International Journal of Studies in Nursing; Vol. 4, No. 3; 2019
ISSN 2424-9653 E-ISSN 2529-7317
Published by July Press

Physical Activity and Menstrual Disorders Among School Girls in Southern Egypt

Hanan Elzeblawy Hassan[1], Walaa Fathy Mohamed Ahmed[2] & Ahmed Arafa[3]

[1] Department of Maternal and Newborn Health Nursing, Faculty of Nursing, Beni-Suef University, Egypt

[2] Department of Maternity and Gynecological Nursing, Faculty of Nursing, Ain Shams University, Egypt

[3] Department of Public Health, Faculty of Medicine, Beni-Suef University, Egypt

Correspondence**:** Hanan Elzeblawy Hassan, Maternal and Newborn Health Nursing, Faculty of Nursing, Beni-Suef University, Egypt. E-mail: nona_nano_1712@yahoo.com

Received: July 7, 2019 Accepted: July 23, 2019 Online Published: July 31, 2019

doi:10.20849/ijsn.v4i3.614 URL: https://doi.org/10.20849/ijsn.v4i3.614

Abstract

Introduction: Menstrual disorders are the most frequent gynecological diagnoses among young girls.

Aim: This study was conducted to investigate whether physical activity could reduce menstrual disorders among schoolgirls.

Methods: In this cross-sectional study, 970 schoolgirls in Southern Egypt were assessed, using a questionnaire, for their socio-demographic characteristics, gynecological history, physical activity, and menstrual disorders during the previous 6 months.

Results: The mean age of schoolgirls was 15.5 ± 0.8 years, menarche age 13.2 ± 1.2 years, menstrual cycle duration 28.8 ± 7.3 days, and 76.1% were circumcised. After adjustment for the socio-demographic and gynecological variables, physical activity was shown to be not associated with all premenstrual symptoms and dysmenorrhea (p -value > 0.05).

Conclusion: No substantial associations between physical activities and menstrual/premenstrualal symptoms can be concluded.

Recommendations: Future cohort and interventional studies are needed to explain whether the risk of dysmenorrhea and premenstrual symptoms can be reduced by physical activity.

Keywords: dysmenorrhea, physical activity, premenstrual disorders, schoolgirls

1. Introduction

Menstrual disorders are common concerns among adolescents since these symptoms carry several debilitating impacts on their physical, emotional, educational, and social well-being [1, 2]. The additional healthcare costs, sick leaves, and academic shortcomings attributed to menstrual disorders add an enormous economic burden on the adolescents, their families, and health care systems [3].

Several risk factors such as stress, smoking, hormonal disturbances, and unhealthy dietary behaviors are thought to increase the risk of menstrual disorders [2,4,5]. Theoretically, physical activity may protect from menstrual disturbances. It can optimize the levels of corticotropin-releasing hormone, cortisol, prolactin, thyroid hormones, endorphins, and prostaglandins. These hormones and hormone-like compounds play a pivotal role in regulating the menstrual cycle and their disturbance can lead to menstrual disorders [6-8]. Although significant emotional and physical menstrual symptoms were detected among the physically inactive women [9-10], some studies denied any association between physical activities and menstrual irregularities [11-13].

1.1 Operational Definitions

Researchers defined the premenstrual symptoms as physical and emotional symptoms experienced within 7-10 days before menstruation. These symptoms included spasm, fatigue, headache, irritation and/or nervousness, breast tenderness, insomnia, nausea and/or vomiting, and abdominal bloating. Also, we defined menstrual symptoms as symptoms experienced during the flow days and included flow days, dysmenorrhea, acne flare, dysuria, and facial hair. To avoid misclassification bias, dysmenorrhea was defined as a state of painful cramping

sensation hitting the groin during flow days [14]. The severity of dysmenorrhea was determined according to its duration, using medications, and school absenteeism.

1.2 Aim of the Study

Nevertheless, there is a scarcity in the population-based studies investigating the association between physical activity and premenstrual and menstrual symptoms. Besides, the available literature inspected women with a long history of menstrual disorders rather than adolescents, described the menstrual disorders collectively without details, and did not adjust the findings for potential socio-demographic and gynecological characteristics. We, therefore, conducted this study to investigate these associations among school girls in Southern Egypt.

1.3 Research Questions

What is the prevalence of physical activity among schoolgirls in Southern Egypt 6 months ago?

What are the types of premenstrual and menstrual symptoms among schoolgirls in Southern Egypt 6 months ago?

Is there association between physical inactivity and premenstrual and menstrual symptoms among schoolgirls in Southern Egypt?

2. Subjects and Methods

2.1 Study Design and Settings

In this the cross-sectional study, the researchers included schoolgirls from 4 public preparatory schools in Beni-Suef City, in Southern Egypt, during the period between 1st January to 30th April 2019.

2.2 Sampling Procedures

The sample size was determined using the Epi-Info version 7 Stat Calc, [Center for Disease Control (CDC), World Health Organization (WHO)] using the following criteria: a confidence level of 95.0% and a margin of error of 5.0%. The least sample size was 381; however, it was tripled to enhance the statistical power. To select our sample population, we divided Beni-Suef City geographically into 4 areas and 1 school was randomly selected from each area by card withdrawal. All schoolgirls in the checklists of the 4 schools were invited to participate in the study. Schoolgirls enrolled for evening classes and those who were absent during the interview day were excluded from the study.

2.3 Data Collecting Tool

The researchers prepared an Arabic questionnaire comprised of 4 sections. The first section included socio-demographic questions; age, residence, education of parents, sleeping hours, exposure to passive smoking, and preference for salty-fatty food. The second section included gynecological history questions; circumcision, the age of the first menarche, days of menstrual flow, and menstrual cycle duration. The third section included questions about premenstrual and menstrual symptoms during the previous 6 months. The fourth section assessed the physical activity using the Global Physical Activity Questionnaire which encompassed 2 questions about the duration of physical activity in the form of days/week and hours/day. This short questionnaire is typically used to identify whether an individual meets a physical activity standard [15].

3. Validity and Readability of Tool

The Cronbach's alpha for the reliability was 0.85 and the content validity was judged by professors of and professors of maternity, gynecology & obstetrics and public health professors from the faculties of Medicine and Nursing, Beni-Suef University as well as faculties of Nursing, Ain Shams University.

4. Research's Ethical Considerations

The study protocol was approved by Beni-Suef University Research Ethics Committee. Then, the heads of the selected schools were contacted for institutional approvals and they signed informed consent forms on behalf of the schoolgirls after being briefed on the steps and aims of the study. Girls were required to give their verbal assent before participation.

5. Pilot Study

Researchers conducted a pilot study on 97 students to assure adequacy and clarity of the designed questionnaire.

6. Statistical Analyses

Researchers used the software, Statistical Package for Social Science (SPSS Inc. Released 2009, PASW Statistics for Windows, version 18.0: SPSS Inc., Chicago, Illinois, USA) for statistical analysis. As suggested by Coleman et al, schoolgirls who reported less than 150 minutes/week of moderate to vigorous physical activity were classified

physically inactive [15]. Multivariable regression analyses were done to determine whether physical activity was related to specific premenstrual and menstrual disorders. The following covariates were included in the regression models; age, parental education, passive smoking, diet, sleeping hours, circumcision, and age of menarche.

Description of quantitative variables were presented as mean and SD (Mean ± SD)

A confidence level (CI) was considered as 95%

Probability (p-value) was considered as follows:

P value > 0.05 insignificant

* P < 0.05 mild significant correlation

** P < 0.01 moderate significant correlation

*** P < 0.001 highly significant correlation

7. Results

With 970 participating schoolgirls, the physical activity represented 16.3%, while 83.7% of the participants were inactive (Figure 1).

The mean age of the participating schoolgirls was 15.5 ± 0.8 years, menarche age 13.2 ± 1.2 years, menstrual cycle duration 28.8 ± 7.3 days; flow days 5.0 ± 1.3, and 76.1% were circumcised. Schoolgirls with educated parents and older age of menarche were more likely to report physical activity (Table 1).

While premenstrual spasm and fatigue were the most commonly reported premenstrual symptoms, dysmenorrhea was heavily reported during flow days. Using univariate analysis, physical activity associated with irritation and nervousness (OR: 1.5, 95% CI: 1-2.2, p-value=0.043) and abdominal bloating (OR: 1.9, 95% CI: 1.1-3.4, p-value = 0.024). After adjustment for the covariates, none of these associations remained significant. Physical activity did not associate with dysmenorrhea or any of the investigated premenstrual symptoms (p-value > 0.05) (Table 2).

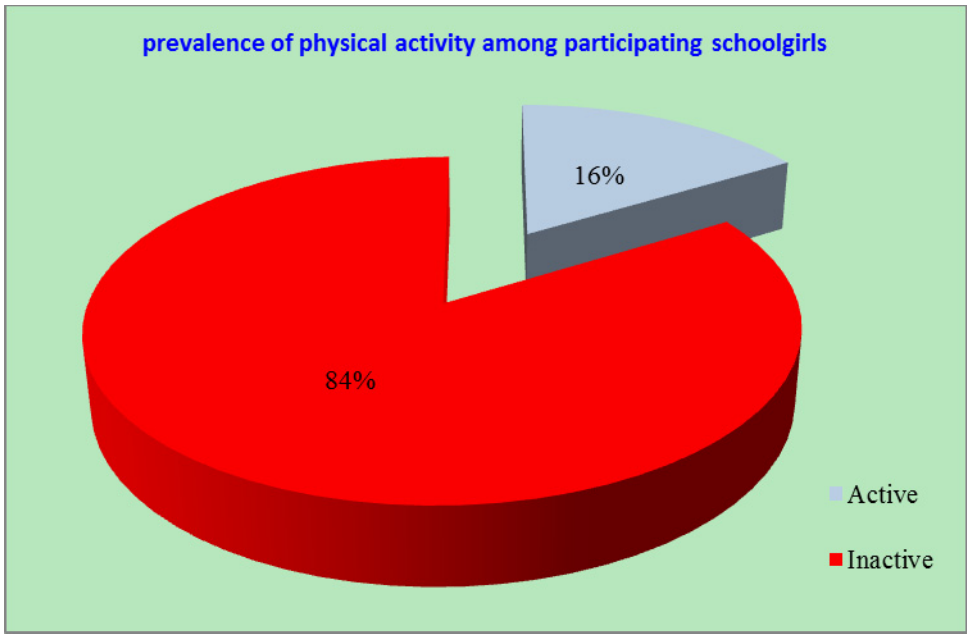

Figure 1. Prevalence of physical activity among participating schoolgirls

Table 1. Socio-demographic, life style, and gynecological characteristics of the participating schoolgirls (n = 970) according to their physical activity

Characteristics		Active, n = 158	Inactive, n = 812	Total	P-value
Age years; Mean ± Sd		15.66 ± 0.70	15.51 ± 0.84	15.54 ± 0.82	0.041
Father's Education	Illiterate	24 (15.2)	238 (29.3)	262 (27.0)	< 0.001***
	Literate	134 (84.8)	574 (70.7)	708 (73.0)	
Mother's Education	Illiterate	41 (25.9)	378 (46.6)	419 (43.2)	< 0.001***
	Literate	117 (74.1)	434 (53.4)	434 (53.4)	
Passive Smoking	Yes	85 (53.8)	409 (50.4)	494 (50.9)	0.242
	No	73 (46.2)	403 (49.6)	476 (49.1)	
Preference of Salty Diets	Yes	130 (82.3)	576 (70.9)	706 (72.8)	0.002**
	No	28 (17.7)	236 (29.1)	264 (27.2)	
Circumcision	Yes	113 (71.5)	625 (77.0)	738 (76.1)	0.087
	No	45 (28.5)	187 (23.0)	232 (23.9)	
Sleeping Hours/day; Mean ± SD		8.63 ± 2.28	8.66 ± 1.88	8.66 ±1.94	0.865
Menarche Age years; Mean ± SD		13.45 ± 1.28	13.15 ± 1.16	13.20 ± 1.19	0.004**
Menstrual Cycle Duration days; Mean ± SD		28.36 ± 5.59	28.90 ± 7.63	28.81 ± 7.33	0.402
Menstrual Flow Duration days; Mean ± SD		5.07 ± 1.27	5.02 ± 1.32	5.03 ± 1.32	0.663

Table 2. Crude and multi-variable adjusted odds ratios and confidence intervals of the menstrual symptoms during the previous 6 months among the participating schoolgirls (n=970) according to their physical activity

Menstrual Symptoms	Active	Inactive (Ref)	Crude P-value	Crude OR (95% CI)	Adjusted P-value	Adjusted OR (95% CI)
Menstrual Cycle > 28 days	70 (44.3)	312 (38.4)	0.098	1.3 (0.9 - 1.8)	0.526	1.1 (0.8 - 1.6)
Premenstrual						
Spasm	99 (62.7)	503 (61.9)	0.470	1.0 (0.7 - 1.5)	0.973	1.0 (0.7 - 1.4)
Headache	36 (22.8)	178 (21.9)	0.441	1.1 (0.7 - 1.6)	0.686	1.1 (0.7 - 1.7)
Irritation/Nervousness	38 (24.1)	144 (17.7)	0.043	1.5 (1.0 - 2.2)	0.102	1.4 (0.9 - 2.2)
Breast Tenderness	22 (13.9)	132 (16.3)	0.273	0.8 (0.5 - 1.4)	0.449	0.8 (0.5 - 1.4)
Insomnia	26 (16.5)	110 (13.5)	0.199	1.3 (0.8 - 2.0)	0.605	1.1 (0.7 - 1.8)
Nausea/Vomiting	15 (9.5)	77 (9.5)	0.547	1.0 (0.6 - 1.8)	0.623	0.9 (0.5 - 1.6)
Abdominal Bloating	17 (10.8)	48 (5.9)	0.024*	1.9 (1.1 - 3.4)	0.051	1.8 (1.0 - 3.3)
Menstrual						
Flow days > 4 days	101 (63.9)	524 (64.5)	0.476	1.0 (0.7 - 1.4)	0.747	0.9 (0.7 - 1.4)
Dysmenorrhea	147 (93.0)	718 (88.4)	0.053	1.7 (0.9 - 3.3)	0.112	1.8 (0.9 - 3.3)
Dysmenorrhea > 1 day	105 (71.4)	461 (64.2)	0.056	1.4 (0.9 - 2.1)	0.339	1.2 (0.8 - 1.8)
Dysmenorrhea With Medications	68 (46.3)	336 (46.8)	0.489	1.0 (0.7 - 1.4)	0.762	0.9 (0.6 - 1.4)
Dysmenorrhea With Absenteeism	69 (46.9)	339 (47.2)	0.512	1.0 (0.7 - 1.4)	0.570	0.9 (0.6 - 1.3)
Acne Flare	54 (34.2)	248 (30.5)	0.208	1.2 (0.8 - 1.7)	0.685	1.1 (0.7 - 1.6)
Dysuria	18 (11.4)	99 (12.2)	0.450	0.9 (0.5 - 1.6)	0.785	0.9 (0.5 - 1.6)
Facial Hair	7 (4.4)	30 (3.7)	0.397	1.2 (0.5 - 2.8)	0.562	1.3 (0.5 - 3.1)

8. Discussion

This study detected no evidence of a substantial relationship between physical activities and menstrual disorders. Although physical activity increases the endorphin levels, suppresses the release of prostaglandins, improves the oxygen in muscles, and reduces sex hormones and cortisol, its association with menstrual disorders remains inconclusive [6, 7, 16].

One explanation for our findings is that the mean age of schoolgirls was 15.5 years while their mean age of menarche was 13.2 years. The majority of cycles in the first two years are anovulatory, and often not associated with progestin/prostaglandin mediated dysmenorrhea associated with anovulation [17].

Further, it should be noted that the previous studies which investigated the same association used different study methods and statistical approaches, adopted different definitions for physical activity, and included populations with different socio-demographic characteristics. These variations led to remarkable inconsistencies in the findings across the studies and made the comparisons quite difficult. For example, the definition of physical activities in the cross-sectional study was practicing moderate to vigorous physical activities for 150 minutes/week. On the other hand, Aganoff and Boyle used a stricter definition of physical activity. They recruited women from fitness clubs after the end of their aerobic sessions to represent the physically active and compared them to apparently healthy women who denied practicing sport. Yet, the authors detected only negative mood not physical symptoms among the physically inactive [9]. Using a cross-sectional design, Vani et al concluded that adolescents who reported physical activity for more than 3 days/week, regardless of training hours per day, had less premenstrual syndrome but the same dysmenorrhea [10]. Johnson et al used a prospective approach to explore the same association and concluded that the days of training correlated negatively with some premenstrual symptoms [18]. In their clinical trial, El-Lithy and colleagues found that training 3 times/week for 3 months led to a significant improvement in all premenstrual symptoms [19].

Although estimating the prevalence of menstrual disorders among schoolgirls is beyond the aim of this study, the researcher noticed that most school girls experienced dysmenorrhea during the previous 6 months and this dysmenorrhea was severe enough to require medication and school absenteeism. They also reported high rates of premenstrual symptoms, especially spasm and/or fatigue. This refers to the crucially of studying the factors that predispose to menstrual disorders with the purpose of creating risk-prevention strategies to reduce their incidence and minimize their negative effects.

9. Limitations of the Study

This study described the association between physical activity and most premenstrual and menstrual disorders after adjustment for socio-demographic and gynecologic factors, yet some limitations should be considered. The first, some covariates that can affect the occurrence of menstrual disorders such as body mass index (ḂMI) and family history of menstrual disorders were not included in the survey. Besides, pain is very subjective to a given individual diagnosis of dysmenorrhea and its severity cannot be confirmed.

10. Conclusion and Recommendations

Premenstrual spasm and fatigue were the most commonly reported premenstrual symptoms; dysmenorrhea was heavily reported during flow days. Physical activity associated with irritation, nervousness and abdominal bloating. In conclusion, we could not reach a robust conclusion that physical activity could protect from menstrual disorders.

11. Recommendations

Physical activity is highly recommended for schoolgirls.

Future cohort and interventional studies are needed to explain whether the risk of dysmenorrhea and premenstrual symptoms can be reduced by physical activity.

Conflict of Interest: None.

Funding: None.

References

[1] Knox, B., Azurah, A., & Grover, S. (2015). Quality of life and menstruation in adolescents. *Curr Opin Obstet Gynecol, 27*(5), 309-314. https://doi.org/10.1097/GCO.0000000000000199

[2] Hailemeskel, S., Demissie, A., & Assefa, N. (2016). Primary dysmenorrhea magnitude, associated risk factors, and its effect on academic performance: Evidence from female university students in Ethiopia. *Int J Womens Health, 8*, 489-496. https://doi.org/10.2147/IJWH.S112768

[3] Tanaka, E., Momoeda, M., Osuga, Y., Rossi, B., Nomoto, K., … Hayakawa, M. (2014). Burden of menstrual symptoms in Japanese women; An analysis of medical care-seeking behavior from a survey-based study. *Int J Womens Health, 6*, 11-23. https://doi.org/10.2147/IJWH.S52429

[4] Ju, M., Jones, M., & Mishra, G. (2014). The prevalence and risk factors of dysmenorrhea. *Epid Rev, 36*(1), 104-13. https://doi.org/10.1093/epirev/mxt009

[5] Emem, E., & Hassan, H. (2017). Correlation between Quality of Life and Dysmenorrhea among Nursing Schools Students. *International Journal of Nursing Science, 7*(6), 123-132. https://doi.org/10.5923/j.nursing.20170706.02

[6] Cho, G., Han, S., Shin, J., & Kim, T. (2017). Effects of intensive training on menstrual function and certain serum hormones and peptides related to the female reproductive system. *Medicine (Baltimore), 96*(21), e6876. https://doi.org/10.1097/MD.0000000000006876

[7] Trappe, T., & Liu, S. (2013). Effects of prostaglandins and COX-inhibiting drugs on skeletal muscle adaptations to exercise. *J Appl Physiol, 115*(6), 909-919. https://doi.org/10.1152/japplphysiol.00061.2013

[8] Hassan, H., Gamel, W., Sheha, E., Sayed, M., & Arafa, A. (2019). Menstrual disorders necessitating counseling among students in Beni-Suef University. *Clinical Nursing Studies, 7*(2), 29-36. https://doi.org/10.5430/cns.v7n2p29

[9] Aganoff, J., & Boyle, G. (1994). Aerobic exercise, mood states and menstrual cycle symptoms. *J Psychosom Res, 38*(3), 183-192. https://doi.org/10.1016/0022-3999(94)90114-7

[10] Vani, K., Veena, K., Subitha, L., Kumar, V., & Bupathy, A. (2013). Menstrual abnormalities in school going girls - Are they related to dietary and exercise pattern?. *J Clin Diagn Res, 7*(11), 2537-2540.

[11] Blakey, H., Chisholm, C., Dear, F., Harris, B., Hartwell, R., … Daley, A. (2010). Is exercise associated with primary dysmenorrhoea in young women?. *Obestet Gynecol, 117* (2), 222-224. https://doi.org/10.1111/j.1471-0528.2009.02220.x

[12] Kroll-Desrosiers, A., Ronnenberg, A., Zagarins, S., Houghton, S., Takashima-Uebelhoer, B., & Bertone-Johnson, E. (2017). Recreational physical activity and premenstrual syndrome in young adult women: A cross-sectional study. *PLoS One, 12*(1), e0169728. https://doi.org/10.1371/journal.pone.0169728

[13] Arafa, A., Khamis, Y., Hassan, H., Saber, N., & Abbas, A. (2018). Epidemiology of dysmenorrhea among workers in Upper Egypt; A cross sectional study. *Middle East Fertil Soc J., 23*, 44-47. https://doi.org/10.1016/j.mefs.2017.07.002

[14] French, L. (2005). Dysmenorrhea. *Am Fam Physician, 71*(2), 285-291.

[15] Coleman, K., Ngor, E., Reynolds, K., Quinn, V., Koebnick, C., … Young, D. (2012). Initial validation of an exercise "vital sign" in electronic medical records. *Med Sci Sports Exerc, 44*, 2071-2076. https://doi.org/10.1249/MSS.0b013e3182630ec1

[16] Schwarz, L., & Kindermann, W. (1992). Changes in beta-endorphin levels in response to aerobic and anaerobic exercise. *Sports Med, 13*(1), 25-36. https://doi.org/10.2165/00007256-199213010-00003

[17] Rosenfield, R. L. (2013). Clinical review: Adolescent anovulation: maturational mechanisms and implications. *J Clin Endocrinol Metab, 98*(9), 3572-3583. https://doi.org/10.1210/jc.2013-1770

[18] Johnson, W., Carr-Nangle, R., & Bergeron, K. (1995). Macronutrient intake, eating habits, and exercise as moderators of menstrual distress in healthy women. *Psychosom Med, 57*, 324-330. https://doi.org/10.1097/00006842-199507000-00003

[19] El-Lithy, A., El-Mazny, A., Sabbour, A., & El-Deeb, A. (2015). Effect of aerobic exercise on premenstrual symptoms, haematological and hormonal parameters in young women. *J Obstet Gynaecol, 35*(4), 389-392. https://doi.org/10.3109/01443615.2014.960823