

Effect of Kegel versus Pelvic Rocking Exercise on Primary Dysmenorrhea Intensity among Adolescents at Secondary Female's Schools in al-Mafraq Jordanian city

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Abstract

Background: Dysmenorrhea “painful menstruation” Common disorder that influence females’ daily life activities”, Kegel and pelvic rocking exercise have been used to reduce primary dysmenorrhea. **Aim:** this study aimed to compare the effect of Kegel versus pelvic rocking exercise on primary dysmenorrhea intensity among adolescents at secondary female’s schools in al-Mafraq Jordanian city. **Design:** A quasi – experimental research design. **Setting:** This study was carried out at three governmental secondary schools at Al-Mafraq Jordan city. **Subject:** A convenient sample of 216 student with dysmenorrhea were recruited. They are randomly, assigned into two groups (Kegel1& Pelvic rocking exercise2). **Tools:** Data was collected through three tools, basic data structured Interview schedule, WALIDD primary dysmenorrhea intensity scale and retrospective associative symptom scale (RSS). **Results:** Mean age of the studied sample was (17.11 ± 0.84 & 17.11 ± 0.84) years old in both studied groups respectively. In addition, 77.7 % of group 1 and 66.7% of group 2 suffered from severe dysmenorrhea while 25.9 % & 33.3% respectively had moderate dysmenorrhea. After 8 weeks became mild in 48.15, moderate in 36.9% and only 15.75 sever in group 1 while group 2 became mild in 3.7%, moderate 74.1% and severe 22.2%, effect size indicate mild relation among group 1 (0.486) and low in group 2 (0.250).while associative symptoms was moderate in two thirds (65.7% and 58.3%) of both groups before intervention, after 8 weeks were significant in posttest p (0.024) became 100% mild in group 1 while 95.4% in group 2 .the effect size moderate in both groups favor to group 1 (0.745 & 0.522) respectively .**Conclusion:** this study concluded that exercise significantly reduced intensity of primary dysmenorrhea. **Recommendations:** Kegel exercise technique should be advocated as a non-pharmacological approach for management of primary dysmenorrhea.

Keywords: Dysmenorrhea, Kegel exercise, pelvic rocking exercise, pain intensity, during menstruation. Common disorder that influence females’ daily life activities,

Introduction

Adolescence, the transitional stage from childhood to adulthood begins at 10 years and ends at 21 years. Worldwide , adolescents represent about 1.2 billion of population (**World Health Organization [WHO], 2019**) . Adolescents represent 21.23% of Jordan population (**Jordan Department of Statistic [JDOS], 2019**). Menstrual disorders are disruptive physical and/or emotional symptoms before and

productivity and recurrent school absences is Dysmenorrhea” painful menstruation”, (Draper, C.F, 2018). 60% - 93% of teenagers suffer from dysmenorrhea, with up to 42 percent of those experiencing severe symptoms. It’s classified to primary and secondary dysmenorrhea; the former refers to "ovulatory cycles typically begin within six to twelve months of menarche. While the

latter is the menstrual pain and discomforts that appear or develop later in life mainly in old women (Molla et al., 2022).The majority (92%) of adolescents in Egypt complain of dysmenorrhea. In same direction 95% of students in Faculty of Health Sciences at Turkey have primary dysmenorrhea, Yasar (2021)Jordanian university adolescents reported that 55.8% had moderate to severe dysmenorrhea(Al-Jefout et al., 2015). Exact cause of primary dysmenorrhea is unknown, but Hyper-production of uterine prostaglandins enhanced uterine tone and high-amplitude contractions (Beckmann et al., 2019). Symptoms associated with dysmenorrhea include, Gastrointestinal, musculoskeletal &neurological symptoms (Ferries-Rowe et al., 2020) .Dysmenorrhea treatment depends on severity, type and causes .Treatment includes pharmacological and non-pharmacological (McInerney et al., 2017). None pharmacological therapies are safe and low risk healthy treatment includes dietary modification, herbal preparations, adequate rest, and physical activity(Abubakar et al., 2020).Kegel and pelvic rocking exercises are most commonused in dysmenorrhea.Kegel exercises are a repeatedly contracting and relaxing of supportive pelvic muscles (Ben, 2020). Pelvic rocking exercises area deep contraction of abdominal and pelvic muscles, which cause a slight movement of the muscles of uterus and make it stronger(Sandhiya et al., 2021).Burden of dysmenorrhea greater than any other gynecological complaint; dysmenorrhea is leading cause of gynecological morbidity among adolescent girls. In spite of the fact that exercises play an important role in coping with dysmenorrhea and decreases its severity, still there is little evidence to evaluate the effect of Kegel and pelvic rocking exercise in dysmenorrhea among adolescents’ girls in Jordan

Aims of the study

To compare between the effects of Kegel versus pelvic rocking exercise on primary dysmenorrhea intensity among

adolescents at secondary female’s schools in al-Mafraq Jordanian city.

Research hypothesis:

Adolescent girls who practice Kegel exercise exhibit less dysmenorrhea intensity than those who practice pelvic rocking exercise.

Materials and Method:

Research design:

A quasi- experimental research design was used in this study as an attempt to establish a cause-and-effect relationship between an independent and dependent variable.

Settings:

The study was carried out in three governmental female's schools in Al-Mafraq Jordan city which they Al Mafraq secondary females’ school, Um AL- Jamal secondary mixed school, Gap gap comprehensive secondary school.

Subjects:

The sample size was estimated using Epi info 7 statistical program using the following parameters; total population 488, primary dysmenorrhea prevalence 50%, confidence level 95% and with 5% margin error. The minimum sample size estimated to be 216students. Using the unequal allocation method, a convenient sample from each school

Settings	Subjects number / setting	Proportion percent / total population	Sample number
Al-Mafraq secondary school	302	61.9%	134
Umm AL Jamal secondary school	87	17.8%	38
Gap gap = secondary school	99	20.3	44
Total	488	100.0	216

Inclusion criteria:

Age ranged between 16-18 years, single, complains of moderate or severe primary dysmenorrhea. Free from any gynecological problems as ovarian cyst. Not currently consume any medication to alleviate dysmenorrhea. Free from any medical diseases as cardiac and renal disease, had a history of regular menstrual cycles ranging from 21-35 days and lasting

from 3-7 days and willing to participate in the study.

Tools: Three tools were used:

Tool (I): Basic data structured interview schedule: Included two parts:

First part: Socio-demographic characteristics: include age, academic year, current residence as well as family income.

Second part: Menstrual history such as age at menarche, cycle duration and cycle interval.

Tool (II): WALIDD primary dysmenorrhea intensity scale

This tool was originally developed by **Teherán et al. (2018)**, then it was adapted by the researcher to assess the intensity of primary dysmenorrhea. It includes 4 items: **Item 1:** Working ability (0: None / 1: almost never / 2: usually / 3: always). **Item 2: Location** (0: none / 1: one site / 2: two-three site / 3: four sites), **Item 3:** Intensity of dysmenorrhea (0: does not hurt / 1: hurts a little / 2: hurts even more / 3: hurts a whole lot more, 4: hurts a lot more), **Item 4:** Days of dysmenorrhea (0: zero day / 1: 1-2 days / 2: 3-4 days / 3: >4 days). Each tool's variable provided a specific score between 0 and 3, and the total score was ranged from 0 to 12 and intensity dysmenorrhea was ranked as follow: No dysmenorrhea (0), Mild dysmenorrhea (from 1 to 4) Moderate dysmenorrhea (from 5 to 7) Sever dysmenorrhea (from 8 to 12)

Tool (III): Retrospective Symptom Scale (RSS) :developed by **Cox and Meyer (1978)** then revised and updated by **Chen et al. (2021)**. It was adapted by researcher to measure intensity and frequency (duration) of most common physical and emotional dysmenorrhea associated symptoms. It consists of 16 items, frequency ratings range from 0 ("did not occur") to 4 ("lasted several days"), and severity ratings range from 0 ("not noticeable") to 4 ("very severely bothersome"). Total scores were calculated by summing the products of frequency and severity ratings for 16 symptoms (**Jin et al., 2017**). Each subject total score ranged from 0-128. Accordingly, each subject rating

score and average symptoms were categorized as follow: None associative symptoms = 0<32, Mild associative symptoms 32<64, moderate associative symptoms 64<96. Sever associative symptoms 96-128.

Method:

Approval of Research Ethics Committee, Faculty of Nursing/ Alexandria University was obtained. Official letter from Faculty of Nursing Alexandria University was submitted to the Jordan Ministry of Education to obtain their permission to conduct the study and the collect data, Tool (I) was developed by the researcher after extensive review of recent, current & relevant literatures. Tools (II & III) were adapted and translated by the researcher into the Arabic language. Tools (I, II & III) were tested for content validity by a jury of 5 experts in obstetrics and gynecologic nursing field. Reliability coefficient for Tools (II & III) was reliable (0.820). A pilot study was carried out on 10% of study sample, (N=22). Each female student interviewed individually during one of the first 3 day of menstruation (Assessment1). Content preparation includes presentation and demonstration regarding Kegel and Pelvic Rocking exercise. Environment preparation includes gym private room in each school with comfort matrix and chairs to perform exercise easy and correctly. Each exercise includes 24 sessions held three sessions weekly for 8 weeks, each session lasting from 10 to 15 minutes. The duration was determined in line with recent studies which indicated that longer duration give better results(**Ben, 2020; Kanedi, 2019**).

Study group 1: Kegel exercise group

Researcher explained Kegel exercise then encouraged every student to empty her bladder, and imagine that she voids then stop voiding to feel which muscles contract to determine right muscles should be used during exercise, and then take a seat or lying position. Each student was asked to breathe deeply and relax her body while performing exercise. After that each student was asked to tighten her pelvic floor muscle groups and hold tight from 3 to 5 seconds then relax

muscle groups from 3 to 5 seconds. Finally, each student was asked to repeat the last step about 30 times each session (Ben, 2020).

Study group 2: Pelvic Rocking exercise group

Firstly, researcher demonstrated Pelvic Rocking exercise and asked student to re-demonstrate it. Then each student was encouraged to lie down on her back on mat with a pillow under head then bend her knees and keep her foot flat on floor and place one hand under curve of her back and other hand on top of abdomen then tighten buttocks and abdominal muscles simultaneously. After that each student was encouraged to inhale and hold (1-2-3-4) then exhale and hold 4-3-2-1 then relax muscles and feel her back flat on the underneath hand. Finally, each student was encouraged to repeat the last two steps about 10 times each session (Kenedi, 2019).

Evaluation- After intervention researcher assessed intensity of dysmenorrhea and associative symptoms for both groups as post-test by using tools (II& III) twice after 4 weeks (post 1) during first three days of menstruation and repeated after 8 weeks (post 2). Differences between pre and posttest (1&2) among both groups was calculated to

detect effect of each exercise. Collection of data consumed 5 months starting from middle of October -2021 till middle of March 2022.

Statistical analysis of the data:

Data analyzed using IBM SPSS software package version 20.0. The **Kolmogorov-Smirnov** test used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation, median. Significance of obtained results was judged at the 5% level. The used tests were Chi-square, Fisher's Exact or Monte Carlo correction, Student t-test, Mann Whitney, Friedman and Effect size test.

Ethical considerations:

Informed oral consents were obtained from students after brief explanation of purpose and nature of research. Anonymity and confidentiality and responses are kept, voluntary participation right to refuse to participate were emphasized. Privacy was ensured.

Results:

Table (I) illustrates the mean age is 17.11 ± 0.84 among both groups. In addition, about two thirds (62%) of participants from each group were urban residents. Family income was enough from the point of view among more than one half (66.7% and 54.6%) of both groups respectively. No statistically significant difference was observed ($p = 0.092$, $p = 0.358$, $p = 1.000$ and $p = 0.070$) among both groups.

Table (II) presents more than three-quarters (75.0% & 75.9%) of both groups had their first menstruation between 12 to 13 years with mean ages (12.39 ± 1.01 & 12.19 ± 0.82) respectively. More than one - half (59.3%, 54.6%) of studied groups had 3-5 days of menstrual flow. No statistically significant differences were observed p (0.143 & 1.000 & 0.550).

Table (III): reveals that before intervention, about half (46.3%) of students in Kegel exercise group reported that dysmenorrhea always affects their work ability, compared to 54.6 % of Pelvic Rocking exercise group. After 4 weeks this percentage decreased to as much as 35.2% in former group compared to only 14.8% of the latter group. After 8 weeks the percentage dropped to 20.4% and 9.3 % among Kegel and Pelvic Rocking exercise groups respectively, both groups approximately had equal percentage of dysmenorrhea in two to three locations (81.5% & 88.0 %) respectively before intervention. While after 4 weeks this percentage decreased to (61.1 % & 85.2 %) among both groups respectively, another drops in percentage after 8 weeks, less than half (40.7 %) of Kegel exercise group compared to most students (82.4%) of

Pelvic Rocking exercise. About half (51.9%) of participants in Kegel exercise group suffered dysmenorrhea as it hurt a lot before intervention which decreased to 48.1% after 4 weeks and to 12.0 % after 8 weeks compared to (45.4% & 22.2% & 21.3%) respectively in Pelvic Rocking exercise group, in favor of Kegel exercise group. Fr test: 75.038 < (0.001) & 29.374 (0.001) respectively. More than two - thirds (74.1 % & 75.9 %) respectively of participants in both groups had reported dysmenorrhea occurred for 1-2 days before intervention. However, after 4 weeks in Kegel exercise group percent increased to 88.9 %, then again after 8 weeks, it raised to 90.7 %. Whereas it increased slightly to 77.8% after 4 weeks and 80.6% after 8 weeks on Pelvic Rocking exercise group in favor to Kegel exercise group. After 4 weeks of applying both interventions, statistically significant differences were noticed ($p < 0.001$ & $p < 0.001$ & $p < 0.001$ & $p = 0.028$ respectively). Again, similar profile was observed after **8 weeks** ($p < 0.001$ & $p < 0.001$ & $p < 0.001$ & $p = 0.033$) respectively.

Table (IV): Illustrates that before intervention dysmenorrhea intensity was moderate among more than one - fifths (25.9% and 33.3%) of Kegel and pelvic Rocking exercise groups respectively and severe in about two - thirds (74.1 % and 66.7 %) respectively with no statistically significant difference ($P = 0.233$). Furthermore, after 4 weeks, symptoms became moderate in 58.3 % of Kegel exercise group compared to 61.1% of pelvic Rocking exercise group, at same time about one - quarter (27.8) % of Kegel exercise group reporting severe symptoms compared to 36.1% of pelvic Rocking exercise group. Meanwhile, 8 weeks after practicing Kegel exercise, dysmenorrhea intensity, became mild in slightly less than half (48.1%) and moderate in slightly more than one third (36.9%) of them and only 15.7% of those had severe symptoms, while dysmenorrhea intensity became mild in only 3.7 %, moderate in 74.1%, and severe in 22.2%

among pelvic Rocking exercise group, there were statistically significant at 4 and 8 weeks after interventions $p < 0.010$ and $p < 0.001$ (Fr 122.725 & 63.085) respectively.

Table (V) Displays no statistically significant difference was noticed between both groups regarding mean score in frequency of physical & emotional dysmenorrhea associative symptoms. After 4 weeks statistically significant differences were observed between both groups $p < 0.005$ except (vomiting, dizziness, concentration and diarrhea as well as physical activity) no statistically significant differences were detected $p = (1.000$ & 1.000 & 0.651 & 1.000 & 1.000). Whereas, After 8 weeks statistically significant differences were observed between both groups in favor to Kegel exercise group regarding frequency associative symptoms include (abdominal cramp, loss of appetite, back pain, concentration, work difficulty, social activity, stress and fun activity) $p (0.001$ & 0.024 & 0.024 & 0.001 & 0.024 & 0.024 & 0.044 & 0.024) respectively.

Table (VI) displays no statistically significant differences was observed between both groups before intervention regarding mean score intensity of physical & emotional associative symptoms. However, a statistically significant differences were observed after 4 weeks between Kegel and pelvic Rocking exercise groups $p < 0.005$ except the following (*abdominal* cramp, nausea, headache, dizziness, concentration, diarrhea and mood change) no statistically significant $p > 0.005$. After 8 weeks statistically significant differences were observed between two groups in favor of Kegel exercise group regarding intensity of all associative symptoms, except loss of appetite, concentration, and work difficulty had no statistically significant differences $p = (0.082$ & 0.652 & 0.317) respectively.

Table (VII) demonstrates that severity of associative symptoms was mild among (65.7 % and 58.3 %) of Kegel and Pelvic Rocking exercise groups respectively and moderate among one -third (33.3%) of Kegel group and 41.7 % of Pelvic Rocking

exercise group. No statistically significant difference was observed ($^{MC}p = 0.202$) before intervention. Meanwhile, 4 weeks after intervention, the symptoms became mild in the majority 95.4 % of Kegel group compared to 85.2% of Pelvic Rocking exercise group, and only 4.6 % of Kegel group compared to 14.8% of Pelvic Rocking exercise had moderate associative symptoms. Furthermore, 8 weeks after application of Kegel exercise symptoms became mild in all students in Kegel exercise group compared to 95.4% in Pelvic Rocking exercise group, statistically significant at 4 and 8 weeks ($p=0.012$ & $p=0.024$). Kegel exercises seemed to be more effective than Pelvic Rocking exercises in improving the dysmenorrhea associative symptoms. Mean \pm SD after 4 weeks (43.57 ± 11.06 & 49.59 ± 14.02) respectively. While after 8 weeks the Mean \pm SD (39.52 ± 7.90 & 45.69 ± 8.01) respectively. Also, Fr test was (150.373 & 115.536) respectively.

Table (VIII) Reveal, effect size of Kegel exercise was (0.486) mild in dysmenorrhea intensity and moderate (0.745) in associative symptoms. While Pelvic Rocking exercise was (0.250 Low & 0.522 Moderate).

Discussion

Adolescence includes physical and hormonal changes for young females. Dysmenorrhea is the most reported problem that has a major impact on Quality of life and academic performance (Paris et al., 2019). Non-pharmacological strategies as massage, dietary management, and Physical activity can be utilized to control dysmenorrhea (Foster & Al-Zubeidi, 2018). Kegel and pelvic rocking exercises are the most common used to assist young women to reinforce the pelvic muscles (Huang & Chang, 2022).

The findings of the present study revealed that primary dysmenorrhea intensity had significantly decreased among Kegel exercise group than Pelvic Rocking

exercise group as regards to (work ability, location, intensity and duration of pain) 8 weeks after applying Kegel exercise, intensity of dysmenorrhea continued to improve (Tables III, IV). These results attributed to the fact that Kegel exercise increased blood flow to pelvic floor muscles, that help to produce energy to increased speed of transmission of nerve impulses to decrease muscle tensions and relieve pain (Sandhiya et al., 2021). On other hand, the repetitive contraction in the stretching and pelvic floor muscles help in improvement of the return of venous blood, resulting in the increase of beta-endorphins that create pain killer (Huang & Chang, 2022). Furthermore exercise increases burn of chemicals discharged (prostaglandins) to decrease the contraction then less pain feelings (Pascoe et al., 2017).

The research results are consistent with Indian study done by Sharma and Augustina (2022) showed significant reduction in intensity and duration of dysmenorrhea among study group who practice exercise. Also it is supported with a study conducted at Indonesia by Christiana et al. (2019) that assessed effect of Kegel exercise against menstrual pain in female students, they found that half (46.7%) of the participants before the intervention complained of moderate menstrual pain while after application of intervention. more than one third had mild menstrual pain. In addition, it is relatively in line with a study conducted in Malaysia by Kaur et al. (2018) who revealed that two-month mixed-exercise includes Kegel, Swiss ball, running, stretching, and relaxation techniques had strong effect in decreasing the pain and suffering for women with dysmenorrhea. It also coincides with Karimi and Ghasemi (2014), their results had revealed that Kegel exercises improve dysmenorrhea severity and length more than stretching exercises.

On the other hand, the current finding contradicts with the finding of study done by Khan et al. (2022) that indicates using myofascial release was more effective than

pelvic floor exercise (Kegel, bridging , hold relax) in decreasing primary dysmenorrhea. The distinction may be due to different sample size (22 young female), long duration of application exercise 12 weeks. Also the finding in disharmony with a study performed at West Midlands of England conducted by **Blakey et al. (2010)** who reported that there no association between practice exercises and dysmenorrhea intensity, distinction between finding of this study and the present one may be due to different sample (654 university student), time and different measurements tool (visual analogue scale (VAS)).

The findings of present the study revealed improvements in mean scores of frequencies and intensity of associate symptoms among Kegel exercises group than pelvic Rocking exercises group, especially **in physiological symptoms as** abdominal cramp, Loss of appetite, back pain, other symptoms were same in two group as nausea, vomiting, leg pain, headache, dizziness diarrhea& physical activity. (Table VI & VII). This attributed to the fact that prostaglandins influence inflammatory response that cause pain fuluterine contractions, smooth muscle spasms, decreased absorption, and increased electrolyte release in the small bowel. Exercises increase cortisol level in the body which decrease the amount of prostaglandins secretion that decrease contraction and improve gastrointestinal symptoms(**Costa et al., 2019**).Furthermore ,Kegel exercise reduces muscular tension by stimulating of sympathetic and parasympathetic receptors, decreasing the demand of oxygen, lowering the concentration of substances like lactic acid, and releasing endorphins, this reaction can reduce pain and other symptoms (**He & Ye, 2020**) . This result is in accordance with a study done by **Seales et al. (2021)** that reported practicing light exercise as stretching or hard exercise as aerobic had effect on improving all of physiological menstrual symptoms. The finding is congruent with a study conducted by **Taiwo**

(**2021**)among African female students who reported practicing Kegel exercise improves associative menstrual symptoms. Also, the finding is supported by a systematic review by **Aboualsoltani et al. (2020)**. It includes articles from 2010 to 2019, which found exercise as one of the most effective non pharmacological treatment to improve the associated symptoms with primary dysmenorrhea. This result is consistent with the findings of **Brown and Brown (2017)** who mentioned that headache pain can be relieved more by Kegel exercise rather than other ones. Exercise can suppress many of physical responses that cause pain. Subjects breathe more deeply and take fewer breaths per minute while performing Kegel exercise that increase flow of oxygen to brain that seems to reduce headaches. While **frequency and Intensity of all emotional symptoms** were significant between two groups in favors to Kegel exercise group except mood change was same in two groups, p (1.000) (Table). This could be attributed to the fact that exercises increase release of endorphins, serotonin and dopamine, which they are all released during and after physical activity cause improve mood, self-esteem, and increase pleasure(**Venkatesh et al., 2020**). Also exercises increase cortisol and adrenaline which decrease feelings of stress and be calm **Cooney (2018)** finding is in harmony with a systematic review that found an emotional associated symptoms like anxiety, stress, and mood change could be reduced by practicing stretching exercise regularly as stretching exercise increases serum progesterone ,improve mood and reduce stress via neurotransmitter system(**Desai, 2022**). This result is in harmony with a study conducted at Iran by **Heidarimoghadam et al. (2019)** who reported that dysmenorrhea, emotional and physical associated symptoms decreased by training and aerobic exercise. Another study in harmony with study result done at Indonesia by (**Bustan & Seweng, 2018**) suggested abdominal stretching exercises for youthful ladies decrease intensity of emotional associated symptoms

of primary dysmenorrhea. **Inconsistent** with the study result **Nwaezuoke and Gbonjubola (2022)** assess aerobic exercise as a non-medicinal option in management of primary dysmenorrhea: A critical review ,they found both yogic postures and stretching exercises had same effect on dysmenorrhea associated symptoms with no one favor than others. Another study by **Cronk et al. (2021)** conducted at Turkey found that there is no relation between exercises and improvement of the associated pain symptoms in primary dysmenorrhea. However, the results of the current study are in consistence with a study done by **Sarhadi et al. (2015)**at Iran they reported that neither in morning nor in afternoon exercise have a different effect on dysmenorrhea, reasons for the disagreement between the current study and another investigation was the presence of various sample sizes of around 1033 females and the short duration of study of approximately 4 weeks. Another study disagrees with this study done by **Nejad et al. (2015)**. They reported that continuous exercise did not influence length and seriousness of dysmenorrhea associated symptoms. Contrast was likely due to diverse sorts of preparing and number of participant (15females) sorts of preparing.

Conclusion

Kegel and pelvic Rocking exercises have been proven to be effective, simple, inexpensive, and creative non - pharmacological nursing interventions that alleviate dysmenorrhea. The research hypothesis is accepted as the results revealed that Kegel exercise has a significant effect in reducing intensity of dysmenorrhea among adolescents’ girls. Also, it has a remarkable effect on physical and emotional associative symptoms as (vomiting, loss of appetite, back pain, leg pain, physical activity, work difficult, social activity, Stress and fun activity abdominal cramp, nausea, headache, dizziness, concentration, diarrhea and mood change) more than pelvic rocking exercise

Recommendations

- Kegel exercise should be advocated a non - pharmacological methods of primary dysmenorrhea management.
- Maternity nurses should encourage women to practice Kegel exercise to decrease primary dysmenorrhea.
- Kegel exercise technique should be practiced in schools and colleges for girls at regular basis.
- The study should be repeated in different sample, setting, measurement, and duration of intervention) to generalize the findings.

Table (I): Distribution of the studied groups according to their socio-demographic characteristics

Socio-demographic characteristics	Kegel Exercise (n = 108)		Pelvic rocking Exercise (n = 108)		Test of Sig.	P
	No.	%	No.	%		
Age (years)						
-16yrs	32	29.6	31	28.7	$\chi^2=4.782$	0.092
-17yrs	32	29.6	46	42.6		
-18yrs	44	40.7	31	28.7		
-Mean ± SD.	17.11 ± 0.84		17.11 ± 0.84		t=1.022	0.308
Academic year						
-First secondary year	14	13.0	16	14.8	$\chi^2=2.056$	0.358
-Second secondary year	52	48.1	60	55.6		
-Third secondary year	42	38.9	32	29.6		
Place of residence						
-Urban	67	62.0	67	62.0	$\chi^2=0.000$	1.000
-Rural	41	38.0	41	38.0		
Family income						
-Not enough	36	33.3	49	45.4	$\chi^2=3.278$	0.070
-Enough	72	66.7	59	54.6		

χ^2 :Chi square test t: Student t-test SD: Standard deviation
 p: p value for comparing between the studied groups *: Statistically significant at $p \leq 0.05$

Table (II): Distribution of the studied groups according to their menstrual history

Menstrual history	Kegel exercise group (n = 108)		Pelvic rocking exercise group (n = 108)		Test of sig.	P
	No.	%	No.	%		
Age of Menarche						
- 10 – <12 yrs.	15	13.9	21	19.4	$\chi^2=3.888$	0.143
- 12 – <14 yrs.	81	75.0	82	75.9		
- ≥14.	12	11.1	5	4.6		
- Mean ± SD.	12.39 ± 1.01		12.19 ± 0.82		t=1.623	0.106
Menstrual interval						
- From 21 to 35 days	108	100.	108	100.0	$\chi^2=1.005$	^{FE} p=1.000
Menstrual duration						
3–5 days	64	59.3	59	54.6	$\chi^2=2.557$	^{MC} p=0.550
From 6–7 days	44	40.7	49	45.4		

SD: Standard deviation t: Student t-test χ^2 :Chi square test MC: Monte Carlo FE: Fisher Exact
 p: p value for comparing between the studied groups *: Statistically significant at p ≤ 0.05

Table (III): Distribution of the studied groups according to WALIDD primary dysmenorrhea intensity scale

dysmenorrhea intensity	Before intervention				After 4 weeks				After 8 weeks			
	Kegel exercise group (n=108)		Pelvic Rocking excise group (n = 108)		Kegel exercise group (n = 108)		Pelvic Rocking excise group (n = 108)		Kegel exercise group (n = 108)		Pelvic Rocking excise group (n = 108)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Work ability												
- None	0	0.9	0	0.0	19	17.6	4	3.7	22	20.4	8	7.4
- Some times	10	9.2	6	5.6	14	13.0	13	12.0	35	32.4	11	10.2
- Usually	48	44.4	43	39.8	37	34.3	75	69.4	29	26.9	79	73.1
- Always	50	46.3	59	54.6	38	35.2	16	14.8	22	20.4	10	9.3
$\chi^2(p)$	2.550 (^{MC} p=0.492)				31.675* (<0.001*)				46.703* (<0.001*)			
Fr test among Kegel group (p0)	57.617* (<0.001*)											
Fr test among Rocking group(p0)	34.067* (<0.001*)											
Location												
None	0	0.0	0	0.0	20	18.5	3	2.8	47	43.5	7	6.5
One site	5	4.6	0	0.0	17	15.7	1	0.9	11	11.2	1	0.9
Two-three site	88	81.5	95	88.0	66	61.1	92	85.2	44	40.7	89	82.4
Four sites	15	13.9	13	12.0	5	4.7	12	11.1	6	4.6	11	10.2
$\chi^2(p)$	5.293 (^{MC} p=0.080)				33.948* (<0.001*)				54.659* (<0.001*)			
Fr test among Kegel group (p0)	83.902* (<0.001*)											
Fr test among Rocking group(p0)	6.250* (0.044*)											
Intensity of dysmenorrhea												
- Does not hurt	0	.00	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
- Hurts a little	7	6.5	10	9.3	24	22.2	28	25.9	62	57.4	27	25.0
- Hurts even more	45	41.7	49	45.4	32	29.6	56	51.9	33	30.6	58	53.7
- Hurts a whole lot more,	56	51.9	49	45.4	52	48.1	24	22.2	13	12.0	23	21.3
$\chi^2(p)$	2.554 (^{MC} p=0.449)				17.292* (<0.001*)				23.410* (<0.001*)			
Fr test among Kegel group (p0)	75.038* (<0.001*)											
Fr test among Rocking group(p0)	29.374* (<0.001*)											
Duration of dysmenorrhea												
- 0 days	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
- 1–2 days	80	74.1	82	75.9	96	88.9	84	77.8	98	90.7	87	80.6
- 3-4 days	28	25.9	26	24.1	12	11.1	24	22.2	10	9.3	21	19.4
$\chi^2(p)$	0.099 (^{FE} p=0.875)				4.800* (0.028*)				4.557* (0.033*)			
Fr test among Kegel group (p0)	15.784* (<0.001*)											
Fr test among Rocking group(p0)	0.844 (0.656)											

χ^2 :Chi square test MC: Monte Carlo Fr: Friedman test p: p value for comparing between the studied groups
 p0: p value for comparing between the studied periods in each other group *: Statistically significant at p ≤ 0.05

Table (IV): Distribution of the studied subjects according to their total score of dysmenorrhea intensity

Dysmenorrhea intensity	Before intervention				After 4 weeks				After 8 weeks			
	Kegel group (n=108)		Rocking group (n = 108)		Kegel group (n = 108)		Rocking group (n = 108)		Kegel group (n = 108)		Rocking group (n = 108)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Dysmenorrhea intensity												
- No dysmenorrhea	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
- Mild dysmenorrhea	0	0.0	0	0.0	15	13.9	3	2.8	52	48.1	4	3.7
- Moderate dysmenorrhea	28	25.9	36	33.3	63	58.3	66	61.1	39	36.1	80	74.1
- Severe dysmenorrhea	80	74.1	72	66.7	30	27.8	39	36.1	17	15.7	24	22.2
$\chi^2(p)$	1.421 (0.233)				9.244* (0.010*)				56.464* (<0.001*)			
Fr test / Kegel group (p0)	122.725* (<0.001*)											
Fr test / rocking group(p0)	63.085* (<0.001*)											

Fr: Friedman test MC: Monte Carlo χ^2 :Chi square test
 p: p value for comparing between the studied groups
 p0: p value for comparing between the studied periods in each other groups
 *: Statistically significant at p ≤ 0.05

Table (V): Mean distribution of studied groups according to frequency of their retrospective associative Symptoms

Frequency of Retrospective associative Symptoms	Before intervention		After 4 weeks		After 8 weeks	
	Kegel group (n=108)	Rocking group (n = 108)	Kegel group (n=108)	Rocking group (n = 108)	Kegel group (n = 108)	Rocking group (n = 108)
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Physiologic symptoms						
Abdominal cramp	2.59 ± 1.16	2.84 ± 1.20	2.15 ± 0.99	2.52 ± 0.86	1.81 ± 0.99	2.52 ± 0.89
U(p)	5038.50 (0.069)		4752.0* (0.004*)		3790.0* (<0.001*)	
Nausea	1.07 ± 1.18	1.24 ± 1.11	1.05 ± 0.21	1.15 ± 0.36	1.00 ± 0.00	1.03 ± 0.29
U(p)	5205.5(0.154)		5238.0* (0.012*)		5778.00 (0.562)	
Vomiting	0.27 ± 0.71	0.30 ± 0.53	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.02 ± 0.14
U(p)	5324.0 (0.118)		5832.00 (1.000)		5724.00 (0.156)	
Loss of appetite	1.31 ± 1.08	1.09 ± 0.91	0.19 ± 0.84	0.59 ± 1.43	0.00 ± 0.00	0.07 ± 0.38
U(p)	5269.0 (0.193)		5238.0* (0.012*)		5562.00* (0.024*)	
Headaches	0.92 ± 1.31	1.02 ± 1.18	0.19 ± 0.84	0.59 ± 1.43	0.00 ± 0.00	0.03 ± 0.17
U(p)	5326.00 (0.234)		5238.0* (0.012*)		5670.000 (0.082)	
Back pain	3.06 ± 0.73	3.24 ± 0.64	2.09 ± 0.42	2.30 ± 0.71	2.00 ± 0.00	2.06 ± 0.31
U(p)	5114.0 (0.061)		5238.0* (0.012*)		5562.000* (0.024*)	
Leg pain	2.81 ± 1.11	3.07 ± 0.94	2.09 ± 0.42	2.30 ± 0.71	2.00 ± 0.00	2.04 ± 0.36
U(p)	5049.0 (0.058)		5238.0* (0.012*)		5670.000 (0.176)	
Dizziness	0.34 ± 0.82	0.10 ± 0.30	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.10
U(p)	5291.00 (0.053)		5832.0 (1.000)		5778.00(0.317)	
Concentration	0.94 ± 0.86	0.81 ± 0.55	3.01 ± 1.07	3.07 ± 1.21	2.81 ± 0.99	3.35 ± 1.04
U(p)	5664.0 (0.669)		5649.0 (0.651)		4264.0* (<0.001*)	
Diarrhea	0.24 ± 0.76	0.31 ± 0.79	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.06 ± 0.41
U(p)	5524.0 (0.264)		5832.0 (1.000)		5724.0 (0.156)	
Physical activity	3.01 ± 0.69	3.11 ± 0.57	3.00 ± 0.00	3.00 ± 0.00	3.00 ± 0.00	3.00 ± 0.00
U(p)	5521.0 (0.371)		5832.0 (1.000)		5832.00 (1.000)	
Work difficult	3.16 ± 0.60	3.24 ± 0.59	1.14 ± 0.63	1.44 ± 1.07	1.00 ± 0.00	1.09 ± 0.42
U(p)	5432.50(0.288)		5238.0* (0.012*)		5562.00* (0.024*)	
Emotional symptoms						
Social activity	3.11 ± 0.88	3.24 ± 0.87	0.19 ± 0.84	0.59 ± 1.43	0.00 ± 0.00	0.15 ± 0.68
U(p)	5237.50(0.145)		5238.0* (0.012*)		5562.00* (0.024*)	
Stress	0.86 ± 1.26	0.84 ± 0.81	0.19 ± 0.84	0.59 ± 1.43	0.00 ± 0.00	0.04 ± 0.19
U(p)	5063.00 (0.069)		5238.0* (0.012*)		5616.00*(0.044*)	
Fun activity	2.73 ± 0.94	2.95 ± 0.85	1.14 ± 0.63	1.44 ± 1.07	1.00 ± 0.00	1.09 ± 0.44
U(p)	5107.0 (0.071)		5238.0* (0.012*)		5562.00* (0.024*)	
Mood change	1.45 ± 1.00	1.19 ± 0.69	0.95 ± 0.21	0.85 ± 0.36	1.00 ± 0.00	1.00 ± 0.14
U(p)	5060.00 (0.063)		5238.0* (0.012*)		5832.000 (1.000)	

p: p value for comparing between the studied groups *: Statistically significant at p ≤ 0.05

U: Mann Whitney test

Table (VI): Mean distribution of studied groups according to intensity of their retrospective Symptoms

Intensity of Retrospective associative Symptoms	Before intervention		After 4 weeks		After 8 weeks	
	Intensity		Intensity		Intensity	
	Kegel group (n = 108)	Rocking group (n = 108)	Kegel group (n = 108)	Rocking group (n = 108)	Kegel group (n = 108)	Rocking group (n = 108)
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Physiologic symptoms						
Abdominal cramp	3.18 ± 0.83	3.30 ± 0.95	2.48 ± 0.59	2.46 ± 0.74	2.41 ± 0.49	2.69 ± 0.56
U(p)	5041.50 (0.056)		5649.00 (0.651)		4092.0* (<0.001*)	
Nausea	1.34 ± 1.43	1.38 ± 1.27	2.00 ± 0.00	2.00 ± 0.00	2.00 ± 0.00	1.93 ± 0.35
U(p)	5566.0 (0.547)		5832.0 (1.000)		5562.0* (0.024*)	
Vomiting	0.32 ± 0.84	0.43 ± 0.79	0.05 ± 0.21	0.15 ± 0.36	0.00 ± 0.00	0.07 ± 0.38
U(p)	5239.00 (0.075)		5238.00* (0.012*)		5562.0* (0.024*)	
Loss of appetite	1.44 ± 1.19	1.33 ± 1.08	0.14 ± 0.63	0.44 ± 1.07	0.00 ± 0.00	0.03 ± 0.17
U(p)	5639.50 (0.660)		5238.00* (0.012*)		5670.000 (0.082)	
Headaches	0.94 ± 1.31	1.19 ± 1.35	3.10 ± 0.98	3.37 ± 0.85	2.81 ± 0.99	3.49 ± 0.87
U(p)	5013.00 (0.056)		5043.00 (0.051)		3856.0* (<0.001*)	
Back pain	3.46 ± 0.79	3.62 ± 0.69	2.72 ± 1.49	3.28 ± 1.29	2.22 ± 1.48	3.25 ± 1.31
U(p)	5123.00 (0.067)		4752.0* (0.004*)		3834.0* (<0.001*)	
Leg pain	3.50 ± 0.81	3.65 ± 0.73	3.15 ± 0.99	3.52 ± 0.86	2.81 ± 0.99	3.32 ± 1.11
U(p)	5133.00 (0.059)		4752.0* (0.004*)		4264.0* (<0.001*)	
Dizziness	0.39 ± 0.91	0.26 ± 0.60	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.04 ± 0.19
U(p)	5701.0 (0.691)		5832.00 (1.000)		5616.00* (0.044*)	
Concentration	0.98 ± 0.92	0.88 ± 0.64	2.00 ± 0.00	2.00 ± 0.00	2.00 ± 0.00	1.97 ± 0.40
U(p)	5759.50 (0.857)		5832.00 (1.000)		5778.00 (0.652)	
Diarrhea	0.42 ± 1.06	0.39 ± 0.84	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.16 ± 0.73
U(p)	5581.50 (0.429)		5832.00 (1.000)		5562.0* (0.024*)	
Physical activity	3.26 ± 0.79	3.36 ± 0.69	1.05 ± 0.21	1.15 ± 0.36	1.00 ± 0.00	1.11 ± 0.52
U(p)	5492.50 (0.411)		5238.00* (0.012*)		5562.0* (0.024*)	
Emotional symptoms						
Work difficult	3.52 ± 0.66	3.56 ± 0.63	2.62 ± 0.58	2.91 ± 0.62	2.41 ± 0.49	2.78 ± 0.48
U(p)	5637.00 (0.620)		4461.00* (0.001*)		5778.000 (0.317)	
Social activity	3.40 ± 0.86	3.59 ± 0.67	1.14 ± 0.63	1.44 ± 1.07	1.00 ± 0.00	1.01 ± 0.10
U(p)	5137.50 (0.078)		5238.00* (0.012*)		5562.0* (0.024*)	
Stress	1.57 ± 1.19	1.44 ± 1.31	0.19 ± 0.84	0.59 ± 1.43	0.00 ± 0.00	0.16 ± 0.74
U(p)	5237.0 (0.171)		5238.00* (0.012*)		4232.0* (<0.001*)	
Fun activity	3.17 ± 0.90	3.32 ± 0.96	2.62 ± 0.58	2.91 ± 0.62	2.41 ± 0.49	2.66 ± 0.58
U(p)	5089.50 (0.078)		4461.0* (0.001*)		3724.0* (<0.001*)	
Mood change	1.44 ± 2.68	1.01 ± 0.56	2.96 ± 1.18	2.93 ± 1.48	2.81 ± 0.99	4.89 ± 6.50
U(p)	5466.0 (0.372)		5649.0 (0.651)		3834.0* (<0.001*)	

U: Mann Whitney test p: p value for comparing between the studied groups
 *: Statistically significant at p ≤ 0.05

Table (VII): Distribution of the studied subjects according to their overall score Retrospective associative Symptoms

Retrospective Symptom	Before intervention				After 4 weeks				After 8 weeks			
	Kegel group (n=108)		Rocking group (n = 108)		Kegel group (n = 108)		Rocking group (n = 108)		Kegel group (n = 108)		Rocking group (n = 108)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
- None associative symptoms	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
- Mild associative symptoms	71	65.7	63	58.3	103	95.4	92	85.2	108	100.0	103	95.4
- Moderate associative symptoms	36	33.3	45	41.7	5	4.6	16	14.8	0	0.0	5	4.6
- Sever associative symptoms	1	0.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
χ ² (p)	3.589 (MC p=0.202)				6.382* (0.012*)				5.118* (0.024*)			
Fr test among Kegel group (p ₀)	57.670* (<0.001*)											
Fr test among rocking group(p ₀)	59.581* (<0.001*)											
Min. – Max.	27.0 – 109.0		37.0 – 91.0		33.0 – 79.0		33.0 – 79.0		33.0 - 49.0		33.0 – 64.0	
Mean ± SD.	60.20 ±11.27		61.33 ± 9.01		43.57 ±11.06		49.59 ±14.02		39.52 ± 7.90		45.69 ± 8.01	
Median	58.0		62.0		49.0		49.0		33.0		49.0	
U (p)	5092.500 (0.107)				4461.0* (0.001*)				3724.0* (<0.001*)			
Fr test among Kegel group (p ₀)	150.373* (<0.001*)											
Fr test among rocking group(p ₀)	115.536* (<0.001*)											

Fr: Friedman test U: Mann Whitney test SD: Standard deviation
 FE: Fisher Exact MC: Monte Carlo χ²: Chi square test
 p: p value for comparing between the studied groups *: Statistically significant at p ≤ 0.05

Table (VIII): Effect size for overall Retrospective Symptom and Dysmenorrhea intensity

	Kegel group(n=108)			Rocking group (n = 108)		
	Before intervention	After 4 weeks	After 8 weeks	Before intervention	After 4 weeks	After 8 weeks
Dysmenorrhea intensity						
Min. – Max.	5.0 – 11.0	2.0 – 10.0	2.0 – 10.0	5.0 – 11.0	2.00 - 9.0	3.0 – 10.0
Mean ± SD.	8.24 ± 1.26	6.76±1.90	5.19 ± 2.57	8.21 ± 1.14	7.29 ± 1.23	7.10 ± 1.30
Median	8.0	7.0	6.0	8.0	7.0	7.0
Effect size	0.486 (Mild)			0.250 (Low)		
Retrospective Symptom						
Min. – Max.	27.0 – 109.0	33.0 – 79.0	33.0 - 49.0	37.0 – 91.0	33.0 – 79.0	33.0 – 64.0
Mean ± SD.	60.20 ±11.27	43.57 ±11.06	39.52 ± 7.90	61.33 ± 9.01	49.59 ±14.02	45.69 ± 8.01
Median	58.0	49.0	33.0	62.0	49.0	49.0
Effect size	0.745 (moderate)			0.522(moderate)		

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