

## Factors Affecting Maternal Fetal Attachment among Low and High Risk Pregnant Women

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### Abstract

**Background:** Maternal-fetal attachment (MFA) plays an important role in the maternal and fetal well-being. Despite the presence of consistent evidence about individual differences in the level of MFA, there is still a need to identify the most salient risk factors of MFA level especially among high risk pregnancy who are vulnerable to increase level of anxiety that can hinder an adequate mother–fetus attachment. **Aim.** This study aimed to compare maternal fetal attachment in low and high risk pregnancies and to identify the underlying factors which may affect maternal-fetal attachment among high risk pregnancy. **Methodology.** A descriptive cross-sectional design was used and conducted at the outpatient antenatal clinic at National Medical Institution, Damanhur City, Egypt for a convenient sample of 203 eligible pregnant women, the researchers used five tools to collect the necessary data; pregnant women basic data, Turkish version of the MFA Scale, Hobel's Prenatal Risk Score, Maternal Anxiety Scale & London questionnaire tool. **Results.** The findings of the present study portrayed a significant higher MFA among low risk mothers and a significant higher level of maternal anxiety was apparent among high risk. No significant differences was observed regarding MFA and pregnancy planning among both groups. Some personal and Obstetric variables affect the MFA level among high risk pregnant women. **Conclusion.** High risk pregnancy has lower level of MFA and higher level of anxiety with a remarkable obstetric predictors affecting their level of MFA. **Recommendations:** More attention should be given for high risk pregnant mothers through development and application of psychosocial nursing interventions program to decrease their anxiety level and improve maternal-fetal attachment.

**Keywords:** *Maternal Fetal Attachment, High Risk Pregnancy, Anxiety Level & the Predictors.*

### Introduction

Maternal-fetal attachment refers to the interaction between the pregnant woman and fetus, which is based on an intimate relationship (Ulrich & Asim, 2014, Salehi & Kohan 2017). This relationship has been described as the most basic form of the human intimacy and represents the earlier adopted representation of the fetus that both parents typically acquire and elaborate during pregnancy. (Camilla et al., 2014) This relationship starts from the beginning of pregnancy and reaches its peak during the second and third trimesters of pregnancy. (Tossi et al., 2011) Moreover, MFA is an important component of maternal identity and plays an important role in the maternal and fetal well-being. As the prenatal period is a proper chance for evaluating maternal-fetal attachment. (Alhusen, 2012 & Ustunsoz et al., 2010) since all of the mother's behaviors, actions and thoughts during pregnancy could have more permanent effects on the fetus than any other period of child's life and also since pregnancy is considered a critical period in the development, therefore it is necessary to evaluate mother's attachment to her fetus more accurately. (Ross, 2012)

Low maternal-fetal attachment has been linked to poorer health practices during pregnancy (Lindgren

2001), as women with high-risk pregnancies are unable to distinguish associated conditions and unfortunately have a high degree of anxiety due to the ambiguity surrounding the condition of the fetus. Furthermore, if high-risk conditions become more critical, anxiety will increase. (Rubertsson et al., 2014). This issue was emphasized by Moon (2007) who stated that anxiety in pregnant women has been interfering with maternal-fetal attachment and emotional empathy with the fetus.

Women with high-risk pregnancies experience anxiety due to uncertainties regarding their own health, the health of the fetus, physical awkwardness, and birth outcomes. (Abasi et al., 2012) This causes reduced confidence in the maternal role and negatively affects maternal-fetal attachment. (Moon, 2007)

In spite of the presence of consistent evidence about individual differences in the level of MFA, there is still a need to clarify its associated factors (Hussein et al., 2017). In this view, it is essential to identify the factors affecting attachment of parents towards their fetus and to planning psychosocial interventions in antepartum units or in obstetric clinics, in order to maintain a positive physical and emotional development of the infant and to provide family-

centered prenatal care. Particular attention should be paid to women hospitalized for a high-risk pregnancy, since this condition involves a high distress that often results in feelings of anxiety and depression that can impede an adequate mother–fetus attachment. (Camilla et al., 2014)

In addition, (Abasi & Tafazoli 2010) emphasized that those mothers who portray high level of attachment with their fetuses have stronger interaction with their infant. However, those with poor attachment to their fetus reported high levels of anxiety and depression that can lead to adverse pregnancy outcomes (Torshizi & Sharifzadeh 2012).

Moreover, more attentions need to be assumed to a specific anxiety experienced during pregnancy, called pregnancy-related anxiety (Bayrampour et al., 2013) Evidence supports the uniqueness of pregnancy-related anxiety from other anxiety types. This evidence includes (but is not restricted to) regular and consistent associations with negative obstetric and pediatric outcome (i.e. preterm birth and postnatal depression. (Grote et al., 2010)

Concerning this issue, Huizink et al., (2014) emphasized that pregnancy-related anxiety, which is regarded to affect up to 14.4% of expectant mothers needs more attention. Commonly, MFA is influenced by numerous socioeconomic status e.g. maternal age, educational level, marital status and obstetric variables such as gestational age, parity, mothers mental imagine of herself, obstetrics and medical problems during pregnancy, social support, maternal anxiety and psychiatric status, accepting the pregnancy, and unwanted pregnancy (Abasi et al., & Abasi & Tafazoli 2010).

However, Walsh (2014) has reported that predictive factors for maternal-fetal relationship have yet not been determined compellingly. By determining mothers' attachment style and the status of maternal-fetal attachment during pregnancy, timely interventions and educations could be planned for improving these interactions and consequently improve the mother-child attachment during the sensitive period of growth. For that the prenatal period is a good chance for evaluating maternal-fetal attachment. (Atashi et al., 2018)

Pregnancy is considered a vital and critical period in life as all of the pregnant mothers' behaviors, actions and thoughts could have more permanent effects on their fetuses than any other period of child's life (Kowalcek & Gembruch 2008) Moreover it is the period of development, therefore it is necessary to evaluate mother's attachment to her fetus more accurately. For that studying attachment during pregnancy would provide us a chance to learn more about this process, and studying this issue would help

us understand and cope with the psychological problems during and after pregnancy. (Ossa et al, 2012)

In light of beyond studies and observation of investigators, it was found that there is great need of pregnant mothers information regarding maternal fetal attachment, because the bond with her unborn baby is an important influence on mothers decision to adapt healthy behaviors during pregnancy and were less anxious and can strictly adhering the confounding factors that may interfere adversely with the mother fetus relationship and its negative consequences.

### Significance of the study

Since pregnancy is considered a critical period in the fetal development, therefore it is necessary to evaluate mother's attachment to her fetus more accurately especially for those who have any element of risks associated with their pregnancy, (Ross, 2012) as they are more vulnerable to experience a certain degree of anxiety due to the uncertainty surrounding the condition of the fetus. Furthermore, shedding the light on these risk associated factors is considered highly needed. In the light of these considerations the present findings will be remarkable as basic data in recognizing the level of maternal fetal attachment and the associated risk factors to enhance the future development of nursing interventions designed to improve maternal-fetal attachment in high-risk pregnancy.

### Aim of the study

The aims of the study were to

1. Compare maternal fetal attachment in low and high risk pregnancies.
2. Identify the underlying factors which may affect maternal-fetal attachment among high risk pregnancy.

### Research Questions

1. Do high-risk pregnant women achieve lower scores on the maternal-fetal attachment scale than low risk pregnant women during the second /third trimester of pregnancy?
2. Do high-risk pregnant women achieve high score of anxiety level compared to low risk pregnancy?
3. Do unplanned pregnant women achieve lower scores on the maternal-fetal attachment among high risk women compared to low risk?
4. What are the confounding factors that may have a role on maternal fetal attachment among high risk pregnant women?

**Operational Definition: High Risk Pregnancy**  
High-risk pregnancy was defined as "a pregnancy in which some aspects of the maternal or fetal environment or the past reproductive performance

represents an increase chance of maternal or fetal morbidity and/or mortality. It is a pregnancy in which the prospects of optimal outcome for either the mother or the fetus are reduced" (Akthar et al., 2009) A high risk pregnancy was defined as a score  $\geq 10$  on **Hobel's Prenatal and High Risk Screening (1973)**.

**Low-Risk Pregnancy:** Low-risk pregnancy was defined as a pregnancy to which the score  $\leq 9$  on **Hobel's Prenatal and Intrapartum High-Risk Screening (1973)** was given.

### Subjects and Methods

- **Study Design:** A descriptive cross-sectional design was used in this study.
- **Setting:** This study was conducted at the outpatient clinic of antenatal unit at National Medical Institution, Damanhur City, Elbehera Governorate. This institution is an educational center have high turnover of patients and serves about 7 districts.
- **Sample:** A total of 203 pregnant women, withdrawers 3 to be finally 200 (one-hundred each for high-risk and low risk pregnant women), any eligible pregnant mother and attended the clinic for their second & third trimester follow-up irrespective of their parity and approved to participate in the study during the period 1<sup>st</sup> of July to the start of September 2018 were included.
- Eligible pregnant women for the high risk group have to be  $\sim 10$  on the **Hobel Prenatal Risk Score**. In this context, three participants of the total sample withdraw (one of them was deaf and can't communicate, the other two participants refused to complete the form for time constrains).
- **The inclusion criteria were as following:** Those who are pregnant in the second & 3rd trimester, willing to participate in the study, has no history of depression, anxiety or any mental conditions, no current history of fetus with fetal congenital anomalies.

**The exclusion criteria were as following:** Past history of depression, anxiety, unwillingness to continue the study; taking psychiatric medications; major stress in the last 6 months; have stressful events during the study period.

**The tools:** Five tools were used to collect the necessary data: **Tool (1):** Pregnant women basic data structured interview schedule: This tool was developed by the researcher after reviewing the related literatures. It entailed the following two parts; **first part:** Personal data (age, level of education, occupation, marital status, residence, family type & size), **second part** related women' reproductive history (gravidity, parity, number of abortions, stillbirths, nature of previous pregnancies, frequency of antenatal visit, Ultrasonography (US) examination

and receiving its result concerning the sex of the baby, number of living children, infertility history, associated obstetric and medical complications), nature of current pregnancy (whether it was planned or not, natural or induced and weeks of gestation).

**Tool (2):** The Turkish version of the Maternal Antenatal Attachment Scale (MAAS 19 items) It was developed by **Condon (1993)**. The scale contains two sub-dimensions: "attachment quality" (items 3, 6, 9, 10, 11, 12, 13, 15, 16, and 19) and "time spent on attachment" (items 1, 2, 4, 5, 8, 14, 17, and 18). Item 7 does not influence any factor of these sub-dimensions; it is added to the total score. This is a Likert-type scale with a score between 1 and 5 attributed to each item (where 5 represents very intense feelings and 1 the absence of feeling). The minimum score for the total MAAS is 19 and the maximum 95. As well as scores for each of these subscales, a "total attachment" score can also be calculated. A high score indicates a high level of attachment. Eleven of the items (1, 3, 5-7, 9, 10, 12, 15, 16, and 18) are reverse scored.

- The factor loadings resulting from the factor analysis directed at the construct validity of the scale were in the 0.33-0.71 range. Cronbach's alpha reliability for the entire scale was 0.79; it was calculated as being 0.76 for the first sub-dimension (11 items) and 0.65 for the second sub-dimension (eight items).

**Tool (3): Hobel's Prenatal Risk Scoring System:** This tool was developed by **Hobel at 1973** and used to identify potential high-risk subjects (risk score  $\geq 10$  was high risk &  $\leq 9$  for low risk pregnancy).

**Tool (4): Maternal Anxiety Scale:** This tool was developed by **Brunton, et al., at (2017)** It consists of 33 items and eight subscales, represents a comprehensive and psychometrically sound screening scale for pregnancy-related anxiety. The eight subscales are childbirth concerns, body image concerns, and attitudes towards childbirth, worry about self, baby concerns, acceptance of pregnancy, avoidance, and attitudes towards medical staff. All items are scored on a 4-point scale ranging from 1-4. Higher scores are indicative of increased pregnancy-related anxiety. The sum of the subscale scores provides the full-scale score. An initial cut-off score of  $>75.50$  has been tentatively proposed as an indicator of high pregnancy-related anxiety. Transformation of subscale scores (if required) can only be completed if the respondent has no missing data, the scores are then summed to provide a total subscale score.

**Tool (5):** London questionnaire to measure unplanned pregnancy comprises of six questions investigating the use of contraceptive methods, timing of pregnancy, intention and desire for

pregnancy, communication with the sexual partner, and preparation for pregnancy. All the questions are scored from zero to two with total scores ranging between zero and 12. The scores of 0-3 demonstrate unplanned pregnancy (Dreesen & Matthijs 2010).

**Method:** Ethical approval was obtained from the ethical committee at Damamhur University and approval from Maternity & Child health Nursing Department at College of Nursing to accomplish the research.

- Official permission and approvals for conducting this study was obtained from the authorized personnel in National Medical Institution.
- An oral informed consent was obtained from all participants after explanation of the purpose of the study and they have the right to abstain from the study at any time regardless of the cause.
- The questionnaire of personal data, obstetric information, maternal-fetal attachment and anxiety scale form were handed to them. They answered the questionnaires at the presence of the researcher either before or after a clinic visit and the researcher clarified any questions they need it.
- The five juries who are experts in the field of Maternity and Psychiatry and Mental health nursing and Community health nursing assessed the validity of the tool & content validity index (CVI) was considered .
- The reliability of the tools (tool 2, 3, 4) were established previously, as the reliability (Cronbach's alpha) of .85 was found for the total scale of maternal and fetal attachment and for the subscale values were as follows; Differentiation of self from fetus - 5 items with a Cronbach's alpha of .62. Interaction with the fetus - 5 items with a Cronbach's alpha of .68. Attributing characteristics or intentions to the fetus - 6 items with a Cronbach's alpha of .67. Giving of self-5 items with a Cronbach's alpha of .52. Role-taking - 4 items with a Cronbach's alpha of .73.
- Reliability of London tool (tool 5) was 0.71.

**A pilot study:** It was done on 10% (20 mothers) of the sample to test the clarity of the tool and to estimate the time needed to fill the sheet. The necessary modifications were done accordingly, one of the modification is simplifying the Arabic translation of item no 16 in the maternal attachment scale & no (15, 16, 18, 26 & 31) in Maternal scale anxiety, moreover the sequences of some questions changed based on the pilot study. The pilot sample was excluded from the study.

- The researcher collected the data by using the tools that mentioned above from all women who were eligible, booked and met the inclusion criteria and consented to join the study, completed a self-administered questionnaire and the researcher read

the questions for those who were illiterate before the commencement of the examination in the waiting area in the antenatal clinic during the period between 1<sup>st</sup> of July to the start of September (Saturday to Thursday weekly recruited for antenatal care). To save time, personal data was obtained at the time the maternal fetal attachment scale questions were answered. The questionnaire took approximately 15-20 minutes to be completed by participants.

#### **Statistical analysis**

The data analysis was performed using SPSS version 20. Descriptive statistics were represented by frequency tables, Chi-square test was used to investigate the homogeneity of qualitative variables of the two groups. For the quantitative variables t-test was performed to compare the mean and standard deviation concerning, obstetrical data and to compare the mean scores between the groups in terms of anxiety level, maternal fetal attachment and pregnancy planning. In all the tests,  $P \leq 0.05$  was considered statistically significant and stepwise multiple regression analysis was applied.

## Results

Table (1): Distribution of the pregnant women according to their personal data

Items	Low risk(N= 100)		High risk(N= 100)		Test of significance
	No	%	No	%	
<b>Age (years)</b>					
- Less than 20	19	19.0	10	10.0	X <sup>2</sup> = 12.289 P = 0.006*
- 20 -	69	69.0	59	59.0	
- 30 -	12	12.0	30	30.0	
- 40 +	0	0.0	1	1.0	
	X ± SD 23.41 ± 4.44		X ± SD 26.04 ± 5.483		
<b>Place of residence</b>					
- Urban	28	28.0	30	30.0	FET = 0.097 P =0.876
- Rural	72	72.0	70	70.0	
<b>Women 'educational level</b>					
- Illiterate	21	21.0	15	15.0	X <sup>2</sup> = 5.903 P =0.206
- Read/write	40	40.0	34	34.0	
- Basic education	0	0.0	2	2.0	
- Secondary/technical education	26	26.0	38	38.0	
- University education	13	13.0	11	11.0	
<b>Women' occupation</b>					
- Not working (housewife)	67	67.0	84	84.0	X <sup>2</sup> = 7.812 P =0.005*
- Working	33	33.0	16	16.0	
<b>Family size</b>					
- 2-	33	33.0	74	74.0	X <sup>2</sup> = 33.78 P =0.000*
- 4+	67	67.0	26	26.0	

X<sup>2</sup> Chi square test FET Fisher Exact Test \* Significant at P≤0.05

Table (2): Distribution of the pregnant women according to their obstetrical and medical history.

Items	Low risk (N= 100)		High risk (N= 100)		Test of significance
	No	%	No	%	
<b>Number of pregnancies</b>					
- Primigravida	24	24.0	34	34.0	X <sup>2</sup> = 2.43 P =0.119
- Multigravida	76	76.0	66	66.0	
	X ± SD 1.98 ± 0.76		X ± SD 2.72 ± 1.85		
<b>Number of parity</b>					
	N=74		N=37		X <sup>2</sup> = 59.85 P =0.000*
- One	54	73.0	2	5.4	
- Two	15	20.3	8	21.6	
- Three times and more	5	6.7	27	73.0	
	X ± SD 0.39 ± 0.69		X ± SD 1.31 ± 1.29		
<b>Number of abortions</b>					
	N= 2		N=29		X <sup>2</sup> = 2.00 P =0.367
- One	2	100.0	14	48.3	
- Two	0	0.0	7	24.1	
- Three and more	0	0.0	8	27.6	
	X ± SD 0.02 ± 0.14		X ± SD 0.52 ± 0.93		
<b>Number of still births</b>					
	N=6		N=17		X <sup>2</sup> = 10.55 P =0.005*
- One	4	66.7	1	5.9	
- Two	1	16.7	2	11.8	
- Three and more	1	16.7	14	82.3	
	X ± SD 0.97 ± 0.37		X ± SD 1.06 ± 0.24		

Items	Low risk (N= 100)		High risk (N= 100)		Test of significance
	No	%	No	%	
<b>History of infertility:</b>					
- History of received fertility medications.					
a. Yes	27	27.0	51	51.0	13.19 0.000*
b.No	73	73.0	49	49.0	
- Is this pregnancy natural:					
a. Yes	12	12.0	43	43.0	24.10 0.000
b.No	88	88.0	57	57.0	
<b>Number of living children</b>	<b>N=68</b>		<b>N=20</b>		
- One	50	73.5	1	5.0	X <sup>2</sup> = 41.08 P =0.000*
- Two	14	20.6	6	30.0	
- Three and more	4	5.9	13	65.0	
	X ± SD 1.22 ± 0.42		X ± SD 2.15 ± 0.94		
<b>History of obstetric complications</b>	<b>N= 100</b>		<b>N= 100</b>		
- Yes	33	33.0	53	53.0	X <sup>2</sup> = 8.16 P =0.004*
- No	67	67.0	47	47.0	
<b>History of medical diseases</b>	<b>N= 100</b>		<b>N= 100</b>		
- Yes	34	34.0	50	50.0	X <sup>2</sup> = 5.25 P =0.022*
- No	66	66.0	50	50.0	

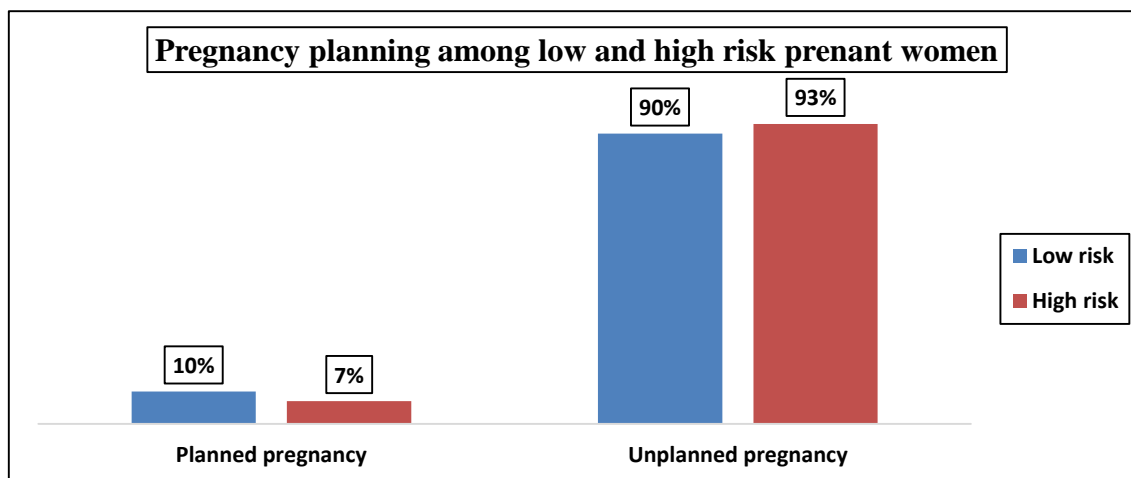
X<sup>2</sup> Chi square test \* Significant at P≤0.05

Table (3): Distribution of the pregnant women according to their current pregnancy follow up

Items	Low risk (N= 100)		High risk (N= 100)		Test of significance
	No	%	No	%	
<b>Regular antenatal visit follow- up</b>					
- Yes	75	75.0	39	39.0	X <sup>2</sup> = 26.44 P =0.000*
- No	25	25.0	61	61.0	
<b>Number of antenatal visits</b>	<b>N=75</b>		<b>N=39</b>		
- 3-	7	9.3	4	10.3	X <sup>2</sup> = 11.62 P =0.003*
- 5-	33	44.0	5	12.8	
- 7+	35	46.7	30	76.9	
	X ± SD 5.23 ± 1.72		X ± SD 7.39 ± 2.26		
<b>Number of ultrasounds scanning</b>	<b>N= 100</b>		<b>N= 100</b>		
- 1-	39	39.0	12	12.0	X <sup>2</sup> = 24.31 P =0.000*
- 3-	14	14.0	15	15.0	
- 5-	11	11.0	31	31.0	
- 7+	36	36.0	42	42.0	
	X ± SD 3.78 ± 2.84		X ± SD 6.56 ± 1.87		
<b>Given feedback about pregnancy and baby's condition</b>					
- Yes	75	75.0	95	95.0	X <sup>2</sup> = 15.68 P =0.000*
- No	25	25.0	5	5.0	
<b>Family support during pregnancy</b>					
- Yes	78	78.0	59	59.0	X <sup>2</sup> = 8.86 P =0.012*
- No	22	22.0	41	41.0	
<b>Desire of the coming baby</b>					
- Yes	97	97.0	86	86.0	X <sup>2</sup> = 7.78 P =0.005*
- No	3	3.0	14	14.0	

X<sup>2</sup> Chi square test \* Significant at P≤0.05

**Figure (1): Distribution of low and high-risk pregnant women according to their planning of the current pregnancy.**



$X^2 = 0.578$        $P = 0.446$

**Table 4: Distribution of low and high-risk pregnant women according to their maternal fetal attachment level**

Items	Low risk (N=100)		High risk (N=100)		Test of significance
	No	%	No	%	
- Poor	0	0.0	13	13.0	$X^2 = 18.977$ $P = 0.0001$
- Fair	37	37.0	19	19.0	$P = 0.004$
- Good	63	63.0	68	68.0	$P = 0.46$

$X^2$  Chi square test

\* Significant at  $P \leq 0.05$

**Table (5): Distribution of the pregnant women according to their maternal anxiety levels.**

Items	Low risk (N= 100)		High risk (N= 100)		Test of significance
	No	%	No	%	
<b>Child birth concern</b>					
- Low	4	4.0	0	.0	$X^2 = 21.61$ $P = 0.000^*$
- Moderate	32	32.0	9	9.0	
- High	64	64.0	91	91.0	
<b>Attitude towards child birth</b>					
- Low	1	1.0	1	1.0	$X^2 = 7.184$ $P = 0.028^*$
- Moderate	27	27.0	12	12.0	
- High	72	72.0	87	87.0	
<b>Baby concern</b>					
- Low	2	2.0	0	0.0	$X^2 = 36.29$ $P = 0.000^*$
- Moderate	31	31.0	1	1.0	
- High	67	67.0	99	99.0	
<b>Acceptance of pregnancy</b>					
- Low	4	4.0	0	0.0	$X^2 = 11.82$ $P = 0.003^*$
- Moderate	28	28.0	13	13.0	
- High	68	68.0	87	87.0	
<b>Avoidance</b>					
- Low	7	7.0	0	.0	$X^2 = 27.98$ $P = 0.000^*$
- Moderate	22	22.0	2	2.0	
- High	71	71.0	98	98.0	

Items	Low risk (N= 100)		High risk (N= 100)		Test of significance
	No	%	No	%	
<b>Body image</b>					
- Low	0	0.0	20	20.0	$X^2 = 52.10$ P =0.000*
- Moderate	20	20.0	48	48.0	
- High	80	80.0	32	32.0	
<b>Worry about self</b>					
- Low	1	1.0	1	1.0	$X^2 = 20.94$ P =0.000*
- Moderate	60	60.0	28	28.0	
- High	39	39.0	71	71.0	
<b>Attitude towards medical staff</b>					
- Low	15	15.0	1	1.0	$X^2 = 41.55$ P =0.000*
- Moderate	38	38.0	10	10.0	
- High	47	47.0	89	89.0	
<b>Total Maternal Anxiety</b>					
- Low	11	11.0	1	1.0	$X^2 = 8.881$ P =0.012*
- Moderate	25	25.0	27	27.0	
- High	64	64.0	72	72.0	

$X^2$  Chi square test \* Significant at  $P \leq 0.05$   $3.78 \pm 2.84$

**Table (6): Distribution of the pregnant women according to their mean score of maternal anxiety, maternal fetal attachment and pregnancy planning.**

Items	Low risk (N= 100)	High risk (N= 100)	Test of significance
	$\bar{X} \pm SD$	$\bar{X} \pm SD$	
<b>Maternal anxiety</b>			
- Child birth concern	18.52 ± 3.727	21.52 ± 2.258	P= 0.381
- Attitude towards child birth	9.04 ± 1.948	9.58 ± 1.288	P= 0.022*
- Baby concern	9.33 ± 2.161	11.41 ± 0.900	P= 0.000*
- Acceptance of pregnancy	8.96 ± 2.370	9.91 ± 1.621	P= 0.001*
- Avoidance	9.17 ± 2.531	10.29 ± 1.140	P= 0.000*
- Body image	12.65 ± 3.170	17.37 ± 1.405	P= 0.001*
- Worry about self	18.44 ± 3.761	16.88 ± 3.291	P= 0.002*
- Attitude towards medical staff	8.09 ± 2.383	10.42 ± 1.558	P= 0.000*
<b>Total Maternal Anxiety</b>			
	94.20 ± 12.41	107.38 ± 6.02	P= 0.000*
<b>Total Maternal fetal attachment</b>			
	75.43 ± 19.43	77.24 ± 7.69	P= 0.387
<b>Total Pregnancy planning</b>			
	10.44 ± 0.656	10.51 ± 1.115	P= 0.589

\* Significant at  $P \leq 0.05$

**Table (7): Risk factors for maternal fetal attachment among high-risk pregnant group.**

Characteristics	OR	95% CI	P
<b>Mother age</b> (less than 20 years/ more than 20 years)	1.863	1.030-3.478	<b>0.040</b>
<b>Mother's educational level</b> (less education/university education)	2.591	1.495-4.492	<b>0.010</b>
<b>Mother's occupation</b> (non-working/ working)	2.873	2.523-9.751	<b>0.045</b>
<b>Family size</b> (2-3 members / four members and more)	6.524	3.278-10.732	<b>0.017</b>
<b>Number of pregnancies</b> (primigravida/ multigravida)	3.871	1.960-7.816	<b>0.010</b>



<b>Number of parities (one/ two and more)</b>	7.950	4.285-14.753	<b>0.017</b>
<b>History of abortion (yes/no)</b>	2.654	1.368-5.152	<b>0.001</b>
<b>Number of living children</b>	0.463	0.109-1.957	0.218
<b>History of still birth (yes/no)</b>	3.266	1.302-8.179	<b>0.015</b>
<b>History of ectopic pregnancy (yes/no)</b>	1.599	1.012-2.254	<b>0.043</b>
<b>Identify the sex of the baby (yes/no)</b>	1.591	0.982-2.546	0.057
<b>Desire of the coming baby (yes/no)</b>	1.671	1.063-2.648	0.35
<b>History of obstetric complications (yes/no)</b>	2.741	1.201-4.308	<b>0.012</b>
<b>mHistory of chronic disease (yes/no)</b>	2.613	1.214-5.584	<b>0.014</b>
<b>Total mean score of pregnancy planning</b>	2.808	0.944-7.137	0.062
<b>Total mean score of maternal anxiety</b>	2.374	1.356-4.146	<b>0.011</b>
<b>Total mean score of fetal attachment</b>	2.994	1.676-5.234	<b>0.021</b>

OR odds ratio

 $P < 0.05$ 

CI confidence interval

The results showed similarity between the two groups, without any significant differences between them in terms of place of residence & mother's educational level, however both groups are incongruent in respect to other characteristics. A significant difference is apparent between high and low risk pregnancy in terms of (Mother's age, occupation & family size). (**Table 1**)

**Table (2)** Delineates a significant distinction of bad obstetric history among those who are at high risk pregnancy compared to low risk pregnancy with respect to (number of parity, stillbirth and number of living children) (73.0 % versus 6.7%, 82.3% versus 16.7 % & 65.0 % versus 5.9 % respectively). Moreover, high risk pregnancy displays more obstetric complications and history of medical diseases in comparison to low risk mothers (53.0% vs 33.0% & 50.0% vs. 34.0% respectively with highly significant difference). **Table (3)** Shows that low risk pregnant women has a significant regular antenatal visit follow-up (75.0%) compared to 39.0% among the high risk pregnancy. However, the numbers of antenatal visits & ultrasound scanning for 7 times and more was clear among high risk mothers compared to low risk (76.9% vs. 46.7% & 42.0 % vs. 36.0% respectively). As regards given feedback about pregnancy and baby's condition, a highly significant concern was clear among high risk mothers than the low risk (95.0 % vs. 75.0%). Concerning family support during pregnancy. It is clear that low level of support was displayed among high risk pregnancy than low risk mothers (59.0 % vs. 78.0% respectively) and consequently the desire of the coming baby was decreased among those with high risk pregnancy compared to low risk ( 86.0 % vs. 97.0% respectively) with highly statistical significant differences. No significant concern is highlighted among both low and high risk pregnancy regarding planned and unplanned pregnancy. **Figure (1)**

**Table (4):** Delineates significant higher level of attachment among low risk mothers to their fetuses than high risk with respect to poor and fair levels (0.0 % vs. 13.0 % & 37.0 % vs. 19.0 % respectively), however no significant differences is apparent concerning good level of attachment among both groups.

**Table (5)** Depicts that the total maternal anxiety level displays a significant high level of anxiety among high risk pregnant mothers. Concerning distribution of the pregnant women according to their mean score of maternal anxiety, maternal fetal attachment and pregnancy planning, **Table (6)** Displays that the only significant difference was observed regarding the mean anxiety score, those who have high risk pregnancy shows high level of anxiety compared to low risk, however no significant difference was displayed regarding both mean score of maternal fetal attachment and pregnancy planning among both groups.

Concerning confounding factors influencing maternal-fetal attachment among the high risk group, regression analysis was performed and included data in terms of (mothers' age [less than 20 years], educational level (less education), occupation (non-working) & Family size (2-3 members) are considered as factors that affecting and interfere with the FMA level among high risk, as regards the obstetric data, several factors are considered as confounding factors with respect to (number of pregnancies [primigravida], number of parities [one], history of abortion, still birth, ectopic pregnancy, obstetric complications & history of chronic disease. Moreover total mean score of maternal anxiety and fetal attachment are considered as confounding factors may have effect with a significant difference.

**Table (7)**

## Discussion

The maternal fetal attachment starts to be developed earlier at the beginning of pregnancy and continue to be increased over gestation. Entirely all pregnant women, by nature of their pregnancy face some level of maternal risk. For those who are hospitalized for a high risk pregnancy particular attention should be paid to them as a way to alleviate feelings of anxiety which can delay an adequate maternal fetal attachment. (Eswi & Khalil 2012; Jadhao et al., 2017) This study was intended to find out the relationship between high risk pregnancy, maternal fetal attachment and maternal anxiety among studied subject and the confounding risks that have effect on MFA among high risk pregnancy.

The present finding indicating a significant difference between high and low risk pregnancy in terms of maternal age, occupation and family size. Nearly Similar results reported by Ganjoei et al., (2011) who implement a study aimed to examine the association between prenatal care and outcome of pregnancy, whereby they found that women with lower age and lower educational level received less prenatal care results in more risk pregnancy. Contradicted results showed by (Eswi & Khalil 2012) who examined the prenatal attachment and fetal health locus of control among low risk and high risk Egyptian pregnant women, they found that neither gestational age nor education differed by high/low risk pregnancy.

The present finding showed a significant increase in obstetric complications and medical diseases history among high risk mothers compared to low risk mothers. This may be related to that the more significant obstetric complications & medical diseases may intensify uncertainty feeling and interfere with the process of effective coping and disrupt relationships with others.

This finding was in line with Sardasht et al., (2017) who carried out a study aiming to estimate the risk factors for pregnancy health among the females seeking planned pregnancy and found that obstetric complications were the most frequent risks which may threaten pregnancy health. Moreover, the study showed that low risk pregnant women have a significant regular antenatal follow-up compared to the high risk pregnancy group. However, the numbers of antenatal visits & ultrasound scanning for 7 times and more was clearly more frequent among high risk mothers compared to low risk. This may be attributed to increasing their level of anxiety and raising the need to be reassured throughout frequent antenatal clinic visit to be sure of the health status of their fetuses and as a requirement schedule for high risk pregnancy follow-up.

As regards given feedback about pregnancy and baby's condition, a highly significant concern was clear among high risk mothers than the low risk mothers. This may be related to anxiety and concern about the coming baby and fear to be affected by their condition.

Concerning family support during pregnancy. The study showed that the level of perceived support was lower among high risk pregnant mothers than low risk mothers and consequently the desire of the coming baby was decreased among those with high risk pregnancy compared to low risk mothers with highly statistical significant differences. This may be attributed to that social support is very significant in preserving well physical & psychological function. Overall, it appears that positive social support of high quality can enhance resilience to stress, help protect against developing trauma-related psychopathology Fatih et al., (2007). Nearly similar results showed by Mukhoirofin & Fatmawati (2017) who conducted a research to estimate the association between self-efficacy and husband's support and maternal anxiety in facing the labor whereby their study revealed a significant relation between husband's support and maternal anxiety in facing the mother during pregnancy and labor process.

The study results showed that the total maternal anxiety level displays a significant high level of anxiety among high risk pregnant mothers compared to low risk pregnancy in respect to (child birth concern, attitude towards child birth, baby concern, acceptance of pregnancy, avoidance, body image, worry about self and attitude towards medical staff).

The same was stated by Hassan et al., (2017) who conducted a study to find out the predictors of maternal fetal attachment among pregnant women, as their study revealed that the majority of the pregnant women feel apprehensive initially about aspects associated with the pregnant woman herself as evident by prolonged sick leave during pregnancy, possible vaginal & perineal trauma, and possible cesarean section. However, there is no significant difference was displayed regarding both maternal fetal attachment and pregnancy planning among both high risk and low risk groups, this findings was in line with our findings concerning pregnancy planning and maternal attachment. This finding is contradicting with Pakseresht et al., (2018) who conduct a study to compare physical health and maternal attachment among high and low risk group, the study concluded that unintended /unplanned pregnancy creates less maternal-fetal attachment and causes insufficient care in addition to inadequate nutrition during pregnancy which in turn leads to corrupt status in mother and child. Also Abasi et al., & Abasi & Tafazoli (2010) perform study to

examine the effects of a pregnancy-adaptation training package on adaptation and maternal-fetal attachment in pregnant women with a history of baby loss. The study found that maternal fetal attachment mostly is influenced by accepting the pregnancy, and unwanted pregnancy. This may be related to differences in both study sample and methodology.

The present study addresses also the confounding factors that influencing maternal-fetal attachment among high risk mothers. A regression analysis was performed and included personal data in terms of (mothers' age (less than 20 years), educational level (less education), and occupation (non-working). In this respect, **Jain et al., (2014)** carried out study aimed to examine high risk factors in pregnancy and to develop a simple scoring system to identify and classify high risk pregnancies and to guess neonatal consequence by potential multifactorial analysis of high risk elements. He reported that the most prevalent factors were low or no education of mother and low income.

Moreover, Family size (2-3 members) are considered as risk factors among those who have high risk, This may be attributed that the culture in this area prefer large family size and this issue may add some burden on the mother who have less child and more stress on her to preserve the current pregnancy which may have effect on their level of anxiety that may have a role on maternal attachment level, as regards the obstetric data, several factors are considered as confounding factors with respect to (number of pregnancies [primigravida], number of parities (one) this result may appear differ than common expectation as more parities may have a role in the maternal fetal attachment. This may be related that the mother in low may add more stress on the pregnant woman who have only one parity rather than others especially if they have a history of infertility which was evident that fifty percent of the high risk group received fertility medications versus only less than one third among low group and the minority among the high risk group have natural current pregnancy, this result explained the increased anxiety level and the rationale behind low parity to be a risk factor among high risk group, also history of abortion, still birth, ectopic pregnancy, obstetric complications & history of chronic disease considered as risk factors. Moreover the total mean score of maternal anxiety and fetal attachment are considered as confounding factors. These findings were similar to **Eswi & Khalil 2012 findings**.

Moreover, a congruent results were emphasized by **Jamshidimanesh et al., (2013)** who evaluate the maternal-fetal attachment behaviour and some correlated factors among mothers. Their study revealed that race, higher maternal age, higher

education, gestational age, planned pregnancy, sex of fetus lead to more constructive impact on prenatal attachment ( $P < 0.05$ ). However, Tobacco use, multiparity, and high risk pregnancy had negative impact on attachment. Furthermore, mother infant attachment level was not affected by previous history of infertility, abortion, number/type of ultrasound, participation in prenatal classes and healthy baby.

Despite the significance of MFA in positive outcomes either for mother or her baby still there is limited studies that address this field. **Alhusen et al., (2012)** carried out longitudinal descriptive study to find the relationships among MFA, and health practices during pregnancy, and neonatal outcomes especially in low-income mothers, investigated the effect gloomy signs and social support on MFA using linear regression models. Results of study showed that depressive symptoms during pregnancy given its effect on MFA. Also showed the significance of a supportive person to pregnant woman especially for high risk woman. Also **Barone (2014)** concluded that prenatal attachment increased as gestational age increased and as mothers experienced bigger levels of couple coping, which enhance MFA foster optimistic affect and MFA interaction.

The same was found by **Hassan et al., (2017)** who reported that Maternal-fetal attachment level was associated with some predictive factors. Specifically, maternal age, gravidity, planned pregnancies, identification of the fetal sex, time of the initial antenatal visit, number of antenatal visits and presence of social support.

## Conclusion

It was concluded that high risk pregnancy seems to have significant lower MFA level than low risk group with respect to poor and fair level with no significant differences regards good level among both groups. A significant high level of anxiety was apparent among high risk mothers to their fetuses than low risk. Personal data in terms of (mothers' age, educational level, occupation and family size) considered as factors that interfere with good fetal attachment for high risk pregnancy and number of pregnancies, parities, history of abortion, still birth, ectopic pregnancy, obstetric complications & history of chronic disease represented the obstetric risk factors of MFA. Both total mean score of maternal anxiety & fetal attachment are considered as a confounding factors affecting MFA among high risk pregnancy however, unplanned pregnancy has no significant role among either high or low risk pregnancy.

## Recommendations

**Based on the findings of the present study, the following recommendations can be suggested:**

- A high need for the development and application of psychosocial nursing interventions program to decrease anxiety level in women with high-risk pregnancies and improve maternal-fetal attachment.
- More attention should be paid to obstetric complications during pregnancy to promote good maternal fetal attachment.
- The current research is needed to be repeated by using a large, random sample from different settings.
- A longitudinal study was highly recommended which can show the effect of related factors and the changes in attachment over time during the postpartum period and to provide us a perspective of the mother-newborn relation over time.
- More researches are needed to investigate social support of the participants and its effect on the maternal fetal attachment.

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