

**THE EFFECT OF TWELVE WEEKS JOGGING EXERCISE ON PRIMARY
DYSMENORRHEA AMONG ADOLESCENTS IN SELECTED SECONDARY
SCHOOLS IN KANO STATE NIGERIA**

By

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Abstract

This paper investigated the effect of a twelve-week jogging exercise program on primary dysmenorrhea among adolescent girls in selected secondary schools in Kano State, Nigeria. Two research questions and corresponding hypotheses guided the study. A repeated measures research design was employed. The study population comprised 8,827 female students from four randomly selected secondary schools. A purposive sampling technique was used to select 79 students who met the criteria for primary dysmenorrhea. Participants engaged in jogging exercises three times weekly for twelve weeks. Pain intensity was assessed at baseline (0th week), mid-intervention (6th week), and post-intervention (12th week) using the Visual Analogue Scale (VAS), while the McGill Quality of Life Questionnaire (MQLQ) was used to assess quality of life. Data were analyzed using repeated measures ANOVA and Scheffé post hoc tests. The results revealed a statistically significant reduction in dysmenorrhea ($F(2,76) = 3.11, p < 0.05$) and an improvement in quality of life ($F(2,76) = 3.11, p < 0.05$). The study concludes that regular jogging exercise can significantly alleviate primary dysmenorrhea and improve quality of life. It is recommended among others that jogging be incorporated into the non-pharmacological management of primary dysmenorrhea among adolescent girls.

Keywords: Primary dysmenorrhea, adolescents, aerobic exercise, jogging, quality of life, Kano State

Introduction

Menstruation is a natural physiological process marking reproductive maturity in females, yet it is often accompanied by discomfort and pain. For many adolescent girls, menstrual pain becomes a recurring and distressing experience that interferes with daily activities, school

attendance, and overall quality of life. One of the most common menstrual complaints among this population is primary dysmenorrhea painful menstruation that occurs in the absence of any identifiable pelvic disorder. While often considered a normal part of growing up, the intensity of the pain experienced by some girls can be debilitating and calls for effective, accessible, and safe interventions.

Primary dysmenorrhea, defined as menstrual pain without an underlying pelvic pathology, is a widespread condition that commonly affects adolescents and young women. It can significantly disrupt daily life, academic performance, and overall well-being (Lentz et al., 2013). This pain typically results from elevated levels of prostaglandins, which stimulate uterine contractions and increase pain sensitivity.

The onset of primary dysmenorrhea usually coincides with the establishment of ovulatory cycles in adolescence and is often accompanied by systemic symptoms such as nausea, vomiting, fatigue, and lower back pain. Studies by Dehnavi and colleagues (2018) suggest that over 50% of menstruating females report some level of pain, with about 10% experiencing symptoms severe enough to impair daily functioning. Despite its frequency, many affected adolescents receive limited attention due to cultural misconceptions or normalization of menstrual pain (Guillebaud, 2016).

While nonsteroidal anti-inflammatory drugs (NSAIDs) remain the first line of treatment for dysmenorrhea because of their prostaglandin-inhibiting action, long-term use may lead to undesirable side effects such as gastrointestinal irritation (Marjoribanks et al., 2015). Moreover, access to these medications is inconsistent, especially in low-resource settings, prompting the need for safer and more sustainable interventions.

Emerging evidence supports aerobic exercise as a viable non-pharmacological strategy. For example, Ortiz et al. (2015) demonstrated that physical activity can modulate hormonal levels and reduce uterine muscle spasticity, resulting in pain relief. Similarly, jogging — a rhythmic, low-to-moderate intensity aerobic exercise has been linked to improved cardiovascular health, hormonal regulation, and reduced inflammation (Deuster & Silverman, 2013).

Previous interventions using aerobic exercise for a minimum of 12 weeks have shown encouraging results in reducing menstrual pain (Gbanbar, Manshavi, & Jafarabadi, 2008; Cicek, 2018). Yet, in the Nigerian context, particularly in Northern states such as Kano, little has been done to examine exercise as a therapeutic approach to managing dysmenorrhea among adolescent girls.

In Nigeria, especially in Northern regions such as Kano State, there is limited empirical data on exercise as a therapeutic option for dysmenorrhea among adolescents. This study, therefore, investigates the effect of a twelve-week jogging exercise program on the severity of primary dysmenorrhea and the quality of life of adolescent schoolgirls in Kano.

Statement of the Problem

Menstruation is supposed to be a blessing to young girls and women and its not supposed to cause discomfort or pain but for many young girls it is not so. It comes with a lot of discomfort and pain. This pain which is known as primary dysmenorrhea is very common amongst adolescents and it is the most common gynaecological problem that causes absenteeism and loss of productivity (Padmavathi, Sankar,& Kokilavan, 2012). This is also supported by reports from the school dispensaries used for this study in the study area. The social economic burden of primary dysmenorrhea is high and because of this women and girls get a lot of advices that do not really work or help with these problems.

With all these advice and management the only thing that has been scientifically proven to relieve primary dysmenorrhea so far are birth control pills and painkillers such as Ibuprofen or Naproxen. These painkillers known as Non-Steroidal Anti-inflammatory Drugs (NSAIDs) lower the production of prostaglandin, thereby relieving period pain. Although, NSAIDs are usually well tolerated, they sometimes have side effects, especially stomach related problems. (Marjoribanks, Ayeleke, Farquhar & Proctor, 2015) and some of these adolescent girls develop stomach ulcers in the process of taking these NSAIDs. Premenstrual syndrome and primary dysmenorrhea affects the quality of life of adolescent girls and in severe cases, leads to inability to function in the school or work place (Dehnavi, Jafarnejad, & Kamali, 2018).

Exercise on the other hand is becoming increasingly popular in the treatment of ailments but the believe that exercise works for relieving symptoms of primary dysmenorrhea is based on

anecdotal evidence and non-experimental studies. There are limited evidences from randomized controlled trial to support the use of exercise to reduce the discomfort of primary dysmenorrhea. Although, primary dysmenorrhea affects many women and girls around the world they basically have very little choices to make in terms of treatment and few researches are done to find solution to this problem that affects women and girl's quality of life. It is because of this that the researcher evaluated the effectiveness of jogging exercise to reduce the intensity of pain and discomfort and improve the quality of life of adolescent students suffering from primary dysmenorrhea using their target heart rate. In view of the stated problem and the occurrence of these conditions in the study area among adolescence the study answered the following research questions.

1. Does a twelve-week jogging exercise program reduce the severity of primary dysmenorrhea among adolescent girls?
2. Does participation in a twelve-week jogging exercise program improve the quality of life of adolescent girls with primary dysmenorrhea?

Hypotheses

The following hypotheses were formulated to guide the study.

1. There will be no significant effect of twelve weeks jogging exercise on primary dysmenorrhea among adolescent girls in Kano State.
2. There will be no significant effect of twelve weeks jogging exercise on the quality of life of adolescent girls in Kano State.

Methodology

Repeated measures research designs, also known as a within-subjects designs was used for this study. The population of the study included all students (both boarding and day students) with premenstrual syndrome in the 4 selected secondary schools in Kano state estimated to be about approximately 551255 (Educational statistics, 2020) in number which was selected through a simple random technique from 6 schools. The schools include, Government Girls College Dala, Government Girls Arabic College Goron Dutse, Government Girls Secondary School Shekara and Government Girls College (W.T.C.) Kano.

A total of 79 adolescent students were selected to participate in the study using a purposive sampling technique of homogeneous type. In which 20 students were selected from each school. 39 students from two schools were used as the experimental group while the other two schools of 40 students were used as control group. Only the adolescents that satisfy the inclusion, criteria were eligible to participate from the selected schools.

Inclusion Criteria

All adolescent students aged between 13 to 16years. With a history of primary dysmenorrhea and. must be in the selected schools.

Exclusion Criteria

The inclusion criteria include all adolescent students aged between 13 to 16years who have a normal period of the range of (21 to 35) days with a history of primary dysmenorrhea in the selected secondary schools not exercising. Participants were excluded if their Primary dysmenorrhea is associated with dysmenorrhea of secondary source with underlying pathologies. Participants with heavy bleeding, who use more than two packs of sanitary towels, diabetes, hypertension or any systemic problem were also excluded.

Training programme

A 20meter line was drawn on the floor. Selected students for the jogging exercise training were made to do 5 minutes warm up exercises which include stretching, jogging, and jumping on the spot exercises. Following which participants were made to jog from the beginning of the drawn line to the end repeatedly until they get to their calculated target heart rate that was timed with a heart rate monitor which the participants wore on their wrists. Immediately the heart rate monitor beeps, the participants were then made to do 5 minutes cool off exercise. This exercise was done three times a week Monday, Wednesday and Friday. Participants started with a 50% of their maximum heart rate the first 4weeks then 60% of their maximum heart rate the second 4 weeks and 70% of their maximum heart rate at the last 4 weeks of exercise. Research assistants who were recruited were taught how to assist the researcher in the study in each of the schools.

At the end of six and twelve weeks data was recorded and descriptive statistics of mean, standard deviation, were used to organize and describe the physical characteristics of the

participants. While repeated measures ANOVA was used to test the hypotheses formulated at 0.05 level of significance. Also, Scheffe's Post-hoc test was used to reveal the statistical significant effect. This is to enable data collected before, during and after exercise to be incorporated.

Results

Table: 1 Physical Characteristics of Participants

VARIABLE	N	MIN	MAX	MEAN	SD
Age	79	13.00	16.00	14.5823	0.51742
Weight	79	50.00	58.00	53.6203	2.69522
Height	79	1.30	1.70	1.5114	0.12709
BMI	79	17.30	33.72	23.9497	4.31256

Table 1 above shows a descriptive statistic of mean and standard deviation of the physical characteristics of the participants. Total number of the participants is 79, the minimum and maximum ages was 13 and 16 years while their mean age and standard deviation was 14.5823 and 1.05742 respectively. The minimum and maximum weight are 50kg and 58kg respectively while the mean and standard deviation are 53.6203 and 2.69522. The minimum and maximum height was 1.30m and 1.70m while the mean and standard deviation was 1.5114 and .12709. The minimum and maximum BMI are 17.30kg/m² and 33.72kg/m² while the mean and standard deviation are 23.9497 and 4.31256 respectively.

Hypothesis 1

There will be no significant effects of twelve weeks jogging exercise on primary dysmenorrhea in adolescent girls.

Table 2: Repeated measures analysis of variance on pain of female adolescent students with primary dysmenorrhea for differences before, during and after jogging exercises programme

Source		Type III Sum				
		of Squares	Df	Mean Square	F	Sig.
factor1	Sphericity Assumed	37.077	2	18.538	8.648	.000
	Greenhouse-Geisser	37.077	1.877	19.752	8.648	.001
	Huynh-Feldt	37.077	1.971	18.809	8.648	.000
	Lower-bound	37.077	1.000	37.077	8.648	.006
Error(factor)	Sphericity Assumed	162.923	76	2.144		
	Greenhouse-Geisser	162.923	71.330	2.284		
	Huynh-Feldt	162.923	74.907	2.175		
	Lower-bound	162.923	38.000	4.287		
F (2, 76) = 8.648; P < 0.05		* = Significant				

Table 2 indicted that there will be significant effects of twelve weeks jogging exercise on the pain of adolescent girls with primary dysmenorrhea. The table presents a repeated measures analysis of variance for the variable "pain" with three time points: before, during, and after the jogging exercise program. The results presented in Table 2 indicate that the F-statistic is 8.648 with a degrees of freedom of 2 and 76, and a probability (p-value) less than 0.05, which is statistically significant at the standard significance level of 0.05. However, this significance is due to the interaction effect between time and group (factor1), which suggests that there are differences in pain levels between the three time points for both groups (before, during, and after jogging exercise). Furthermore, the table presents three types of adjustments for sphericity: sphericity assumed, Greenhouse-Geisser, and Huynh-Feldt. The significance level for the F-statistic remains significant for all three adjustments, indicating that there are differences in pain levels between the three time points for both groups (before, during, and after jogging exercise). However, when examining the mean square values for each time point (before, during, and after jogging exercise), it can be seen that there are no significant differences between the mean scores for pain levels before and after jogging exercise (mean square values of 18.538 and 37.077, respectively). This suggests that there were significant

effects of twelve weeks jogging exercise on the pain of adolescent girls with primary dysmenorrhea based on the data presented in Table 2 alone. Therefore, there are differences in pain levels between the three time points for both groups (before, during, and after jogging exercise), there are no significant differences between the mean scores for pain levels before and after jogging exercise among adolescent girls with primary dysmenorrhea based on the data presented in Table 2.

To establish which phase of exercise that was responsible for the significant difference; Scheffe's post hoc test was applied on the means at baseline, 6th week and 12th week, the result of which is presented in Table 3.

Table 3: Results of Scheffe's Post-hoc tests on the means of pain of female adolescent students with primary dysmenorrhea before, during and after exercise programme

(I) factor1	(J) factor1	Mean	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
		Difference (I-J)			Lower Bound	Upper Bound
Oweek	6week	-.077	.364	.834	-.815	.661
	12week	1.154*	.336	.001	.474	1.834
6week	Oweek	.077	.364	.834	-.661	.815
	12week	1.231*	.290	.000	.643	1.819
12week	Oweek	-1.154*	.336	.001	-1.834	-.474
	6week	-1.231*	.290	.000	-1.819	-.643

*=Significant at 12week

Based on the information provided in Table 3, it can be concluded that there is a significant difference in pain levels between O week (before the exercise program) and 12week (after twelve weeks of exercise) for adolescent girls with primary dysmenorrhea. The table presents the results of Scheffe's post-hoc tests, which are used to compare the mean differences between different time points (O week, 6week, and 12week) while controlling for multiple comparisons. The results indicate that there is a significant difference in pain levels between O week and 12week (mean difference of -1.154, $p < 0.001$). However, there is no significant difference in pain levels between O week and 6week (mean difference of -.077, $p = 0.834$) or

between 6week and 12week (mean difference of -1.231, $p = 0.000$). Therefore, these results suggest that there is a decrease in pain levels for adolescent girls with primary dysmenorrhea after twelve weeks of exercise compared to before the exercise program (0 week). However, there is no significant difference in pain levels between before and after six weeks of exercise.

Hypothesis 2

There will be no significant effect of twelve weeks jogging exercise on the quality of life of adolescent girls.

Table 4: Repeated measures analysis of variance on quality of life of female adolescent students for differences before, during and after jogging exercises programme

		Type III Sum				
Source		of Squares	Df	Mean Square	F	Sig.
factor1	Sphericity Assumed	46.154	2	23.077	8.632	.000
	Greenhouse-Geisser	46.154	1.552	29.729	8.632	.001
	Huynh-Feldt	46.154	1.606	28.732	8.632	.001
	Lower-bound	46.154	1.000	46.154	8.632	.006
Error(factor1)	Sphericity Assumed	203.179	76	2.673		
	Greenhouse-Geisser	203.179	58.995	3.444		
	Huynh-Feldt	203.179	61.041	3.329		
	Lower-bound	203.179	38.000	5.347		

F (2, 76) = 8.632; P < 0.05 *=Significant

Table 4 observed that there were significant effects of twelve weeks jogging exercise on the quality of life of adolescent girls. The table presents a repeated measures analysis of variance for the variable "quality of life" with three time points: before, during, and after the jogging exercise program. The results presented in Table 4 indicate that the F-statistic is 8.632 with a degrees of freedom of 2 and 76, and a probability (p-value) less than 0.05, which is statistically significant at the standard significance level of 0.05. However, this significance is due to the interaction effect between time and group (factor1), which suggests that there are differences in quality of life levels between the three time points for both groups (before,

during, and after jogging exercise). Furthermore, the table presents three types of adjustments for sphericity, assumed, Greenhouse-Geisser, and Huynh-Feldt. The significance level for the F-statistic remains significant for all three adjustments, indicating that there are differences in quality of life levels between the three time points for both groups (before, during, and after jogging exercise). However, when examining the mean square values for each time point (before, during, and after jogging exercise), it can be seen that there are no significant differences between the mean scores for quality of life levels before and after jogging exercise (mean square values of 23.077 and 46.154, respectively). This suggests that there will be no significant effects of twelve weeks jogging exercise on the quality of life of adolescent girls based on the data presented in Table 4 alone. Therefore, there are differences in quality of life levels between the three time points for both groups (before, during, and after jogging exercise), there are no significant differences between the mean scores for quality of life levels before and after jogging exercise among adolescent girls based on the data presented in Table.4.

To establish which phase of exercise that was responsible for the significant difference; Scheffe’s Post- hoc test was applied on the means at baseline, 6th week and 12th week, the result of which is presented in Table 5.

Table 5: Results of Scheffe’s Post-hoc tests on the means of quality of life of female adolescent students before, during and after exercise programme

(I) factor1	(J) factor1	Mean		Sig. ^b	95% Confidence Interval for Difference ^b	
		Difference (I- J)	Std. Error		Lower Bound	Upper Bound
O week	6week	.769	.426	.079	-.093	1.632
	12week	1.538*	.407	.001	.714	2.363
6week	O week	-.769	.426	.079	-1.632	.093
	12week	.769*	.253	.004	.257	1.282
12week	Oweek	-1.538*	.407	.001	-2.363	-.714
	6week	-.769*	.253	.004	-1.282	-.257

*=Significant at 12week

Based on the information provided in Table 5, it can be concluded that there is a significant difference in quality of life for adolescent girls after twelve weeks of exercise compared to before the exercise program (O week). The table presents the results of Scheffe's post-hoc tests, which are used to compare the mean differences between different time points (O week, 6week, and 12week) while controlling for multiple comparisons. The results indicate that there is a significant difference in quality of life between O week and 12week (mean difference of -1.538, $p < 0.001$). However, there is no significant difference in quality of life between O week and 6week (mean difference of -.769, $p = 0.079$) or between 6week and 12week (mean difference of -.769, $p = 0.004$). Therefore, these results suggest that there is an improvement in quality of life for adolescent girls after twelve weeks of exercise compared to before the exercise program (O week). However, there is no significant difference in quality of life between before and after six weeks of exercise.

4.2 Discussions

The findings of this study also revealed that 12weeks jogging exercise a type of aerobic exercise had significant effect on primary dysmenorrhea amongst adolescents. The findings indicates that 12 weeks aerobic exercise significantly decreased the pain in primary dysmenorrhea. This findings in this study is in conformity with the study of Hightower, (1998) in which the relationship between exercise participation and menstrual pain, physical symptoms, and negative mood were examined. Twenty-one sedentary women and 20 women who participated in regular exercise completed a modified version of the Prospective Record of the Impact and Severity of Menstrual Symptoms (PRISM) calendar for two complete menstrual cycles. Analyses revealed that pain was greater in all women during menses compared to the follicular and luteal phases. Moreover, exercise status was found to interact with menstrual cycle phase in predicting pain. Specifically, exercise participants reported less pain than sedentary women during menses, though, there were no differences between the two groups during the follicular and luteal phases. Exercise status was also associated with greater reports of anxiety during menses. Otherwise, exercise status was not observed to influence reports of symptoms or negative mood throughout the menstrual cycle. These results suggest that participation in even moderate amounts of exercise affects the experience of menstrual pain in women.

The study of Harris and Walters (2013) also supported the findings of this study. Thirty-six college students who suffered from moderate or severe cases of primary dysmenorrhea were tested for abdominal strength and endurance and then required to perform daily specified abdominal exercises for a minimum of eight weeks. Upon being re-tested it was found that through an abdominal exercise program there is an increase in abdominal strength and endurance which is significant at the .01 percent level of confidence and that approximately 87 per cent of those showing improvement in abdominal strength and endurance showed a decrease in one or more factors indicative of the severity of dysmenorrhea.

Kannan, Claydon, Miller and Chapple, (2015) did a feasibility study using an exercise intervention for reducing menstrual pain associated with primary dysmenorrhea and to obtain preliminary results to estimate the sample size for a future randomized controlled trial (RCT). A quasi-experimental design was applied. Ten women between ages of 18–45 years with Primary Dysmenorrhoea were included. The participants underwent vigorous aerobic training at the School of Physiotherapy on a treadmill three times a week for up to 4 weeks followed by aerobic training at home for up to 4 weeks. The feasibility measures were adherence to the intervention program and intervention prescription, retention and safety. The short form McGill pain questionnaire was used to measure pain at first (T1), second (T2) and third (T3) menstrual cycles following trial entry. The Overall adherence was 98%, with 100% adherence to clinic-based intervention and intervention prescription and 96% for home exercise programme. Retention rate was 100%. With respect to pain a large effect size was identified at T2 and T3. No adverse events reported. The results demonstrated that the intervention is applicable and feasible. In addition, the preliminary results showed evidence of positive changes after the intervention. .

Also supporting this study is the American College of Obstetricians and Gynaecologists which stated in their patient information leaflet (http://www.acog.org/publications/patient_education/bp057.cfm Retrieved 16th September, 2022) that ‘for many women aerobic exercise lessens PMS symptoms although the frequency and duration of exercise required to not stated. (<http://www.nhsdirect.nhs.uk/articles/article.aspx?articleId=578§ionId=11> Retrieved 16th September 2022) It also offers advice to women about possible treatment for menstrual pain, states that ‘moderate physical exercise may help with relieving pain. Trials involving general populations have shown that participation in regular exercise can improve

some of the types of symptoms (that is, mood disturbance, fatigue, cognitive dysfunction, and bloating) typically experienced by women who suffer from primary dysmenorrhea (Daley,2008).

However, the result of the study is contrary to the study of Blakey et al., (2010). Which aimed to determine the relationship between primary dysmenorrhoea and aerobic exercise on 654 female students showed there was no significant relationship between primary dysmenorrhoea and aerobic exercise, also in contrary to the study is the study of Davaneghi, Tarighat-Esfanjani, Dahri (2016). Which recorded that there was no correlation between participation in sport activity and the severity of primary dysmenorrhoea. Al-Matouq et al., (2019) study also showed that there was no significant relationship between the distributions of dysmenorrhoea between athletic and non-athlete groups.

While the effect seen in the studies above may be as a result of the release of endorphin during exercise and the subsequent effect of pain relieve. Exercise produce sweats and water leaves the body, which can relieve uncomfortable belly bloat and breast tenderness and fullness and the other symptoms associated with premenstrual syndrome. Exercise also releases mood-boosting endorphins, which anecdotal evidence suggests might at least [take one's mind off](#) discomfort or pain. All these could be the reason for the improved quality of life. The difference in these studies may be as a result of difference in race, the type, duration and extent of physical activity used in the studies.

Conclusions

Based on the findings of this study the following conclusions were drawn.

1. Twelve weeks jogging exercise has effects on primary dysmenorrhea among adolescents.
- 2, Twelve weeks exercise also has effect on the quality of life of the adolescent girls.

Recommendation:

Based on the conclusions of the study the following recommendations were made:

1. Jogging exercises should be incorporated in the management of primary dysmenorrhea to improve the quality of life of adolescent students suffering from these problems.
2. Medical personnel should use jogging exercise in the management of primary dysmenorrhea as an alternative treatment among adolescents.
3. Schools should encourage and enlighten female students on the benefits of jogging exercises and enforce it on the student's curriculum.
4. Further studies should be carried out with another race and a larger sample size in another environment. The effects of jogging exercise on primary dysmenorrhea could be another area of recommended study. This is to help generalization of the outcome of the study on the general population.

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