dysmenorrhea in experimental and control groups (n = 80).

S. No	Demographic variables	Experimental group (40)		Control group (40)	
		f	%	f	%
1.	Age				
	a) 13-14 year	15	37.5	13	32.5
	b) 15-16 year	16	40	21	52.5
	c) <16 year	9	22.5	6	15

2.	Education	4	10	6	15
	a) 8 th standard	9	22.5	7	17.5
	b) 9 th standard	17	42.5	14	35
	c) 10 th standard	10	25	13	32.5
3.	Religion	23	57.5	13	32.5
	a) Hindu	13	32.5	20	50
	b) Christian	4	10	7	17.5
	c) Muslim				
4.	Dietary pattern				
	a) Vegetarian	20	50	22	55
	b) Non vegetarian	20	50	18	45
5.	Type of family				
	a) Nuclear family	18	45	12	30
	b) Joint family	18	45	11	47.5
	c) Single parent	4	10	9	22.5
6.	Mother & Father Occupation				
	a) Cooli				
	b) Farmer	20	50	17	42.5
	c) Business	17	42.5	20	50
		3	7.5	3	7.5
7	Family monthly income				
	a) Below Rs 5000	10	25	10	25
	b) Rs 5001-10,000	9	22.5	8	20
	c) Rs10001-Rs 15000	10	25	20	50
	d) Above 15000	11	47.5	2	5
8.	Source of information				
	a) TV	22	55	21	52.5
	b) Media	18	45	19	47.5
	c) Letter	0	0	0	0

Table 6. Frequency and percentage distribution of clinical variables of dysmenorrhea in experimental and control groups (n = 80)

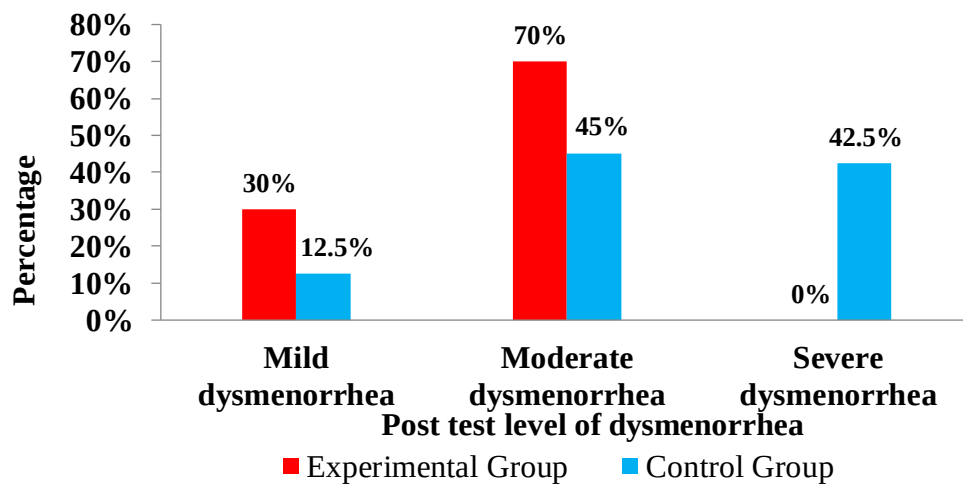
S. No	Clinical variables	Experimental group (40)		Control group (40)	
		F	%	F	%
1.	Age at menarche	20	50	14	35
	a) >12 hours	18	45	23	57.5
	b) 12-13 hours	2	5	3	7.5
	c) 14- 15 hours				
2.	Duration of menstrual days				
	a) 2 - 3 days	19	47.5	14	35
	b) 4 - 5 days	9	22.5	23	57.5
	c) 5 - 7 days	12	30	3	7.5
	d) >10 days	0	0	0	0
3.	Frequency of menstruation				
	a) Once in 28 days	18	45	7	17.5
	b) Once 29 – 30 days	12	30	14	35
	c) Once 31- 35 days	10	25	19	47.5
4.	Duration of menstrual hours				
	a) <12 hours	22	55	19	47.5
	b) 13-24 hours	10	25	21	52.5

	c)	>24 hours	8	20	0	0
5.		Nature of menstruation				
	a)	Pricking	15	37.5	13	32.5
	b)	Throbbing	15	37.5	18	45
	c)	Cramping	10	25	8	20
	d)	Squeezing	0	0	1	2.5
6.		Location of menstruation				
	a)	Lower abdomen	19	47.5	7	17.5
	b)	Back & Thighs	7	17.5	12	30
	c)	Pubic area	7	17.5	16	40
	d)	General body pain	7	17.5	5	12.5
7.		Previous history of medication				
	a)	Yes	21	52.5	24	60
	b)	No	19	47.5	16	40
8.		School absenteeism due to dysmenorrhea				
	a)	Yes	22	55	25	62.5
	b)	No	18	45	15	37.5

With regard to age in experimental group, out of 40 samples, 15 (37.5%) people belongs to the age between 13-14 years, 16 (40%) of people belong to the age 15 - 16 years, 9 (22.5%) of people belong to the age >16 years. And also, the other parameters such as education, religion, dietary pattern, duration of menstrual days and hours, and menstrual pain were observed. With regard to school absenteeism due to dysmenorrhea in experimental group, out of 40 samples 22 of the students had symptoms severe enough to cause absenteeism from classes. The school absenteeism rate in present study was 55%. In this regards, previous studies reported that rates of absenteeism were ranged from 24 to 50%. To control the rates of absenteeism, appropriate counselling and management should be instituted among the students to improve their academic performance and maintain their body ([Karanth and Liya, 2018](#)).

The pre-test level of dysmenorrhea in experimental group (40 adolescent girls), 16 (40%) girls had moderate dysmenorrhea and 24 (60%) girls had severe dysmenorrhea, whereas, in the control group (40), 8 (20%) adolescent girls were having mild dysmenorrhea, 14 (35 %) girls had moderate and 18 (45%) had severe dysmenorrhea. Further, in the second pre-test (40), 12 (30%) and 28 (70%) adolescent girls had mild and moderate dysmenorrhea, respectively. In this, second pre-test, no severe dysmenorrhea was found among the adolescent girls, whereas, 5 (12.5%), 18 (45%) and 17 (42.5%) girls had mild, moderate and severe dysmenorrhea, respectively ([Fig. 1](#)). Similar responses were observed in 60 adolescent girls studied in the BVVS High School Bagalkot, Karnataka, India ([Rathod et al., 2024](#)) suggesting Billig's exercise is beneficial in relieving pains and menstruation discomfort in adolescent girls during their menstruation period. The results of this study shows that the pain score of experimental groups was reduced after providing Billig's exercise. In this case, in most of the countries, 91% of adolescents (14 - 18 years) had dysmenorrhoea. Further, 55% respondents reported that the dysmenorrhoea pain caused impacts on their routine academic works and 26% of respondents missed classes due to pain. The level of dysmenorrhoea among adolescent girls in the experimental and control group were assessed after the Billig's exercises. It shows that there was a significant difference between pre-test and post-test scores which implied that was a significant reduction in menstrual pain after providing Billig's exercise.

Figure 1. Frequency and percentage of the post-test level of dysmenorrhea among adolescent girls in experimental group.



Similar responses were found and reported that Billig's exercise was used in reducing primary dysmenorrhea and agony during the monthly cycle among 60 young girls with age between 12-17 years conducted in Semmiyamangalam Village at Thiruvannamalai district, Tamil Nadu, India (Mary Minolin et al., 2020). Their finding strongly corroborates the results of this study. The mean and standard deviation of the pre- and post-test levels of dysmenorrhea among the adolescent girls in experimental and control groups are given in Table 7 and 8. In this study, the mean scores of pre- and post-test were 5.2 and 1.8, respectively. The calculated 't' value was 7.21 at 29 degrees of freedom at 0.05% level of significance, which is greater than that of table value (2.045). In this study, there was no significant difference between pre-tests and post-test pain scored among control group, there is an appreciable difference in case of experimental group with Billig's exercise. The mean of pre-test of control group was 4.63 and that of post-test was 4.43. The calculate 't' value was 0.3744 at 29 degrees of freedom and at 0.05% level of significance, which is less than table value.

Table 7. Mean and standard deviation of level of dysmenorrhea among adolescent girls in experimental and control groups (n = 80).

S.no	Group	Pre-test Mean	Post-test SD	't' value
1.	Experimental group	52.6	16.2	0.437*
2.	Control group	54.5	11.9	
3.	Experimental group	47.8	16.0	2.906*
4.	Control group	55.9	12.6	

* = Significant; SD = Standard deviation

$P < 0.05$

Table 8. Mean and standard deviation of level of dysmenorrhea among adolescent girls in experimental group and control groups (n = 40).

S. No	Group	Pre-test Mean	SD	Post-test Mean	SD	Mean difference	't' test value
1.	Experimental Group	52.6	16.2	47.8	16.0	1.4	10.398*
2.	Control group	54.5	11.9	55.9	12.6	0.1	8.382*

* = Significant; SD = Standard deviation

$P < 0.05$

CONCLUSIONS

Taken together, the result of the study concludes that providing Billig's exercise is very effective in improving the level of dysmenorrhea among adolescent girls. And also, it brings self-awareness therefore the investigator felt that more importance should be given for billig's exercise to reduce the level of dysmenorrhea especially in school going students and working women. In

addition, the present study suggest that more comparative study can be conducted by using various other complementary and alternative therapies to find out the effectiveness in reducing menstrual pain among women and adolescent girls.

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