

Pain improvement in women with primary dysmenorrhea treated with Pilates*

Diminuição da dor em mulheres com dismenorreia primária, tratadas pelo método Pilates

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SUMMARY

BACKGROUND AND OBJECTIVES: Dysmenorrhea is a set of painful manifestations appearing the day before or during the first menstrual cycle day. Pilates is a series of exercises based on progressive movements the body is able to perform. This study aimed at comparing pain in women with primary dysmenorrhea before and after being submitted to Pilates.

METHOD: This is a descriptive, experimental study with longitudinal characteristic and quantitative approach. A clinical evaluation was performed in 10 Physical Therapy students, Center of Unified Teaching, Teresina (CEUT), aged between 18 and 30 years, with primary dysmenorrhea, who were submitted to a protocol of 16 Pilates floor and ball exercises aimed at the pelvic region. Pain intensity was evaluated by the visual analog scale and pain characteristics were evaluated by the McGill questionnaire.

RESULTS: Mean pain value during menstrual cycle before treatment was 7.89 ± 1.96 , and after treatment it was 2.56 ± 0.56 ($p < 0.001$). McGill questionnaire has shown significant improvement of all pain components after treatment: sensory ($p < 0.001$), affective ($p < 0.005$), evaluative ($p < 0.001$) and miscellaneous ($p < 0.001$).

CONCLUSION: Pilates, as physical activity practice, has provided improvement of symptoms associated to primary dysmenorrhea, positively interfering with decreasing pain and representing a promising non-pharmacological alternative.

Keywords: Dysmenorrhea, Pain evaluation Physical therapy.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dismenorreia corresponde a um conjunto de manifestações de caráter doloroso que aparecem no dia anterior ou no primeiro dia de fluxo menstrual. O método Pilates, compreende uma série de exercícios baseados nos movimentos progressivos que o corpo é capaz de executar. O presente estudo teve como objetivo comparar a dor em mulheres com dismenorreia primária antes e após serem submetidas ao método Pilates.

MÉTODO: Trata-se de um estudo descritivo, experimental, com característica longitudinal e abordagem quantitativa. Foi realizada avaliação clínica em 10 acadêmicas do curso de Fisioterapia do Centro de Ensino Unificado de Teresina (CEUT), com faixa etária entre 18 e 30 anos, com dismenorreia primária, que a seguir foram submetidas a um protocolo de 16 exercícios, de solo e bola, voltados para a região pélvica, baseados no método Pilates. A intensidade da dor foi avaliada pela escala analógica visual e as características da dor pelo questionário de McGill.

RESULTADOS: O valor médio da dor no período menstrual antes do tratamento foi de $7,89 \pm 1,96$ e após o tratamento de $2,56 \pm 0,56$ ($p < 0,001$). Pelo questionário de McGill observa-se que houve diminuição significativa em todos os componentes da dor antes e depois do tratamento: sensorial ($p < 0,001$), afetivo ($p < 0,05$), avaliativo ($p < 0,001$) e miscelânea ($p < 0,001$).

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CONCLUSÃO: O método Pilates como prática de atividade física, proporcionou melhora dos sintomas associados à dismenorrea primária, interferindo de forma positiva na redução da dor das pacientes, mostrando-se alternativa não medicamentosa promissora.

Descritores: Avaliação da dor, Dismenorrea, Fisioterapia.

INTRODUCTION

Primary dysmenorrhea is a gynecological disorder also known as menalgia, which is characterized by lower abdominal pain which may irradiate to thighs and top and bottom of the spine. It is commonly associated with nausea, headache, fatigue and diarrhea¹. Pain usually starts the day before or in the first menstrual cycle day and disappears at the end of menstruation².

This disease affects 60% of females, with systemic symptoms such as headache (60%), low back pain, nausea and vomiting (80%), diarrhea (50%), irritability (30%) and adynamia (45%), among others^{1,2}.

Several approaches have been proposed for dysmenorrhea, including non-steroid anti-inflammatory drugs, oral contraceptives, vitamins, tocolytic agents and acupuncture, among others³. One approach involves physical activities because it is believed that they improve pelvic and extra pelvic organs functioning by adjusting metabolism, hydroelectric balance, hemodynamic conditions and blood flow, which promote the phenomenon called analgesia by physical exercises, through endogenous mechanisms and endogenous opioids release which increased pain threshold^{3,4}.

Joseph Humbertus Pilates has developed a series of exercises based on progressive movements the body is able to make, currently called Pilates. Pilates is a dynamic technique aiming at working strength, stretching and flexibility, concerned with maintaining physiological body curves with the abdomen as the strength center, which constantly works during all Pilates exercises. The literature also points as advantages circulation stimulation and fitness improvement, which help prevent injuries and provide pain relief, with excellent results^{5,6}.

This is why we were interested in evaluating such method as a non-pharmacological resource to treat pain in females with primary dysmenorrhea.

METHOD

This is a descriptive, experimental study with longitudinal characteristic and quantitative approach. All ethic

aspects were respected, taking into consideration resolution 196/96 of the National Health Council, which regulates research involving humans.

Participants were oriented and informed about the purpose of the research and were invited to sign a Free and Informed Consent Term. Participants' anonymity was assured.

The study was carried out from September to October 2011 in the physical therapy laboratory III, CEUT, due to easy access and to resources used throughout the treatment.

A convenience sample was selected with 10 CEUT physical therapy students with primary dysmenorrhea, aged from 18 to 30 years.

Exclusion criteria were: being under drug or physical therapy treatment, having child, smoking, having gynecological diseases, pelvic disease, not attending to two consecutive sessions without justification and performing other type of physical activity such as fitness center, swimming and boxing, among others.

Initially, participants answered the International Physical Activity Questionnaire (IPAQ), to evaluate the level of physical activity. Participants were classified as sedentary, when not performing any physical activity for at least 30 continuous minutes per week, and insufficiently active, when performing moderate physical activity at least three times a week with minimum duration of 50 minutes.

Participants were evaluated by the Specific Dysmenorrhea Evaluation card, which considers general symptoms and physiological changes during the menstrual cycle. Next, they quantified their pain during menstrual crises through the visual analog scale (VAS) and McGill Pain Questionnaire adapted to the Portuguese language, which is a very popular tool to evaluate other pain characteristics in addition to intensity.

Since breathing is critical in all exercises, from the simplest to the most complex, participants were oriented to do diaphragmatic breathing, synchronously inhaling and exhaling at each posture^{7,8}.

They all attended a session before treatment to better understand techniques, postures and breathing to be correctly used, with a total of 16 ground exercises and with Swiss Ball, involving the pelvic region since pelvic movements improve blood flow in this region as well as they massage internal organs⁹. Frequency was twice a week with 15 repetitions of each exercise, in a total of 10 sessions lasting 60 minutes.

Participants were oriented to wear comfortable clothes to prevent compressing and/or impairing circulation, in addition to avoid watches or bracelets to prevent skin injuries.

Participants were re-evaluated at treatment completion by the same initial evaluation criteria, to compare pre and post-treatment data.

The SSPSS® program, version 18.0 for Windows was used for data processing and statistical analysis. Shapiro-Wilk test was used to evaluate normality. Student's *t* test was used to compare differences among means, and Pearson's correlation test was used to analyze the correlation among variables, being considered significant $p < 0.05$ (95%).

The study was approved by the Ethics and Research Committee, Center of Unified Teaching, Teresina (CEUT), under protocol number 7106/2011.

RESULTS

Sixty percent of participants were classified as sedentary and 40% were classified as insufficiently active according to IPAQ. Mean age was 20.3 ± 2.06 years with median of 20.5, mean body mass index (BMI) was $20.84 \pm 45 \text{ kg/m}^2$ with median of 21.4.

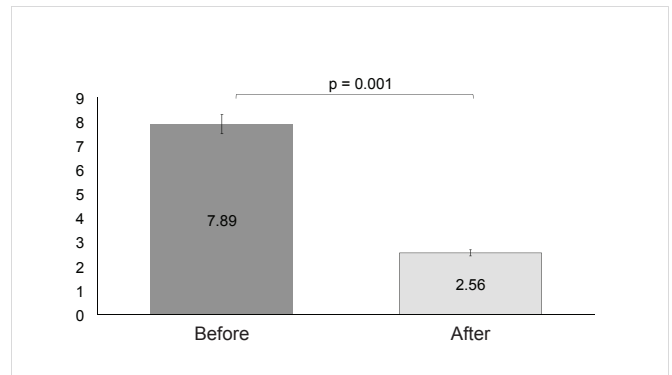
Graph 1 shows mean pain intensity values according to VAS. Menstrual cycle pain before treatment was 7.89 ± 1.96 and after treatment it was 2.56 ± 0.56 with $p < 0.001$, showing significant difference before and after treatment with Pilates.

According to McGill Pain questionnaire, there has been significant decrease in all pain components when values before and after treatment were compared: sensory ($p < 0.001$), affective ($p < 0.05$), evaluative ($p < 0.001$) and miscellaneous ($p < 0.001$) (Graph 2).

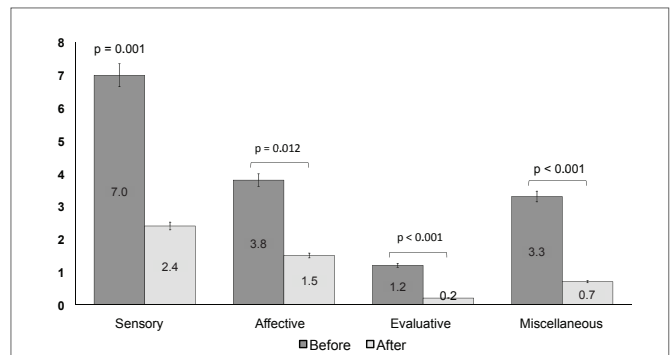
There has been no correlation between age and anthropometric variables and pain intensity before and after treatment, reported by participants of this study (Table 1).

DISCUSSION

The two pain evaluation tools of this research have



Graph 1 – Mean pain intensity reported by patients before and after Pilates treatment.



Graph 2 – Mean pain comparison according to McGill questionnaire components reported by participants before and after treatment.

shown significant pain intensity decrease reported by participants of Pilates. There has been decrease because exercises increase blood flow, correct muscle and postural unbalances and recover body and mind vitality, thus contributing to pain decrease⁹.

In our protocol, most exercises were performed lying down since this position decreases body support joints impact, especially the spine, allowing the recovery of muscle, joint and ligament structures, especially in

Table 1 – Pearson's correlation between pain intensity (VAS) and age, weight, height and body mass index of participants.

Variables	Pain Before		Pain After	
	r	p*	r	p*
Age (years)	-0.079	0.829	0.201	0.605
Weight (kg)	-0.146	0.687	0.163	0.675
Body mass index (kg/m ²)	-0.100	0.783	0.035	0.928
Body mass index (kg/m ²)	-0.131	0.718	0.175	0.635

* $p > 0.05$: non significant correlation; $r < 0.30$: poor.

lumbar and sacral regions, because such movements provide more pelvic flexibility, decreasing pain and allowing people from different age groups to benefit from the method⁶.

In our study, sessions lasted 60 minutes twice a week, due to participants' availability. There is a consensus among studies that each session should last 60 minutes and that all method principles should be followed when applied as rehabilitation. However, there is still no definition of the time needed to reach the objectives proposed by the treatment, or of the frequency of application, being that most studies recommend that the method should be applied three times a week¹⁰.

It is believed that this decrease was possible because this practice promotes metabolism, hydroelectric balance and hemodynamic conditions adjustment, improving pelvic blood flow¹¹.

Studies have reported that Pilates applied to females with low back pain has decreased pain levels, improving daily life activities quality and showing that future studies may be important to prove the influence of Pilates on flexibility, respiratory capacity and psychoemotional aspects¹².

A study with 100 females with low back pain and practicing systematic physical activity has observed that 26% of them had no change but even so they continued practicing physical activity; symptoms have improved or disappeared in 74% while they remained assiduous practitioners of physical activities, which is in line with our results¹³.

A different study with Pilates has shown that during six months there has been considerable of low back pain patients improvement; most part of this analgesia was obtained with just one month of program¹³.

The use of two pain evaluation tools in this study (VAS and McGill) helped determining the similarity of data obtained in each phase, increasing the reliability of results.

Most study results are similar to those obtained in our study with Pilates, which would improve pelvic blood flow, decreasing muscle stresses, providing the stretching of all involved structures with consequent pain relief^{12,13}.

This phenomenon is called exercise-induced analgesia, that is, during the treatment with Pilates, these patients may have increased their pain threshold due to the adjustment of endogenous pain control mechanisms. The body would start to secrete more neurotransmitters, such as norepinephrine, serotonin, enkephalins and dopamine, which would act to inhibit and control pain¹⁴.

Another possible justification for this phenomenon would be the action of endogenous opioids, being that the most important opioid for this effect is endorphin, which would increase tolerance to pain and decrease anxiety and tension, among others¹².

Our results confirm other findings already reported by the literature which state that physical exercises may be used as non-pharmacological treatment to decrease pain. However, further studies aimed at this subject should be encouraged, with a larger sample, to confirm the results or our study.

CONCLUSION

Our study data allowed concluding that Pilates as physical activity has improved symptoms associated to primary dysmenorrhea, decreasing pain and showing to be a promising non-pharmacological alternative.

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