Physical activity and exercise during pregnancy in Turkey: A narrative review

Türkiye'de gebelik döneminde fiziksel aktivite ve egzersiz: Bir literatür derlemesi

Dilara Ozen Oruk[1]

[1] Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Muğla Sıtkı Koçman University

Abstract

It is known that physical activity (PA) in pregnancy is beneficial for both women and fetal health. For the optimal exercise prescription, healthcare professionals interested in obstetrics-gynecology should evaluate women carefully before making any exercise recommendations during pregnancy. If there aren't any contraindications, pregnant women should be encouraged to engage in regular physical activity. This narrative review aimed to determine PA during pregnancy in Turkey. A literature search was performed in the databases. A total of 29 original articles on PA during pregnancy in Turkey were included in this present study. Eighteen studies were chosen from among these articles for analysis. Two studies assessed PA levels in pregnancy with objective/direct methods such as PA monitors and pedometers, and non-objective/indirect methods were used in all 18 studies. Regarding exercise types, the most preferred exercises during pregnancy were walking, breathing exercises, strengthening exercises, and stretching neck muscles. This narrative review revealed that the level of PA participation and the frequency of regular exercise during pregnancy in Turkey is inadequate. More studies are necessary to examine PA participation from various contexts during pregnancy in Turkey to guide interventions for improving maternal health.

Keywords: Exercise; healthy lifestyle; maternal health; pregnancy; pregnant women

Öz

Gebelikte fiziksel aktivitenin (FA) hem kadın hem de fetal sağlık için faydalı olduğu bilinmektedir. Optimal egzersiz reçetesi için kadın doğum-jinekoloji ile ilgilenen sağlık profesyonellerinin gebelikte herhangi bir egzersiz önerisinde bulunmadan önce dikkatli bir değerlendirme yapması gerekir. Herhangi bir kontrendikasyon yoksa, gebeler düzenli fiziksel aktiviteye teşvik edilmelidir. Bu literatür derlemesinde, Türkiye'de gebelik döneminde FA ve egzersiz düzeyini belirlemek amaçlandı. Çeşitli veri tabanlarında literatür taraması yapıldı. Bu çalışmaya Türkiye'de gebelikte PA ile ilgili toplam 29 orijinal makale dahil edildi. Bu çalışmalardan 18 tanesi analiz edildi. İki çalışmada FA monitörleri ve pedometre gibi objektif/doğrudan yöntemlerle gebelik sırasında FA seviyeleri değerlendirildi ve 18 çalışmanın tümünde objektif olmayan/dolaylı yöntemler kullanıldı. Egzersiz türlerine göre gebelikte en çok tercih edilen egzersizler yürüyüş, nefes egzersizleri, kuvvetlendirme egzersizleri ve boyun kaslarını germe egzersizleriydi. Bu derleme, Türkiye'de gebelikte FA katılım düzeyinin ve düzenli egzersiz sıklığının düşük olduğunu ortaya koymuştur. Anne sağlığını iyileştirmeye yönelik müdahalelere rehberlik etmek için Türkiye'de hamilelik sırasında çeşitli bağlamlardan FA katılımını inceleyen daha fazla çalışmaya ihtiyaç vardır.

Anahtar Sözcükler: Anne sağlığı; egzersiz; gebelik; gebe kadınlar; sağlıklı yaşam tarzı

Received/*Geliş* : 29.11.2022
Accepted/*Kabul*: 11.05.2023

DOI: 10.21673/anadoluklin.1211698

Corresponding author/*Yazışma yazarı*

Dilara Özen Oruk

Muğla Sıtkı Koçman Üniversitesi Sağlık Bilimleri Fakültesi Fizyoterapi ve Rehabilitasyon Bölümü, Muğla, Türkiye,
E-mail: fztdilaraozen@gmail.com

ORCID

Dilara Özen Oruk: 0000-0001-8180-2328

INTRODUCTION

Pregnancy is the beginning of a new stage in a woman's life, with all the changes brought. The main reason for the changes in the pregnancy period is to support the pregnant woman to tolerate the changes and adapt to the new situation (1). Pregnancy causes many anatomical and physiological changes in the female body. Blood volume, cardiac output, heart rate, and stroke volume increase in pregnant women. Also, there is a decrease in systemic vascular resistance. Hormonal changes such as increased estrogen and relaxin levels cause an increase in joint laxity (2). Also, the center of gravity of pregnant women moves towards the abdomen. These changes increase lumbar lordosis and posterior tilt of the sacrum, which are often the main causes of low back pain in pregnancy (2, 3). In addition to these changes, progressively increasing fetal pressure causes the risk of urinary incontinence (4).

Pregnancy can be turned into an opportunity to adopt a healthy lifestyle, and exercise is often considered an integral component of it. Exercise is a physical activity (PA) consisting of planned, structured, repetitive body movements and the purpose of improving various components of physical fitness (5). Numerous benefits of regular exercise during pregnancy include higher cardiorespiratory fitness, prevention of urinary incontinence, reduced symptoms of depression and maternal back pain, increased incidence of vaginal birth, and decreased incidence of excessive gestational weight gain, gestational diabetes and hypertension, preeclampsia, premature birth, cesarean birth and, lower birth weight (6-8). Additionally, exercise during pregnancy has potential benefits for fetal health, such as decreased resting fetal heart rate, improvement in the viability of the placenta, and increased amniotic fluid levels (9).

To determine the specific exercise prescription during pregnancy, the PA level should be evaluated most accurately. PA level can be evaluated with objective methods such as accelerometer, pedometer, and PA monitors or non-objective/subjective methods such as exercise diaries and questionnaires. While objective methods give more accurate results, subjective methods are more practical and low-cost. The most used and valid questionnaires in the literature were the Pregnancy Physical Activity Questionnaire (PPAQ) and the International Physical Activity Questionnaire (IPAQ) (10-12).

American College of Obstetricians and Gynecologists (ACOG) Guideline recommends an exercise program that includes moderate-intensity exercise for at least 20–30 minutes per day on most/all days of the week if there is no medical reason to avoid exercise (5). Particularly safe and beneficial types of exercises such as walking, aerobic exercises, dancing, hydrotherapy, stretching exercises, resistance exercises, and stationary cycling are recommended during pregnancy (6).

To the best of our knowledge, a narrative review about PA during pregnancy in Turkey is not available in the literature. The present study aimed to conduct a narrative literature review on the level of PA during pregnancy in Turkey. PA and exercise were used synonymously to meet the same meaning.

MATERIALS AND METHODS

A literature search was conducted in the databases "PubMed", "Google Scholar", "Web of Science" and "Science Direct". The terms 'Physical activity', 'Exercise', 'Pregnancy', 'Pregnant women', and 'Turkey' were used for search in the literature. Also, searches were performed manually for additional references from retrieved articles. Research articles published in other languages (except English and Turkish), systematic reviews, expert opinions, theses, conference abstracts, and studies whose full texts were not open access were excluded. A total of 29 original articles on PA during pregnancy in Turkey were included in this present study. Of these, 18 studies were considered for the analysis (12-29). The search was performed in April 2022. The flow diagram of the procedure is presented in **Figure 1**. The following information about studies was recorded and shown in Table 1: Year and first author of the article, study design, participant, gestational period, a tool for measurement of PA/Exercise level, and main findings.

RESULTS

Of the 29 articles included in the study, 18 were analyzed for the narrative review (Figure 1). Two studies assessed PA levels during pregnancy with objective/

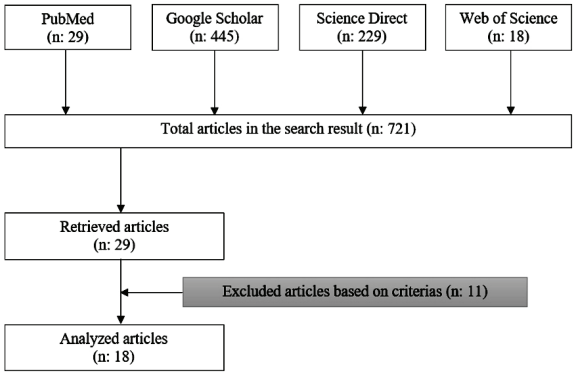

Figure 1. Flow diagram

direct methods such as PA monitors and pedometers (12, 20), and non-objective/indirect methods were used in all 18 studies. Four studies include the PPAQ (12, 13, 20, 21), and 17 studies used surveys or questionnaires (Health-Promoting Lifestyle Profile II (HPLP-II), International Physical Activity Questionnaire-Short Form (IPAQ-SF), Kaiser Physical Activity Survey (KPAS), exercise diaries or interviews) (Table 1) (12-20, 22-29).

Of the analyzed studies, 10 were cross-sectional studies (15, 17-19, 21-23, 27-29), four were validity and reliability studies (12, 13, 20, 25), three were randomized controlled trials (14, 24, 26) and one was a case-control study (16). Most studies focused on all trimesters of pregnancy (12, 15, 16, 18, 20, 21, 23, 25, 27-29), and the other seven studies involved several gestational weeks of pregnancy (13, 14, 17, 19, 22, 24, 26).

Levels of PA participation during pregnancy were generally low. Başbuğ et al. defined a sufficient PA level as more than three days in a week – at least 30 minutes of exercise. In their study, it was reported that 24.8% of the intervention group had sufficient PA levels. Also, the study showed that the frequency of regular exercise for pregnant women was quite low, and only 20.43% of the pregnant women were exercising (16). Similarly, many studies reported low PA levels in pregnancy (12-15, 17-23, 26, 28).

One study found that moderate (600-3000 metabolic equivalent (MET)-min/week) and severe (>3000 MET-min/week) PA during pregnancy significantly increased the energy levels and quality of life of pregnant women and reduced social isolation. Also, it was reported that pregnant women who performed moderate PA had a better quality of life than those performing low-level PA (28). Regarding exercise types, it was found that the most preferred exercises during pregnancy of the participants were walking (61.8%), breathing exercises (11.8%), strengthening exercises (23.5%), and stretching neck muscles (2.6%) (15, 17, 27).

Balsak et al. investigated the knowledge and behavior of pregnant women living in the Aegean region. They reported that a significant percentage of the participants (72.1%) had no sufficient information about pregnancy exercises. The people who provided information about exercise were mostly healthcare professionals (45.2%) (15).

Bilgin et al. investigated perceptions of PA in Turkish pregnant women. They found that the first three reasons for preventing exercise during pregnancy were the distance of exercise facilities (60.4%), facilities that were not suitable for pregnant women (56.5%), and the insufficient number of exercise facilities (55.3%), respectively (17).

DISCUSSION AND CONCLUSION

In this narrative review, we determined the level of PA or exercise participation during pregnancy in Turkey, primarily. Besides, types and intensity of PA, factors preventing PA, reasons for low PA levels, and opinions about PA were also mentioned in it. We found that the PA levels of pregnant women were low. In addition, this review showed insufficient knowledge levels about exercise benefits among pregnant women in Turkey.

While PA during pregnancy is beneficial and safe, it also increases the mother's and baby's health. Regular PA contributes positively to the physical and mental health of pregnant women. It is known that as pregnancy progresses, the level of PA usually decreases. Nevertheless, it is essential to keep exercising for both the health of the mother and baby (30).

Most of the studies reported low levels of PA during pregnancy in Turkey (12-15, 17-23, 26, 28). According to guidelines ("ACOG Committee" 2020), it can be said that the PA levels of the participants in Turkey were quite low (5). The participants' regular exercise rate ranged from 6.9% to 40.1 (15, 28). This finding is in line with other studies that use varied methodologies and tools for assessing PA and are conducted

Table 1. Characteristics of reviewed studies.

First author, Year	Design	Participants	Gestational Period	Measurement of PA/ Exercise Level	Main Findings
Aşcı et al., 2016	RCT*	Total 90 participants, 45 in the control group (mean age: 24.28±4.15) and 45 in the intervention group (mean age: 24.31±4.22)	12-15 weeks	Health Promoting Lifestyle Profile II (HPLP-II)	• Lifestyle interventions including physical activity improve the lifestyle behaviors during pregnancy and increase the appropriate gestational weight gain for pre-pregnancy body mass index, but it has a limited effect in terms of improving dietary habits.
Aydın et al., 2019	Validity-reliability	1st measurement 120, 2nd measurement 74 participants aged 24-44	24-28 weeks	The Pregnancy Physical Activity Questionnaire (PPAQ) International Physical Activity Questionnaire-Short Form (IPAQ-SF)	• Evaluation of the physical activity in diabetic pregnant women may contribute to gaining a better understanding of the role of physical activity during treatment.
Balsak et al., 2007	Cross-sectional	526 participants aged 15-44	All	A questionnaire form	• It was determined that 59.9% of pregnant women did not exercise during pregnancy. Most of the pregnant women who exercised were doing walking exercises. • The knowledge of pregnant women in the Aegean region about pregnancy exercises should be improved by health care providers.
Başbuğ et al., 2018	Case-control	262 participants	All	A questionnaire form	• The frequency of regular exercise for pregnant women was quite low and only 20.43% of them were exercising.
Bilgin et al., 2020	Cross-sectional	331 participants aged 18-45	>20 weeks	A questionnaire form and the Exercise Benefit and Obstacle Scale	• Most pregnant women believed in the benefit of exercise and agreed that exercise improves muscle strength, reduces stress and tension, and is useful in regulating body functions. • The first three factors that prevented exercise were the distance of exercise facilities, lack of exercise programs for pregnant women, and the insufficient number of exercise facilities.
Çelenay et al., 2021	Validity-reliability	253 participants aged >18	All	A questionnaire form	• The Exercise Attitude Scale-Turkish for pregnant women is a valid and reliable measurement tool for evaluating the exercise attitude. Using the scale might help to plan an appropriate exercise program and to maintain exercise adherence for pregnant.
Çelik et al., 2018	Cross-sectional	239 participants (mean age: 30.81±4.59)	All	IPAQ-SF	• Women should be monitored for their BMI and weight in the postpartum period and during pregnancy. • Health professionals should provide education on regular exercise and healthy nutrition prevent to obesity and its consequences.
Çınar et al., 2017	Cross-sectional	211 participants aged >18	>20 weeks	A questionnaire form	• Pregnant women with positive health behaviors during pregnancy feel less fatigue and positively affect prenatal attachment.
Çırak et al., 2015	Validity-reliability	204 participants aged 18-40	All	PPAQ Pedometer International Physical Activity Questionnaire (IPAQ)	• The total activity scores of Turkish pregnant women were higher than those in America, Canada, and Vietnam. • The most significant higher activity score was for household/caregiving activities. • The translated and cross-culturally adapted form of the Turkish PPAQ may provide an important perspective for preventing pregnancy complications and maintaining a healthy life for both the mother and baby.
Kostanoğlu et al., 2019	Cross-sectional	104 participants (mean age: 30.80±5.36)	All 1st trimester: (17.3%) 2nd trimester (26%) 3rd trimester (56.7%)	PPAQ	• Physical activity levels didn't change according to trimesters. Quality of sleep decreases and in relation to this the quality of life is negatively affected as pregnancy progresses.

Ölmez et al., 2015	Cross-sectional	100 participants aged 16-42	5-40 weeks	A questionnaire form	• Regarding sleep quality, there weren't any differences between pregnant women who do regular exercise and who do not. • When the patients were compared in terms of sleepiness scale scores, there were no significant differences between the individuals doing regular exercise and not doing regular exercise. • 13% of the participants were exercising regularly.
Özcan et al., 2015	Cross-sectional	256 participants aged 17-41	All	A questionnaire form	• 25.8% of the participants were exercising regularly. The authors suggested that women may view exercise during pregnancy as negative health behavior.
Özdemir et al., 2015	RCT	Total of 96 participants, 48 in the control group (mean age: 30.10±4.26) and 48 in the intervention group (mean age: 29.15±5.39)	20-35 weeks	Exercise diary	• Regular exercises during pregnancy may promote improved functional status. • An effective health counseling and an exercise program easily initiated by a health professional may show rapid effects by motivating pregnant women to exercise.
Uğurlu et al., 2021	RCT	Total of 100 participants aged 18-40, 53 in the control group and 47 in the intervention group	12-20 weeks	HPLP-II	• Education and counseling about preeclampsia had a statistically significant effect on healthy lifestyle behaviors. • A preeclampsia education and counseling program could help to develop healthy lifestyle behaviors in pregnant women at risk of preeclampsia.
Üzelpasacı et al., 2019	Validity-reliability	151 participants (mean age: 29.3±5.0)	All 1st trimester: (11.3%) 2nd trimester (33.7%) 3rd trimester (55%)	Kaiser Physical Activity Survey (KPAS) PPAQ Physical Activity Monitor	• A physical activity and exercise program specific to each pregnant woman could be recommended to gain benefit from the positive effects of physical activity during pregnancy. • The use of the KPAS in Turkish pregnant women will provide an important perspective for clinicians working in this area to prevent complications of pregnancy and maintain a healthy life for both mother and baby.
Yalçın et al., 2013	Cross-sectional	126 participants aged 15-44	All	A questionnaire form	• It was seen that the pregnant women have knowledge about the exercises performed during pregnancy, but they do not have sufficient and true knowledge about the exercises performed during pregnancy.
Yıldırım et al., 2020	Cross-sectional	347 participants aged 16-43	All 1st trimester: (9.2%) 2nd trimester (30.8%) 3rd trimester (60%)	IPAQ-SF	• Physical activity at low (<600 MET-min/week) and moderate (600-3000 MET-min/week) levels in pregnant reduce anxiety and activities such as lifting light weights, dancing, cycling at normal speed, and at least 30 minutes of walking per day, on at least 5 days of the week (495 MET-min/week) may be recommended for pregnant women. • Moderate (600-3000 MET-min/week) and severe (>3000 MET-min/week) physical activity during pregnancy significantly increased the energy levels of pregnant women as the pregnancy week progressed. Moderate and severe physical activity during pregnancy reduced social isolation significantly as the pregnancy week progressed. • Moderate and severe physical activity during pregnancy significantly increased the quality of life of pregnant women. • Physicians should tell pregnant women about the benefits of physical activity and recommend physical activity for the mother's and baby's health.
Yuvacı et al., 2019	Cross-sectional	163 participants (mean age: 29.15±6.14)	All 1st trimester: (15.8%) 2nd trimester (35.3%) 3rd trimester (48.9%)	A questionnaire form	• Women use exercise to cope with psychiatric symptoms during pregnancy and the postpartum period.

RCT: Randomized controlled trial, MET: Metabolic equivalent, IPAQ-SF: International Physical Activity Questionnaire-Short Form, PPAQ: The Pregnancy Physical Activity Questionnaire, HPLP-II: Health Promoting Lifestyle Profile II

in different countries (31-33). The reason for the low exercise rate for pregnant women may be due to social and cultural reasons, education level, and religious beliefs in Turkey (15).

There are different opinions in the literature regarding the PA level across trimesters. Most studies reported that the PA level decreases with the progression of pregnancy, especially due to physical impediments in the third trimester (34-36). In contrast to these, Kostanoğlu et al. reported that PA levels did not change according to trimesters. This difference may be caused by the sociocultural levels of pregnant women, whether PA is recommended by health professionals during pregnancy, whether women are physically active before pregnancy, and cultural behavior differences (21). On the other hand, Yıldırım et al. found that pregnant women performed very low PA during the first trimester compared to the other trimesters. They emphasized that the PA level may be low due to pregnancy-related discomforts such as malaise, fatigue, nausea, vomiting, and the desire to protect the fetus safely. Also, this study found that the PA level was the highest in the second trimester. This may be caused by the reduction of symptoms of pregnancy and adapting to the pregnancy (28).

Walking has been reported as the most preferred exercise among pregnant women in many studies in the literature (8, 37, 38). Also, in the reviewed studies, the exercise preference of the participants was mostly walking. Otherwise, the most preferred exercises by Turkish pregnant women during pregnancy were breathing exercises, strengthening exercises, and stretching the neck muscles (15, 17, 27). The types of PA participation in pregnancy showed variety across studies and the majority of pregnant women in Turkey participated in Household/caregiving activities (13, 20, 21).

To effectively promote pregnant women to exercise, it is crucial to identify exercise barriers and facilitators. The findings of this research indicate that pregnant women in Turkey mainly do not participate in PA because of the distance and/or the small number of exercise facilities, and facilities were not suitable for pregnant women (17). Many studies reported that the most common barriers of exercise in pregnancy were lack of motivation-energy, lack of time, financial insufficiency, pregnancy symptoms, and fatigue (39, 40). Other studies found that factors such as education, income level, age, and the number of children influence this situation (41, 42). Also, lack of knowledge about exercise was one of the most important barriers. Consistent with the literature, some of the studies reported low maternal knowledge of the benefits of PA during pregnancy (15, 17, 27). While the people who provided information about exercise were mostly healthcare professionals; also books, written and visual media, the internet, and close circle were the sources for pregnant women to get information about exercise (27). Pregnant women should be informed about how to exercise safely and PA recommendations during pregnancy. It is known that pregnant women with higher education levels had higher levels of knowledge about exercise (15, 27). Interventions to educate women with lower education are important to encourage women to participate in prenatal activities.

Lifestyle interventions may be effective in maintaining the PA levels of pregnant women, even in late pregnancy (43). Aşçı et al. indicated that lifestyle interventions that focused on a healthy lifestyle, nutrition, PA, and weight follow-up improve lifestyle behaviors during pregnancy and increase the appropriate gestational weight gain for pre-pregnancy body mass index. However, it has a limited effect in terms of improving dietary habits (14). Health professionals play a key role in managing optimal weight gain during pregnancy by promoting the maintenance of a healthy lifestyle, and they should provide education on regular exercise and healthy nutrition to prevent obesity etc. (18).

Limitations - Strengths

Several limitations of this study should be considered when interpreting the findings. Firstly, only studies published in English and Turkish languages are included in the research. Secondly, it was performed a literature search in only four databases. Another limitation is that during this narrative, methodologies used to evaluate PA in reviewed articles are heterogeneous, and findings differ between studies due to reported PA results. Lastly, most of the studies used indirect measures of PA rather than objective ones. Therefore, the results should be interpreted cautiously and should not be generalized. Despite these limitations, this narrative review has its strengths. To the best of our knowledge, this is the first narrative review to comprehensively

assess PA participation from various contexts during pregnancy in Turkey. This review provides quantitative and qualitative information on the level of PA and its types, intensity, prevention factors, and opinions.

Although pregnancy is seen as a challenging period, it is in the hands of pregnant women to turn this period into an opportunity. Pregnancy can also serve as a motivation to start exercising for those who are not used to it. Regular exercise can help to cope with the physical changes of pregnancy and build resilience for the challenges ahead. Women in our country may have the misconception that: I am pregnant, I should not move a lot. The way to break this prejudice is through education and awareness-raising. One of the best ways to achieve this is for health professionals to address this issue. By raising awareness about the benefits of exercise for maternal and fetal health, and supporting and motivating the expectant mother, the first steps can be taken towards an exercise habit. It is important to provide an education program that includes these components to expectant mothers within the scope of general health services.

This narrative review revealed that the level of PA participation and the frequency of regular exercise during pregnancy in Turkey is inadequate. Regular PA contributes positively to the mental and physical health of pregnant women. Nevertheless, it is important to exercise for the health of both mother and baby. Further research is required to understand better the factors contributing to low PA participation rates during pregnancy in Turkey and to develop effective interventions to promote physical activity among pregnant women.

Conflict-of-interest and financial disclosure

The author declares that she has no conflict of interest to disclose. The author also declares that she did not receive any financial support for the study.

REFERENCES

1. Sızlan A, Kurt E. Gebelik Fizyolojisi. Turkiye Klinikleri J Surg Med Sci. 2007;3(32):1-7.
2. Kader M, Naim-Shuchana S. Physical activity and exercise during pregnancy. Eur J Physiother. 2014;16(1):2-9.
3. Wu W-H, Meijer OG, Uegaki K, et al. Pregnancy-related pelvic girdle pain (PPP), I: Terminology, clinical presentation, and prevalence. Eur Spine J. 2004;13(7):575-89.
4. Hunskaar S, Burgio K, Clark A, et al. Epidemiology of urinary (UI) and faecal (FI) incontinence and pelvic organ prolapse (POP). Incontinence. 2005;1:255-312.
5. ACOG Committee. Opinion no. 804: exercise during pregnancy and the postpartum period. Obstet Gynecol. 2020;135:178-88.
6. Berghella V, Saccone G. Exercise in pregnancy! Am J Obstet Gynecol. 2017;216(4):335-7.
7. Gregg VH, Ferguson JE. Exercise in pregnancy. Clin. Sports Med. 2017;36(4):741-52.
8. Nascimento SL, Surita FG, Cecatti JG. Physical exercise during pregnancy: a systematic review. Curr Opin Obstet Gynecol. 2012;24(6):387-94.
9. Prather H, Spitznagle T, Hunt D. Benefits of exercise during pregnancy. PM R. 2012;4(11):845-50.
10. Evenson KR, Chasan-Taber L, Symons Downs D, Pearce EE. Review of self-reported physical activity assessments for pregnancy: summary of the evidence for validity and reliability. Paediatr Perinat Epidemiol. 2012;26(5):479-94.
11. Lee J-H, Park JH, Kim Y-J. Sensitivity of the accelerometer as a measurement tool for upper extremity movement by stroke patients: a comparison with the action research arm test. J Phys Ther Sci. 2015;27(4):1053-4.
12. Uzelpasaci E, Akbayrak T, Özgül S, et al. The Reliability and Validity of the Turkish Kaiser Physical Activity Survey for Pregnant Women. J Phys Act Health. 2019;16(11):962-7.
13. Adanaş Aydın G, Taşan HA, Tarhan N, et al. Reliability and validity of Turkish version of pregnancy physical activity questionnaire (PPAQ) in patients with gestational diabetes mellitus. J Obstet Gynaecol. 2020;40(2):176-181.
14. Aşcı Ö, Rathfisch G. Effect of lifestyle interventions of pregnant women on their dietary habits, lifestyle behaviors, and weight gain: a randomized controlled trial. J Health Popul Nutr. 2016;35(1):1-9.
15. Balsak D, Yildirim Y, Avci ME, et al. Ege bölgesinde yaşayan gebe kadınların gebelik egzersizleri hakkındaki bilgi ve davranışlarının incelenmesi. Balkan Med J. 2007;2007(3):200-4.
16. Başbuğ A, Sönmez Cİ, Kaya AE, Yildirim E. Gestasyonel diyabet taramasında karşılaşılan önemli bir problem: Gebeler neden oral glukoz tolerans testi yaptırmak istemiyor? Konuralp Med J. 2018;10(2):144-8.
17. Bilgin Z, Yılmaz Esencan T. Perception of physical exercise in Turkish pregnant women and affecting factors. Eur J Physiother. 2022;24(2):97-103.
18. Celik N, Atan SU. Investigation of factors affecting post-

partum maternal weight retention: A cross-sectional study. J Pak Med Assoc. 2018;68(11):1578-83.
19. Cinar N, Caka SY, Topal S, Yuvaci HU, Erkorkmaz U. The relation of health-related practices of pregnant women, fatigue and prenatal attachment. J Coll Physicians Surg Pak. 2017;27:693-8.
20. Çırak Y, Yılmaz GD, Demir YP, Dalkılınç M, Yaman S. Pregnancy physical activity questionnaire (PPAQ): reliability and validity of Turkish version. J Phys Ther Sci. 2015;27(12):3703-9.
21. Kostanoğlu A, Manzak A, Sahin A. The Effect of Physical Activity Level and Sleep Quality on Quality of Life in Pregnant Women. J Turk Sleep Med. 2019;6:80-7.
22. Ölmez S, Keten HS, Kardaş S, et al. Factors affecting general sleep pattern and quality of sleep in pregnant women. Turk J Obstet Gynecol. 2015;12(1):1-5.
23. Özcan S, Duyan V. Fetal health locus of control in a sample of pregnant Turkish women. Turk J Med Sci. 2015;45(3):714-22.
24. Ozdemir S, Bebis H, Ortabag T, Acikel C. Evaluation of the efficacy of an exercise program for pregnant women with low back and pelvic pain: a prospective randomized controlled trial. J Adv Nurs. 2015;71(8):1926-39.
25. Toprak Celenay S, Calik Var E, Ozer Kaya D. Development of an exercise attitude scale in Turkish for pregnant women: validity and reliability. Women Health. 2021;61(9):854-66.
26. Ugurlu M, Yavan T, Karasahin KE. The Effect of an Education and Counseling Program on Maternal/Neonatal Outcomes in Pregnant Women at Risk of Preeclampsia. P R Health Sci J. 2021;40(3):127-35.
27. Yalçın H, Tekin M. Assessing the knowledge level of pregnant women in Karaman about the exercises during pregnancy. J Hum Sci. 2013;10(1):24-33.
28. Yıldırım Dİ, Balcı Ş, Günenç O, Eryılmaz MA. Effect of physical activity on health-related quality of life and depression anxiety in pregnancy. Cukurova Med J. 2020;45(2):547-55.
29. Yuvaci HU, Yazici E, Yazici AB, Cevrioglu S. How often do women use non-drug treatment methods for psychiatric symptoms during pregnancy and postpartum periods?. Ment Illn. 2019;11(1):7988.
30. Szumilewicz A. Who and how should prescribe and conduct exercise programs for pregnant women? Recommendation based on the European educational standards for pregnancy and postnatal exercise specialists. Dev Period Med. 2018;22(2):107-112.
31. Gaston A, Cramp A. Exercise during pregnancy: a review of patterns and determinants. J Sci Med Sport. 2011;14(4):299-305.
32. Okafor UB, Goon DT. Physical activity and exercise during pregnancy in Africa: a review of the literature. BMC Pregnancy Childbirth. 2020;20(1):732.
33. Zhang Y, Dong S, Zuo J, Hu X, Zhang H, Zhao Y. Physical activity level of urban pregnant women in Tianjin, China: a cross-sectional study. PLoS One. 2014;9(10):e109624.
34. Guelinckx I, Devlieger R, Mullie P, Vansant G. Effect of lifestyle intervention on dietary habits, physical activity, and gestational weight gain in obese pregnant women: a randomized controlled trial. Am J Clin Nutr. 2010;91(2):373-80.
35. Lawan A, Awotidebe AW, Oyeyemi AL, Rufa'i AA, Oyeyemi AY. Relationship between Physical Activity and Health Related Quality of Life among Pregnant Women. Afr J Reprod Health. 2018;22(3):80-9.
36. Santos PC, Abreu S, Moreira C, et al. Physical Activity Patterns During Pregnancy in a Sample of Portuguese Women: A Longitudinal Prospective Study. Iran Red Crescent Med J. 2016;18(3):e22455.
37. Evenson KR, Moos MK, Carrier K, Siega-Riz AM. Perceived barriers to physical activity among pregnant women. Matern Child Health J. 2009;13(3):364-75.
38. Guelfi KJ, Wang C, Dimmock JA, Jackson B, Newnham JP, Yang H. A comparison of beliefs about exercise during pregnancy between Chinese and Australian pregnant women. BMC Pregnancy Childbirth. 2015;15:345.
39. Marquez DX, Bustamante EE, Bock BC, Markenson G, Tovar A, Chasan-Taber L. Perspectives of Latina and non-Latina white women on barriers and facilitators to exercise in pregnancy. Women Health. 2009;49(6):505-21.
40. Connelly M, Brown H, van der Pligt P, Teychenne M. Modifiable barriers to leisure-time physical activity during pregnancy: a qualitative study investigating first time mother's views and experiences. BMC Pregnancy Childbirth. 2015;15:100.
41. Foxcroft KF, Rowlands IJ, Byrne NM, McIntyre HD, Callaway LK; BAMBINO group. Exercise in obese pregnant women: the role of social factors, lifestyle and pregnancy symptoms. BMC Pregnancy Childbirth. 2011;11:4.
42. Jukic A MZ, Evenson KR, Herring AH, Wilcox AJ, Hartmann KE, Daniels JL. Correlates of physical activity at two time points during pregnancy. J Phys Act Health. 2012;9(3):325-35.
43. Sanda B, Vistad I, Sagedal LR, Haakstad LAH, Lohne-Seiler H, Torstveit MK. Effect of a prenatal lifestyle intervention on physical activity level in late pregnancy and the first year postpartum. PLoS One. 2017;12(11):e0188102.