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Maternal and paternal attachment levels in the prenatal period

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ABSTRACT

Aims: This study determined maternal and paternal attachment levels and the factors affecting attachment during the prenatal period.

Methods: This descriptive study included pregnant women aged 18 to 48 years and their spouses admitted to a follow-up clinic. Women with risky pregnancies were excluded. Attachment was assessed using the maternal antenatal attachment scale (MAAS) and the paternal antenatal attachment scale (PAAS). The primary outcomes were the maternal and paternal attachment levels and the factors affecting attachment during the prenatal period.

Results: The study population consisted of 100 pregnant women and their spouses, totaling 200 individuals [age, mean±standard deviation: 27.8±5.1 years, prospective mothers; 31.5±5.9 years, prospective fathers]. The mean MAAS score was 77.87±8.08, and the mean PAAS score was 63.7±8.2. There was a statistically significant correlation between the total MAAS and PAAS scores (r=0.279, p=0.005). Also, mean scores of the subdimensions of quality of attachment (r=0.203, p=0.042) and time spent on attachment (r=0.236, p=0.018) of the MAAS and PAAS showed correlations. We observed that 48% of the pregnant women saw their babies with their spouses on ultrasound. Median MAAS score [81 (56 to 93) vs. 77 (45 to 93), p=0.002] and PAAS score [66.5 (54 to 77) vs. 61 (41 to 79), p=0.015] of the expectant mothers and fathers who saw their babies together on the ultrasound were higher than couples who did not see their babies on the ultrasound together.

Conclusions: This study showed a significant relationship between maternal and paternal attachment levels of couples in the prenatal period.

Introduction

Attachment is an emotional and loving bond that starts between the parents and the fetus in the prenatal period (1). In this period, prospective mothers and fathers begin to bond with the fetus with the development of adaptation to parenting roles (2). The level of attachment in the prenatal period affects the biological, psychological, and behavioral fetal development of the fetus throughout its life (3-5) and the parent-child relations after birth (6,7).

Maternal attachment in the prenatal period is the emotion, feeling, and love that a mother feels for her unborn baby (8,9). The level of maternal attachment affects maternal and infant health (9,10). There is a linear relationship between maternal attachment and the infant's cognitive, emotional, psychological, and social development (11,12). This bond between the mother and fetus begins when the woman learns that she is pregnant and increases when the fetal movements start (12,13). Sociodemographic characteristics of the mother, marital relationship, obstetric characteristics, acceptance of pregnancy,

and mental health affect the quality of attachment (1,9,10,14). An increase is observed in adaptation to the role of motherhood and positive health behaviors in women with high levels of attachment, whereas women with low attachment levels show negative health behaviors (8,10,15,16) and, consequently, many fetal and neonatal complications may develop (14).

Paternal attachment, on the other hand, is defined as the love and care that the father feels toward his unborn baby (17,18). Similar to maternal attachment, paternal attachment impacts the infant's behavioral, emotional, and developmental outcomes (18-20). Paternal attachment begins to be established in the prenatal period and continues to increase with the first physical contact with the baby after birth (21). Factors like sociodemographic characteristics, maternal obstetric status, and father's mental health affect paternal attachment (5,22). Fathers with a high level of paternal attachment adapt better to parenting roles, support the mother more in all processes, and increase their participation in the care of the baby in the postpartum period (17,20). Paternal attachment level is also effective in alleviating mothers' need for analgesia at birth, breastfeeding problems, and postpartum psychological problems (5).

The cognitive, emotional, psychological, and social development starts in the prenatal period and continues throughout life. It is important to evaluate the quality of maternal and paternal attachment in the prenatal period and to intervene when necessary because the level and quality of attachment can affect the development of the fetus and the newborn (6,22). Although studies in the literature generally focus on maternal attachment (6), studies have also focused on paternal attachment as the effects of paternal attachment on the fetus and the newborn have been determined, and there has been an increase in fathers' participation in infant care (4). This study investigated maternal and paternal attachment levels and the factors affecting attachment.

Methods

This descriptive study included pregnant women and their spouses admitted to the University of Health Sciences Türkiye, Gülhane Training and Research Hospital, Obstetrics and Gynecology Polyclinic for antenatal follow-up between February and December 2021. The inclusion criteria of the participants in the sample were being between the ages of 18 and 49, being able to read and write Turkish, having a healthy and single pregnancy, having a spontaneous pregnancy, and not having any psychiatric disease. The exclusion criteria were risky pregnancies, multiple pregnancies, and women diagnosed with psychiatric illness. We recruited consecutive couples who met the inclusion criteria and volunteered to participate in the study.

The power of the study was calculated using G*Power 3.1.9.7. After the data collection process, post hoc power analysis was performed to determine the statistical power. A sample of 100 pregnant women was sufficient at the 0.05 level of alfa error with a 95% confidence interval and 89.7% power according to the post hoc power analysis.

Data Collection Tools

The Descriptive Information Form and the Maternal Antenatal Attachment Scale (MAAS) (12) were used to collect data from prospective mothers, and the Paternal Antenatal Attachment Scale (PAAS) (18) was used to collect data from prospective fathers.

The descriptive information form

The form was prepared by the researchers in line with the literature (6,7,10,16,20). It includes 20 questions such as the age of women and their spouses, educational status of women and spouses, employment status, income status, duration of marriage, the quality of relationship with the spouse, being willingly pregnant, number of pregnancies, gestational week, desired and current baby gender, and breastfeeding and receiving prenatal care to reveal the sociodemographic and obstetric characteristics of the participants.

Maternal antenatal attachment scale

The scale was developed by Condon (23) in 1993. A Turkish validity and reliability study of the scale was carried out by Golbasi et al. (12) in 2015. The scale consists of 19 items examining the feelings, attitudes, and behaviors of a prospective mother toward the fetus. Each item of the five-point Likert-type scale is scored between 1 and 5. The scale has two sub-dimensions: "quality of attachment" (items 3, 6, 9, 10, 11, 12, 13, 15, 16, 19) and "time spent on attachment" (items 1, 2, 4, 5, 8, 14, 17, 18). Since item 7 does not affect any sub-dimension, it is used only in calculating the total score. Items 1, 3, 5, 6, 7, 9, 10, 12, 15, 16, and 18 are reverse codes. The scale does not have any cutoff value. Higher scores indicate higher levels of attachment (12,23).

Paternal antenatal attachment scale

The scale was developed by Condon (23) in 1993, and the Turkish validity and reliability study was conducted by Benli and Aksoy Derya (18) in 2019. The five-point Likert-type scale consists of 16 items measuring the father's feelings toward and thoughts about the baby. Items 1, 3, 5, 6, 7, 8, 12, 13, and 15 are reverse-coded. The scale consists of two sub-dimensions: "quality of attachment" (items 2, 3, 7, 9, 11, 12, 15, 16) and "time spent on attachment" (items 1, 4, 5, 6, 8, 10, 13, 14). The scale does not have a cutoff value. Higher scores indicate higher levels of attachment (18,23).

Data Collection

After informing the participants about the importance, purpose and method of the study face-to-face, the data collection forms were administered to the pregnant women who agreed to

participate in the study. The expectant mothers filled out the data collection forms on paper in an empty room in the polyclinic. It took about 10-15 minutes for them to fill out the forms. After the expectant mothers completed the forms, the PAAS, which the prospective fathers should fill out, was turned into an online scale via Google Forms by the researchers. The link to the online scale was sent to the expectant mothers on WhatsApp, and they shared the online scale with their husbands. It took 10 to 15 minutes for prospective fathers to complete the scale.

Statistical Analysis

The data were analyzed using Statistical Package for the Social Sciences Statistics for Windows, version 22.0 (IBM Corp., Armonk, NY: USA, 2013). Number, percentage, mean, standard deviation, median, minimum, and maximum values were calculated for descriptive statistics. The normality of continuous variables was evaluated with the Kolmogorov-Smirnov test. The independent samples t-test and one-way ANOVA were used to compare the scores showing normal distribution. The Mann-Whitney U and Kruskal-Wallis tests were used to compare the variables showing a non-normal distribution. Correlations were evaluated by calculating Spearman's coefficients. The level of statistical significance was set at 0.05.

Outcomes

The primary outcomes were maternal and paternal attachment levels and their relationship in the prenatal period. The secondary outcome was the factors affecting maternal and paternal attachment in the prenatal period.

Ethical Considerations

Ethics approval for the research was obtained from the University of Health Sciences Türkiye, Gülhane Scientific Research Ethics Committee (date: 14.01.2021, decision no: 2021-24). After explaining the importance, purpose, and research methods, voluntary prospective mothers provided signed consent. An informed consent form was delivered to the prospective fathers on the screen when they clicked on the link for the online data collection form. Those who gave consent to participate were allowed to fill in the form.

Results

The study included 100 pregnant women and their spouses, totaling 200 individuals. The mean age of the pregnant women in the study was 27.8±5.1 years, the mean age of the prospective fathers was 31.5±5.9 years, and the duration of marriage was 5.0±4.7 years on average. The mean gestational week of the pregnant women was 26.2±11.4.

Table 1 shows the comparison of maternal and paternal attachment levels according to sociodemographic characteristics. There was no significant difference between maternal and paternal attachment levels according to sociodemographic characteristics, including the mother's age, educational level and employment status, father's age, family income, place of residence and family type ($p>0.05$). The level of maternal attachment showed a statistically significant difference ($p=0.036$) according to the educational level of the father and the difference was related to fathers who graduated from primary school and those with a university or higher degree.

Table 2 shows maternal and paternal attachment levels according to the obstetric characteristics and pregnancy follow-up. No statistically significant difference was found between maternal and paternal attachment levels according to the number of pregnancies, miscarriage history, gestational week, having a planned pregnancy, feeling the baby's movements, the quality of the relationship between the mother and the father, the gender of the baby, and the presence of the spouse in the follow-ups ($p<0.05$). A statistically significant difference was found between maternal attachment ($p=0.022$) and paternal attachment ($p=0.015$) levels according to seeing the baby on ultrasound with the spouse.

The mean MAAS score of the prospective mothers was 77.87±8.08. The mean score of the quality of attachment sub-dimension of the maternal attachment scale was 43.12±4.25 and the mean score of the time spent on attachment sub-dimension was 30.28±4.58. The mean PAAS score of the prospective fathers was 63.70±8.22. The mean score of the quality of attachment sub-dimension of the paternal attachment scale was 35.64±3.65 and the mean score of the time spent on attachment sub-dimension was 28.06±5.59. We observed a positive correlation between the total mean maternal and paternal attachment scores ($r=0.279$, $p=0.005$). We also observed a statistically significant correlation between the quality of attachment ($r=0.203$, $p=0.042$) and time spent on attachment ($r=0.236$, $p=0.018$) sub-dimensions of maternal and paternal attachment scales.

Discussion

A significant relationship was found between the mean total score of maternal attachment levels in the prenatal period and the mean scores on the subdimensions of quality of attachment and the time spent on attachment. As prenatal maternal attachment levels increased, paternal attachment levels also increased. It was determined that the maternal and paternal attachment levels of the couples who saw the baby with their spouses on ultrasound were significantly higher.

During pregnancy, parents form a mental and emotional bond with their unborn baby. This bond represents the mother's and father's awareness of their unborn baby, their desire to be with the baby and their interactions. Prenatal attachment is also considered the earliest form of parenting (18,24). This study revealed a positive and significant relationship between prenatal maternal and paternal attachment levels.

Table 1. Comparison of maternal and paternal attachment scale scores according to some sociodemographic characteristics

		Maternal attachment scale# (n=100)	p	Paternal attachment scale# (n=100)	p
Mother's age	n (%)				
18-30	71 (71)	79 (45-93)	0.228[a]	64 (41-79)	0.584[a]
31 and above	29 (29)	78 (56-86)		63 (49-76)	
Father's age					
18-30	51 (51)	79 (60-93)	0.709[a]	65 (41-78)	0.490[a]
31 and above	49 (49)	79 (45-93)		63 (46-79)	
Mother's education level					
Primary school	25 (25)	75 (64-85)	0.426[b]	75.28±9.38[a]	0.711[c]
High school	38 (38)	80.5 (45-89)		77.47±7.88[ab]	
University and higher	37 (37)	81 (56-93)		80.43±6.41[b]	
Father's education level					
Primary school	29 (29)	75.2±9.3[x]	**0.036[c]**	64.5±9.4	0.776[c]
High school	36 (36)	77.4±7.8[xy]		63.0±7.4	
University and above	35 (35)	80.4±6.4[y]		63.6±8.0	
Mother's working status					
Yes	84 (84)	78±8.29	0.069[d]	64.1±6.1	0.797[d]
No	16 (16)	77.85±8.09		63.6±8.5	
Family Income status					
Income less than expenses	30 (30)	77 (60-91)	0.110[b]	63.4±8.1	0.966[c]
Income equals expenses	60 (60)	80 (45-93)		63.7±8.4	
Income more than expenses	10 (10)	83 (71-88)		64.2±7.7	
Place of residence					
City center	89 (89)	78.0±8.1	0.622[d]	64.2±8.2	0.053[d]
Town	11 (11)	76.7±7.4		59.1±7.2	
Family type					
Nuclear	90 (90)	80.0 (45-93)	0.157[a]	63.5±8.1	0.688[d]
Extended	10 (10)	75.5 (60-85)		64.7±9.6	

#: Data are shown mean±standard deviation, and median (minimum-maximum) otherwise specified.
[a]: Mann-Whitney U, [b]: Kruskal-Wallis, [c]: One-Way ANOVA (for analysis post-hoc Tukey), [d]: Independent two-sample t-test, [x-y]: There is no difference between groups with the same letter

In the current study, the paternal attachment level increased parallel to the maternal attachment. Ustunsoz et al. (25) reported a significant relationship between maternal-fetal attachment and paternal fetal attachment in the prenatal period. Thus, it can be suggested that the attachment levels of couples are positively affected by each other, and interventions such as focusing on fetal movements, improving social support, and reducing parents' anxiety levels aimed at increasing maternal or paternal attachment levels may contribute positively to the attachment levels of both parents.

The present study showed no difference between the maternal attachment levels of the couples according to their sociodemographic characteristics such as age, employment status, family income level, place of residence, and family type. Some studies examining the level of maternal attachment reported that age (14,26,27), level of education (26-28), and economic status (27) affect maternal attachment. Some studies found that the level of education (16,25), employment (26), and income status (16) of pregnant women were not related to maternal attachment. Our study revealed that the educational level of the spouse was associated with maternal attachment, and the prenatal maternal attachment level of pregnant women whose spouses were university graduates was significantly higher than those whose spouses were primary school graduates. Ustunsoz et al. (25) reported that as the level of education of the prospective father increases, the level of maternal attachment increases. More research on the effects of sociodemographic characteristics on maternal attachment level

is required, however, the role of the educational status of the spouse seems important.

Our study found that maternal attachment did not differ according to parity, gestational week, number of miscarriages, having a planned pregnancy, feeling fetal movements, fetal gender, spouse's participation in antenatal follow-ups, and the quality of the relationship between the women and the spouse. Some studies examining maternal attachment also showed that parity (14), gestational week (14), having a planned pregnancy (26,27), history of miscarriage/curettage (27,29), and satisfaction with the partner (26) did not affect maternal attachment. However, some studies reported that gestational week (16,27,29), number of pregnancies (16,29), number of children (16), having a planned pregnancy (26,29), feeling fetal movements (30,31), and satisfaction with the partner (32) affected maternal attachment levels. It has also been reported that having a female fetus and having the desired gender affects maternal attachment (29). Ample evidence is needed to conclude the effects of obstetrics characteristics and the quality of the marital relationship on maternal attachment level.

This study showed that paternal attachment level did not differ according to sociodemographic, obstetric, and other characteristics, except after seeing the baby on ultrasound. Similar studies on paternal attachment revealed that factors

Table 2. Comparison of the maternal and paternal attachment scale scores according to the obstetric characteristics and pregnancy follow-up

	n (%)	Maternal attachment scale[#] (n=100)	p	Paternal attachment scale[#] (n=100)	p
Number of pregnancies					
1	42 (42)	79.6±7.1		64.6±8.5	
2	36 (36)	77.6±7.6	0.093[c]	63.3±6.5	0.627[c]
3 and over	22 (22)	75.0±9.7		62.4±10.1	
History of miscarriage					
Yes	17 (17)	76 (45-89)	0.093[a]	62.1±8.7	0.405[d]
No	83 (83)	80 (56-93)		64.0±8.1	
Gestational week					
1st trimester	19 (19)	77 (64-93)		61 (49-77)	
2nd trimester	24 (24)	81 (64-89)	0.296[b]	67.5 (51-79)	0.305[b]
3rd trimester	57 (57)	79 (45-93)		63 (41-78)	
Planned pregnancy					
Yes	86 (86)	78.6±7.3	0.076[d]	64.3±8.0	0.050[d]
No	14 (14)	73.1±10.6		59.7±8.3	
Feeling baby movements					
Yes	70 (70)	80 (45-93)	0.695[a]	63.6±8.7	0.958[d]
No	30 (30)	78.5 (69-93)		63.7±6.8	
Quality of the relationship with the spouse					
Good	85 (85)	79.2±6.9	0.427[d]	63.9±8.1	0.427[d]
Moderate/poor	15 (15)	70.0±9.5		62.1±8.6	
Baby's gender					
Girl	34 (34)	78.5 (45-93)		63.5±8.6	
Boy	34 (34)	80 (56-91)	0.938[b]	64.2±8.2	0.864[c]
Unknown	32 (32)	79 (64-93)		63.2±7.9	
Spouse's attendance at the follow-ups					
Yes	76 (76)	79 (56-93)	0.926[a]	63.5 (41-78)	0.381[a]
No	24 (24)	79.5 (45-89)		63 (47-79)	
Seeing the baby on ultrasound with the spouse					
Yes	48 (48)	81 (56-93)	**0.022[a]**	66.5 (54-77)	**0.015[a]**
No	52 (52)	77 (45-93)		61 (41-79)	

[#]: Data are shown mean±standard deviation, and median (minimum-maximum) otherwise specified.
[a]: Mann-Whitney U, [b]Kruskal-Wallis, [c]: One-Way ANOVA (for analysis post-hoc Tukey), [d]: Independent two-sample t-test

such as the spouse's age (25), mother's level of education (25), mother's employment status (33), number of children (33), having a planned pregnancy, and participation in prenatal courses (33) affected paternal attachment level. There are also studies stating that the level of paternal attachment does not differ according to factors such as the gender of the fetus, the desired gender of the fetus, having a planned pregnancy, and the quality of the relationship with the spouse (20). In this respect, the factors affecting the paternal attachment level in the prenatal period are still unclear. However, couples' level of education might impact a planned pregnancy.

One of the remarkable findings of our study is that both maternal and paternal attachment levels of couples who see their babies together on ultrasound are significantly higher. Türkmen and Güler (33) reported that fathers who attended antenatal follow-ups and pregnancy classes with their spouses had a significantly higher level of attachment. Øyen and Aune (34) found that ultrasound examination strengthens the attachment level of a mother to her baby. In the same study, prospective mothers preferred to attend the ultrasound examination with their spouses. Coté et al. (35) emphasized that 3D ultrasonography using 3D printed models was effective on maternal and paternal attachment levels. A systematic review of the effects of imaging techniques on parent-fetal bonds in antenatal follow-up showed a positive relationship (36). Thus, our findings are consistent with the literature. Today, obstetric ultrasound is frequently used in antenatal follow-ups. Fathers attending antenatal follow-ups may have higher responsibility toward their babies and better intrafamilial communication. Seeing the baby on ultrasound offers the opportunity to witness real-time and moving images of babies and to screen for abnormalities in the baby's development (37). Including spouses in antenatal follow-ups and ultrasound examinations may be beneficial in improving the attachment quality of parents. It is recommended that healthcare providers should include both pregnant women and their spouses in the antenatal follow-ups and raise awareness about the importance of seeing the baby on ultrasound.

Study Limitations

There are some limitations to our study. First, since the questionnaires were delivered to prospective fathers using an online platform, some fathers did not fill in the form causing insufficient data in some cases. Second, the data were collected using scales based on self-reports.

Conclusion

Promoting maternal and paternal attachment during the prenatal period can play a significant role in improving maternal and newborn outcomes. Determining the factors affecting the attachment level of the mother and father to the fetus may be important for the physical, emotional, and psychological development of the child. Therefore, mothers and fathers can be provided with interdisciplinary support. Including fathers in antenatal follow-ups and seeing the baby with the mother on ultrasound may positively impact the pregnancy. In this regard, it is considered important to increase the awareness of healthcare professionals about the importance of including fathers in antenatal follow-ups. Larger studies including different populations may help gain better insights into the factors affecting the attachment levels of prospective parents.

Ethics

Ethics Committee Approval: This study protocol was approved by the University of Health Sciences Türkiye, Gülhane Scientific Research Ethics Committee (date: 14.01.2021, no: 2021/24).

Informed Consent: Consent form was filled out by all participants.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: M.U., G.A., Ö.Ö., Design: M.U., Data Collection or Processing: M.U., G.A., Ö.Ö., Analysis or Interpretation: M.U., Ö.Ö., Literature Search: M.U., G.A., Ö.Ö., Writing: M.U., G.A., Ö.Ö.

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