

Effect of Core Strength Exercise on Primary Dysmenorrhea: The Case of Model High School Female Students of Haramaya University, Oromia Regional State, Ethiopia

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Abstract

Primary dysmenorrhea refers to recurrent, cramp lower abdominal pain that occurs during menstruation. Aim of this study to assess the effect of core strength exercise on pain intensity and pain duration of primary dysmenorrhea in high school students. 41 Unmarried girls aged 15-20 years with moderate-to-worst primary dysmenorrhea were selected from a high school located in Haramaya University. The students were non-athletes and volunteered for the study. The target group was only one group without a control group as an experimental group only (n = 41). In the intervention, the subjects were requested to complete an active core strength exercise for 8 weeks (4 days per week). Data were obtained using 10-point rating scale pain intensity, pain duration. After 8 weeks, the analysis of pre-test and post-test of 41 participants pain intensity and duration of pain showed that mean 8.44 to 3.22, standard deviation (SD) 1.305 to 1.824, mean difference (MD) 5.220, standard error mean (SEM) .301, (95% confidence interval), (p =.000) and pain duration mean 66.93 to 31.80 standard division (SD) 24.900 to 20.512 mean difference (MD) 35.122, standard error mean (SEM) 4.740, (95% confidence interval), (p =.000). Core strength exercises are effective in reducing pain intensity and pain duration, of primary dysmenorrhea. Further research on the effect of particular core strength training exercises programs ought to be conducted for further understanding of core strength training exercises.

Keywords: Pain; Duration; Pain Intensity; Core Muscle; Primary Dysmenorrhea

Abbreviations

PD; primary dysmenorrhea, SD; standard deviation; MD; Mean difference; SEM; standard error mean

Background

Menstruation is a normal physiological phenomenon in a woman's reproductive life. Among the gynecological problems, menstrual problems are said to be the major ones especially among adolescent females [1]. Dysmenorrhea is a subgroup of pelvic pain that manifests as painful menstrual flow (Lefebvre et al., 2005; Nasir & Bope, 2004). Dysmenorrhea is the most common gynecologic disorder among the female adolescents that affects more than half of women of 18-25 years. And it is one of the leading causes of recurrent short-term absenteeism in schools and workplaces and limitation of usual daily activities [2]. Prevalence of dysmenorrhea in northern Ethiopia 71.8%, [3]. World-wide ranges 15.8 - 89.5%, [4].

The pain has been associated with high levels of prostaglandins and leukotrienes in the menstrual fluid, which then causes abnormal uterine contractions [5,6]. Pain is experienced by those affected for two to three days during ovulatory cycles and is most intense during the first 24-26 hours, when prostaglandin levels are high within the menstrual fluid [6]. The core muscle can be described as a muscular box with the abdominals in the front, Paraspinal and gluteal in the back, the diaphragm as the roof, and the pelvic floor and hip girdle musculature as the bottom. It consists of muscles including abdominal, hip, and back muscles that stabilize the spine, pelvis, and shoulder [7].

Primary dysmenorrhea is defined as the pain during menstruation which usually begins around the time that menstruation begins [8]. And it refers to repeated, cramp lower abdominal pain that occurs during menstruation in the absence of other underlying conditions/disease [9]. Negative consequences of primary dysmenorrhea include impaired quality of personal and social life, mood disorders, sleep disturbance, and limitation of usual daily activities [10].

Pain is often not completely relieved by conventional medicines and the medicine has also its own side effects on the human body [11]. Nausea, breast tenderness, bleed-

ing, dizziness, drowsiness, hearing, and visual disturbances are associated with conventional medicines [12].

The exercise intervention studies conducted on dysmenorrhea are more of aerobic exercise implying research to be undertaken on core strength forms of exercise. Despite the widespread belief that exercise can reduce dysmenorrhea, evidence-based studies are limited (Onur et al., 2012). Dysmenorrhea and physical exercise are commonly cited a probable remedies for menstrual symptoms with limited research available (Sutar et al., 2016). Researches have shown contradictory results about the role of exercise in the treatment of primary dysmenorrhea in general. Therefore, the study aimed to investigate the effects of core strength exercise on pain intensity and pain duration of PD.

Methods

The study was conducted on High school girls who were (100%) complains of dysmenorrhea. The purpose of this study was to compare the effects of 8 weeks of core strength exercise on PD in the case of Haramaya University model high school. Forty-one human subjects were selected based on the sample size formula for paired pre-post quasi experimental research design with $\alpha = 0.05$, $\beta = 0.2$, and $\Delta = 0.45$ (Campbell et al., 2009). 54 female students were screened with the presence of PD. From 54 volunteers' dysmenorrheal female students of model High school of Haramaya University, Their health condition and physical readiness questionnaire were prepared for identifying their health status. The information was obtained from a self-administered questionnaire. Background information of respondents in terms of age category, and grade level. 29.3% of students are under age 15-16, 53.7% of students are under age 17-18, and 17.1% of students are under age 19-20. And 36.6% of subjects are from grade 10th, 26.8% of students are from 11th and 36.6% of students are from grade 12th.

A pre-tested, structured and interview administered questioner was used that was adopted from the previous study and reviewing relevant literature to the problem under study to include all the possible variables that address the objective of the study. The questionnaires were divided

into two 2 sections. The first was to cover socio-demographic factors such as sex, age, grade level, marital sates. The second section contains a numeric pain rating scale to measure pain intensity and duration of pain. The intensity of pain was measured by the Standardized (0-10) Numeric Pain Rating Scale, to assess the severity of pain during menstruation. Scoring of the severity of pain is No pain-0, for mild pain- 1-3, for moderate pain- 4-6, For severe pain- 7-8, and For worst possible pain- 9-10 [5]. Content validity of the NRS has been established by nine nursing experts. The reliability of the numeric rating scale (NRS) has been used for estimating the reliability ($r = 0.95$) [13]. The duration of pain was measured based on the number of days and interims of hours. The pain duration ranges from Less than 1 day, 1 day, 2 days, 3days, and More than 3 days. The collected data were coded entered into statistical software (SPSS V.20) for analysis and paired sample t-test, were used to test the data pre-tested and post-tested scores of pain intensity

and pain duration.

Results

Table1 summarizes Paired Samples Test outcomes of the Pain Intensity with the corresponding pre-intervention and post-intervention test. And, the Paired Samples Statistics, Paired Samples Correlations of the pain intensity. Table 2 Indicate the Pain duration paired t-test and, implies the Paired Samples Statistics and, the Paired Samples Correlations.

Statistical Analyses (pre-test and post-test of pain intensity of primary dysmenorrhea)

As shown by Table 1 the Paired Samples Test, the interaction effect core strengthening exercise and pain intensity of primary dysmenorrhea were revealed.

Table 1: Pain Intensity Paired T Test

								Paired Differences			t	df	P. value
		N	Mean	SD	S.E.M	95% Confidence Interval		Mean	SD	SEM			
Pair 1	pain intensity at time 1 (pt)	41	8.44	1.305	.204	Upper	lower	5.220	1.930	.301	17.315	40	.000
	pain intensity at time 2 (Pt)	41	3.22	1.824	.285	4.610	5.829						

*SD= standard deviation *PT=pre-test and post -test *MD= Mean difference *SEM = standard error mean *p value = significant level

Table 2: Pain duration paired t test

								Paired Differences			t	df	P. value
		N	Mean	SD	S.E.M	95% Confidence Interval		Mean	SD	SEM			
Pair 1	pain duration at time 1 (pt)	41	66.93	24.900	3.889	Upper	lower	35.122	30.351	.301	7.410	40	.000
	pain duration at time 2 (Pt)	41	31.80	20.512	3.204	25.542	44.702						

*SD= standard deviation *PT=pre-test and post -test *MD= Mean difference *SEM = standard error mean *p value = significant level

Statistical Analyses of (pre-test and post-test of pain duration of primary dysmenorrhea)

The pain duration recorded in both before and after completion of the exercises presented in table . Hence, it inferred that among before exercise pain was more than 3 days, whereas after exercise reported to have pain less than 1 a day. Therefore, there was a significant difference in the duration of pain between pre core strength exercise and post. It was found that after practicing the exercises along 8 weeks pain duration decreased significantly ($p= 0.00$) in the after exercise and as compared to before core strength exercise.

Discussion

The study was conducted on High school girls who were (100%) complains of dysmenorrhea. The aim of this Finding was conducted to examine the effect of core strength exercises in relieving the pain of primary dysmenorrhea, on pain intensity, pain duration, and how much core strengthening exercise protocol was better regarding reducing primary dysmenorrhea.

Dysmenorrhea is a severe pain, cramping sensation in the lower abdomen is characterized by lower abdominal pain that may radiate to the lower back and upper thighs and it is associated with nausea, headache, fatigue, and diarrhea. Dysmenorrhea harms a woman's life. It may be so severe as to confine the woman to bed (Shadia et al., 2012).

Core strengthening allows the small intrinsic musculature surrounding the lumbar spine to be conditioned for greater performance proposed that the increase in the blood flow and metabolism of the uterus during exercise may be effective in the reduction of dysmenorrhea symptoms [12]. Exercise acts as non-specific analgesia by improving pelvic blood circulation and stimulating the release of beta-endorphins [14].

But the exercise intervention studies conducted on dysmenorrhea are more of aerobic exercise and Researches has shown inconsistent results about the role of exercise in

the treatment of primary dysmenorrhea in general. Implying research to be undertaken on core strength forms of exercise the treated females students reported a significant reduction in menstrual pain within an average of 8 weeks of exercise. In the present study, the pain intensity, pain duration, and primary dysmenorrhea have reduced after the intervention.

Therefore, in this study, we had expected the effect of core strength exercises over pain and menstrual symptoms in subjects with primary dysmenorrhea. The statistical result of this study shows that the intensity of pain and pain duration measured by the Numeric pain rating scale before and after the exercise intervention show a significant difference.

Furthermore, these findings are similar to those of lots of authors who studied the effects of exercises on primary dysmenorrhea. Prove that core strength and stretching exercises are effective in reducing pain intensity and pain duration, of girls with primary dysmenorrhea [8,12,15-19].

Conclusions

According to Our study results, the following points are stated as conclusions. Core strengthening exercise has a positive effect on the treatment of primary dysmenorrhea in high school girls. According to the results of this study, performing exercise in various forms including core-strengthening exercises reduces pain intensity and duration of pain of primary dysmenorrhea. Based on the findings of the present study, it can be concluded that primary dysmenorrhea is the most common complaint of high school girls. Almost the entire target group mentioned that they were suffering from severe primary dysmenorrhea before intervention. The pain scores before intervention were significantly reduced from the pre-test to the post-test. Practicing the core strength exercise besides the usual menstrual care reduced the pain intensity, pain during primary dysmenorrhea for the studied target group compared to pre participate.

Declarations

Ethics Approval and Consent to Participate

The study was conducted by considering the university rules, codes of conduct, and policies. The protocols were approved by the Haramaya university guidelines. The protocol was reviewed and approved by institutional reviewers or bodies. The entire target group had clear information about the purpose of the study. The subjects did not face any risk of harm. The results of the questionnaires were kept confidential. Any type of information did not disclose to anyone.

Consent for Publication

Not applicable.

Availability of Data and Material

Availability of Data and Materials The datasets of

the present study are obtainable from the corresponding author on reasonable request.

Competing Interests

The Authors, Sufiyan Adam, Desta Enyew, Abinet Ayalew, and Biniam Eshete, Assert That They Have No Competing Interests.

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Authors' Contributions

Authors' contributed meaningfully to the beginning and design of the study, data analysis, critical evaluation, interpretation of data, and recruiting of the manuscript. All authors have given their final endorsement for the document to be published.

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