Journal of
Controversies in Obstetrics & Gynecology and Pediatrics

Original Article

DOI:10.51271/JCOGP-0030

The consequence of 12 weeks of pilates exercise on the quality of sleep and life of pregnant women

Nurgül Ulusoy[1], Ayşe Şeyma Küçükakça[2]

[1] Private Gynecology and Obstetric Clinic, İstanbul, Turkiye
[2] Department of Gynecology and Obstetric, İstanbul Medipol University Çamlıca Hospital, İstanbul, Turkiye

Cite this article: Ulusoy N, Küçükkaya A.The consequence of 12 weeks of pilates exercise on the qualityoff sleep andlife of pregnant women. *J Controv Obstetr Gynecol Ped*. 2024;2(2):29-33.

Corresponding Author: Nurgül Ulusoy, nculusoy17@gmail.com

Received: 11/03/2024 ◆ **Accepted**: 31/03/2024 ◆ **Published**: 29/04/2024

ABSTRACT

Aims: As one of the most critical periods in women's lives, pregnancy affects their physical, mental, and functional conditions. These changes can affect the quality of life and sleep of pregnant women. The main purpose of this study is to investigate the effect of pilates exercises on 150 young pregnant women between the ages of 20-40.

Methods: This randomized double-blind clinical trial study was done between September 2023 and March 2024, including 60 pregnant women in case group and 90 control subjects of similar age and body mass index (BMI). This study investigated the effect of 12 weeks of pilates exercises on the quality of women's sleep and life. Quality of life was measured by the short-form 36 (SF-36) and quality of sleep by the Pittsburgh Sleep Quality Index (PSQI). People were randomly divided into intervention and control groups. Pregnant women in the intervention group were required to participate in two pilates sessions per week for 12 weeks from the 20th week of pregnancy.

Results: Our results found that quality of life levels were statistically significant higher than case group after intervention compared to control group (p<0.05; 67.19 vs. 54.94). Also, a statistically significant association between the case and control regarding quality of sleep (p<0.05; 5.41 vs. 6.77).

Conclusion: It is concluded that performing moderate-intensity pilates exercises for 12 weeks in the last months of pregnancy can increase sleep quality and life.

Keywords: Pregnant women, pilates, sleep quality, quality of life, women's life

INTRODUCTION

Pregnancy is one of the most essential stages of a women's life and is associated with fundamental lifestyle change.[1] Physiological, anatomical, and biochemical changes in pregnant women cause stress and decrease their quality of life (QoL).[2] According to studies, discomfort and problems during pregnancy reduce a woman's ability to perform daily roles in life and cause many changes in people's physical, mental, and social issues, all of which can disrupt the QoL of pregnant women.[1]

The quality of sleep has a significant impact on the QoL and is one of the main foundations of health.[3] Sleep in pregnant women is generally disrupted as a consequence of numerous factors.[4] Sleep problems is one of the most prevalent complaints during pregnancy.[5] The most common type of sleep disorder in pregnancy is insomnia. Most sleep disorders during pregnancy are experienced by expectant mothers in the third trimester and closer to the end of pregnancy. Insomnia, with changes in a women's immune system, such as changes in the level of C-reactive protein and cytokines, can have adverse consequences such as premature birth, reduced pain tolerance, blood pressure disorders, mental health problems, low birth weight, glucose tolerance disorders and depression during pregnancy and postpartum are related.[6,7]

Despite the apparent reduction of sleep quality in pregnancy, the mechanisms and solutions to this problem are still unknown. Sleeping pills are the first recommended treatment for chronic insomnia, which has severe side effects for pregnant women. Therefore, complementary and alternative therapies such as acupressure, acupuncture, aromatherapy, reflexology, and exercise have been followed in many studies.[8]

QoL includes different aspects of health and physical, mental, and social comfort of people. Each dimension of quality of life has two subjective and objective elements that can be measured. Moderate physical activity can improve a person's QoL by affecting physical and mental health. Regarding the necessity of physical activity in women with uncomplicated pregnancies, the American College of Obstetricians and Gynecologists (ACOG) recommends exercising at moderate intensity for 20-30 minutes a day during pregnancy on most or all days of the week.[9] Pilates exercise is a prevalent physical activity preferred by pregnant women.[10] ACOG recommends modified pilates during pregnancy.[11] By saving and increasing the energy level, pilates improves the body's strength, stability, and flexibility and is beneficial in musculoskeletal pain, stress and fatigue reduction, creating relaxation, and curing sleep health.[12,13]

Despite the many advantages of pilates and suggestions for doing this exercise during pregnancy, its benefits are still debated, and more relevant research is needed. Considering the existing uncertainties about the effect of pilates on the quality of sleep and life of pregnant women, the present study was conducted to investigate the effect of pilates on the outcomes expressed in pregnant women.

METHODS

This randomized double-blind clinical trial was conducted on patients between September 2023 and March 2024. Local ethics committee approval was obtained from İstanbul Medipol University Non-invasive Clinical Researches Ethics Committee (Date: 12.10.2023 Decision No: 839). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

The study did not include women with a ban on exercise during pregnancy. Women who had chronic diseases, multiple pregnancies and were not between 20-40 years old were also excluded from the study.

Pilates exercises for the case group started from the 20th week of pregnancy. At the beginning of the research gestational age was determined through ultrasound. Exercises were performed in the gym under the supervision of a certified pilates instructor and based on safe pilates exercises (modified plank, banana leg, and modified roll-up) during pregnancy. The intervention was conducted with moderate intensity for 12 weeks and twice a week. Each pilates training session, including 8-10 strength exercises, was done for 30 minutes. The trainer controlled the research participants' attendance list to ensure the exercises' regularity. The women of the case group were followed up regularly through phone calls every week. Women in the control group also received usual care.

This study's data collection tools included a demographic profile questionnaire, the Pittsburgh Sleep Quality Index (PSQI), and short-form 36 (SF-36) questionnaire.[14,15] To investigate the effect of pilates exercise, sleep quality and life quality questionnaires were completed by women in both case and control groups. PSQI is an international standard instrument validated in several studies. The reliability and validity of the Turkish version of this questionnaire were checked and confirmed.[16] The total score of this index is between 0-21, and the total score is greater than 6, showing the inappropriateness of sleep quality.

The quality of life index SF-36 is also an international standard instrument whose Turkish version validated in previous study.[17] This questionnaire consists of 8 sections, which include physical function (10 items), physical pain (2 items), social function (2 items), mental health (5 items), general health (5 items), vitality (4 items), physical problems (4 items) and mental problems (3 items) and includes 36 questions in total. Therefore, the mentioned questionnaire tries to express a comprehensive assessment of the individual's current health status to the researcher by examining the individual's health status in 8 dimensions. The total score of this index is between 0-100.

Statistical Analysis

The study used mean (M) and standard deviation (SD) to report the descriptive statistics of data. The categorical variables described by number and percent and analyzing by Chi-Squared test. To compare the data between groups, the Independent t-test was employed, which is appropriate for normal distributions. SPSS software (version 21.0, SSPS Inc., Chicago, IL, USA) was employed for statistical analysis. The threshold for statistical significance was set at a p-value of less than 0.05.

RESULTS

This study included one hundred fifty age-matched (25.11±4.24) and body mass index (BMI) matched (26.21±3.42) women. Table 1 shows a comparison of demographic parameters between case and control groups. Demographic characteristics including age, BMI, women's occupation, use of pregnancy supplements, history of previous pregnancy and history of regular exercise were compared.

Table 1. A comparison of demographic parameters between case and control groups (n=150)

Demographic parameters	Case (n=60) M±SD n(%)		Control (n=90) M±SD n(%)	p-value
Age	25.36±4.94		24.90±4.11	0.814
BMI	26.45±3.87		26.01±3.45	0.645
Women's occupation	Housewife	39 (65)	50 (62.5)	0.971
	Employee	12 (20)	17 (21.1)	
	Student	9 (15)	13 (16.25)	
BMI	Underweight (<18)	7 (11.7)	10 (12.5)	0.940
	Healthy weight (18-25)	20 (33.3)	25 (31.25)	
	Over weight (25-30)	21 (35)	27 (33.75)	
	Obesity (>30)	12 (20)	17 (21.25)	
Use of pregnancy supplements	Yes	51 (85)	72 (90)	0.094
	No	9 (15)	8 (10)	
History of previous pregnancy	Yes	27 (45)	34 (42.5)	0.146
	No	33 (55)	46 (57.5)	
History of regular exercise	Yes	22 (36.7)	32 (40)	0.104
	No	38 (63.3)	38 (60)	

BMI: Body mass index

There was not a statistically significant between the case and control regarding women's occupation (p>0.05). There was not a statistically significant between the case and control regarding use of pregnancy supplements, history of previous pregnancy, and history of regular exercise (p>0.05).

Table 2 shows comparison PSQI and SF-36 scores between case and control groups in detail. As stated in the table above, an Independent t-test did not find a statistically significant association between case and control in terms of PSQI score in pre-intervention (p>0.05). The PSQI score was similar for case and control groups (6.21 vs. 6.38). There was a statistically significant association was observed between the case and control regarding PSQI score in post-intervention (p<0.05). Women after pilates exercise had significantly higher sleep quality than controls (5.41 vs. 6.77). In Table 2, the comparison and examination of the sleep quality score separately before and after the intervention in each case and control group shows that the average sleep quality score before the intervention was insignificant between the control and intervention groups. However, after the intervention, the average sleep quality score of the case group was significantly lower than the score of the control group, and considering that in the PSQI, the total score is greater than six and shows the inappropriateness of the sleep quality, so it concluded that the case group experienced better sleep quality than the control group.

As stated in Table 2, a statistically significant association was observed between the case and control regarding the SF-36 score in post-intervention (p<0.05). The case group had significantly higher quality of life score than controls after the pilates exercise (67.19 vs. 54.94). There was not a statistically significant association was observed between the case and control regarding SF-36 score in pre-intervention (p<0.05). Figure shows a comparison of PSQI and SF-36 scores between case and control groups.

Table 2. A comparison PSQI and SF-36 scores between case and control groups (n=150)

Comparison criteria		Case (n=60) M±SD	Control (n=90) M±SD	p-value
PSQI	Pre-intervention	6.21±0.94	6.38±21.35	0.68
	Post-intervention	5.41±1.14	6.77±1.09	0.005
SF-36	Pre-intervention	54.94±4.11	55.65±5.93	0.7
	Post-intervention	67.19±5.15	54.94±7.45	<0.001

PSQI: Pittsburgh Sleep Quality Index, SF-36: short-form-36

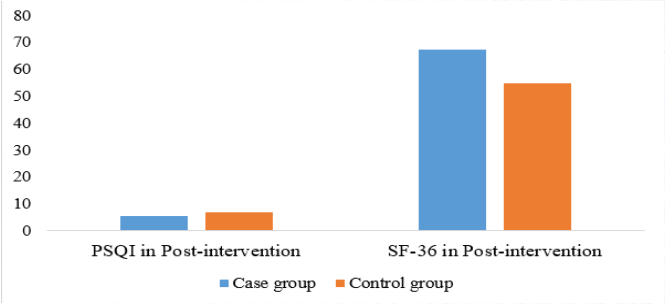

Figure. A comparison of PSQI and SF-36 scores between case and control groups

DISCUSSION

The present study, conducted to measure Pilates' effect on the quality of sleep and life of pregnant women between the ages of 18-30, showed that regular Pilates exercise during the last months of pregnancy increases the quality of sleep and life in pregnant women. Meanwhile, in the present study, sleep quality decreased with the progress of pregnancy in the control group, and the quality of life remained unchanged.

Scholars have recently highlighted the significance of exercise for pregnant women.[18] Our results were comparable to those of prior investigations that reported the positive impact of physical activities on pregnant women's QoL and mental health.[19,20] The details of physical activities and their positive impact are still essential and debatable topics among researchers. Liu et al.[21] showed that group-based aerobic or resistance exercises increase the positive effects of these exercises on pregnant women's QoL.

Ferraz et al.[22] in a systematic review and meta-analysis, reviewed articles to evaluate the effect of pilates on the QoL of pregnant women. Based on the findings of this study, pilates exercises increase the QoL in pregnant women by reducing low-back pain. Mazzarino et al.[23] reported regular pilates exercises to increase the QoL of low-risk pregnant women. They showed that this type of exercise is feasible for pregnant women and have small benefits for QoL, pain, and mobility. The results were consistent with the present study. Contrary to the results of the present study, Gustafsson et al.[24] showed that performing sports exercises for 24 sessions at home did not improve pregnant women's QoL. In this study, unlike the current study, sports training did not improve the quality of life. The lack of alignment in the results of these studies can be due to the difference in sports training, intervention time, and lifestyle of the investigated community.

Azward et al.[25] indicated the positive effect of yoga on improving sleep quality in the third trimester in pregnant women. Kocsis et al.[26] showed the positive effect of gymnastics on the sleep quality of pregnant women during a designed 10-week exercise program. McCarthy et al.[27] in a systematic review and meta-analysis, showed that different types of exercise during pregnancy improve sleep quality during pregnancy. Although the exercise type differed in these studies, the results were consistent with the present study. Hyun et al.[28] reported that eight weeks of home-based tele-pilates exercise (50 min/day and twice a week) relieves pelvic and back pain and increases sleep quality during pregnancy. et al.[29] suggested clinical Pilates exercises, including 18 positions, as a safe and effective method for reducing pain, disability and sleep problems in pregnant women. Insomnia in pregnant women is annoying, especially in the final months, and because the exact cause is unknown, regular Pilates exercises can be used for its treatment.

The main contribution of this study is to increase the quality of sleep and life in pregnant women. Reducing the quality of sleep and life is one of the most common problems in this period. The importance of physical activity during pregnancy is clear, but the details related to the number of exercises and their intensity should be considered more in research. This study investigated the effect of regular pilates exercises on pregnant women and reported its effects.

The size of the present study could be larger, and it is recommended to repeat the present study with a more significant number of participants in future studies.

There are few studies on regular pilates practice to improve quality of life and treat insomnia. In the discussion section, the results of the present study were compared with a limited number of related studies. It is recommended to conduct more research on specific groups of pregnant women in future studies to examine the pilates exercises. Researching the effect of regular pilates exercises on women with older age and higher BMI can reveal the possible risks of these exercises on women.

CONCLUSION

In view of the fact that the positive effects of Pilates exercises on the QoL and sleep reported in this study, it is possible to suggest pilates during pregnancy to pregnant women. Insomnia and reduced quality of life in pregnant women profoundly affect them, and providing solutions without negative effects can be helpful. There is a need for more research on the subject with larger sample size.

ETHICAL DECLARATIONS

Ethics Committee Approval

This study was approved by İstanbul Medipol University Non-invasive Clinical Researches Ethics Committee (Date: 12.10.2023 Decision No: 839).

Informed Consent

All patients signed the free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Boutib A, Chergaoui S, Marfak A, Hilali A, Youlyouz-Marfak I. Quality of Life during pregnancy from 2011 to 2021: systematic review. *Int J Womens Health*. 2022;14:975-1005. doi: 10.2147/IJWH.S361643
2. Gürbüz T, Güngör ND, Okçu NT, Yurci A. Effects of contraception methods on female sexual function and quality of life. *J Surg Med*. 2020;4(12):1231-1235. doi: 10.28982/josam.830293
3. Acikgoz A, Acikgoz B, Acikgoz O. The effect of internet addiction and smartphone addiction on sleep quality among Turkish adolescents. *PeerJ*. 2022;10:e12876. doi: 10.7717/peerj.12876
4. Meers JM, Nowakowski S. Sleep during pregnancy. *Curr Psychiatry Rep*. 2022;24(8):353-357. doi: 10.1007/s11920-022-01343-2
5. Jomeen J, Martin CR. The impact of choice of maternity care on psychological health outcomes for women during pregnancy and the postnatal period. *J Eval Clin Pract*. 2008;14(3):391-398. doi: 10.1111/j.1365-2753.2007.00878.x
6. Kadıoğlu N, Sert UY, Sariaslan SG, Mursel K, Celen S. Sleep disorders in pregnancy, influencing factors and quality of life. *Z Geburtshilfe Neonatol*. 2022;226(1):34-40. doi: 10.1055/a-1519-7517
7. Williams MA, Miller RS, Qiu C, Cripe SM, Gelaye B, Enquobahrie D. Associations of early pregnancy sleep duration with trimester-specific blood pressures and hypertensive disorders in pregnancy. *Sleep*. 2010;33(10):1363-1371. doi: 10.1093/sleep/33.10.1363
8. Morin CM, Benca R. Chronic insomnia. *Lancet*. 2012;379(9821):1129-1141. doi: 10.1016/S0140-6736(11)60750-2
9. da Silva SG, Hallal PC, Domingues MR, et al. A randomized controlled trial of exercise during pregnancy on maternal and neonatal outcomes: results from the PAMELA study. *Int J Behav Nutr Phys Act*. 2017;14(1):175. doi: 10.1186/s12966-017-0632-6
10. Wardle J. The Australian government review of natural therapies for private health insurance rebates: what does it say and what does it mean? *Advanc Integrat Med*. 2016;3(1):3-10. doi: 10.1016/j.aimed.2016.07.004.
11. Laitinen L, Nurmi M, Rautava P, Koivisto M, Polo-Kantola P. Sleep quality in women with nausea and vomiting of pregnancy: a cross-sectional study. *BMC Pregnancy Childbirth*. 2021;21(1):152. doi: 10.1186/s12884-021-03639-2
12. Giacomini MB, da Silva AM, Weber LM, Monteiro MB. The pilates method increases respiratory muscle strength and performance as well as abdominal muscle thickness. *J Bodyw Mov Ther*. 2016;20(2):258-264. doi: 10.1016/j.jbmt.2015.11.003
13. Abasıyanık Z, Yiğit P, Özdoğar AT, Kahraman T, Ertekin Ö, Özakbaş S. A comparative study of the effects of yoga and clinical pilates training on walking, cognition, respiratory functions, and quality of life in persons with multiple sclerosis: a quasi-experimental study. *Explore*. 2021;17(5):424-429. doi: 10.1016/j.explore.2020.07.013
14. Smyth C. The Pittsburgh sleep quality index (PSQI). *J Gerontol Nurs*. 1999;25(12):10-11. doi: 10.3928/0098-9134-19991201-10
15. Lins L, Carvalho FM. SF-36 total score as a single measure of health-related quality of life: scoping review. *SAGE Open Med*. 2016;4:2050312116671725. doi: 10.1177/2050312116671725
16. İrem A, Malakcıoğlu C, Mutlu HH. Uykusuzluk şikayetleri ve Uyku Kalitesi Temel Ölçeği'nin Türkçe geçerlilik ve güvenirliği. *Turkish J Fam Med Prim Care*. 2021;15(4):846-852. doi: 10.21763/tjfmpc.971532
17. Ozgen Alpaydin A, Yorgancioğlu A, Yilmaz O, et al. Validity and reliability of "Asthma Quality of Life Questionnaire" in a sample of Turkish adult asthmatic patients. *Tuberk Toraks*. 2011;59(4):321-327.
18. Kuźniar A, Wąsiewicz E, Szawica D, Fularska K, Oleszko M. Exercise and pregnancy-review of literature and current recommendations. *J Educat Health Sport*. 2023;15(1):35-42.
19. Krzepota J, Sadowska D, Biernat E. Relationships between physical activity and quality of life in pregnant women in the second and third trimester. *Int J Environ Res Pub Health*. 2018;15(12):2745.
20. Dipietro L, Evenson KR, Bloodgood B, et al. Benefits of Physical activity during pregnancy and postpartum: an umbrella review. *Med Sci Sports Exerc*. 2019;51(6):1292-1302. doi: 10.1249/MSS.0000000000001941
21. Liu N, Gou WH, Wang J, et al. Effects of exercise on pregnant women's quality of life: a systematic review. *Eur J Obstet Gynecol Reprod Biol*. 2019;242:170-177. doi: 10.1016/j.ejogrb.2019.03.009
22. Ferraz VS, Peixoto C, Ferreira Resstel AP, Cerqueira de Paula YT, Gomes de Souza Pegorare AB. Effect of the pilates method on pain and quality of life in pregnancy: a systematic review and meta-analysis. *J Bodyw Mov Ther*. 2023;35:220-227. doi: 10.1016/j.jbmt.2023.04.076
23. Mazzarino M, Kerr D, Morris ME. Feasibility of pilates for pregnant women: a randomised trial. *J Bodyw Mov Ther*. 2022;32:207-212. doi: 10.1016/j.jbmt.2022.05.001

24. Gustafsson MK, Stafne SN, Romundstad PR, Mørkved S, Salvesen K, Helvik AS. The effects of an exercise programme during pregnancy on health-related quality of life in pregnant women: a Norwegian randomised controlled trial. *BJOG*. 2016;123(7):1152-1160. doi: 10.1111/1471-0528.13570
25. Azward H, Ramadhany S, Pelupessy N, Usman AN, Bara FT. Prenatal yoga exercise improves sleep quality in the third trimester of pregnant women. *Gac Sanit*. 2021;35(Supplement 2):S258-S262. doi: 10.1016/j.gaceta.2021.10.030
26. Kocsis I, Szilágyi T, Turos J, Bakó A, Frigy A. Effect of a gymnastics program on sleep characteristics in pregnant women. *Taiwan J Obstet Gynecol*. 2017;56(2):204-209. doi: 10.1016/j.tjog.2017.02.001
27. McCarthy TA, Reddy PS, Spaeth AM. The effects of exercise on sleep during pregnancy: a systematic review and meta-analysis. *J Women's Pelv Health Physic Ther.* 2023;47(3):159-168.
28. Hyun AH, Cho JY, Koo JH. Effect of home-based tele-pilates intervention on pregnant women: a pilot study. *Healthcare*. 2022;10(1):125. doi: 10.3390/healthcare10010125
29. Sonmezer E, Özköslü MA, Yosmaoğlu HB. The effects of clinical pilates exercises on functional disability, pain, quality of life and lumbopelvic stabilization in pregnant women with low back pain: a randomized controlled study. *J Back Musculoskelet Rehabil*. 2021;34(1):69-76. doi: 10.3233/BMR-191810

Nurgül Ulusoy

I graduated from Istanbul University, Istanbul Medicine Faculty in 1997. I'm specialist in gynecology and obstetrics. I completed my specialization at Bakırköy Women and Children's Diseases Training and Research Hospital in 2002. I worked at Gynecology and Obstetrics Department of Bakırköy Women and Children's Diseases Training and Research Hospital between 2002-2006 as chief assistant. Then I worked as a Gynecology and Obstetrics specialist at Private Avicenna Esenler Ensar Hospital between 2006-2016 and at Private Incirli Ethica Hospital between 2016-2017. I served at VM Medicalpark Florya Hospital as a Physician Lecturer at Istanbul Aydın University Gynecology and Obstetrics Department between March 2017-2020. As of 2023, I have been continuing my proffesional studies at my own private clinic (Bakirkoy, İstanbul) since January 2021