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Prenatal Attachment and Fetal Health Locus of Control among Low Risk and High Risk Pregnant Women

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Abstract: The present study was carried out to assess prenatal attachment and fetal health locus of control among low risk and high risk Egyptian pregnant women. A descriptive correlational design was utilized for the study. A total of 100 pregnant women, both low (N=55) and high (N= 45) risk pregnant women were recruited for the study. Prenatal attachment inventory and fetal health locus of control scale (FHLC) were used for data collection Results indicated that participants experienced more positive feelings of attachment towards their fetuses, the mean prenatal attachment was 50.7 (SD± 9.9). Participants also reported high levels of fetal health locus of control, with the mean of 119.3 (SD ±15.0). Prenatal attachment was positively associated with fetal health locus of control, age and number of living children. Fetal health locus of control was positively associated with number of deliveries, number of abortions and marital status. Both prenatal attachment and fetal health locus of control differed by high/low risk pregnancy. In Conclusion**,** Egyptian pregnant women experienced more positive feeling of attachment toward their fetuses. Prenatal attachment differed by high/low risk pregnancy.

Key words: Prenatal Attachment · Locus of Control · High Risk And Low Risk Pregnancy

INTRODUCTION

Bonding during pregnancy refers to a process through which a pregnant woman experiences feelings and emotions for her fetus, interacts with her fetus and develops a maternal identity (i.e. begins to identify herself as a mother) during pregnancy. The bond between a woman and her fetus is often conceptualized by health professionals in terms of maternal-fetal attachment or prenatal attachment [1].

The attachment between the pregnant woman and the fetus during pregnancy had been described as the first important relation to the baby and has strongly been associated with the following mother-child relation after the birth. The attachment to the fetus and later to the baby is developing successively. It starts in early pregnancy and increases during the pregnancy to be most intensive during the last trimester [1, 2].

Maternal Fetal Attachment (MFA) is manifested in behaviors that demonstrate care and commitment to the fetus and include nurturance (eating well, abstaining from harmful substances, such as alcohol), comforting (stroking the belly) and physical preparation (buying baby clothes and equipment) .Rubin. [3] identified four specific tasks the women she observed navigated before childbirth (1)Seeking safe passage for self and baby, (2), ensuring that the baby is accepted by significant others, (3), "binding-in"3 and (4), giving of herself. These tasks formed a framework for her conceptualization of the psychological experience of pregnancy and, although she did not use the term "attachment," Rubin states: "By the end of the second trimester, the pregnant woman becomes so aware of the child within her and attaches so much value to him that she possesses something very dear, very important to her, something that gives her considerable pleasure and pride"

The frequency and intensity of MFA behaviors increase with advancing gestational age, particularly after quickening at approximately 18 to 22 weeks of gestation. The rate and degree of MFA development appears to be influenced by gestational age at quickening, amount of fetal movement, pregnancy history and the mother's own attachment history [4].

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Many studies have investigated the contributing and inhibiting factors of maternal antenatal attachment. As a result, a range of demographic (age, education, socioeconomic status), pregnancy-related clinical (risk status of current pregnancy, outcome of previous pregnancy), psychosocial (self-esteem, social support, coping style) and psychopathological (depressive and anxiety symptoms) variables have been identified as significant correlates of maternal antenatal attachment [5].

There has also been some evidences suggest that maternal attachment increases as the pregnancy progresses [6]. Researchers that examined 69 pregnant women monthly during their pregnancies indicated that MFA increases over the course of the pregnancy as the MFAS correlation coefficients increased significantly from .55 at 16-28 weeks gestation to .95 at 36-40 weeks gestation [6].

Health Locus of control (HLC) is a personality dimension originally conceived of by Rotter [7], it is a measure of the degree to which individuals believe their lives are controlled by themselves or external forces. Scores provided by Rooter's scale range from Internal (controlled by one) to external (controlled by outside forces. The relationship between health locus of control (HLC) and childbirth outcomes has become a particular focus of perinatal health research [8, 9]. Martin and Jomens [10] conceptualized it as a type of perceived control. Health locus of control is one factor thought to influence health-related behavior and psychological adjustment to illness [11, 12]. Given the impact of the childbirth experience, assessment of maternal expectations of control over childbirth outcomes may be a clinically relevant component of antenatal care [13, 14].

There have been some evidences that suggest that higher doctor HLC is associated with experiencing fewer depressive symptoms during pregnancy [15]. In postpartum women, higher Internal HLC has been associated with improved physical recovery after vaginal and cesarean deliveries [8]. Therefore, the health locus of control is related to various health behaviors and attitudes. For example, internal locus of control is positively related to perceived health, positive perceptions of health professionals [16, 17] and health-related information seeking [18] and negatively related to irrational health beliefs and negative perceptions of health professionals [16].

Significance of the Study: Pregnancy and adaptation to motherhood is one of the most significant events during a woman's life. Pregnancy is associated with major psychological and physiological changes that could affect maternal attachment to the fetus. Many studies were conducted to assess maternal fetal attachment during pregnancy; however, most of the studies were in western cultures and societies. It was reported by Steven *et al*. [19] that virtually no researchers have compared high and low-obstetric risk groups in terms of HLC beliefs. No researches related to this aspect were conducted in Egypt; the current study will contribute to a better understanding of the prenatal attachment as related to Egyptian women and its particular features that may differ from western women. Recognizing women with low levels of maternal – fetal attachment can predict which pregnant women might have poor health practices during pregnancy that might consequently affect women's attachment to their babies during postpartum period. Therefore, the current study aim was to assess prenatal attachment and fetal health locus of control among low risk and high risk Egyptian pregnant women.

MATRIALS AND METHODS

Setting: The current study was conducted in the Obstetrics and Gynecology Outpatient Clinic in Kasr El Ani Maternity Hospital which is a university affiliated hospital that admits patients from all governorates and provides free health care services for women who come for antenatal care and gynecological health problems treatment.

Participants: A total of 100 pregnant women, both low (N= 55) and high (N = 45) risk pregnant women who came for prenatal visits in the obstetrics and gynecology out-patient clinic, mothers from different trimesters of pregnancy, who agreed to participate in the study were recruited for the study.

Design: A descriptive correlational design was utilized for the study as it suited its nature in finding the relationship between the study variables.

Measurments

Prenatal Attachment Inventory (PAI): Emotional attachment to the fetus was examined using the 21-item Prenatal Attachment Inventory PAI; Muller [20]; this scale is designed to assess "the unique, affectionate bond that develops between a woman and her fetus" [20]. Responses to the PAI are made on a four-point likert scale and scores may range from 21 to 84 with higher scores indicating increased attachment quality/intensity.

Total PAI scores for each respondent are calculated by summing the responses to each question. None of the items are reverse scored. Cronbach's alpha values for the total scale have ranged from .85 [21], to .86 [22, 23], to .89 [24].

Fetal Health Locus of Control Scale (FHLC): The Fetal Health Locus of Control Scale FHLC; Labs & Wurtele [25] was used to examine an internal dimension, women's beliefs regarding their own responsibility for the health of the unborn child (FHLC-I), as well as two external dimensions – chance factors (FHLC-C) and the role of health professionals (FHLC-P). Responses to each question are made on a nine-point likert scale and scores on each subscale may range from 0 to 54 with higher scores indicating stronger belief in the respective locus of control. Total scores are/7 calculated for each FHLC subscale by summing the responses to the questions on each respective subscale. None of the items on the FHLC are reverse scored. Labs and Wurtele [25] found that in a sample of pregnant women, all of the scale's 18 items (six items per dimension) had factor loadings of at least .50 on their respective factors (i.e., dimension). Using a sample of introductory psychology students, [25] Labs and Wurtele found test-retest reliabilities over a two-week interval of .80 for the FHLC-I, .86 for the FHLC-C and .67 for the FHLC-P. Using the same sample, Cronbach's alpha coefficients were .88 for the FHLC-I, .83 for the FHLC-C and .76 for the FHLC-P.

Ethical Considerations: Participants were informed about the nature of the study. All women were informed that their participation is voluntary and they can withdraw from the study at any time. A written consent was obtained from all participants. Confidentiality and anonymity of the collected data were assured.

Data Analysis: Data were coded and analyzed using SPSS version 18. Descriptive analyses were conducted to determine the frequency distributions of the study variables. Distribution of study variables were examined for normality, measures of central tendency and variability, Pearson's Product Moment correlation coefficients were calculated to assess the relationship among study variables, also hierarchical multiple regression analysis was used to assess the most predicators variables for maternal attachment and fetal health locus of control.

RESULTS

Participants Characteristic: Table 1 provides a summary of the characteristics of the sample. Participants were predominantly young adults, the age ranged from 17-42 years, mean age was 28.6 (SD±4.3), married, un-employed, more than half with secondary school education. Fifty three percent of the studied sample reported normal vaginal delivery as the most common mode of their previous deliveries with no previous labor complications; (86%) of the participants have cephalic fetal presentation. More than half of the participants did not experience any problem during current pregnancy (low risk) versus (45%) experienced problems during the current pregnancy (high risk).

Description of the Major Study Variables: Table 2 illustrates the descriptive results for the prenatal attachment and fetal health locus of control. Participants experienced more positive feelings of attachment towards their fetuses, the mean prenatal attachment was 50.7 (SD±9.9). Participants also reported high levels of fetal health locus of control, with the mean of 119.3 (SD±15.0). Descriptive analyses were also conducted to determine the frequency distributions of the study variables. Distribution of study variables were examined for normality, measures of central tendency and variability. Prenatal attachment and fetal health locus of control and age were normally distributed.

Descriptive Statistics of Prenatal Attachment Behaviors of the Egyptian Pregnant Women: Table 3 presents frequencies of prenatal attachment behaviors experienced almost always during the past month by the Egyptian pregnant women. Eighty-two women feel love for their baby, 55.0% women wonder what the baby looks like now, 53.0% women buy / make things for the baby, 47.0% women know that the baby hears them, 44.0% women plan things they will do with their baby, 40.0% women like sitting with their arms around their tummy, 35.0% women enjoy feeling the baby moves, 34.0% women try to imagine what the baby is doing in there, 34.0% women tell others what the baby does inside them, 30.0% women imagine what part of the baby they are touching, 28.0% women think that their baby already have a personality, 27.0% women let other people put their hands on their tummy to feel the baby move, 26.0% women dream about the baby. On the other hand 77.0% women almost never

Table 1: Sample Characteristics

Variable	N	%
Marital Status		
Married	99	99
Divorced	1	1
Educational Level		
Elementary	8	8
Preparatory	13	13
Secondary	53	53
University	26	26
Occupation		
Employed	29	29
Un-Employed	71	71
Mode of Previous Deliveries		
Not delivered	21	21
NVD	53	53
CS	18	18
NVD & CS	6	6
NVD & Ventose	2	2
Previous Labor Complications		
YES	18	18
NO	82	82
Presentation of Fetus		
Cephalic	86	86
Breech	14	14
Problems during Current Pregnancy		
YES	45	45
NO	55	55

Table 2: Descriptive Statistics of theStudy Variables

Variable	M	SD±	Range	Possible Range
Dependent Variable				
Prenatal Attachment	50.7	9.9	31-74	21-84
Fetal Health Locus of Control	119.3	15.0	75-162	0-162
Independent Variable		4.3		
Age	28.6	1.1	17-35	-------
Number of Deliveries	1.6	0.9	0-5	-------
Number of Full Term Pregnancies	1.7	0.5	0-5	-------
Number of Preterm Labor	0.2	0.9	0-3	-------
Number of Abortion	0.5	1	0-5	-------
Number of Living Children	1.5	7.4	0-4	-------
Gestational Age	28.6		12-39	-------

stroke the baby through their tummy, 50.0% women never share secrets with the baby, 44.0% women never get very excited when they think about the baby, 36.0% women never imagine calling the baby by name, 33.0% women never know why the baby is movingand, 26.0% women never make their baby move.

Descriptive Statistics of Fetal Health Locus of Control among the Egyptian Pregnant Women: Table 4 presentes the frequencies of beliefs that Egyptian pregnant women strongly agree with which determine the way they view various health issues concerning their pregnancy. Seventy-four women strongly believe that God will determine the health of their child, 67.0% women strongly believe that if they get sick during pregnancy, consulting their doctor is the best thing they can do to protect the health of their unborn child, 52.0% women strongly believe that even if they take excellent care of themselves when they are pregnant, fate will determine whether their child will be normal or abnormal, 50.0% women strongly believe that having a miscarriage means to them that their baby were not destined to live, 47.0% women strongly believe that before becoming pregnant, they would learn what specific things they should do and not do during

Table 3: Descriptive Statistics of Prenatal Attachment Behaviors of Egyptian Pregnant Women

	Almost Always	Almost Never	%
Prenatal Attachment Behaviors	N	N	
1. I feel love for the baby	82	---	82
2. I wonder what the baby looks like now	55	---	55
3. I buy/make things for the baby	53	---	53
4. I know the baby hears me	47	---	47
5. I plan the things I will do with my baby	44	---	44
6. I like to sit with my arms around my tummy	40	---	40
7. I enjoy feeling the baby move	35	---	35
8. I try to imagine what the baby is doing in there	34	---	34
9. I tell others what the baby does inside me	34	---	34
10. I imagine what part of the baby I am touching	30	---	30
11. I think that my baby already has a personality	28	---	28
12. I let other people put their hands on my tummy to feel the baby move	27	---	27
13. I dream about the baby	26	---	26
14. I stroke the baby through my tummy	---	77	77
15. I share secrets with the baby	---	50	50
16. I get very excited when I think about the baby	---	44	44
17. I imagine calling the baby by name	---	36	36
18. I know why the baby is moving	---	33	33
19. I can make my baby move	---	26	26

Table 4: Descriptive Statistics of Fetal Health Locus of Control among Egyptian Pregnant Women

Fetal Health Locus of Control (FHLC)	Strongly Agree	Strongly Disagree	%
	N	N	
1. God will determine the health of my child	74	---	74.0
2. If I get sick during pregnancy, consulting my doctor is the best thing I can do to protect the health of my unborn child	67	---	67.0
3. Even if I take excellent care of myself when I am pregnant, fate will determine whether my child will be normal or abnormal	52	---	52.0
4. Having a miscarriage means to me that my baby was not destined to live	50	---	50.0
5. Before becoming pregnant, I would learn what specific things I should do and not do during the pregnancy in order to have a healthy, normal baby	47	---	47.0
6. Only qualified health professionals can tell me what I should and should not do when I am pregnant	38	---	38.0
7. Learning how to care for myself before I become pregnant helps my child to be born healthy	38	---	38.0
8. Fate determines the health of my unborn child	33	---	33.0
9. If my baby is born unhealthy or abnormal, nature intended it to be that way	31	---	31.0
10. My unborn child's health can be seriously affected by my dietary intake during pregnancy	27	---	27.0
11. What I do right up to the time that my baby is born can affect my baby's health	25	---	25.0
12. No matter what I do when I am pregnant, the laws of nature will determine whether or not my child will be normal	---	31	31.0

Table 5 Pearson-Product-Moment Correlation Coefficients among Study Variables

Variables	1	2	3	4	5	6	7	8	9
1) Prenatal Attachment	.26**	.21*			.19*			.15	-. 03
2) Fetal Health Locus of Control					.19*	.25*	.22*	-.02	-.08
3) Age									
4) Number of Deliveries									
5) Number of Living Children									
6) Marital Status									
7) Number of Abortion									
8) Gestational Age									
9) Education									

*p≤.05, **p≤.01

Table 6: High risk/low risk pregnancy Differences among the Study Variable

			t-test	
Variable	High / low risk pregnancy	Mean	T	P
Prenatal Attachment	Complication during previous labor			
	Yes	53.5	1.55	.04*
	No	50.1		
	Problem during current pregnancy			
	Yes	49.9	-0.75	.05*
	No	51.4		
Fetal Health Locus of Control	Problem during current pregnancy			
	Yes	119.6	0.145	.05*
	No	118		
Gestational Age	Problem during current pregnancy			
	Yes	28.9	0.431	0.53
	No	28.3		
Education	Problem during current pregnancy			
	Yes	3.9	-0.154	0.91
	No	3.9		

the pregnancy in order to have a healthy, normal baby, 38.0% women strongly believe that only qualified health professionals can tell them what they should and should not do when they are pregnant, 38.0% women strongly believe that learning how to care for themselves before they become pregnant help their child to be born healthy, 33.0% women strongly believe that fate determines the health of their unborn child, 31.0% women strongly believe that if their baby is born unhealthy or abnormal, nature intended it to be that way, 27.0% women strongly believe that their unborn child's health can be seriously affected by their dietary intake during pregnancy, 25.0% women strongly believe that what they do right up to the time that their baby is born can affect their baby's health. While 31.0% women strongly disbelieve that no matter what they do when they are pregnant, the laws of nature will determine whether or not their child will be normal.

Relationships among the Study Variables: Pearson's Product Moment correlation coefficients were calculated to assess the relationships among the study variables. These associations are presented in Table 5. Prenatal attachment was positively associated with fetal health locus of control, age and number of living children. The strength of these associations is at a moderate level. Prenatal attachment was not associated with education, gestational age, number of deliveries, number of abortions and marital status. Fetal health locus of control was positively associated with number of deliveries, number of abortions and marital status. The strength of these associations is at a moderate level. Fetal health locus of control was not associated with education, gestational age, number of living children or age.

High risk/low risk pregnancy Differences among the Study Variables: Table 6 presents differences in the major study variables by high/low risk pregnancy. Fetal health locus of control differed by high/low risk pregnancy. Women with high risk pregnancy experienced higher level of fetal health locus of control than other women with low risk pregnancy .Prenatal attachment differed by high/low risk pregnancy. Women with low risk pregnancy experienced higher level of prenatal attachment than other women with high risk pregnancy. Neither gestational age nor education differed by high/low risk pregnancy. A significant difference was found between the mean attachment score of low risk pregnant women and the high risk pregnant women t= -, 75, P .05. Also a significant difference was found between the mean FHLC among low risk and high risk pregnant women t=.145 P=.05.

Hierarchical Multiple Regression Analysis: Hierarchical multiple regression analysis was used. One regression equation with three steps was conducted. In the first step of the equation, prenatal attachment was regressed on fetal health locus of control. Results indicated that fetal health locus of control was a significant predictor of prenatal attachment. Seven point seven percent of the variance in prenatal attachment was accounted for by fetal health locus of control. In the second step of the equation, age, educational level and occupation were entered. Findings revealed that prenatal attachment remained a significant predictor of fetal health locus of control. In the third step of the equation, number of preterm labor, number of abortions, number of deliveries, number of full term pregnancy, number of living children and gestational age were entered. Findings revealed that

Table 7: Hierarchical Multiple Regression Analysis for Maternal Fetal Attachment and Fetal Health Locus of Control

	Standardized Regression Coefficients (Beta)			
Variables	Step 1	Step 2	Step 3	95% CI
Age	----	.22	.19	0.07, 0.94
Educational Level	----	-.13	-.14	-4.1, 1.1
Occupation	----	-.13	-.18	-7.7, 1.8
Number of Preterm Labor	----	----	-.12	-6.2, 1.6
Number of Abortions	----	----	.05	-1.6, 2.7
Number of Deliveries	----	----	.13	-4.4, 6.7
Number of Full Term Pregnancy	----	----	-.27	-6.9, 1.6
Number of Living Children	----	----	.25	-3.3, 8.0
Gestational Age	----	----	.17	-.05, 0.4
Fetal Health Locus of Control	.26***	.27***	.28***	-.34, -.07
R^2	.07	.13	.20	
Adjusted R^2	.06	.10	.11	
R^2 Change		.07	.07	
F Change		2.4	1.3*	

*p≤.05, **p≤.01, ***p≤.001

prenatal attachment remained a significant predictor of fetal health locus of control with only an additional 5% variance in prenatal attachment. There were no significant values of the standardized coefficients (Beta) for other study variables entered into the equation (Table 7).

DISCUSSION

The aim of the present study was to assess prenatal attachment and fetal health locus of control among low and high risk Egyptian pregnant women. The questions of how was the Egyptian pregnant women attached to their fetuses, the fetal health locus of control among them and the difference between low risk pregnant women and high risk pregnant women in relation to prenatal attachment and fetal health locus of control were all investigated.

Results of the study indicated that the Egyptian pregnant women experienced more positive feeling of attachment toward their fetuses as the mean PA was (50.7) with SD±9.9. A significant differences was found between the mean attachment score of the low risk pregnant women and the mean of high risk pregnant women P= .05, this finding is equivocal with the finding of Brandon *et al*. [26] who found that there was a significant difference between low risk and high risk pregnant women as regard to maternal attachment and reporting of depressive symptoms. (antenatal attachment is negatively associated with severity of depressive symptoms). The study finding is also in consistent with Kornfield [14] who found a significant difference between women with and without HIV as higher MFA and positive health practices was found among women without AIDS.

The results of current study are contradicting with Kemp & Page [27] who found no significant differences in the scores of the normal and high risk groups on prenatal attachment in their study of maternal attachment in normal and high risk pregnancies.

Results of the present study indicated that prenatal attachment was positively associated with age, this finding is in consistent with the findings reported by Damato [28] as maternal age was a significant contributor in which younger women of later gestation who had experienced fetal movement reported greater attachment to their twin fetuses, as maternal age increased, attachment decreased, this findings may reflect older women's concerns about the changes the pregnancy and a new infant bring [4]. Therefore, its worth to assess maternal fetal attachment and fetal health locus of control among Egyptian women Turriff [29], found that maternal age did not significantly predict prenatal attachment, (p =.206.) and Brandon *et al*. [26] as they found that demographic characteristics had no impact on MFA among low risk and high risk depressive symptoms.

The current study findings are in accordance with those obtained by Cannella [5] as he reported that MFA is increased among low risk pregnancies and decreased with the presence of complications during current pregnancies or pervious labor. Every pregnancy/birth contains a circumscribed set of physical, psychological and social experiences that contribute uniquely to the future expectations and experiences. Therefore, childbirth expectations of women who have never given birth undoubtedly differ from expectations of women who have given birth [19]. Within the same context pregnancy-

elated clinical (risk status of current pregnancy, outcome of previous pregnancy), psychosocial (self-esteem, social support, coping style) and psychopathological (depressive and anxiety symptoms) variables have been identified as significant correlates of maternal antenatal attachment.

As regard to abortion, results of the current study indicated that abortion was not significantly correlated with PA, this finding is contradicting with that reported by Turriff [29] in which the participants who had a previous miscarriage were found to have increased prenatal emotional attachment, which suggests that women who have had miscarriage are more heavily invested in subsequent pregnancies. This finding was of particular interest because past literature would suggest that these women should either have lower levels of prenatal attachment [30], or that attachment should not differ between the groups [31]. The theory would suggest that women who have had miscarriages would delay bonding, much like those waiting for prenatal testing results.

As regard to the gestational age, the current study indicated that gestational age was not significantly correlated with PA *r= .15, this finding is in contrast to Damato[32] who found a significant correlations between PAI scores and gestational age (r = .30) Also, contradicting with Turriff[29], Brandon *et al*. [26] who they found that prenatal emotional Attachment to the fetus and gestational age were significantly positively correlated, r = .25, p = .017 and r =0.25,p .004 respectively.

Concerning the Feeling of personal control over the health of one's fetus is a predictive of prenatal attachment, results of the present study indicated that the participants reported high levels of fetal health locus of control with a mean of (119.3) SD 15. Prenatal attachment was positively associated with fetal health locus of control * r .26, this finding was supported by Reading, Campbell, Cox & Sledmere [33], Turrif [29], Kornfield [14] who reported that good health practices might lead to stronger maternal – fetal attachment . Women who are more attached to their fetuses are thought to be more interested in caring for themselves during pregnancy in an attempt to improve the health of the fetus; strong maternal – fetal attachment therefore, would directly lead a woman engage in health practices associated with improved fetal outcomes. Moreover, Lindgren [34] in his research that investigated the relationships among maternal – fetal attachment, prenatal depression and health practices in pregnancy found a positive relationship between maternal – fetal attachment and positive health practices, which supports the belief commonly held by clinicians that higher levels of maternal – fetal attachment are associated with better health practices.

The current study results indicated that fetal heath locus of control (FHLC) was positively correlated with maternal age, number of living children the women's have and marital status, This finding is supported with that reported by Lindgren [34] as certain demographic and pregnancy variables influenced women health practices, women who were married, had more education and fewer children engaged in more positive health practices, these may be due to partner support and knowledge of prenatal care. Results also indicated a moderate correlation between previous abortion and FHLC, in contrast Turriff[29] found no differences in the scores of FHLC between the women who had previous miscarriages and those without previous miscarriages.

Results of the current study revealed that FHLC differed by high/low risk pregnancy, women with high risk pregnancy experienced higher level of fetal health locus of control than other women with low risk pregnancy. This finding is in contrast to Stewart and Cecutti [35] who stated that a woman who believes that her behaviors has little effect on the health of her fetus and rather it is controlled by chance, will have low motivations to change these maladaptive behaviors, this is of particular concern as previous research has found belief in the role of chance to be significantly higher among women who experienced miscarriages [36], delivery complications, or medical complications during pregnancy [37] than among those who have not.

Spirito *et al*. [38] studied maternal and fetal health locus of control during pregnancy : a comparison of women with diabetes and nondiabetic women found that women with overt diabetes obtained higher scores on the powerful others subscale of FHLC than nondiabetic controls, findings suggested that when providing care for pregnant women with diabetes, clinicians might best emphasize the effects of maternal behavior on the health of the fetus rather than on the mother's own health. In summary, extant literature provided evidence that women's HLC beliefs specific to childbirth are an important correlates with postpartum adjustment and that pregnant women's HLC beliefs may vary widely according to several factors including risk status and previous childbirth experiences. However, concerns regarding the accurate measurement of childbirth specific HLC have not been fully addressed [19].

CONCLUSION

It's clear that the relationship between the child and the mother doesn't begin at birth; maternal fetal attachment commences early in pregnancy and increases over gestation. Egyptian pregnant women experienced more positive feeling of attachment toward their fetuses. Prenatal attachment differed by high/low risk pregnancy .Women with low risk pregnancy experienced higher level of maternal fetal attachment than other women with high risk pregnancy; this is consistent with most of the previous research findings**.** The current study indicated that gestational age was not significantly correlated with prenatal attachment which is contradicting to the previous researches, the majority of the participants were at the end of the 2nd trimester and this may be one of the reasons of inconsistency with other research findings. Fetal health locus of control was a significant predictor of prenatal attachment.

Recommendations: Based on the study findings, it's important to replicate the research using a large, random sample from different settings. A longitudinal study design that measure maternal attachment at various time of pregnancy should be conducted. Nurses should have an active role in helping the pregnant women to adhere to the healthy practices during pregnancy which will consequently affect their attachment. Individuals caring for pregnant women must be aware of the most appropriate strategies to utilize in the promotion of the positive maternal – fetal attachment, at any stage of pregnancy; health care providers can use MFAS as a starting point to discuss potential attachment activities in which the parents might engage [39].

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