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Research Article

Prenatal Attachment and Related Factors in Adolescent Pregnant Women

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Abstract:

The aim of this study was to determine the level of prenatal attachment and related factors in adolescent pregnant women. The study is cross-sectional descriptive type. The sample consisted of 34 adolescent pregnant women who applied to obstetrics outpatient clinics in a Training and Research Hospital. The data were collected between June 2018-June 2019. The Personal Information Form was collected using the Prenatal Attachment Inventory (PAI), Marriage Life Scale (MLS) and Health Practices in Pregnancy Scale (HPPS). The mean scores obtained from the scales are PAI 38.38±11.47; MLS is 32.74±8.16 and HPPS is 94.93±10.87. A significant negative correlation was found between PAI and HPPS mean score, and a positive and strong relationship between PAI and MLS score mean. While the mean score of PAI and MLS in adolescent pregnants is below the average level, HPPS is above the average. Prenatal attachment level was found to be low in those who are secondary school graduates, married for 2 years, whose first pregnancy and gender of the baby were male, and who evaluated the relationship with their husband at a moderate level. Prenatal attachment increases as satisfaction with marriage increases, while prenatal attachment decreases as health practices during pregnancy increase. Midwives should especially evaluate the prenatal attachment level and related factors of adolescent pregnants, and perform applications to increase prenatal attachment.

1. Introduction

Pregnancy is an important process in a woman's life during which normal physiological changes occur. Physical and mental changes accompanying pregnancy can make it difficult to adapt to these new roles and responsibilities, and therefore, more anxiety, stress and anxiety may be experienced during pregnancy [1].

According to World Health Organization (WHO), the age group of 10-19 years is defined as adolescents and those 15-24 years of age are defined as youth [2]. Adolescence refers to the transition from childhood to adulthood. Marriages under 19 years, before an adolescent is physiologically and psychologically ready to shoulder the responsibilities of marriage and parenthood, are defined as early marriages and also prevent child's social development [3].

The adaptation of adolescents to pregnancy and risky situations that may develop during pregnancy is affected by one's own internal dynamics (thoughts, emotions, desires, fears) and environmental factors [4].

Particular reasons such as limited access to health services in adolescence, insufficient knowledge of reproductive health, cultural pressure, and difficulty in making their own decisions cause adolescent pregnancies to be at high risk and increase maternal mortality rate; besides, depression and post-traumatic stress disorders are common [3].

Furthermore, it was determined that adolescent mothers cannot adequately meet the physical and psychological needs of their babies compared to adult mothers, babies of adolescent mothers have more nutritional disorders, growth and developmental retardation, cognitive dysfunctions and suffer from low learning capacity, exhibit higher behavioral problems in childhood and higher potential to commit crimes [5]. It is thought that all these negativities are caused by insufficient attachment during pregnancy [4]. Attachment develops depending on the nature of the real relationship and turns into great love over time. Although the most intense attachment is experienced in the postpartum period, it is known that the attachment process truly begins in the prenatal period. Attachment is very important for the adoption of the maternal role and the continuity of parenting. Previous reports stated that mother-infant attachment during pregnancy is affected by the family's income level, planned pregnancy and feeling fetal movements; however, the effects of maternal age and physical symptoms of pregnancy are still not fully known [6, 7].

On the other hand, while increasing depression rates decrease attachment, positive health behaviors increase attachment [7] and negative health behaviors affect attachment negatively. Inadequate health practices during pregnancy lead to maternal bleeding, invasive delivery, preterm delivery, congenital anomalies and miscarriages in the fetus, and low birth weight in newborns [8].

Quality and adequate prenatal care provided to adolescent pregnant women would be effective in improving health practices during pregnancy and increasing prenatal attachment. “Satisfaction in marriage” refers to one’s perception of the degree to which their needs in the marital relationship were being met and is also defined as the happiness felt from the marital relationship [9].

Mood changes in the adolescent age group may negatively affect their marriage and harmony between couples. Spouses need to support each other for satisfaction in marriage, so late prenatal attachment occurs in marriages with a lack of spousal support and weak family bonds [10].

Based on the above-mentioned information, it is believed that satisfaction in marriage and health practices can be effective among adolescent pregnant women as in other pregnant women. Midwives should determine the factors that may affect prenatal attachment in adolescent pregnant women, give care with a holistic perspective, and determine the possible risks in advance. Therefore, the current study examines prenatal attachment in adolescent pregnant women and related factors.

2. Material and Methods

2.1. Sample and Population

Adolescent pregnant women who attended the maternity clinic of a Research and Training Hospital between June 2018 and June 2019 participated in the study. The population of this study consists of adolescent pregnant women who visited this Research and Training Hospital between the stated dates for follow-up. A total of 44 adolescent pregnant women applied to the hospital where the study was conducted in 2017. While determining the sample size, Vural Batik and Kalkan's study and G*Power 3.1 were used (11). While calculating the sample size, the effect size (d=0.63), 1-β=0.95 and the margin of error were taken as 5%, and accordingly, we determined that the study could be conducted with 34 adolescent pregnant women. Pregnant women aged 19 and under, with a healthy pregnancy period, at 24-40 weeks of pregnancy, who were not diagnosed with psychiatric illness, and who agreed to participate in the study were included in the study. Data were gathered with face-to-face interviews by the researcher. The interviews were carried out in a convenient room of the hospital before or after the follow-up visits. The interview duration was an average of 20 minutes.

2.2. Ethical Permission

The study was conducted under the Principles of the Declaration of Helsinki. Before the study, ethical approval was obtained from Sivas Cumhuriyet University Non-Interventional Clinical Research Ethics Committee (dated 30.04.2018 and numbered 04/31) and the research permission was obtained from the Provincial Health Directorate (dated 04.12.2018 and numbered E. 11853). Also, the participants were informed about the nature of the study and they provided written informed consents.

2.3. Data Collection Tools

Data was collected using “Personal Information Sheet”, “Marital life scale”, “Prenatal Attachment Inventory”, and “Health Practices in Pregnancy Questionnaire”.

I.Personal Information Sheet was created by the authors based on a literature survey and consists of items related to the sociodemographic and obstetric characteristics of pregnant women [6, 11].

II. Prenatal Attachment Inventory (PAI) was developed by Muller to reveal the thoughts and feelings experienced by women during pregnancy

and to determine their prenatal attachment level [12]. The inventory consists of 21 items assessed by using a four-point Likert scale (1 = never, 2 = rarely, 3 = often, and 4 = always). The highest and lowest scores that can be obtained from the scale were 84 and 21, respectively. Higher scores indicate higher prenatal attachment. The validity and reliability studies for the Turkish version of the inventory were carried out in a previous study and the Cronbach's Alpha reliability coefficient was calculated as 0.84 [6]. However, in the current study, Cronbach's Alpha was found to be 0.90.

III. Marital life scale (MLS) was developed by Tezer to measure the overall satisfaction in the marital relationship [13]. MLS consists of 10 items assessed with a five-point Likert scale. Comprising: Strongly disagree (1); Disagree (2); Undecided (3); Agree (4); and Strongly agree [5]. The lowest and highest scores that can be obtained from the scale were 10 and 50, respectively. Higher scores indicate higher satisfaction in marriage. The Cronbach's Alpha reliability coefficient of the scale was calculated as 0.85, whereas, in the current study, it was found to be 0.78 [13].

IV. Health Practices in Pregnancy Questionnaire (HPQ) was developed by Lindgreen to evaluate health practices during pregnancy that may affect pregnancy outcomes [14]. HPQ consists of 33 items. Health practices during pregnancy were defined as balance of rest and exercise, safety measures, nutrition, avoiding the use of harmful substances, obtaining health care, and obtaining information. The items 1-16 were rated on a five-point Likert scale (always = 5, often = 4, sometimes = 3, rarely = 2, never = 1). The items 17-33 were scored 1 to 5 through five answer choices. Ten items of the scale (6, 7, 21, 22, 23, 24, 25, 26, 32, and 33) were reverse-coded. A score that can be obtained from the scale varies from 33 to 165. Higher scores indicate higher quality health behaviors during pregnancy. However, it was calculated as 0.62 in our study.

2.4. Analysis of the Data

The data were analyzed using Statistical Package for Social Sciences (SPSS 21.0). While analyzing the data, the descriptive statistical methods (mean, standard deviation minimum and maximum values, and percentages) were used and also chi-square test was performed to examine the relationships between the categorical variables. As stated by Demir et al., Shapiro-Wilk's test was used to examine if the variables are homogeneously distributed since the sample size is 34 [15]. After determining the variables were homogeneously distributed, the independent sample t-test was used for comparison of two independent groups and One Way ANOVA was conducted for comparing more than two independent groups. Pearson Correlation analysis was used to examine the relationships between the scales. To identify which group is significantly different from other groups, the Tukey test was used when the homogeneity assumption was met and Tamhane's T2 test was used when the homogeneity assumption was not met. $p<0.05$ was accepted as statistically significant.

3. Results and Discussions

The mean age of the adolescent pregnant women was 18.07±0.76. We determined that 55.9% of the participants were "high school" graduates, almost all of them were married, 82.4% were not spouse's kin, 76.5% were married for 1 year or less, 97.1% were unemployed, 88.2% were not smokers, and 61.8% of them perceived their income as equal to their expenditure. A total of 52.9% of pregnant women's husbands were "primary school" graduates and 50.0% of them were "workers" (Table 1).

Table 1: *Distribution of Pregnant Adolescents' Sociodemographic Characteristics*

Sociodemographic Characteristics		**n**	**%**
Mean age	18.07±0.76 (min-max: 17-19)		
Education	Primary school	15	44.1
	High school	**19**	**55.9**
Marital Status	Married	**33**	**97.1**
	Single	1	2.9
Spouse's kin	Yes	6	17.6
	No	**28**	**82.4**
Marriage Duration	1 Year and Less	**26**	**76.5**
	2-3 Years*	8	23.5
Employment	Unemployed	**33**	**97.1**
	Employed	1	2.9
Spouse's Education	Primary school	**18**	**52.9**
	High school and above	16	47.1
Spouse's Occupation	Public servant	4	11.8
	Worker	**17**	**50.0**
	Farmer	5	14.7
	Storekeeper	5	14.7
	Self-employment	3	8.8
Income Perception	Income is Less Than Expenses	10	29.4
	Income is Equal to Expenses	**21**	**61.8**
	Income is Higher Than Expenses	3	8.8
Smoking	Never Used	**30**	**88.2**
	Still Using	4	11.8
Total		34	100.0

*6 pregnant women have been married for 2 years and 2 pregnant women for 3 years

The mean pregnancy weak of the adolescent pregnant women was 26.50±9.94. We determined that 82.4% of the participants had their first pregnancy, 50.0% of them prefer a baby "boy", 94.1% were willing to become pregnant, and 73.5% had a planned pregnancy. Moreover, 85.3% of the pregnant women felt "joy and happiness" when they

learned pregnancy and 82.4% defined their relationship with their spouse as "very good" (Table 2).

Table 2: *Distribution of Pregnant Adolescents' Obstetrical Characteristics*

Obstetrical Characteristics		**n**	**%**
Mean Pregnancy Week	26.50±9.94 (min-max: 25–40)		
Number of pregnancies	First Pregnancy	**28**	**82.4**
	Second or Third Pregnancy *	6	17.6
Number of children alive	No children alive	**31**	**91.2**
	One or Two Children**	3	8.8
Pregnancy after assisted reproduction	Yes	3	8.8
	No	**31**	**91.2**
Gender of the baby	Girl	**14**	**41.2**
	Boy	10	29.4
	Not yet known	10	29.4
Gender Preference	Girl	16	47.1
	Boy	**17**	**50.0**
	Does not matter	1	2.9
Willingness to Become Pregnant	Yes	**32**	**94.1**
	No	2	5.9
Planned Pregnancy	Yes	**25**	**73.5**
	No	9	26.5
Emotions Felt When They Learned Pregnancy	Joy and Happiness	**29**	**85.3**
	Fear and Anxiety	5	14.7
Relationship with Spouse	Very good	**28**	**82.4**
	Good	3	8.8
	Very Bad	3	8.8
Total		34	100

*Third pregnancy of 1 pregnant and the second pregnancy of 5 pregnant women; **1 woman had 2 living children and 2 women had 2 living children.

Table 3: *Mean scores of Prenatal Attachment Inventory, Marital life scale, and Health Practices in Pregnancy Questionnaire*

Scales	**The highest and lowest scores that can be obtained from the scale**	**Min-Max**	**Mean ± SS**
Prenatal ttachment Inventory	21 - 84	21-67	38.79±11.66
Marital life scale	10 - 50	12-44	32.62±8.38
Health Practices in Pregnancy Questionnaire	33 - 165	69-114	94.03±10.94

Mean scores of the adolescent pregnant women for PAI, MLS, and HPQ were 38.79±11.66, 32.62±8.38, and 94.03±10.94, respectively (Table 3). Significant differences were found in the adolescent pregnant women's MLS scores according to smoking status, gender of the baby, and emotions felt when they learned pregnancy. Furthermore, the PAI scores significantly differ according to gender, being spouse's kin, willingness to become pregnant, and emotions felt when they learned pregnancy. Moreover, significant differences were obtained in the HPQ scores according to the number of pregnancies and pregnancy after assisted reproduction ($p<0.05$) (Table 4). MLS scores were higher in those who never smoked, whose baby was male, and those who felt joy and happiness when they learned pregnancy. Furthermore, PAI scores were higher in those aged 18 years, spouse's kin, willing to become pregnant, and those who felt joy and happiness when they learned pregnancy. Moreover, higher HPQ scores were observed in pregnant women in their first pregnancy and became pregnant after assisted reproduction. On the other hand, no significant differences were found in the mean scores of MLS, PAI, and HPQ according to education and relationship with their spouse ($p>0.05$).

Table 4: *Comparison of the Adolescent Pregnant Women's MLS, PAI, and HPQ scores with Their Sociodemographic and Obstetric Characteristics*

Sociodemographic and Obstetric Characteristics	**n**	**MLS**	**PAI**	**HPQ**
Age				
17	9	**35.44±8.15**	36.00±8.88	90.89±11.94
18	14	31.29±8.35	**44.64±12.10**	92.21±9.09
19	11	32.00±8.82	33.64±10.55	**98.91±11.56**
F* / p		0.706/0.501	**3.573/0.040**	1.731/0.194
Education				
Primary School	15	**32.73±9.22**	38.13±12.60	92.87±11.50
High School	19	32.53±7.91	**39.32±11.19**	**94.95±10.70**
t** / p		0.070/0.944	0.289/0.774	0.545/0.590
Spouse's Kin				
Yes	6	30.67±8.98	**49.50±10.48**	90.50±10.89
No	28	**33.04±8.36**	36.50±10.73	**94.79±11.00**
t** / p		-0.622/0.538	**2.703/0.011**	-0.867/0.392
Smoking				
Never Used	30	**36.00±3.74**	**39.28±12.11**	**99.20±4.55**
Still Using	4	30.92±8.88	36.80±9.85	92.84±10.89
t** / p		**-2.063/0.047**	0.399/0.692	-1.058/0.298
Number of Pregnancies				
First Pregnancy	28	**32.57±8.03**	37.96±11.90	**96.25±9.38**
Second or Third Pregnancy	6	32.83±10.70	**42.67±10.53**	83.67±12.58
t** / p		-0.068/0.946	-0.893/0.379	**2.811/0.008**
Pregnancy after assisted reproduction				
Yes	3	30.33±11.59	**48.67±20.79**	**95.26±10.31**
No	31	**32.84±8.23**	37.84±10.50	81.33±10.69
t** / p		-0.489/0.628	1.568/0.127	**2.227/0.033**
Gender of the Baby*				
Girl	14	28.50±8.84	37.71±12.31	94.86±10.12
Boy	10	**36.40±2.27**	35.40±7.77	**99.00±8.64**
Not yet known	10	34.60±9.62	**43.70±13.35**	87.90±12.08
F* / p		**3.427/0.045**	1.400/0.262	2.953/0.067
Willingness to Become Pregnant				
Yes	32	**32.72±8.39**	**56.50±14.84**	**94.41±11.03**
No	2	31.00±11.31	37.69±10.78	88.00±9.89
t** / p		0.277/0.783	**2.360/0.025**	0.799/0.430
Emotions Felt When They Learned Pregnancy				
Joy and Happiness	25	**34.17±7.80**	**51.60±10.99**	**94.76±10.86**
Fear and Anxiety	9	23.60±5.81	36.59±10.43	89.80±11.64
t** /p		**2.878/0.007**	**2.951/0.006**	0.934/0.357
Relationship with Spouse				
Very Good	28	**33.36±8.56**	**42.00±21.65**	**95.36±11.14**
Goof	3	33.00±2.00	38.50±10.85	86.00±9.53
Very Bad	3	25.33±8.73	38.33±13.01	89.67±7.57
F*/ p		1.265/0.296	0.118/0.889	1.273/0.294

MLS: Marital Life Scale; PAI: Prenatal Attachment Inventory; HPQ: Health Practices in Pregnancy Questionnaire *One Way ANOVA; **Independent Sample T-test;

An examination of the mean scores of MLS, PAI, and HPQ indicated that a strong positive correlation exists between PAI and MLS scores (r=0.873; p=0.025) and a weak negative correlation exists between PAI and HPQ scores (r=-0.423; p=0.005) (Figure 1). The adolescent pregnant women perceived higher overall satisfaction of marriage as their prenatal attachment increases and accordingly, the increase in prenatal attachment leads to higher satisfaction in marriage. However, prenatal attachment increases as the health practices in pregnancy decrease and health practices in pregnancy increase as the prenatal attachment decreases.

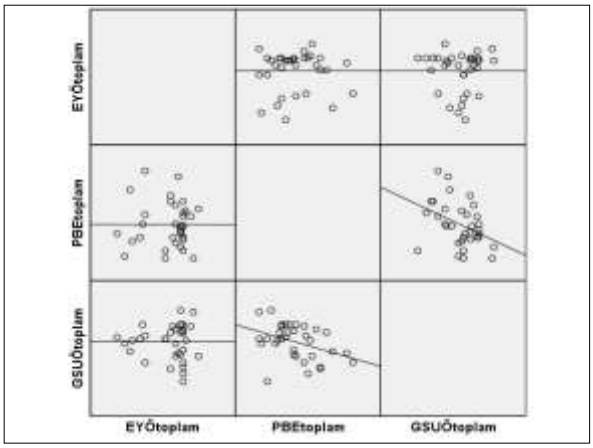

Figure 1: *The relationship curves for MLS, PAI, and HPQ*

The results of the current study which aimed at examining the level of prenatal attachment experienced by adolescent pregnant women and related factors are discussed using the recent research literature. We found that the adolescent pregnant women's perceived overall satisfaction of marriage increases as their prenatal attachment increases; however, prenatal attachment increases as health practices in pregnancy decrease. According to a literature survey on prenatal attachment, studies on mother-infant attachment in Turkey generally focused on adult pregnant women and few studies have examined factors affecting the level of prenatal attachment experienced by adolescent pregnant women [16-19]. The present study is very important since it examined both the level of mother-infant attachment and the relation of mother-infant attachment to marital harmony and health practices in pregnancy. With this study, our purpose was to draw attention to adolescent pregnancies, to evaluate the level of mother-infant attachment and its related factors, as well as to be aware of the importance of care and practices targeting these factors. Our findings draw attention to the potential risks in adolescent pregnant women and also the importance of general health practices and satisfaction in marriage on prenatal attachment. We found that the mean PAI score of adolescent pregnant women was 38.79±11.66. Considering that the lowest and highest scores that can be obtained from the scale were 21 and 84, respectively, the levels of prenatal attachment experienced by adolescent pregnant women were below average. Previous studies found that the PAI mean scores were 64.67±6.61 in pregnant women 20 years of age or younger; 62,50±9,67 in pregnant women 19 years of age or younger [18, 20]. The lower PAI scores obtained in our study than these reports can be explained by the mean participant age was lower and the duration of the marriage in our study was higher than these studies, as well as the regional differences [18]. A similar PAI mean score (44.7±14.08) with our study was obtained by the study of Eyüpoğlu and Eyüpoğlu examining adolescent pregnant women with pregnancy complications [19]. Adolescent pregnancies are defined as high risk and may negatively affect mother-infant attachment [2].

We found that those aged 18 years, were spouse's kin, willing to become pregnant, and felt joy and happiness when she'd learned she was pregnant had higher PAI scores. A majority of the pregnant women who participated in our study stated that their relationship with their spouse was very good (82.4%) and they planned to become pregnant (73.5%). It may be argued that these factors helped women to feel happy as well as to increase relationships with their spouses and the level of prenatal attachment. Consistent with our results, Alan Dikmen and Çankaya found that those willing to become pregnant had significantly higher PAI scores [16]. Also, Ulu and Bayraktar determined a significant relationship between the level of prenatal attachment experienced by pregnant women and their relationship with their spouses [21]. On the other hand, Badem and Zeyneloğlu found that the PAI scores significantly differ according to the age and emotions felt when they've learned pregnancy [18]. They also determined that those aged 19 years and younger felt happiness when they've learned pregnancy had higher prenatal attachment compared to those aged 20 years and above and felt sadness when they've learned pregnancy. These results suggest that willingness to become pregnant might be effective on willing and enthusiastic to be a mother and mother-infant attachment can be affected by many factors including age. In our study, the mean MLS score of adolescent pregnant women was calculated as 32.62±8.38. Considering that the highest and lowest scores that can be obtained from the scale were 50 and 10, respectively, the participants' mean score was found to be above the average scale score. This was a desirable and important finding as it indicates adolescent pregnant

women had good marital harmony. The fact that only a limited number of studies examined adolescent pregnant women using MLS limits the opportunity to discuss the data, therefore, the results were also evaluated using the reports on adult pregnant women [22]. Accordingly, Yıldız and Baytemir calculated the mean MLS scores as 37.95±8.08 and Ulu and Bayraktar found to be 38.64±8.49 in adult pregnant women. The mean MLS scores of adult pregnant women were found to be higher than the mean score calculated in our study [21, 23]. Marriage is a union between spouses who have a sense of responsibility towards each other, support each other socially, have open communication, and can develop problem-solving skills. It can be argued that individuals who have not yet completed their own identity and personality development and have not formed value judgments cannot build a healthy marriage union and cannot get satisfaction from marriage. Because, in marriages made at a young age, individuals may be more likely to make mistakes when choosing a life partner and this may lead to an increased risk of divorce; so, spouses may exhibit negative attitudes towards each other. From this point of view, the higher MLS scores in adult women than adolescents are considered expected results. Aslan et al. determined that women who married before the age of 18 had lower marital harmony than those who married after the age of 18 [16]. Instead of satisfaction in marriage, other terms such as marital harmony, quality of marriage, marital success, marital happiness are also used in the literature [24]. The relationship between marital adjustment and marital satisfaction allows these two concepts to be used synonymously [25]. We found that adolescent pregnant women who never smoked, carrying a boy, and felt joy and happiness when learned pregnancy had higher MLS scores. Consistent with our results, Haylı et al. found that a baby of the desired gender and Yanıkkerem et al. determined that planned pregnancy and not smoking positively affect marital harmony [26, 27]. Furthermore, in a previous study, a significant correlation was found between the marital harmony of adult women who had a 1–4-month-old baby and having a desired gender of baby [28]. Having planned and a desired number of children, experiencing desired pregnancies, proper birth preparedness before and during pregnancy might increase the attachment of both mother and father to the baby as well as help increase marital satisfaction.

We found that the mean HPQ score of adolescent pregnant women was 94.03±10.94, and those in their first pregnancy and became pregnant after assisted reproduction had higher HPQ scores. However, we determined that the age of women did not affect HPQ scores. In previous studies using HPQ, Sis Çelik and Aksoy Derya calculated the mean HPQ score as 114.43±17.90 in adult pregnant women; Beyaz et al., calculated as 105.85±10.17 in women who had their first pregnancy before 18 years old; Hadian et al. calculated as 135.29±9.08 in adolescent pregnant women [29-31]. Accordingly, the mean HPQ score found in our study was below the mean scores found in the previous studies. Probably, this difference in the mean HPQ scores lies in the socio-cultural differences, adolescent pregnancies, and pregnant women's lack of knowledge in general health practices. Consistent with our findings, some previous reports obtained a significant correlation between number of pregnancies and HPQ scores and found that HPQ scores decrease as the number of pregnancies increases [29, 30]. These results point out that the workload caused by having more children might negatively affect the individual health practices of adolescent pregnant women.

While describing factors affecting prenatal attachment, readiness to become a mother, spouse support for building and maintaining a love relationship between mother and fetus, and health practices during pregnancy are important [17]. The correlation analysis conducted to determine relationships between the scales revealed that adolescent pregnant women perceived overall satisfaction in marriage increase as their prenatal attachment increases. On the other hand, prenatal attachment increase as their perceived overall satisfaction in marriage increases. Previous studies showed that marital harmony and social support increase prenatal attachment [32]; pregnant women who experienced dating prior to marriage and who were emotionally and physically supported exhibit higher marital harmony and prenatal attachment [17]; a moderate positive correlation exists between mother's satisfaction in marriage and mother-baby attachment and mother's satisfaction in marriage increases as mother-baby attachment increases [28]. Ulu and Bayraktar also emphasized that pregnant women's satisfaction in marriage increases as their prenatal attachment increases [21]. These previous reports support our research findings. Therefore, it can be argued that higher harmony with spouse during pregnancy increases marital harmony, provides psychological relief in the expectant mother, enables more effective adaptation of the role of motherhood, and thus increases prenatal attachment. Moreover, when a pregnant woman has positive attitudes towards her unborn baby, she might exhibit more warm and responsive behaviors towards her baby and spouse, adopt a parental role better, and thus have higher satisfaction in marriage as well as higher marital harmony. Positive health behaviors include not smoking, not using alcohol, receiving health care before birth and involving in

health care practices, healthy eating, regular sleep, and exercising. Previous research showed that women with higher prenatal attachment try to develop positive health behaviors and positive health behaviors increase as prenatal attachment increases [7, 31]. Badem and Zeyneloğlu found that prenatal attachment levels of pregnant women who developed positive health behaviors during pregnancy were higher than those who did not develop positive health behaviors [18]. However, our findings surprisingly suggest that prenatal attachment increases as health practices in pregnancy decrease and health practices in pregnancy increase as prenatal attachment decreases. Furthermore, we found that pregnant women who did not smoke and did not use alcohol during pregnancy had a higher prenatal attachment. In this regard, while the presence of a positive relationship between health practices during pregnancy and prenatal attachment is expected, the negative relationship determined in our study is a thought-provoking result. The underlying reasons for this contradiction may be different health practices other than smoking and alcohol use. Hadian et al. obtained a weak positive correlation between maternal-fetal attachment in adolescent pregnant women and HPQ scores [31]. Our finding that indicating increased positive health behaviors resulted in lower prenatal attachment suggests that adolescents do not attach much importance to their own health and do not pay more attention to protecting the health of their babies.

4. Conclusions

Our results showed that the mean PAI score of the adolescent pregnant women was below the average inventory score whereas, their mean MLS and HPQ scores were above the average. We found that the participants who were high school graduates, carrying a boy, had a moderate spouse relationship displayed lower levels of prenatal attachment. Also, the satisfaction in marriage increases as prenatal attachment increases, on the other hand, the health practices in pregnancy increase as prenatal attachment decreases. In this regard, it is important to ensure that midwives and nurses evaluate prenatal attachment, marital harmony, and health practices during pregnancy while receiving histories of pregnant women, especially adolescent pregnant women. Also, they should determine factors that may affect prenatal attachment and provide education and counseling to adolescent pregnant women, who are a risky group in terms of prenatal attachment and evaluate pregnant women from a holistic perspective. To prevent adolescent pregnancies, it is important to detect early pregnancy if a pregnancy has occurred. Also, a mother's physical and mental health should be protected by regular physical and psychological follow-ups in the postpartum period. Furthermore, studies evaluating the effectiveness of evidence-based practices regarding prenatal attachment are needed.

Author Statements:

- **Ethical approval:** The conducted research is not related to either human or animal use.
- **Conflict of interest:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper
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- **Data availability statement:** The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

References

[1] Arslan, S., Okçu, G., Coşkun, M.A., Temiz, F. (2019). Women's perception of pregnancy and the affecting factors. *Journal of Health Science and Profession*. 6(1):179-192. DOI: 10.17681/hsp.432333

[2] World Health Organization (2021, Jun 14). Adolescent health, 2021. https://www.who.int/southeastasia/health-topics/adolescent-health; Accessed Date: 10 Aug 2021.

[3] Kabir, R., Ghosh, S., Shawly, A. (2019). Causes of early marriage and its effect on reproductive health of young mothers in Bangladesh. *American Journal of Applied Sciences*. 16(9):289-297. DOI: 10.3844/ajassp.2019.289.297

[4] Keramat, A., Malary, M., Moosazadeh, M., Bagherian, N., Raiabi-Shakib, M.R. (2021). Factors influencing stress, anxiety, and depression among Iraian pregnant women: the role of sexual distress and genital self-image. *BMC Pregnancy and Childbirth*. 21:87. DOI:10.1186/s12884-021-03575-1

[5] Kara Uzun, A., & Şimşek Orhon, F. (2013). Influences of adolescent pregnancy on maternal and infant health. *Ankara Üniversitesi Tıp Fakültesi Mecmuası*. 66(1):19-23. DOI: 10.1501/Tipfak_0000000836

[6] Yılmaz, D.S., & Kızılkaya Beji, N. (2013). Turkish version of prenatal attachment inventory: A study of

reliability and validity. *Journal of Anatolia Nursing and Health Sciences*. 16(2):103-109.

[7] Karakaş, M. N., & Dağlı Şahin, F. (2019). The importance of attachment in infant and influencing factors. *Turkish Archives of Pediatrics.* 54(2):76-81. DOI: 10.14744/TurkPediatriArs.2018.80269

[8] Balkaya Akdolun, N., Vural, G., Eroğlu, K. (2014). Investigating problems related to the health of mothers and their babies resulting from risk factors determined during pregnancy. *Journal of Duzce University Health Sciences Institute*. 1(1):6-16.

[9] Yedirir, S., & Hamarta, E. (2015). Emotional expression and spousal support as predictors of marital satisfaction: The case of Turkey. *Educational Sciences: Theory and Practice*. 15(6):1549-1558. DOI: 10.12738/estp.2015.6.2822

[10] Dakin, J., & Wampler, R. (2007). Money doesn't buy happiness, but it helps: marital satisfaction, psychological distress, and demographic differences between low- and middle-income clinic couples. *The American Journal of Family Therapy*. 36:300-311. DOI: 10.1080/01926180701647512

[11] Vural Batık, M., & Kalkan, M. (2017). Perceived marital problem-solving skills and marital satisfaction. *Journal of the Human and Social Science Researches*, 6(5):2630-2646.

[12] Muller, M.E. (1993). Development of the prenatal attachment inventory. *Western J Nurs Res*. 15(2):199-211.DOI: 10.1177/019394599301500205

[13] Tezer, E. (1996). Satisfaction from marital relationship: Marital Life Scale. *Turkish Psychological Counseling and Guidance Journal.* 2(7):1-7.

[14] Lindgren, K. (2005). Testing the Health Practices in Pregnancy Questionnaire-II. *Journal of Obstetric, Gynecologic, and Neonatal Nursing: JOGNN*. 34(4):465–472. DOI: 10.1177/0884217505276308

[15] Demir, E., Saatçioğlu, Ö., İmrol, F. (2016). Examination of educational researches published in international journals in terms of normality assumptions. *Curr Res Educ*. 2(3):130-149.

[16] Alan Dikmen, H., & Çankaya, S. (2018). Effects of maternal obesity on prenatal attachment. *Acıbadem University Health Sciences Journal*. 9(2):118-123. DOI: 10.31067/0.2018.1

[17] Küçükkaya, B., Kahyaoğlu Süt, H., Öz, S., Altan Sarıkaya, N. (2020). The relationship between dyadic adjustment and prenatal attachment in pregnancy. *Acıbadem University Health Sciences Journal*. 11(1):102-110. DOI:10.31067/0.2020.246

[18] Badem, A., & Zeyneloğlu, S. (2021). Determination of prenatal attachment levels of pregnant women and affecting factors. *Kırşehir Ahi Evran University Journal of Health Sciences*. 1(1):37-47.

[19] Eyüpoğlu, D., & Eyüpoğlu, M. (2020). Prenatal attachment, anxiety and depression in pregnant adolescents and the emotional availability of their parents. *Anatolian Journal of Psychiatry*. 21(2):124-132. DOI:10.5455/apd.56516

[20] Dağlar, G., & Nur, N. (2018). Level of mother-baby bonding and influencing factors during pregnancy and postpartum period. *Psychiatria Danubina*. 30(4):433-440. DOI: 10.24869/psyd.2018.433

[21] Ulu, P.G., & Bayraktar, S. (2018). Investigation of variables related to prenatal bonding levels in pregnant women. *Yeni Symposium*. 56(2):1-9. DOI: 10.5455/NYS.20180629015333

[22] Tekin, H.H., & Karakuş, Ö. (2019). The relationship between childhood trauma, emotion regulation difficulties and marital satisfaction in pregnant adolescents. *Turkish Journal of Family Medicine and Primary Care*. 13(4):500-507. DOI:10.21763/tjfmpc.519969

[23] Yıldız, M. A., & Baytemir, K. A. (2016). Mediation role of self-esteem in the relationship between marital satisfaction and life satisfaction in married individuals. *Inonu University Journal of the Faculty of Education.* 17(1):67-80. DOI: 10.17679/iuefd.17181627

[24] Fincham, F. D., & Bradbury, T. N. (1987). The assessment of marital quality: A reevaluation. *Journal of Marriage and the Family*. 797-809. DOI: 10.2307/351973

[25] Erbil, D. D., & Hazer, O. (2018) Examination of married and working individuals' marital adjustment. *International Journal of Eurasian Education and Culture*. 3(5):99-116. DOI: 388/810

[26] Haylı, R.G., Durmuş, E., Kış, A. (2017). Investigating the marital satisfaction in terms of gender: A meta-analysis study. *International Journal of Human Sciences.* 14(4):3328-3342. doi:10.14687/jhs.v14i4.4830

[27] Yanikkerem, E., Goker, A., Ustgorul, S., Karakus, A. (2016). Evaluation of sexual functions and marital adjustment of pregnant women in Turkey. *Int J Impot Res*. 28(5):176–183. DOI: 10.1038/ijir.2016.26

[28] Durualp, E., Kaytez, N., Aykanat Girgin, B. (2017). An analysis of the relation between marital satisfaction and maternal bonding. *Anatolian Journal of Psychiatry*. 18(2):129-138.

[29] Sis Çelik, D., & Aksoy Derya, Y. (2019). Determining the self-care agency and the health practice levels of the pregnant women and the effective factors. *Gümüşhane University Journal of Health Sciences.* 8(1):111-119.

[30] Beyaz, E., Gökçeoğlu, S., Özdemir, N. (2020). Determination the health practice levels of pregnant women in the Muş City Center. *Van Health Sciences Journal*. 13(2):9-16.

[31] Hadian, T., Moosavi, S., Meedya, S., Mohammad-Alizadeh-Charandabi, S., Mohammadi, E., Mirghafourvand, M. (2021). Relationship of health practices with depression and maternal-fetal attachment in adolescent pregnant women: A prospective study. *Archives of Psychiatric Nursing*. 35(5):465–471. DOI: 10.1016/j.apnu.2021.06.011

[32] Özcan, N., Boyacıoğlu, N., Dikeç, G., Dinç, H., Enginkaya, S., Tomruk, N. (2018). Prenatal and postnatal attachment among turkish mothers diagnosed with a mental health disorder. *Journal Issues in Mental Health Nursing*. 39(9):795-801. DOI:10.1080/01612840.2018.1455773