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Factors affecting the maternal-fetal attachment during pregnancy

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Abstract

Background: Maternal-fetal attachment is intangibleconnection and maintains a bond between mother and baby in her womb which is considered an important part of fetal development and this attachment can be affected by different factors. This study was aimed toidentify the factors affecting the maternal-fetal attachment during pregnancy. **Design:** A descriptive design was used.Subjects: A purposive sample including 100 pregnant women were participated. Setting: Antenatal Clinics of Al-Azhar University Hospital in New Damietta City, Damietta Governorate, in Egypt. Tools:A structure Interview Questionnaire, Cranley's Maternal-Fetal attachment Scale (CMFAS),Fetal position awareness scale (FPAS). **Results:**There was a positive and significant relationship between the mean of MFA in mothers with the history of fetal loss and presence of support provider and strong attachment to mother, on the other hand this study confirmed that a statistically significant negative correlation between MFA and pregnant woman's gravidity.Conclusion: Maternal fetal attachment is associated significantly and positively with multiple factors: previous fetal loss, presence of support provider, and strong attachment to mother. Education level and history of previous low birth weight baby come in the second level of significant in this study.Additionally,increased gravidity contributed to a decreased MFA level. **Recommendation:** Early and effective interventions should be applied for the expectant mother to achieve a physically and psychologically wellbeing during pregnancy to reach best optimize maternal and fetal health

Keywords: Attachement, Fetal loss, gravidity,pregnant woman, support.

Introduction

Attachment is a stable emotional bond between two individuals **(McNamara, 2019)**. Maternal–fetal attachment involves behaviors and actions that indicate the mother's emotional bond with the fetus. These behaviors cause the early start and continuation of parental care, proper nutrition, sleep and exercise, abstinence from alcohol and drugs, and the desire to get to know the fetus during pregnancy, which ultimately result in a desirable pregnancy outcome and promote maternal and neonatal health **(Heidary & Akbarzadeh 2019).**

A wide range of attachment behaviors emerge during pregnancy, such as talking to the fetus and touching and caressing the belly. This attachment may begin with pregnancy or during the first ultrasound or when feeling the first movement of the fetus and may then improve gradually with gestational age and with the increase in fetal movements **(Mountain et al, 2017).**

Various factors affect maternal–fetal attachment, such as communication within the family, pregnancy acceptance and support, the mother's mental self-image, a previous history of pregnancy, obstetric and medical complications during pregnancy and the pregnancy being unwanted (**Wonch Hillet al., 2017**).

As well, it is important to identify the factors attributing the maternal-foetal relationship in a negative way because many of these factors are preventable if recognized at prenatal time. Early recognition of low attachment and correct application of various intervention might improve the quality of pregnancy, maternity, and childhood **(Lamb, Pleck, Charnov & Levine, 2017).**

1.1 Significance of the study

Considering the importance of attachment in child's development and mother's health, various related factors and also lack of necessary information in this regard in our country, the research group aimed to conduct this study to assess maternal-fetal attachment during pregnancy, its attributing factors. This process should be studied during pregnancy so that the effect of related factors and the changes in attachment over time could be determined and comprehensible information about the effective underlying conditions on this issue would be gathered.

1.2 Aim of the study

This study aims *to*identify the factors affecting the maternal-fetal attachment during pregnancy.

1.3 Research questions

- What are the factors affecting the maternal-fetal attachment during pregnancy?
- Is there is relationship between factors affecting maternal fetal attachment and total mean score of Cranley's maternal fetal attachment scale and total mean score of the fetal position awareness scale?

II. Methodology

2.1 Study design:

A descriptive design was used in the study.

2.2 Study Setting

This study was conducted at Antenatal Clinics of Al-Azhar University Hospital in New Damietta City, Damietta Governorate, in Egypt. The setting consists of one flour divided into five parts; reception part, sonar partition, examination section, antenatal care instrument departmentand room for the nursing staff. The antenatal clinic is opened daily from Saturday to Thursday

from 9 am to 12 pm, the care was provided by two nurses and 5 obstetricians (consultant, specialist assistant, specialist, and two juniors). There are between 70-50 follow up cases weekly and 5-7 new cases each day.

2.3 Subjects of the study

A purposive sample was used in this study.The study sample included 100 pregnant women attended and booked in the previous mentioned setting based on the following criteria:Women at 30th week gestation,Singleton pregnancy, regular follows schedule of antenatal visits,able to read and write.Women with fetal malformation and history of mental illness were excluded.

2.4 Sample size calculation

Based on data from literature **Baghdari et al, (2016)** considering level of significance of 5%, and power of study of 80%, and assuming that the difference of 5 between the mean scores after training is satisfactory, the sample size can be calculated using the following formula:

$n = [(Z\alpha/2 + Z\beta)2 \times \{2(SD)2\}]/$ (mean difference between the two groups)2

Where SD = standard deviation

$Z\alpha/2$: This depends on level of significance, for 5% this is 1.96

$Z\beta$: This depends on power, for 80% this is 0.84

Therefore,

$n= [(1.96 + 0.84)2 \times \{2(8.12)2\}]/ (3.21)2 = 100.3$

Based on the above formula, the sample size required 100 pregnant women.

2.5 Tools of Data Collection

Three tools were used to collect the data

ToolI: A Structure Interview Questionnaire: It was designed by the researcher in Arabic form after reviewing the related literature, it consisted of three parts. **Part I:** It aimed to assess women's demographic characteristics such as age, educational level, occupation…etc.

Part II: It aimed to assess women's obstetric history such as, parity, number of abortions or number of baby loss …etc.

Part III: It aimed to assess common factors affecting maternal fetal attachment such as health related problems, number of children and desire of pregnancy …etc.

Tool II: Cranley's Maternal Fetal Attachment Scale (CMFAS): It was adopted from **Cranley (1981)** to measure the extent to which the mother to be is engaged in a behavior which is expressing a sense of belonging and interaction with the development of pregnancy. It is composed of 24 items and each item is scored by a five-point likert scale ranging from 1 (definitely no) to 5(definitely yes). The total score is between 24 to 120and the higher scores showing more attachment.

Tool III: The Fetal Position Awareness scale (FPAS): It was adopted from **Nishikawa & Sakakibara (2013)** to measure to what degree expectant mothers perceive the fetus position in the uterus. It is composed of 6 item scale with 5 likert-type responses, for each item 5 point are given for (always), 4 point for (frequently), 3 points for (sometimes), 2 points (occasionally) and 1 point for (almost never). The total score is between 6 and 30, with the higher scores showing more attachment.

2.6 Validity of the tool

Tools were revised by a jury of five professors specialized in woman's health and midwifery nursing field to test the validity of the content to ensure that the tools were conveying the intentional meaning and the recommended adjustments and modulation were

considered according to their remarks and comments.

2.7 Reliability of the tool

The reliability of tool II was adopted from Cranley (1981) reliability it was (0.84). Reliability of tool III was adopted from **Nishikawa & Sakakibara (2013)** it was (0.797). Therefore, the tools were reliable.

2.8 Pilot study

The pilot sample was excluded from the analyzed study sample. It done on 10% (10 pregnant woman), to estimate the time needed to complete each tool and assess their applicability. The pilot sample was excluded from the analyzed study sample.

2.8 Ethical Consideration

The study was approved by head of woman's health and midwifery department at faculty of nursing. As well as an informed consent was obtained from the women who participated in the study. The participants were ensured about the privacy and the information's confidentiality. They also informed about their rights to refuse or withdraw at any time from the study.

2.9 Fieldwork

- The study conducted for 5months period started on October 2018 till end ofFebruary 2019.
- The relevant literature related to the study was collected, the tools were prepared, Official permission to carry out the study was obtained from the head of Obstetricsand Gynecology Department as well as the director of the antenatal clinics of Al-Azhar University Hospital and finally the pilot study was conducted to assess applicability of the study tool
- The researcher attended the antenatal clinic at Al-Azhar University Hospital three days /week from 9 Am to 12 Pm until the sample size was completed and checked the registered book to identify the pregnant women who met the inclusion criteria.
- Then the researcher met the potential participants individually after receiving their routine antenatal care and invited them to participate in the study and informed them about the purpose of the study and the time required for participation.
- After their agreements to participate, the researcher explained and provided the tools which include the interview questionnaire (tool I and the (CMFAS (II,) FPAS (III) they were asked to answer the tools and the researcher filled in and completed them.

2.10 Statistical analysis

All statistical analyses were performed using SPSS for windows version 20.0 (SPSS, Chicago, IL). All continuous data were normally distributed and were expressed in mean ±standard deviation (SD). Categorical data wereexpressed in number and percentage. The comparisons were determined using Student's t test for two variables with continuous data and ANOVA test for more than two variables with continuous data. Chi-square test was used for comparison of variables with categorical data. Cronbach's alpha test was preformed to test for the internal consistency of the tools used in the study. Statistical significance was set at $p<0.05$.

RESULTS

Table 1: Frequency distribution of the studied sample according to their Socio-Demographic Characteristics (n=100).

Variables	No.	%
Age		
18 < 24	29	29.0
24 < 30	46	46.0
30 < 35	22	22.0
≥35	3	3.0
Mean ±SD	**26.4 ±4.8**	
Duration of marriage		
<1 year	25	25.0
1 – 5 years	52	52.0
6 – 10 years	17	17.0
>10 years	6	6.0
Educational level		
Read and write	9	9.0
Primary education	14	14.0
Secondary education	23	23.0
University education	49	49.0
Postgraduate education	5	5.0
Work status		
Housewife	71	71.0
Professional	11	11.0
Managerial and Semi-Professional	16	16.0
Skilled (technician)	2	2.0
Residence		
Rural	46	46.0
Urban	54	54.0
Income		
Not enough	29	29.0
Enough	67	67.0
Enough and Saves	4	4.0

Table (1)shows distributionof studied sample according to socio-demographic characteristics. It was shown that less than half (46%) of them aged between 24 <30 years old; with a mean age 26.4 ±4.8. More than half (52%) of them got married for 1 to 5 years. About (49%) of them graduated

from universities. More than two thirds (71%) of the studied sample were housewives, more than half (54%) of them were residents from urban areas and more than two thirds (67%) of them had enough income

Table (2): Frequency distribution of the studied sample according to their reproductive history (n=100).

Variables	No.	%
Gravidity		
Primi	26	26.0
Multi	74	74.0
Mode of conception		
Natural	80	80.0
Assisted	20	20.0
Cause of infertility in assisted pregnancy (n=20)		
Male	5	25.0
Female	9	45.0
Both	3	15.0
Unexplained	3	15.0
Birth before 7th month		
No	97	97.0
Yes	3	3.0
Previous Fetal loss		
No	78	78.0
Yes	22	22.0
Causes of fetal loss (n=22)		
Abortion	18	81.8
Intrauterine death	2	9.1
Neonatal death (still birth)	2	9.1
History of low birth weight		
Never	97	97.0
Once	3	3.0

Table2 shows frequency distribution of the studied sample regarding their reproductive history. It's shown that 74.0% of them had multi-gravida, 80% of them use natural mode of conception. Additionally, 45% of causes of infertility in assisted pregnancy are related to females, 97% of them never had birth before 7th month and never had history of low birth weight. Also, 78% never had previous fetal loss, but in 18% of them, the cause of fetal loss was abortion

Table (3): Frequency distribution of the studied sampleregarding factors affecting the mother-Fetus attachment (n=100).

Variables	No.	%
Strong attachment to mother		
No	30	30.0
Yes	70	70.0
Planned Pregnancy		
Yes	71	71.0
No	9	9.0
I have not planned or prevented	20	20.0
First sense of fetus movement (quickening)		
Week 14	6	6.0
Week 18	60	60.0
Week 20	32	32.0
Week 24	2	2.0
Frequency of fetus movements during the day at 30 weeks		
<10	2	2.0
≥10	98	98.0
Number of children		
No	27	27.0
One	39	39.0
Two or more	34	34.0
Age of youngest child (n=73)		
≤1 year	7	9.6
>1 year	66	90.4
Practicing exercise during pregnancy		
No	53	53.0
Yes	47	47.0
Your diet during pregnancy rich in		
Calcium, protein, iron	65	65.0
Fat and Carbohydrates	35	35.0
Use of Modern technological devices (sonar)		
Yes	95	95.0
No	3	3.0
Not available	2	2.0
Positive attitude toward the training		
No	6	6.0
Yes	94	94.0
Degree of affection		
Strong	68	68.0
Medium	26	26.0
None/Poor	6	6.0

Table 3 illustrates frequency distribution of the studied sample regarding factors affecting the mother-fetus attachment. It's illustrated that 70% of them are strongly attached to their mother, 71% planned for pregnancy. Also, 60% of them felt the first sense of fetus movement (quickening) at 18 weeks of pregnancy, and 98% of them felt the fetus movements during the day at 30 weeks more than 10 times.

Furthermore, 39% of those participants have only one child, and the age of their youngest child in 90.4% of them is more than one year. Also, 53% of them don't practice exercise during pregnancy, and 65% have diets rich in calcium, protein, and iron during their pregnancy. Moreover, 95% of them use modern technological devices (sonar), 94% have positive attitudes toward the training. Also, 68% of them have strong degree of affection.

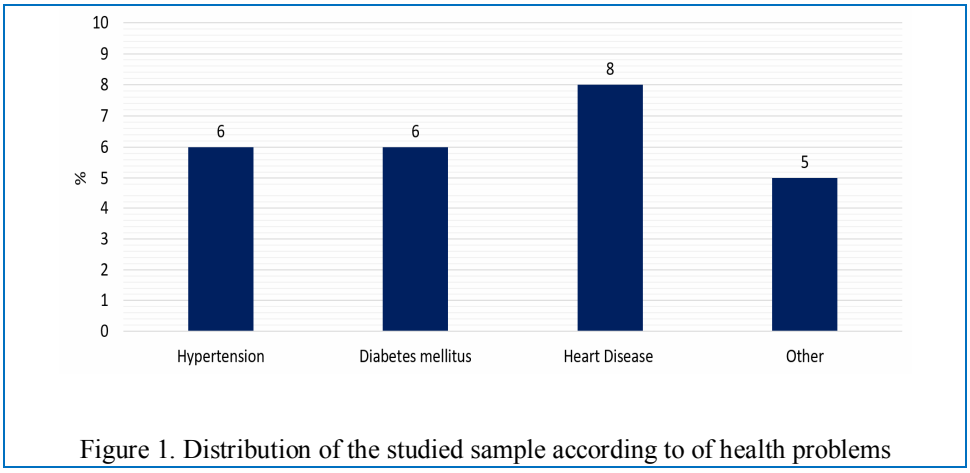

Figure 1. Distribution of the studied sample according to of health problems

Figure 1 illustrates frequency distribution of the studied participants regarding factors affecting the mother-fetus relationship. It's illustrated that 75% of them don't complain of any health problems.

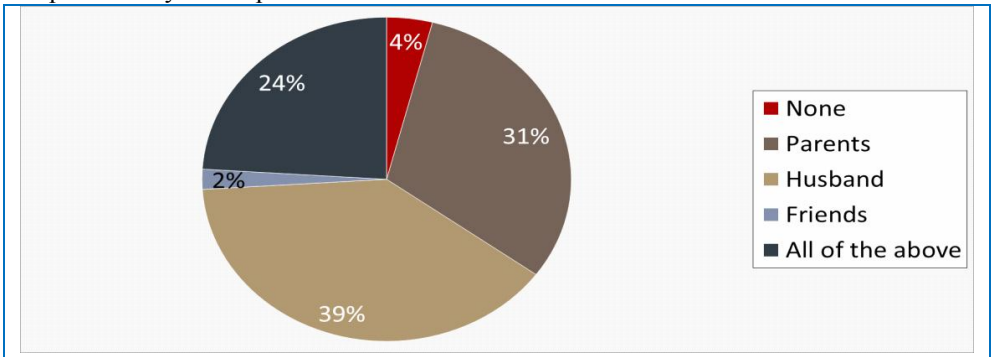

Figure 2. Distribution of the studied sample according to of support provider

Figure 2 illustrates frequency distribution of the studied participants regarding factors affecting the mother-fetus relationship. Husbands of 39% of them are their support providers

Table (4): Relationship between between Means of CMFAS and FPAS Scores of the Studied Sample and Previous Fetal Loss, Strong attachment to mother, Gravidity and low birth weight

Variables	Fetal loss		Student's t test	
	No	Yes	T	P
Total CMFAS score	76.64 ±10.17	90.05 ±11.46	5.309	<0.001**
Total FPAS score	12.73 ±3.95	15.68 ±5.01	2.913	0.004**
	Strong attachment to mother		Student's t test	
	No	Yes	T	P value
Total CMFAS score	75.10 ±10.79	81.51 ±11.77	2.558	0.012*
Total FPAS score	11.90 ±4.04	14.01 ±4.36	2.272	0.025*
	Gravidity		Student's t test	
	Primi	Multi	T	P value
	Mean ±SD	Mean ±SD		
Total CMFAS score	82.54 ±11.20	78.55 ±12.09	1.473	0.144
Total FPAS score	15.15 ±5.21	12.76 ±4.42	2.269	0.025*
	Low birth weight		Student's t test	
	No	Yes	T	*P* value
	Mean ±SD	Mean ±SD		
Total CMFAS score	79.65 ±12.02	77.67 ±10.50	0.282	0.778
Total FPAS score	13.55 ±4.70	8.00 ±1.3	2.031	0.045*

Table (4) shows statistically significant relationship was found between thetotal CMFAS score,total FPAS score and the previous fetal lossand strong attachment to mother. Regarding gravidity and low birth weight, It was shown that statistically significant relationship were found concerning the total FPAS (*P*= 0.025*, 0.045* respectively)

Table 5: relationship between Means of CMFAS and FPAS Scores of the studied sample regarding Educational Levels and Support provider (n=100).

Variables	Educational level					ANOVA test	
	Read and write	Primary education	Secondary education	University education	Postgraduate education	F	P
	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD		
Total CMFAS score (Mean ±SD)	78.22 ±15.57	83.93 ±14.90	83.48 ±10.54	77.63 ±9.12	71.20 ±20.47	2.144	0.081
Total FPAS score (Mean ±SD)	14.00 ±6.28	13.71 ±4.18	15.87 ±4.50	12.22 ±4.28	11.20 ±5.26	2.842	0.028*
	Support provider					F	P
	None	Parents	Husband	Friends	All of the above		
Total CMFAS score (Mean ±SD)	77.75 ±10.72	74.97 ±9.65	84.00±11.53	74.00 ±4.24	79.79 ±13.27	2.918	0.025*
Total FPAS score (Mean ±SD)	11.75 ±1.26	11.90 ±3.89	14.50 ±4.47	8.50 ±0.70	14.04 ±4.51	2.594	0.041*

Table 5shows that there were statistically significant relationshipsbetween the twototal CMFAS score,total FPAS scoreand education level and support provider

IV. DISCUSSION

This study aims to identifythe factors affecting factors affecting the mother-Fetus attachment.Regard to the pregnant mothers' reproductive history, it was found that about three quarters of sample had multi-gravid, the majority of them use natural mode of conception and never had birth before 7th month and never had history of low birth weight. Similarly, a study by **Mobarak & Sultan (2019)** studying the prevalence, indications and determinants of caesarean delivery in Alexandria, Egypt, found that the most of their participants use natural modes of conception. The World Health Organization estimates the prevalence of preterm birth to be 5–18% across 184 countries of the world. And this was assured by **Wagura et al., (2018)** they were found to be 18.3% in their study prevalence and factors associated with preterm birth at kenyatta national hospital.

Concerning support providers, two fifth of the study group were supported by their husbands; Support from husbands for their wives is considered good due to the fact that these husbands are aware of the need to provide motivation to their wives for taking ANC, the need to have ANC visit for their wives and the need of making financial plan for the coming delivery. However, the husbands do no accompany their wives for ANC. The husband may support his pregnant wife receive better care and consequently make contribution to development of prenatal attachment. Similarly, a study done by **Diamond-Smith, et al., (2016)** about the relationship between women's experiences of mistreatment at facilities during childbirth, types of support received and person providing the support in Lucknow, India, reported that their husbands provided them with sufficient support and satisfying encouragement or guidance in labor.

Regarding the sense of fetus movement, two thirds of the studied group felt it firstly at 18 weeks gestation. Since in the present study about three quarter of the participants were mutigravida. A multiparous womanusually first notice these fluttering movements of the fetus at an earlier gestation than a primiparous woman. According to **Australian Family Physician source (2020)** who studied decreased fetal movements in practical approach in primary care setting and stated that pregnant women start to feel baby moving, often called 'quickening', around 18 weeks into pregnancy. If this is the first pregnancy, it might not happen until about 20 weeks. However, by the second pregnancy, you might notice the tell-tale signs as early as 16 weeks.

Also, the present study findings were supported by **Flenady et al., (2019)** who study fetal movement awareness as an important stillbirth prevention strategy and stated that the first fetal movements which are felt by the mother are called quickening. One function of these movements is to alert the pregnant woman that she has a fetus growing in her uterus. Quickening often occurs between the 16th to the 22nd week of pregnancy. A multiparous woman might feel movements as early as 16 weeks, whereas a primiparous woman may not feel anything until 20 to 22 weeks.

Regarding attributing factors affecting maternal-fetal attachment and fetal position awareness. The present study results shows that previous fetal loss, social support, and strong attachment to mother were the most apparent factors. The current study results were in the same line with **Sadeghi & Kheirkhah (2014)** who study the relationship between marital satisfaction and social support with maternal fetal attachment in pregnant women with a history of baby loss, they stated that there was a positive and significant relationship between the mean of MFA in mothers with the history of fetal loss and social support and MFA.

Furthermore, the current study finding was supported by the Egyptian study done by **Hassan & Hassan, (2017)** predictors of maternal fetal attachment among pregnant women they reported that a statistically significant positive correlation was noticed between subjects' level of overall maternal-fetal attachment and their level of perceived social support, and the attachment to their mothers.

Moreover, **Metin (2014)** who exam the relationship between perceived social support and prenatal self-assessment in pregnant reported that there was a statistically significant correlation between pregnant women's prenatal attachment mean scores, and the number of stillbirths and abortion. However, **Baghdari et al., (2016)** found that the pregnant women who had stillbirth and history of abortion have lower prenatal attachment mean scores. This may be due to psychological and mental changes results from history of fetal or infant death so the application of similar prenatal educational interventions is recommended for these mothers.

V. CONCLUSION

Maternal fetal attachment is associated significantly and positively with multiple factors: previous fetal loss, presence of support provider, and strong attachment to mother. Education level and history of previous low birth weight baby come in the second level of significant in this study. Additionally,increased gravidity contributed to a decreased MFA level

VI. RECOMMENDATION

Early and effective interventions should be applied for the expectant mother to achieve a physically and psychologically well-being during pregnancy when poor level of MfA are identified during pregnancy.

Maternity healthcare communication is highly advised as an effort to achieve best optimize maternal and fetal health when factors known to threaten MFA such as lack of social support are present or suspected.

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CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest statement.

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