Care Practices Supporting Prenatal Attachment

Prenatal Bağlanmayı Destekleyici Bakım Uygulamaları

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Abstract

Mother-baby attachment is a process that starts from the pregnancy period and continues in the birth and postpartum period. Nurses working in the field of women's health and midwives have important roles and responsibilities in supporting prenatal attachment. In this review, it is aimed to present the measurement tools, influencing factors and supporting evidence-based applications that evaluate prenatal attachment in the light of literature. As a result of the literature review; "Maternal-Fetal Attachment Scale", "Prenatal Attachment Inventory", "Maternal Prenatal Attachment Scale" and "Prenatal Attachment Scale", which evaluated mother-infant attachment in pregnant women and whose validity and reliability were made in Turkish, were reached. In these studies, it was revealed that many individual and environmental factors of the pregnant woman affected prenatal attachment. In experimental studies available, it was shown that fetal movement count, leopold maneuver practice, pregnancy training and counseling, father training, birth preparation training, relaxation exercise and guided imagery, cognitive behavioral therapies, yoga and meditation practices support prenatal attachment, while listening to music does not affect it. Nurses are recommended to provide training and counseling to pregnant women with low prenatal attachment risk on these cheap and non-invasive practices, and to support the pregnant woman to use the most appropriate method for her. In addition, it was found that studies testing the effectiveness of evidence-based practices in prenatal attachment are limited in our country and more randomized controlled studies are needed.

Keywords: Pregnancy, nurse, midwives, maternal-fetal attachment, prenatal attachment, prenatal care

Öz

Anne-bebek bağlanması, gebelik döneminden başlayıp, doğum ve doğum sonu dönemde devam eden bir süreçtir. Kadın sağlığı alanında çalışan hemşire ve ebelerin prenatal bağlanmanın desteklenmesinde önemli rol ve sorumlulukları bulunmaktadır. Bu derleme ile literatür ışığında prenatal bağlanmayı değerlendiren ölçüm araçlarının, etkileyen faktörlerin ve destekleyici kanıta dayalı uygulamaların sunulması amaçlanmıştır. Yapılan literatür incelemesi sonucunda; gebelerde anne-bebek bağlanmasını değerlendiren ve Türkçe geçerlik-güvenirliği yapılmış olan "Maternal-Fetal Bağlanma Ölçeği", "Prenatal Bağlanma Envanteri", "Anne Doğum Öncesi Bağlanma Ölçeği" ve "Prenatal Bağlanma Ölçeği"ne ulaşılmıştır. Bu çalışmalarda prenatal bağlanmayı etkileyen pek çok bireysel ve çevresel faktörün olduğu belirlenmiştir. Ulaşılabilen deneysel çalışmalarda prenatal bağlanmayı; fetal hareket sayımı, leopold manevrası uygulaması, gebe eğitimi ve danışmanlık, baba eğitimi, doğuma hazırlık eğitimi, gevşeme egzersizi ve rehberli imgeleme, bilişsel davranışçı terapiler, yoga ve meditasyon uygulamalarının desteklediği, müzik dinletmenin ise etkilemediği gösterilmiştir. Hemşirelerin düşük prenatal bağlanma riski olan gebelere ucuz ve non-invaziv olan bu uygulamalar hakkında eğitim ve danışmanlık vermesi, gebenin kendisi için seçeceği en uygun yöntemi kullanması için desteklemesi önerilmektedir. Ayrıca ülkemizde prenatal bağlanmada kanıta dayalı uygulamaların etkinliğini test eden çalışmaların sınırlı olduğu, daha fazla randomize kontrollü çalışmalara gereksinim olduğu saptanmıştır.

Anahtar sözcükler: Gebelik, hemşire, ebe, maternal-fetal bağlanma, prenatal bağlanma, prenatal bakım

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PRENATAL attachment is a concept used to describe the relationship established between pregnant and fetus. Various studies on prenatal attachment were started as a result of observing women mourning due to infant deaths in the 1960-1970s. In a study conducted by Peppers and Knapp (1980) with 65 women who lost their babies, it proved that mother-baby attachment started in the prenatal period before the neonatal period. Peppers and Knapp (1980) mentioned nine behaviors that can affect prenatal attachment. These are planning pregnancy, having a desired pregnancy, accepting pregnancy, feeling fetal movements, accepting the fetus as a separate individual, giving birth, seeing the baby, touching the baby and providing care to the baby.

Rubin (1975), the founder of the theoretical structure of prenatal attachment, emphasized that women have four special tasks in the prenatal period. These are (a) Seeking a safe passage for himself and his baby during pregnancy, (b) Ensuring that the baby is accepted by others (c) Establishing an internal bond with the fetus (d) Committing herself to the baby. After Rubin, researchers such as Muller, Cranley, and Condon worked in this field (Cranley 1981, Condon 1993, Muller 1993). Cranley (1981) defined the concept of Maternal-Fetal Attachment (MFA) as a woman's attachment with her baby during pregnancy, establishing a close relationship and interacting with him/her. According to Cranley (1981), MFA includes different situations such as the mother's perception of the fetus as different from herself and her body, communicating with it, interpreting the characteristics of the fetus, devotion, and adopting the role of motherhood. Muller (1993) defined the concept of Prenatal Attachment (PA) as the unique, love and affection relationship established between the mother and her unborn baby.

The foundations of attachment behavior that started to be established in the postpartum period are laid with mother-baby attachment during pregnancy (Yılmaz 2013). If secure attachment is not achieved during this period, the life of the baby may be put at risk physically and mentally (Çoban and Saruhan 2005, Yılmaz 2013, Elkin 2015, Mutlu et al. 2015, Höbek Akarsu et al. 2017, Baltacı and Başer 2020). The hormonal and physical changes that occur in the body of women during the prenatal period prepare women for motherhood and initiate the attachment process against the fetus (Koptur Buldum and Güner Emül 2017). Prenatal attachment is also associated with feeling the baby's movements for the first time or imaging the baby with ultrasound (Mehran et al.2013).

Midwives and nurses have important roles and responsibilities in recognizing the factors affecting attachment during the prenatal period when attachment is formed and developing, preparing women for motherhood, initiating and maintaining the bond of love between mother and fetus, using attachment-supporting practices, and improving perinatal and neonatal health outcomes (Koptur Buldum and Güner Emül 2017). Considering that attachment is a process, midwives and nurses should support and consult the family to increase family-infant interaction and quality. Ensuring secure attachment in the prenatal period is also important for the ongoing attachment behavior in the postnatal period. Considering that failure to ensure secure attachment may lead to some physical and mental problems in the future of the individual, midwives and nurses serving in the primary care especially

in the prenatal period should carefully evaluate mother-infant attachment and the factors affecting it (Yılmaz 2013, Elkin 2015). It is important that midwives and nurses working in the field of women's health inform pregnant women who have problems with prenatal attachment about effective practices and encourage them to choose the most appropriate method for them (Yılmaz 2013). In this review, it is aimed to present the measurement tools, influencing factors and supporting evidence-based applications that evaluate prenatal attachment in the light of literature.

Measurement tools used in the evaluation of prenatal attachment

The development of measurement tools that evaluate the level of attachment between mother and fetus started in the 1970s. "Maternal-Fetal Attachment Scale (MFAS)", "Prenatal Attachment Inventory (PAI)", "Maternal Prenatal Attachment Scale (MPA)", "Prenatal Attachment Scale (PAS)", which evaluate mother-infant attachment in pregnant women, have been validated and reliable in Turkish. Nurses and midwives working in the field of women's health can use these measurement tools to evaluate prenatal attachment in pregnant women and identify women at risk at an early stage.

The Maternal-Fetal Attachment Scale (MFAS) was developed by Cranley in 1981 to measure the attachment between mother and fetus during prenatal period. MFAS consists of 24 questions and is evaluated with an average score. The increase in the score obtained by the pregnant from the scale indicates that the level of attachment has also increased. The validity-reliability study of the scale in our country was conducted by Üstünsöz et al. (2010) and the Cronbach alpha value was found to be 0.82.

The Prenatal Attachment Inventory (PBE) was developed by Muller in 1993 to measure the level of prenatal attachment. It is one of the most commonly used measurement tools in the literature to measure the level of prenatal attachment. The scale, which was developed to determine women's emotions, thoughts and attachment levels about the baby during pregnancy, consists of 21 items. A minimum of 21 and a maximum of 84 points can be obtained from PBE. The increase in the score obtained by the pregnant from the scale indicates that the level of attachment has also increased. The validity-reliability study of PBE in our country was conducted by Yılmaz and Beji (2013) and the Cronbach alpha value was found 0.84. In addition, the Turkish validity-reliability study of the same scale was performed by Duyan et al. In 2013 with the name of Prenatal Attachment Inventory (PAI) and the Cronbach alpha value was found to be 0.90.

The Maternal Prenatal Attachment Scale (MOAS) was developed by Condon in 1993 to evaluate the maternal-fetal attachment level during pregnancy. The scale consists of 19 items and two sub-dimensions: "attachment quality" and "time spent on attachment". The increase in the score obtained by the pregnant from the scale indicates that the level of attachment has also increased. The lowest score that can be obtained from the scale is 19, and the highest score is 95. The validity-reliability study of the scale in our country was conducted by Gölbaşı et al. (2015) and the Cronbach alpha value was found to be 0.79.

The Prenatal Attachment Scale (PAS) was developed by Türkmen Çevik and Kurnaz (2019) to measure the level of prenatal attachment in accordance with Turkish culture. This scale consists of 33 items and three sub-dimensions: "curiosity and excitement", "acceptance and enthusiasm" and "hope". The increase in the score obtained by the pregnant from the scale indicates that the level of attachment has also increased. The lowest score that can be obtained from the scale is 33, and the highest score is 99. The internal consistency coefficient of the PAS was calculated as 0.94.

Some factors affecting prenatal attachment level

Prenatal attachment is affected by many individual and environmental factors. These are age (Yılmaz and Kızılkaya Beji 2010, Alan Dikmen and Çankaya 2018, Karabulutlu et al.2020, Koç Özkan et al. 2020), education status (Yılmaz and Kızılkaya Beji 2010, Alan Dikmen and Çankaya 2018, Topaç Tunçel and Kahyaoğlu Süt 2019, Karabulutlu et al. 2020, Koç Özkan et al. 2020), employment status (Yılmaz and Kızılkaya Beji 2010, Elkin 2015, Topaç Tunçel and Kahyaoğlu Süt 2019, Karabulutlu et al. 2020), family type (Elkin 2015, Alan Dikmen and Çankaya 2018, Karabulutlu et al. 2020), income status (Yılmaz and Kızılkaya Beji 2010, Elkin 2015, Karabulutlu et al. 2020), duration of marriage and marital adjustment (Alan Dikmen and Çankaya 2018, Karabulutlu et al. 2020, Küçükkaya et al. 2020), week of pregnancy (Elkin 2015, Alan Dikmen and Çankaya, 2018, Topaç Tunçel and Kahyaoğlu Süt 2019), desire and planning status of pregnancy (Yılmaz and Kızılkaya Beji 2010, Alan Dikmen and Çankaya 2018, Karabulutlu et al. 2020, Küçükkaya and et al. 2020), the number of pregnancies and the number of surviving children (Yılmaz and Kızılkaya Beji 2010, Alan Di kmen and Çankaya 2018, Karabulutlu et al. 2020, Koç Özkan et al. 2020), body mass index (Alan Dikmen and Çankaya 2018), psychosocial status (Topaç Tunçel and Kahyaoğlu Süt 2019, Özdemir et al.2020), social support status (Erkal Aksoy et al. 2016, Alan Dikmen and Çankaya 2018, Küçükaya et al. 2020), sleep duration (Nacar and Timur Taşhan 2019), receiving prenatal care (Alan Dikmen and Çankaya 2018, Karabulutlu et al. 2020), and participation in the birth preparation class (Alan Dikmen and Çankaya 2018) (Table 1). It is important that these factors be recognized by the midwives and nurses who are in the closest interaction with the pregnant woman.

Practices supporting prenatal attachment

It is important for nurses and midwives working in the field of women's health to first evaluate each pregnant woman in terms of the risk of prenatal attachment disorder and to intervene in case of weak prenatal attachment. In this part of the article, studies testing practices supporting prenatal attachment in the light of the literature are presented (Table 2).

Counting fetal movements

Regular counting and recording of fetal movements by pregnant women in the home environment is an easy, cheap and useful procedure. When the literature was examined, it was

Table 1. Maternal factors affecting prenatal attachment according to the results of the studies in our country

Maternal factors	Its effect on prenatal attachment level
Age	• Pregnant women over the age of 31 have higher prenatal attachment levels (Koç Özkan 2020) • Pregnant women aged 35 and over have lower prenatal attachment levels (Dereli Yılmaz and Kızılkaya Beji 2010) • Pregnant women aged 40 and over have lower prenatal attachment levels (Karabulutlu et al.2020) • A weak and negative relationship was found between the age of pregnant women and their prenatal attachment levels (Alan Dikmen and Çankaya 2018) • No relationship was found between the age of pregnant women and their prenatal attachment levels (Elkin 2015).
Education status	• As the educational status of pregnant women increases, their prenatal attachment levels increase (Kahyaoğlu Süt 2019) • Pregnant women who graduated from primary school had lower levels of prenatal attachment (Alan Dikmen and Çankaya 2018, Dereli Yılmaz and Kızılkaya Beji 2010, Karabulutlu et al.2020) • Primary education graduate women have higher levels of prenatal attachment (Koç Özkan 2020) • No relationship was found between the educational status of pregnant women and their prenatal attachment levels (Elkin 2015).
Employment status	• The prenatal attachment levels of unemployed pregnant women are lower than those who are employed (Dereli Yılmaz and Kızılkaya Beji 2010, Elkin 2015, Karabulutlu et al 2020) • Working pregnant women have lower prenatal attachment levels (Kahyaoğlu Süt 2019)
Family type	• Pregnant women with extended family structure have lower levels of prenatal attachment (Alan Dikmen and Çankaya 2018, Karabulutlu et al.2020) • A relationship was found between the family type of pregnant women and their prenatal attachment levels (Elkin 2015)
Income status	• Pregnant women with low income have lower levels of prenatal attachment (Elkin 2015, Dereli Yılmaz and Kızılkaya Beji 2010, Karabulutlu et al.2020)
Marriage duration and marital harmony	• Pregnant women with a marriage period of 11 years or more have lower levels of prenatal attachment (Karabulutlu et al. 2020) • A weak, negative relationship was found between the year of marriage and prenatal attachment levels (Alan Dikmen and Çankaya 2018) • Pregnant women who married unwillingly had lower levels of prenatal attachment (Alan Dikmen and Çankaya 2018) • As the marital adjustment of pregnant women increases, their prenatal attachment levels also increase (Küçükkaya et al. 2020).
Pregnancy week	• As the pregnancy trimester increases, the prenatal attachment levels of pregnant women also increase (Topaç Tunçel and Kahyaoğlu Süt 2019) • Those with a gestational age of 26 and above have higher prenatal attachment levels (Elkin 2015) • A weak, negative relationship was found between the week of gestation and prenatal attachment levels (Alan Dikmen and Çankaya 2018) • The month of gestation has no effect on prenatal attachment level (Karabulutlu et al. 2020)
Desiring and planning status of pregnancy	• Pregnant women with planned pregnancy have higher levels of prenatal attachment (Dereli Yılmaz and Kızılkaya Beji 2010, Küçükkaya et al. 2020) • Pregnant women considering terminating pregnancy have lower levels of prenatal attachment (Alan Dikmen and Çankaya 2018) • No relationship was found between the desired state of pregnancy and the prenatal attachment levels of pregnant women (Elkin 2015) • Those who have a planned pregnancy and want pregnancy have higher levels of prenatal attachment (Karabulutlu et al. 2020) • Those whose pregnancy was treated with higher levels of prenatal attachment (Karabulutlu et al.2020)
Number of pregnancies and living children	• Multiparous women have higher levels of prenatal attachment (Dereli Yılmaz and Kızılkaya Beji 2010) • Women with 3 or more pregnancies have higher levels of prenatal attachment (Koç Özkan 2020) • A weak and negative relationship was found between the number of children living and their prenatal attachment levels (Alan Dikmen and Çankaya 2018) • Pregnant women who had never had a child or had a child before had higher levels of prenatal attachment (Karabulutlu et al.2020) • No relationship was found between the number of pregnancies and living children and the level of prenatal attachment (Elkin 2015)

Table 1. Continued

Maternal factors	Its effect on prenatal attachment level
Body Mass Index	• Prenatal attachment level of obese pregnant women is lower than normal and pre-obese pregnant women (Alan Dikmen and Çankaya 2018)
Fear of birth	• No relationship was found between perceived fear of childbirth and the level of prenatal attachment in pregnant women (Sade et al.2020)
Sleep time	• Pregnant women who sleep less than seven hours have higher levels of prenatal attachment than those who sleep more (Nacar and Timur Taşhan 2019)
Psychosocial status	• A moderate negative correlation was found between the scores the pregnant women got from the Beck Anxiety Scale and their PBE mean scores (Özdemir et al 2020). • As the level of prenatal distress increases in first trimester pregnant women, the level of prenatal attachment increases, and as the level of depression increases in the third trimester, prenatal attachment decreases. As the level of anxiety increases during pregnancy, prenatal attachment increases (Topaç Tunçel and Kahyaoğlu Süt 2019)
Social support status	• A positive correlation was found between the prenatal attachment levels of the pregnant women and the mean scores of the Multidimensional Scale of Perceived Social Support (Erkal Aksoy et al.2016) • Pregnant women who receive emotional or physical support have higher levels of prenatal attachment (Küçükaya et al. 2020) • A weak and negative relationship was found between the time of first informing the family of pregnancy and the levels of prenatal attachment (Alan Dikmen and Çankaya 2018)
Getting prenatal care	• Pregnant women who have health problems during pregnancy have lower levels of prenatal attachment (Alan Dikmen and Çankaya 2018) • Those who have little control during pregnancy, who do not receive training and who do not have the necessary tests during pregnancy have lower levels of prenatal attachment (Karabulutlu et al. 2020).¬¬ • Pregnant women who do not attend the birth preparation class have lower levels of prenatal attachment (Alan Dikmen and Çankaya 2018)

seen that the most frequently examined interventional studies on maternal-fetal attachment were conducted on fetal movement count training. While four studies found that counting fetal movements supported prenatal attachment, it was not effective in two studies. Mikhail et al. (1991), Rincy and Nalini (2014), Güney and Uçar (2019) and Demirkan et al. (2020) examined the effect of fetal movement count application on maternal-fetal attachment. After fetal movement count training was given to the pregnant women in the intervention group in this study, they were asked to count daily fetal movements. Pregnant women in the control group were given standard prenatal care. At the end of the intervention, the mean maternal-fetal attachment score of the pregnant women in the intervention group was found to be statistically significantly higher than the pregnant women in the control group. On the other hand, in the studies of Saastad et al. (2011) and Delaram et al. (2018), it was revealed that fetal movement count training was not effective in supporting the prenatal attachment levels of pregnant women.

Leopold maneuver practice

It was determined in two studies that the implementation of leopold maneuver in the last trimester supports the prenatal attachment level of pregnant women. In the studies of Celik and Ergin (2020) and Nishikawa and Sakakibara (2013), while leopold maneuvers were applied to the pregnant women in the intervention group, the pregnant women in

the control group were given routine prenatal care. At the end of the intervention, the prenatal attachment levels of the pregnant women in the intervention group were found to be statistically significantly higher than the pregnant women in the control group.

Training and consultancy

Studies have shown that the training and counseling approach given to pregnant women supports prenatal attachment in healthy ongoing pregnancies, as well as in pregnant women with a history of infant loss or violence, and unwanted or unplanned pregnancy. In the studies of Marzouk et al (2015), Abasi et al. (2013) and Akbarzadeh et al. (2017), it was found that the training given to pregnant women in the third trimester on maternal-fetal attachment skills increased prenatal attachment. It has been demonstrated in the studies of Ekrami et al. (2019) Jangjoo et al. (2019) that counseling service is effective in improving the maternal-fetal attachment level in unplanned and unwanted pregnancies. For this reason, it may be suggested that midwives and nurses provide effective family planning counseling services in order to prevent unwanted pregnancies. In the study of Baghdari et al. (2016), it was revealed that pregnancy adjustment training given to pregnant women with a history of infant loss increased maternal-fetal attachment, while Khalili et al. (2020) found that supportive-educational intervention increased maternal-fetal attachment in pregnant women exposed to violence by their spouses.

Father training

Only one study was found to examine the effect of attachment behavior and skills training given to fathers on prenatal attachment. In the study of Akbarzade et al. (2014), while the fathers in the intervention group were trained on attachment behavior and skills, the pregnant women in the control group were given routine pregnancy care. A significant difference was found between the intervention group and the control group in terms of average attachment scores before and one month after the intervention. For this reason, it is thought that it is important to support the participation of fathers in prenatal care programs.

Music

Two studies were found that examined the effect of listening to music on prenatal attachment, but it was found that listening to music was not effective in supporting prenatal attachment in both. In the study of Chang et al. (2015), it was found that the practice of listening to music to pregnant women was not effective in increasing the maternal-fetal attachment level. In addition, Shin and Kim (2011) examined the effect of music therapy applied during transvaginal ultrasound on maternal-fetal attachment level. While routine prenatal care and single-session music therapy were applied to the pregnant women in the intervention group in this study during transvaginal ultrasonography, the pregnant women in the control group were given routine prenatal care. No statistically significant difference was found between the maternal-fetal attachment levels of pregnant women in the intervention and control

Table 2. Investigation of studies investigating practices supporting prenatal attachment

Author, year, country	Method	Sampling
Abasi et al. 2013, Iran	Semi-experimental	**GG:** Maternal-fetal attachment behavior training once a week for two hours, four sessions in total (n=40) **KG:** Standard prenatal care (n=43)
Akbarzade et al. 2014, Iran	RKÇ	**GG:** Once a week, a total of four sessions, 60-90 minutes of maternal-fetal attachment training (n=75) **KG:** Standard prenatal care (n=75)
Akbarzadeh et al. 2017, Iran	Experimental	**GG:** Training based on BASNEF model, lasting 90 minutes, once a week for six weeks (n=50) **KG:** Standard prenatal education (n=50)
Alhusen et al. 2021, USA	RKÇ	**GG:** Group-based Cognitive Behavioral therapy intervention for six weeks, two hours a week (n=30) K**G:** Standard prenatal care (n=30)
Baghdari et al. 2016, Iran	Experimental	**GG:** Standard prenatal education and four-session adaptation training program (n=30) **KG:** Standard prenatal education (n=30)
Bellieni et al. 2007, Italy	Experimental	**GG:** Five sessions and an hour long prenatal education course (n=36) **KG:** No intervention was applied (n=41)
Çelik and Ergin, 2020, Turkey	RKÇ	**GG:** Nursing practice with the I and II Leopold maneuvers (n=50) **KG:** Standard prenatal care (n=50)
Chang et al. 2004, South Korea	Experimental	Birth preparation class (n=49)
Chang et al 2015, Taiwan	RKÇ	**GG:** Listening to music and standard prenatal care (n=145) **KG:** Standard prenatal care (n=151)
Çıtak Bilgin et al., 2020, Türkiye	Experimental	**GG:** Birth training once a week, three hours a week for five weeks (n=90) **KG:** Routine prenatal follow-up (n=83)
Delaram et al 2018, Iran	RKÇ	**GG:** Fetal movement tracking training and practice (n=104) **KG:** Standard prenatal care (n=104)
Maiden et al 2020, Turkey	Experimental	**GG:** Fetal movement tracking training (n=35) **KG:** Standard prenatal care (n=35)
Ekrami et al. 2019, Iran	RKÇ	**GG:** Individual or group counseling once a week for six weeks (n=40) **KG:** Standard prenatal care (n=40)
Gheibi et al 2020, Iran	RKÇ	**GG:** An awareness-based birth and parenting program with standard prenatal care (n=18) **KG:** Standard prenatal care (n=20)
Güney and Uçar 2019, Turkey	RKÇ	**GG:** Fetal movement tracking training and practice (n=55) **KG:** Standard prenatal care (n=55)
Höbek Akarsu and Rathfisch 2018, Turkey	RKÇ	**GG:** Eight weeks, two days a week, 40 minutes of yoga practice and standard prenatal care (n=31) **KG:** Standard prenatal care (n=32)
Jangjoo et al. 2019, Iran	RKÇ	**GG:** A total of four sessions of group counseling for four weeks (n=40) **KG:** Standard prenatal care (n=40)
Kartal and Karaman, 2018, Turkey	Experimental	Birth preparation class (n=44)
Khalili et al 2020, Iran	RKÇ	**GG:** Four sessions, individual supportive-educational intervention (n=50) **KG:** Standard prenatal care (n=50)

Measuring Tool	Results
MFBÖ	A statistically significant difference was found in terms of attachment scores of pregnant women in the intervention (3.96±0.38) and control (3.42±0.41) groups (p<0.001).
MFBÖ	Mean prenatal attachment score of GG was 55.98±6.99 before the intervention and 61.90±5.41 after the intervention. A statistically significant difference was found between GG and DG in terms of mean prenatal attachment scores one month after the intervention (p<0.001).
MFBÖ	A statistically significant difference was found in the maternal-fetal attachment levels of the intervention (4.63±30.75) and control (3.19±22.20) groups (p<0.001).
MFBÖ	At the end of the intervention, an increase of 12.6 points was measured in the prenatal attachment levels of the pregnant women in the GG, and a 4.6 points increase in the KG was measured.
MFBÖ	A statistically significant difference was found in maternal-fetal attachment levels of pregnant women in the intervention (77.57±7.23) and control (61.53±2.62) groups (p = 0.001).
PBE	The prenatal attachment levels of the pregnant women in GG (65.5±6.9) who attended prenatal education were found to be statistically significantly higher than the pregnant women in KG (59.9±6.1) (p<0.05).
PBE	At 32nd and 36th weeks of gestation, PBE scores in DD are 71.18±7.87 and 76.10±6.76 KG, respectively, and 65.66±8.51 and 67.10±7.80. PBE mean score of GG is statistically significantly higher than KG (p=0.001).
MFBÖ	While the maternal-fetal attachment level of pregnant women was 71.2±11.26 before the intervention, it increased to 78.7±8.91 after the intervention (p<0.001).
M-MFBÖ	There was no statistically significant difference in maternal-fetal attachment levels in the intervention (100.96±20.47) and control (95.60±22.83) groups (p>0.05).
PBE	Prenatal attachment level in GG increased statistically significantly (p<0.001). There was no statistically significant increase in the scores of the intervention (71.7±8.9) and control (70.1±8.6) groups after the intervention.
PBE	No statistically significant difference was found between the prenatal attachment levels of the intervention (93.75±7.59) and control (92.78±9.90) groups (p=0.433).
PBE	The prenatal attachment level, which was 53.3±11.9 in the GG before the intervention, increased to 64.6±9.22 after the intervention (p<0.001). In KG, the prenatal attachment level, which was 51.5±12.6, increased to 52.0±13.7 (p=0.695).
MFBÖ	After four weeks, maternal-fetal attachment levels of pregnant women were measured, and a statistically significant difference was found between the maternal-fetal attachment levels of the intervention (96.6±9.3) and control (76.5±6.4) groups (p<0.001).
MFBÖ	Maternal-fetal attachment level of GG (95.39±7.20) was found to be statistically significantly higher than the control (83.60±6.93) group (p<0.001).
ADBÖ	A statistically significant difference was found between the maternal-fetal attachment scores of the intervention (78.41±6.65) and control (72.25±7.16) groups (p<0.001).
PBE	While the pregnant women in KG did yoga for 40 minutes, two days a week for eight weeks, the pregnant women in KG were given standard prenatal care. At the end of the intervention, the prenatal attachment level of the GG (67.6± 8.7) was found to be significantly higher than the control (61.9±11.4) group (p=0.031).
MFBÖ	A statistically significant difference was found between the maternal-fetal attachment levels of the intervention (104.43±22.51) and control (64.79±12.86) groups (p<0.001).
PBE	It was determined that the average score of the prenatal attachment level of pregnant women before attending the birth preparation class was 59.90±12.40, and increased to 71.88±8.25 after the education.
MFBÖ	A statistically significant difference was found in maternal-fetal attachment levels of the intervention (80.36±6.75) and control (65.50±6.78) groups (p=0.0001).

Table 2. Continued

Author, year, country	Method	Sampling
Kim and Gim 2019, South Korea	Experimental	**GG:** Kindness and Compassion Meditation Program (n=27) **KAG:** Yoga practice (n=29) **KG:** No intervention was applied (n=27)
Kordi et al 2016, Iran	Experimental	**GG:** Guided imagination training and practice (n=35) **KG:** Standard prenatal care (n=32)
Marzouk and Nabil 2015, Egypt	Experimental	**GG:** Maternal-fetal attachment skill training (n=40) **KG:** Standard prenatal care (n=40)
Mikhail et al. 1991, USA	Experimental	**GG:** Fetal movement count during one month (n=125) **KG:** No intervention was applied (n=88)
Mojahed et al. 2019, Iran	Experimental	**GG:** Midwifery counseling with a cognitive-behavioral approach that lasts 90 minutes for six weeks (n=30) **KG:** Prenatal care and education given in the birth preparation class (n=30)
Mokaberian et al. 2021, Iran	Experimental	**GG:** Progressive muscle relaxation with a 30-minute imagination-based relaxation technique, twice a week for eight weeks (n=30) **KG:** No applied (n=30)
Nishikawa and Sakakibara 2013, Japan	Experimental	**GG:** Pregnancy information class and application of Leopold maneuvers with abdominal palpation (n=35) **KG:** Pregnancy information class application (n=30)
Rincy and Nalini 2014, India	Experimental	**GG:** Standard prenatal care and fetal movement follow-up twice a day for 14 days (n=50) **KG:** Standard prenatal care (n=50)
Saastad et al. 2011, Norway	RKÇ	**GG:** Fetal movement tracking training and practice (n=478) **KG:** Standard prenatal care (n=473)
Salehi et al. 2017, Iran	RKÇ	**GG:** Fetal movement tracking training and practice (n=23) **KG:** Standard prenatal care (n=29)
Shin and Kim, 2011, Korea	Experimental	**GG:** Standard antenatal care and 30-minute single-session music therapy (n=117) **KG:** Standard prenatal care (n=116)
Toosi et al. 2014, Iran	Experimental	**GG:** Standard antenatal care and four sessions of relaxation training, 90 minutes, once a week (n=42) **KG:** Standard prenatal care (n=42)
Toosi et al. 2017, Iran	Experimental	**GG:** Standard antenatal care and four sessions of relaxation training, 90 minutes, once a week (n=40) **KG:** Standard prenatal care (n=40)

GG: Intervention group, KG: Control group, KAG: Comparison group, ADBÖ: Maternal prenatal attachment scale, MFBÖ: Maternal-fetal attachment scale, M- MFBÖ: Modified mat

groups. According to the results of these two studies, more research is recommended on music listening.

Relaxation exercise and guided imaging

Studies have shown that the imagination-based relaxation technique and progressive muscle relaxation application, which is a low-cost and non-pharmacological method, is effective in supporting maternal-fetal attachment. Toosi et al. (2014, 2017) examined the effect of

Measuring Tool	Results
MFBÖ	A statistically significant difference was found in the prenatal attachment levels of the pregnant women included in the kindness and compassion meditation program and the yoga and control groups (p<0.001). The prenatal attachment levels of pregnant women participating in the wellness and compassion meditation program were statistically significantly higher than the other two groups.
MFBÖ	A statistically significant difference was found between the maternal-fetal attachment scores of the intervention (94.26±6.7) and control (90.22±9.5) groups (p=0.046).
MFBÖ	The mean MFBÖ total score, which was 61.6±5.9 before the training, increased to 68.5±6.8 and 69.6±5.9 at 32nd and 34th weeks of gestation, respectively (p<0.001). There was no statistically significant difference in KG's mean of MFBÖ total score (p=0.379).
MFBÖ	After the intervention, the maternal-fetal attachment level of the pregnant women in the GG was found to be statistically significantly higher than the KG (p<0.05).
MFBÖ	After the intervention, a statistically significant difference was found between the prenatal attachment levels of the intervention (99.8±5.64) and control (90.9±2.15) groups (p <0.001). In addition, maternal-fetal attachment level increased 13.53 points in pregnant women in GG after the intervention (p<0.001).
MFBÖ	At the end of the intervention, a statistically significant difference was found in the maternal-fetal attachment levels of the intervention (97.4±60.04) and control (86.3±13.72) groups (p=0.0001).
PBE	Although the level of prenatal attachment increases significantly in pregnant women in GG and KG, this increase is higher in GG compared to KG.
PBE	A statistically significant difference was found between the maternal-fetal attachment scores of the intervention (64.38±7.53) and control (49.29±11.46) groups (p=0.000).
PBE	No statistically significant difference was found between the maternal-fetal attachment scores of the intervention (59.54±9.39) and control (59.43±9.35) groups (p=0.747).
MFBÖ	A statistically significant difference was found between the maternal-fetal attachment levels of the intervention (96.30±10.81) and control (88.64±10.31) groups (p<0.001).
MFBÖ	No statistically significant difference was found between the maternal-fetal attachment levels of the intervention (64.81±11.51) and control (65.73±13.08) groups (p=0.659).
MFBÖ	A statistically significant difference was found between the maternal-fetal attachment levels of pregnant women in the intervention (63.6±4.3) and control (61.1±51) groups (p=0.017).
MFBÖ	A statistically significant difference was found in the maternal-fetal attachment level of pregnant women in the intervention (92.0±10.8) and control (74.0±13.8) groups (p<0.001).

ternal-fetal attachment scale, PBE: Prenatal Attachment inventory

education given to pregnant women on maternal-fetal attachment. While the pregnant women in the intervention group in this study were given relaxation training in addition to the standard prenatal care, the pregnant women in the control group were given standard prenatal care. At the end of the intervention, the maternal-fetal attachment levels of the pregnant women in the intervention group were found to be statistically significantly higher than the pregnant women in the control group. In the study of Kordi et al. (2016), it was revealed that the guided imagination exercise training and application given to women

with unplanned pregnancy and in the study of Mokaberian et al. (2021), the application of progressive muscle relaxation with the imagination-based relaxation technique was effective in increasing maternal-fetal attachment in women with unwanted pregnancy.

Cognitive behavioral therapies

Cognitive Behavioral Therapies have been shown to be effective in supporting prenatal attachment, especially in high-risk pregnancies. Azogh et al. (2018) determined that Cognitive Behavioral Therapy increases maternal-fetal attachment in pregnant women with stillbirth history and Mojahed et al. (2019) in pregnant women with abortion history. Alhusen et al. (2021) found that the Cognitive Behavioral Therapy intervention applied to a group of pregnant women with moderate and severe depressive symptoms was effective in supporting the prenatal attachment level. Considering that psychiatric disorders such as depression and anxiety affect attachment, it is extremely important for nurses and midwives working in the field of women's health to refer pregnant women who are at risk for depressive symptoms and other psychiatric problems to a psychiatrist.

Birth preparation training

It has been shown in four studies that preparation for childbirth training supports maternal-fetal attachment of pregnant women. In the studies of Bellieni et al (2007) and Chang et al. (2004), it was shown that the prenatal attachment levels of pregnant women who attended prenatal training courses increased statistically significantly compared to pregnant women who received standard care. In the studies of Kartal and Karaman (2018) and Çıtak Bilgin et al. (2020), which were conducted in our country, it was revealed that the prenatal attachment level of pregnant women was increased by the childbirth preparation training.

Meditation and yoga

It has been shown in the literature that meditation and yoga practice increase prenatal attachment. In the study of Gheibi et al. (2020), it was found that the prenatal attachment levels of pregnant women who were included in the awareness-based birth and parenting program together with standard prenatal care increased. In their study, Kim and Gim (2019) included the pregnant women in the intervention group to the kindness and compassion meditation program, and the pregnant women in the comparison group to the yoga program. No intervention was applied to the pregnant women in the control group. The prenatal attachment levels of pregnant women participating in the wellness and compassion meditation program were statistically significantly higher than the other two groups. In our country, Höbek Akarsu and Rathfisch (2018) showed that yoga performed during pregnancy is an effective method in increasing prenatal attachment.

Conclusion

With the examination of the current literature, it has been shown that fetal movement count, leopold maneuver practice, pregnancy training and counseling, father training, birth

preparation training, relaxation exercise and guided imagery, cognitive behavioral therapies, yoga and meditation practices support prenatal attachment. Nurses and midwives working in women's health can advise women to talk to their babies after conceiving, touch them, and count after feeling their movements. It is recommended that midwives and nurses provide training and counseling about these cheap, simple and non-invasive practices to pregnant women with low prenatal attachment risk, and also support the pregnant woman in using the appropriate method that she will choose for her. At the same time, it is recommended to conduct more randomized controlled studies testing the effectiveness of evidence-based practices in prenatal attachment in our country.

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