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The Relationship Between Physical Activity Level and Fear of Childbirth (Tokophobia) in Pregnant Women: A Cross-Sectional Study

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ABSTRACT

Objective: This study aims to determine the relationship between physical activity level and tokophobia in pregnant women. **Materials and Methods:** 81 healthy pregnant women at 14-40 weeks of gestation were included in the study. The participant's physical activity levels were measured using the Pregnancy Physical Activity Questionnaire (PPAQ), and their tokophobia was evaluated using the WIJMA Delivery Expectation/Experience Scale (W-DEQ). The W-DEQ results are divided into four subgroups: low fear of childbirth (W-DEQ score ≤ 37), moderate fear of childbirth (W-DEQ score between 38 and 65), severe fear of childbirth (W-DEQ score 66-84), and clinical fear of childbirth (W-DEQ score ≥ 85). **Results:** We found a low level of tokophobia in participants (W-DEQ 3.57 ± 36.19). Low-intensity physical activity decreased in the third trimester (78.82 ± 40.88 MET-min/week) compared to the second trimester (120.10 ± 54.80 MET-min/week) ($p = 0.001$). Housework/care activities decreased in the third trimester (105.81 ± 56.09 MET-min/week) compared to the second trimester (162.08 ± 98.08 MET-min/week) ($p = 0.023$). Low-tokophobia pregnant women (141.54 MET-min/week) were more active than moderate-tokophobia pregnant women (73.01 MET-min/week) ($p = 0.026$). A moderately strong negative correlation existed between the total W-DEQ score and the total PPAQ score ($r = -0.431$; $p = 0.000$). **Conclusion:** It was determined that the physical activity levels of the pregnant women decreased as the trimester of pregnancy progressed, and the level of physical activity decreased as tokophobia increased.

Keywords: Pregnancy, Exercise, Phobia, Parturition, Pregnancy.

Gebelerde Fiziksel Aktivite Düzeyinin Doğum Korkusu (Tokofobi) ile İlişkisi: Kesitsel Bir Çalışma

ÖZ

Amaç: Bu çalışmanın amacı gebelerde fiziksel aktivite düzeyi ile tokofobi arasındaki ilişkiyi belirlemektir. **Gereç ve Yöntem:** Çalışmaya 14-40 gebelik haftaları arasındaki 81 sağlıklı gebe dahil edildi. Katılımcıların fiziksel aktivite düzeyleri Gebelik Fiziksel Aktivite Anketi (PPAQ) ile tokofobi ise WIJMA Doğum Beklenti/Deneyim Ölçeği (W-DEQ) kullanılarak değerlendirildi. W-DEQ sonuçları dört alt gruba ayrılır: Düşük doğum korkusu (W-DEQ puanı ≤ 37), orta düzeyde doğum korkusu (W-DEQ puanı 38-65 arası), şiddetli doğum korkusu (W-DEQ puanı 66-84) ve klinik doğum korkusu (W-DEQ puanı ≥ 85). **Bulgular:** Katılımcılarda düşük düzeyde tokofobi bulundu (W-DEQ $3,57 \pm 36,19$). Düşük yoğunluklu fiziksel aktivite üçüncü trimesterde ($78,82 \pm 40,88$ MET-dk/hafta) ikinci trimestere göre ($120,10 \pm 54,80$ MET-dk/hafta) azaldı ($p = 0,001$). Ev işleri/bakım aktiviteleri üçüncü trimesterde ($105,81 \pm 56,09$ MET-dk/hafta) ikinci trimestere göre ($162,08 \pm 98,08$ MET-dk/hafta) azaldı ($p = 0,023$). Düşük tokofobili gebeler ($141,54$ MET-dk/hafta), orta tokofobili gebelere ($73,01$ MET-dk/hafta) göre daha aktifti ($p = 0,026$). Toplam W-DEQ puanı ile toplam PPAQ puanı arasında orta derecede güçlü bir negatif korelasyon vardı ($r = -0,431$; $p = 0,000$). **Sonuç:** Gebelerin trimester ilerledikçe fiziksel aktivite düzeylerinin düştüğü, tokofobi arttıkça fiziksel aktivite düzeylerinin düştüğü belirlendi.

Anahtar Kelimeler: Hamilelik, Egzersiz, Fobi, Doğum, Hamilelik.

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INTRODUCTION

Tokophobia is the fear of childbirth experienced before, during, and after birth (Wijma et al., 1998). However, an appropriate level of tokophobia motivates expectant mothers to prepare for birth (Wijma et al., 1998).

The frequency of tokophobia is 12.40% in the second trimester and 13.50% in the last period of the third trimester (Hildingsson et al., 2011). Women may experience tokophobia at mild, moderate, and high intensity. Prevalence of moderate fear of childbirth in pregnant women varies between 18-31%, and the prevalence of severe fear of childbirth is between 2-11% (Mortazavi & Agah, 2018). In general, authors reported that the fear of childbirth is higher in women who are pregnant for the first time (nulliparous) compared to those who have previously been pregnant (multiparous) (Pirdadeh Beiranvand et al., 2017).

Tokophobia can affect women from childhood to old age (Hofberg & Ward, 2003). Among the reasons are hearing or witnessing the fearful birth stories of others, not getting enough support from the family and spouse during pregnancy and at the time of birth, previous births with vacuum or forceps, insufficient information about birth, lack of trust in healthcare professionals and inadequate psychological support given by the obstetrician (Striebich et al., 2018). Review dealing with birth-related concerns include fears of pregnant women such as pain, panic, the feeling of failure in childbirth, loss of control, injury to the child and the mother, emergency cesarean section, excessive bleeding, adverse effects on their sexual life, death of the mother or child, and the development of complications during delivery (Striebich et al., 2018).

Physical activity involves muscle contraction that increases heart and respiratory rate, requiring more energy than basal metabolism (Harrison et al., 2018).

It has been shown in the literature that physical activity in pregnant women contributes to the health of both the mother and the infant. Many studies have reported the benefits of physical activity and exercise in preventing many risks during pregnancy, including reducing the chances of excessive weight gain, preeclampsia, gestational diabetes, gestational hypertension, prenatal depression, macrosomia, and improving psychological well-being. Evidence also reports that physical activity during pregnancy reduces preterm birth rates, provides physical fitness, improves sleep quality, reduces cesarean risk, reduces postpartum recovery and delivery time, reduces fatigue, stress, anxiety, depression, and low back pain, and improves health. Despite the reported benefits of regular physical activity in the literature, it has been reported that the level of physical activity during pregnancy is lower compared to the pre-pregnancy period (Harrison et al., 2018). While physical activity is crucial during pregnancy, studies investigating the relationship between tokophobia, and physical activity are limited in the literature.

This study aimed to investigate the relationship between physical activity level and fear of childbirth (tokophobia) in pregnant women in the 2nd and 3rd trimesters of pregnancy (14-40 weeks).

MATERIALS AND METHODS

Study type

This cross-sectional study was conducted online with community-dwelling pregnant women on the Google Forms web survey platform (Google LLC, Mountain View, CA, USA) online between May 2021 and July 2021.

Study group

The study population included 81 pregnant volunteers from Artvin in 2021 who were in their 2nd or 3rd trimesters (between 14-40 weeks) and met inclusion criteria.

Sample Size

The effect size was used according to the average tokophobia score in a reference study examining the tokophobia in nulliparous and multiparous pregnant women to calculate the sample size. In this study, the effect size of the groups was 0.53 (Cohen's d) (Gün, 2018). In the G*Power v3.1.9.6 program, power analysis revealed the necessary sample size to be n=63 with a d=0.53, $\alpha=0.05$, β at 95% conditions. 81 individuals were included in the study to achieve 95% power.

Variables

The Pregnancy Evaluation Form was used to record information about the pregnant participants, including their age, BMI, gestation week, number of children, educational status, smoking/alcohol consumption, miscarriage/abortion status, and trimester. Their physical activity levels were assessed using the Pregnancy Physical Activity Questionnaire (PPAQ), and their tokophobia was evaluated through the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ)-A.

Inclusion Criteria

- Being a healthy pregnant woman,
- Being between the ages of 18-40,
- Not having difficulties in communicating to understand and answer the evaluation questions correctly,
- Being at 14-40 weeks of gestation,
- To have regular perinatal control.

Exclusion Criteria

- Chronic illness or obesity,
- Having a history of orthopedic, neurological, rheumatological, or cardiopulmonary disease or surgery,
- History of 2 or more miscarriages
- Multiple pregnancies,
- High-risk pregnancy,
- Continuous vaginal bleeding
- Pre-pregnancy Body Mass Index (BMI) less than 17.50

Procedures

The Pregnancy Physical Activity Questionnaire (PPAQ)

The Pregnancy Physical Activity Questionnaire (PPAQ), which evaluates 32 activities, determines the physical activity levels of pregnant women only (Chasan-Taber et al., 2004). The PPAQ questionnaire covers housework/caregiving, occupational tasks, sports/exercise, transportation, and inactivity. Participants report how much time they spend on each activity weekly or daily. It takes around 10-15 minutes to complete independently (Chasan-Taber et al., 2004).

The PPAQ includes pregnancy activities such as walking, dancing, jogging, and swimming. To calculate weekly energy expenditure, the duration of time spent on each activity is multiplied by activity-specific intensities (MET values), and scores are expressed as MET hours per week (MET-h/week). To determine the average daily energy expenditure (MET-h/day), the activity intensity (METs) is multiplied by the time spent on each activity itself. The intensity of each activity is classified as sedentary (< 1.5 METs), mild (1.5-3.0 METs), moderate (3.0-6.0 METs), and severe (> 6.0 METs), and average MET-hours spent per week at each intensity level is calculated. Activities are also classified according to their types (housework/caring activities, occupational activities, and sports/exercise), and the average number of MET-hours spent per week in each activity type is calculated (Inter Class Correlation Coefficient (ICC) = 0.78 - 0.93) (Chasan-Taber et al., 2004). The PPAQ was validated and published in Turkey in 2015 (Cronbach's alpha (α) = 0.93 - 0.95) (Tosun et al., 2015).

Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ)

The Wijma Delivery Expectation/Experience Scale (W-DEQ) has two versions, A and B, which measure tokophobia prenatal and postpartum, respectively. This study used the "A" version of the W-DEQ. W-DEQ measures tokophobia in women on a scale of 0 to 5, with 0 as "extremely" and 5 as "not at all". Scores range from 0 to 165, with higher scores indicating higher levels of tokophobia. The W-DEQ results are divided into four subgroups: low (W-DEQ score \leq 37), moderate (W-DEQ score between 38 and 65), severe (W-DEQ score 66 -84), and clinical tokophobia (W-DEQ score \geq 85) (ICC = 0.83 - 0.99) (Wijma et al., 1998). The Turkish validity and reliability study of the W-DEQ scale was conducted recently (α = 0.88 - 0.96) (Korukcu et al., 2012).

Statistical analysis

The "Statistical Package for Social Sciences" (SPSS) Version 24 (SPSS Inc., Chicago, IL, USA) program was

used in the data analysis of this study. Statistical significance was evaluated at the $p < 0.05$ level in all analyses. The results obtained in our study were tested for conformity to normal distribution with the "Kolmogorov-Smirnov" test. Descriptive statistics are shown as mean \pm standard deviation for normally distributed continuous variables and as numbers and (%) for categorical variables. For comparisons between groups, the "Independent T-test" analysis was used for comparisons means between two independent groups, and the "AVONA Test" was used for comparisons between groups of three. The correlation between the variables was investigated using the Spearman correlation test. The correlation coefficients were labelled as follows: 0 - 0.2 very weak, 0.2 - 0.4 weak, 0.4 - 0.6 moderate, 0.6 - 0.8 strong, and "0.8" and above as very strong.

Ethical considerations

Ethics committee approval for this study was obtained from Artvin Coruh University Rectorate Ethics Committee (Decision No: E-18457941-050-99-1067 Decision Date: 30.04.2021). This study was conducted by the Declaration of Helsinki (World Medical Association, 2018), and informed consent was obtained from the participants via the online form before data collection.

RESULTS

The study included 81 pregnant women with an average age of 30.02 ± 3.38 years. Among them, 20 (24.70%) were in their second trimester, while 61 (75.30%) were in their third trimester. Their before of pregnancy BMI mean was 25.87 ± 2.99 kg/m², and the average week of gestation was 29.49 ± 5.50 . The study revealed that 15 (18.50%) of the pregnant women had abortions or miscarriages. Moreover, 54 (66.70%) reported no smoking habit, while 72 (88.90%) did not consume alcohol (Table 1).

Table 1. Demographic characteristics of pregnant women (n = 81).

Variables	Mean \pm SD		Miscarriage/Abortion Status	n	%
Age (Year)	30.02 \pm 3.38		Yes	15	18.50
Height (cm)	167.52 \pm 5.79		No	66	81.50
Weight (kg)	72.55 \pm 8.68		Smoking Status	n	%
BMI (kg/m ²)	25.87 \pm 2.99		Smokers	27	33.30
Gestation week	29.49 \pm 5.50		Non-Smokers	54	66.70
Number of Children	0.58 \pm 0.74		Alcohol Use Status	n	%
Education Status	n	%	User	9	11.10
Primary education	10	12.30	Non-User	72	88.90
High school	20	24.70	Trimester	n	%
Associate degree	2	2.50	2nd Trimester	20	24.70
Bachelor degree	35	43.20	3rd Trimester	61	75.30
Postgraduate degree	14	17.30			

SD: Standart deviation

The pregnant women in our study had a low fear of childbirth, with an average W-DEQ score below 37 (3.57 ± 36.19). Low-intensity physical activity decreased in the third trimester (78.82 ± 40.88 MET-min/week) compared to the second trimester (120.10 ± 54.80 MET-min/week) ($p = 0.001$). Similarly, housework/caregiving activities decreased in the third trimester (105.81 ± 56.09 MET-

min/week) compared to the second trimester (162.08 ± 98.08 MET-min/week) ($p = 0.023$) (Table 2).

The tokophobia scores of individuals with high education levels (-5.21 ± 35.88) were statically lower compared to individuals with low education levels (primary education, high school) (18.50 ± 32.04) ($p = 0.004$) (Table 3).

Table 2. Comparison of physical activity and tokophobia according to pregnancy trimesters.

	2nd Trimester	3rd Trimester	Total	p
	Mean \pm SD (n = 20)	Mean \pm SD (n = 61)	Mean \pm SD (n = 81)	
Physical Activity (MET-min/week)				
Total PPAQ	301.68 \pm 125.29	244.07 \pm 103.73	258.30 \pm 111.46	0.44
Sedentary activity	54.57 \pm 39.97	67.27 \pm 33.12	64.13 \pm 35.10	0.162
Low-intensity activity	120.10 \pm 54.80	78.82 \pm 40.88	89.01 \pm 47.82	0.001*
Moderate-intensity activity	121.10 \pm 75.45	91.89 \pm 68.81	99.10 \pm 71.16	0.112
High-intensity activity	5.91 \pm 11.32	6.10 \pm 12.07	6.05 \pm 11.82	0.951
Household/caregiving activity	162.08 \pm 98.08	105.81 \pm 56.09	119.71 \pm 72.39	0.023*
Occupational activity	34.87 \pm 44.40	35.45 \pm 53.53	35.31 \pm 51.16	0.965
Sports/exercise	44.26 \pm 41.31	39.46 \pm 42.82	40.64 \pm 42.25	0.662
Fear of Childbirth (Tokophobia)				
Total W-DEQ	-6.25 \pm 37.04	6.79 \pm 35.63	3.57 \pm 36.19	0.164

SD: Standart deviation, PPAQ: The Pregnancy Physical Activity Questionnaire, W-DEQ: Wijma Delivery Expectation/Experience Scale. * Statistically significant difference ($p < 0.05$). The comparison of the variables was carried out with the Independent Sample T-Test.

Table 3. Comparison of tokophobia by birth experience, miscarriage/ abortion, and education status.

	Tokophobia	p		Tokophobia	p		Tokophobi a	p
	Mean \pm SD			Mean \pm SD			Mean \pm SD	
Birth Experience		Miscarriage/Abortion Status			Education Status			
Nulliparous (n=45)	-4.86 \pm 35.11	0.60	Yes (n=15)	11.47 \pm 34.95	0.352	High Education Level	-5.21 \pm 35.88	0.004*
Multiparous (n=36)	10.31 \pm 36.01		No (n = 66)	1.77 \pm 36.49		Low Education Level	18.50 \pm 32.04	

SD: Standart deviation, * Statistically significant difference ($p < 0.05$). The comparison of the variables was carried out with the Independent Sample T-Test.

A significant difference was observed in terms of physical activity scores and tokophobia levels of pregnant women ($F(2) = 3.97$, $p = 0.023$). In the Post Hoc Test (LSD), pregnant women with low tokophobia (141.54 MET-min/week) were found to be more active than those with moderate tokophobia (73.01 MET-min/week) ($p = 0.026$) (Table 4). A moderately strong negative correlation was found between the total W-DEQ and the total PPAQ score ($r = -0.431$; $p = 0.000$). There

is a moderate negative correlation between low-intensity activity and total W-DEQ scores ($r = -0.416$; $p = 0.000$), as well as between moderate-intensity activity and total W-DEQ scores ($r = -0.503$; $p = 0.000$). Additionally, there is a moderately strong negative correlation between housework/caregiving activities and total W-DEQ scores ($r = -0.327$; $p = 0.003$), and between sports/exercise activities and total W-DEQ scores ($r = -0.510$; $p = 0.000$) (Table 5).

Table 4. Comparison of physical activities of pregnant women according to tokophobia levels.

Tokophobia Levels		Physical Activity			
		Mean	p		
Low	Moderate	68.53	0.026*		
	High	141.54	0.071		
Moderate	Low	-68.53	0.026*		
	High	73.01	0.368		
High	Low	-141.54	0.071		
	Moderate	-73.01	0.368		
Source of Variance	Sum of Squares	Sd	Average of Squares	F	p
Intergroup	91717	2	45858.50	3.97	0.023*
Intragrop	902144.98	78	11565.97		
Total	993861.98	80			

SD: Standart deviation, * Statistically significant difference ($p < 0.05$), The comparison of the variables was carried out with the ANOVA Test.

Table 5. The relationship between tokophobia and physical activity level in pregnant women.

	Total W-DEQ	
	r	p
Total PPAQ	-0.431	0.000*
Sedentary activity	0.077	0.493
Low-intensity activity	-0.416	0.000*
Moderate-intensity activity	-0.503	0.000*
High-intensity activity	-0.111	0.324
Household/caregiving activity	-0.327	0.003*
Occupational activity	-0.194	0.083
Sports/exercise	-0.510	0.000*

* Statistically significant difference ($p < 0.05$), The relationship between the variables was calculated with the Spearman Correlation Coefficient.

DISCUSSION

This study aimed to investigate the effects of physical activity on tokophobia in pregnant women.

This study determined that the pregnant participants had low tokophobia. In Turkey, pregnant women experience severe tokophobia, while international studies show moderate tokophobia (Adams et al., 2012; Barut & Uçar, 2018; Hall et al., 2012; Onchonga et al., 2020; Størksen et al., 2013). In this study, individuals with higher education levels had lower tokophobia scores than those with lower education levels. Some women may be more likely to experience tokophobia, a fear of childbirth, due to factors such as low education, lack of social support, and exposure to negative pregnancy and childbirth stories (Erkaya et al., 2017; Pirdadeh Beiranvand et al., 2017). A 2018 study in Israel found that 75% of pregnant women had low to moderate fear of childbirth, while 25% had high or very high fear. Factors contributing to tokophobia included concerns about episiotomy, labour control, pain, and future sexual life (Demšar et al., 2018). In similar studies, it has been reported that pregnant women with tokophobia prefer cesarean section more, and psychoeducation sessions performed individually or in groups for nulliparous women have the potential to

reduce the number of cesarean sections due to severe tokophobia (Striebich et al., 2018; Weaver et al., 2012). This research shows that pregnant women tend to reduce low-intensity physical activities and housework/caregiving as their pregnancy progresses, which is consistent with the findings of Guelinckx et al., particularly in the third trimester (Guelinckx et al., 2009). Hayes et al. reported a decline in daily physical activity from 37 to 23 minutes by 35 weeks of pregnancy (Hayes et al., 2012). In Adeniyi et al.'s study, pregnant women engaged mostly in indoor physical activities, which decreased as the pregnancy progressed (Adeniyi & Ogwumike, 2014).

According to this research, pregnant women with low tokophobia tend to be more active than those with moderate tokophobia. Additionally, it was discovered that as physical activity increased, tokophobia decreased. After reviewing the literature, it was found that only two studies have explored the relationship between physical activity and tokophobia. In both studies, it was found that women who engaged in physical activity were less likely to experience tokophobia (Mortazavi & Agah, 2018; Onchonga et al., 2020). However, these studies did not evaluate physical activity with standard measurement

methods. A low level of physical activity is one of the determinants of tokophobia.

This study revealed that there was no relationship between being multiparous/nulliparous and the level of tokophobia. A review presented different results from our study, and it was stated that tokophobia was more common after the 21st week of pregnancy and in nulliparous women (Striebich et al., 2018). It has been found that moderate/severe dyspareunia during first intercourse, poor health, unwanted pregnancy, and low levels of physical activity are the factors that contribute to tokophobia in multiparous women. On the other hand, nulliparous women, the lack of support from their partners, opinions of other women about their current pregnancies, and physical inactivity for less than 30 minutes per week are the determinants of tokophobia (Mortazavi & Agah, 2018).

This research found that experiencing miscarriage or abortion is linked to severe tokophobia. Previous pregnancy, miscarriage, or abortion experiences were not associated with tokophobia in a prior study (Koc et al., 2020).

It is recommended by the American College of Obstetrics and Gynecology that healthy pregnant women should participate in low to moderate regular physical activity for at least 30 minutes every day, if possible, throughout pregnancy (Obstetricians & Gynecologists, 2015). Physical activity during pregnancy increases serotonin and endorphin levels and maintains mental and physical health (Field, 2009, 2012; Guskowska, 2013; Kołomańska et al., 2019; Price et al., 2012).

Limitations of the study

This study was the first to explore the correlation between physical activity levels among pregnant women and their fear of childbirth on a national scale. It was discovered that numerous global studies on this subject did not employ standardized assessment techniques to evaluate physical activity. However, our study methodology is strong in this aspect. Additionally, we utilized physical activity measurement approaches that are specifically tailored for pregnant women, further strengthening our findings. Moving forward, we recommend that subsequent research should increase their sample size, incorporate physical activity training, and monitor the progression of tokophobia about heightened physical activity.

CONCLUSION

Research shows that expectant mothers who engage in physical activity may experience a reduction in tokophobia. As a result, it is advisable to keep a close watch on the physical activity of pregnant women and educate them about its advantages. Pregnant women should also be enrolled in an exercise or prenatal preparation session through online or face-to-face interviews to reduce their tokophobia.

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Conflict of Interest

The authors declare no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

Author Contributions

Plan, design: ZYK, AÖA, MARB, YH; **Material, methods, and data collection:** ZYK, AÖA, MARB, YH; **Data analysis and comments:** ZYK, AÖA; **Writing and corrections:** ZYK, AÖA, MARB, YH, ZS.

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Ethical considerations

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