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Original Research Paper

Maternal-fetal attachment during pregnancy at the Public Health Center

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Abstract
Maternal-fetal attachment (MFA) makes an essential contribution to maternal and fetal health and influences the adoption of a healthy lifestyle during pregnancy. Mothers who have a strong MFA tend to have healthy behaviors and give birth to healthy babies. Mothers who feel emotionally connected to their fetus tend to be more motivated to take care of their own health. They realize that their health directly affects the health of the developing baby. The purpose of this study is to provide an overview of maternal-fetal attachment in primigravida in the third trimester. The quantitative descriptive research method was used with 85 primigravida mothers who have met the inclusion criteria (third-trimester primigravida; no complications during pregnancy, self-examination at the Sleman regional public health centre) and have participated in this study. The Indonesian version of the Prenatal Attachment Inventory (PAI) questionnaire is used to review maternal-fetal attachments in a face-to-face interview. The results of the study provide an overview of the fact that most primigravida mothers in the third trimester have high maternal-fetal attachment scores. In addition, effective information communication and education for pregnant women were identified as factors that contributed to the level of maternal-fetal attachment. Effective maternal-fetal attachment-related programs in the education of new-reproductive couples are needed to be developed and implemented by health workers, including by midwives.

Keywords: maternal-fetal attachment; pregnancy; primigravida

1. Introduction

Pregnancy has a profound effect on the lives of women. Future moms may encounter particular challenges during this special time, and they will need to adjust by responding in both positive and negative ways (Copeland & Harbaugh, 2019; Su et al., 2015). Maternal-fetal attachment's quality is essential during pregnancy, helping the mother develop feelings of love, affection, and commitment to the baby to be born. This builds a strong emotional foundation for positive interactions after birth, as mothers who have a strong attachment to their fetus tend to be more responsive and sensitive to the needs of the baby after birth (Taffazoli et al., 2015). This responsiveness is important for a child's emotional and psychological development, helping them feel safe and secure (Shahmoradi & Danesh, 2020).

A positive early relationship between mother and child can have long-term effects on a child's social, emotional, and cognitive development. According to Taffazoli et al. (2015), MFA has a beneficial impact on the psychosocial functioning of the infant in the future, as well as the gradual development of personality qualities including curiosity, friendliness, self-confidence, independence, partnership, and integrity. Children who have strong bonds with their mothers tend to have better social skills, develop healthy relationships, and deal with stress better, helping mothers prepare psychologically for their new role as caregivers (Maddahi et al., 2016). This helps them form an identity as mothers, which is essential for a positive long-term relationship with their child.

Previous studies reveal that good attachment during pregnancy can help reduce maternal stress and anxiety, which can have a positive impact on fetal health and the baby's brain development (Purwati, Pramono, et al., 2023). Mothers who are calmer and healthier tend to provide a more stable and supportive environment for their children. Overall, MFA is an important foundation that affects the quality of the relationship between mother and child throughout their lives. These healthy and secure relationships help shape the emotional and psychological development of children, as well as contribute to the well-being of mothers and children (Matthies et al., 2020; Testouri et al., 2023).

In terms of physical needs, MFA makes an essential contribution to maternal and fetal health and influences the adoption of a healthy lifestyle during pregnancy (Maddahi et al., 2016). Mothers who have a strong maternal-fetal attachment tend to live a healthy lifestyle and tend to give birth to healthy babies, as mothers who feel emotionally connected to their fetuses tend to be more motivated to take care of their own health. They realize that their health directly affects the health of their developing babies. They are more likely to adopt a healthy lifestyle, such as eating nutritious foods (Naaz & Muneshwar, 2023), avoiding harmful substances (such as alcohol, cigarettes, and illegal drugs) (Jussila et al., 2020; Massey et al., 2015), and doing safe light exercise during pregnancy (Shen & Chen, 2021). Furthermore, mothers with a strong MFA are more likely to have regular prenatal check-ups (Mokoginta et al., 2023). This health check-up is important to monitor fetal development and detect and overcome health problems early (S. A. M. Hassan et al., 2021). Adherence to prenatal care can reduce the risk of complications during pregnancy and childbirth. The results of the study stated that mothers with strong maternal-fetal attachment are usually more open to learning about pregnancy and fetal health (Lahti et al., 2017). They may be more involved in birth preparation classes or reading literature about healthy pregnancy, which can provide them with the knowledge and skills to keep them and their babies healthy (Yu & Kim, 2014). In addition, strong MFA also reduces the effects of postpartum depression and makes the mother feel a great sense of responsibility for the well-being of the fetus (Delavari et al., 2018; Matthies et al., 2020; Petri et al., 2018).

Compared to other children, those with insecure mother-infant bonding exhibit more aggressive behaviors, poor social interactions, delayed emotional and mental development, and increased inclinations to avoid school (Taffazoli et al., 2015). They are also less likely to establish lasting relationships. Meanwhile, mothers with low MFA tend to adopt an unhealthy lifestyle, such as smoking, drinking alcohol (Hyysalo et al., 2022; Kartal & Kocataş, 2023; Magee et al., 2014), or neglecting prenatal care (Shahmoradi & Danesh, 2020). According to Shahmoradi & Danesh (2020), low-quality MFA can reduce the mother's commitment to follow medical advice and attend regular prenatal checkups. In addition, low-quality maternal-fetal attachment will tend to make mothers feel less motivated to provide the necessary care for their baby after birth, which can affect the baby's well-being. For mothers, the impact of a lack of MFA quality, apparently related to poor maternal mental health and well-being, can have an impact on overall family dynamics, including relationships with partners and other children (Maddahi et al., 2016). Overall, reinforcement of the MFA is important to ensure optimal health and well-being for both mother and baby. Emotional and psychological support, pregnancy education, and access to good health care can help improve these attachments (Newman et al., 2016).

The maternal fetal attachment reinforcement model has been widely carried out by previous researchers, starting with the 4-dimensional (4D) interactive ultrasound model, and the virtual reality (VR) model which are widely developed and have become a new trend in the world today (Benzie et al., 2018; Fallon et al., 2024; Hajesmaeel Gohari et al., 2021; Lee et al., 2023; Venkatesan et al., 2021). Studies related to MFA in Indonesia have become more extensive. However, pregnant women have not been exposed to adequate information about the significance of fostering maternal-fetal attachment as part of health promotion strategies.

Public health centers provide health workers, especially midwives, who are in charge of managing health promotion about maternal-fetal attachment professionally. They must also be able to manage and organize promotional and preventive services. Due to the lack of information related to the importance of MFA in Indonesia and the importance of the basis for the innovative development of MFA reinforcement models, this research was conducted with the purpose of seeing how maternal fetal attachment is described in pregnant women in the third trimester.

2. Research Methods

The research carried out a quantitative descriptive design. The study was conducted at a community health center in Sleman, Yogyakarta, Indonesia. Eighty-five primigravida mothers who have met the inclusion criteria (third-trimester primigravida; no complications during pregnancy, checked at the Sleman Regional Health Center). The Indonesian version of the Prenatal Attachment Inventory (PAI) questionnaire is used to review maternal-fetal attachments in a face-to-face interview. There are 21 question items in the PAI and previous studies have reported a validity test (Cronbach's alpha 0.937) (Suryaningsih et al., 2021a). Univariate statistics were carried out as an approach to find out the picture of maternal-fetal attachment.

3. Results and Discussion

3.1.Characteristics of Respondents

There are eighty-five primigravida mothers who have met the inclusion criteria have participated in this study. The results of this study describe the characteristics of respondents' based on the age range of mothers, education levels, and occupational status (Table 1). The majority of respondents were in the age range of 20-35 years (83%), senior high school graduates (58%), and employees (65%). Prior studies have shown that no correlation between maternal age and MFA (Daglar & Nur, 2018; Suryaningsih et al., 2021b; Ulu & Bayraktar, 2018). On the other hand, some studies found that variables including maternal age may have an impact on MFA intensity (Čėsnaitė et al., 2019; McNamara et al., 2019). Compared to older women, pregnant women under the age of twenty-one exhibit the lowest levels of MFA (Canlı & Demirtaş, 2022).The low MFA levels may be impaired by the possibility that younger women feel conflicted and unclear about the psychological and physical changes that occur during pregnancy and they feel unprepared for motherhood (Wilson-Mitchell et al., 2014).

Gioia et al. (2023) found a quadratic relationship between MFA and maternal age. Both younger and older women had higher levels of prenatal attachment, reaching a minimum at around 34 years of age. Attractively, Gioia et al. (2023) also reported a synergistic nonlinear effect of maternal age and gestational age on MFA. Women around 30-35 years of age had higher MFA to their mothers in early pregnancy (e.g., within 10 weeks), but this relationship was reversed in late pregnancy (e.g., after 30 weeks), with younger women or women older than women in the middle age group (30-35 years) having higher MFA. According to Barone et al., (2014), MFA behaviors—such as considering her role in the dyadic relationship and interaction with the mother—increase with increasing gestational age and are linked to a beneficial outcome for the fetus. Because of this, it is reasonable to believe that pregnant women are able to sense the baby's movements, which gives the experience a more tangible quality and may enable them to communicate with the child more effectively.

Table 1. Characteristics of Respondents

Characteristics	f	%
Age		

Characteristics	f	%
>20 years	13	15
20-35 tahun	70	83
>35 tahun	2	2
Total	**85**	**100**
Education Level		
Elementary-Junior high school	15	17
Senior high school	49	58
College	21	25
Total	85	100
Occupational Status		
Employee	55	65
Housewife	30	35
Total	**85**	**100**

Source: Primary Data

The prior study found no correlation between mothers' educational level and MFA (N. M. Hassan & Hassan, 2017). MFA levels were nearly as noticeable in both highly and lowly educated people. This outcome was unexpected because education typically encourages people to access more health information. In addition, there is an expectation that women with higher levels of education have acquired more appropriate abilities to support their child's development.

3.2.Overview of Maternal-Fetal Attachment

We found that the majority of respondents had a high score of MFA (81%). The study in Egypt by Hassan & Hassan (2017) showed a similar results, where 81.4% pregnant women in this study had a high MFA level. Pregnant women who have a higher level of MFA exhibit better health practices and self-care behaviors. Instead, pregnant women with a low level of MFA are more likely to deliver babies with poorer health outcomes because they are less likely to adhere to health practices during pregnancy (Maddahi et al., 2016).

The level of MFA associated with maternal age, maternal anxiety, planned/expected pregnancy, gravidity, fetal sex determination, the number of antenatal appointments, timing of first prenatal visit, marital satisfaction and the existence of social support (Anjarwati & Suryaningsih, 2021; N. M. Hassan & Hassan, 2017; Pasricha et al., 2021; Ulu & Bayraktar, 2018). Antenatal care (ANC) and social support which will greatly influence a high MFA score (Abasi et al., 2022; da Rosa et al., 2021; Gonzales & Barcelo, 2023; Purwati, Pramono, et al., 2023). Gonzales & Barcelo (2023) found that there is a significant correlation between MFA and the quality of ANC (sharing of information, having enough time, and receiving respect and support). A detailed explanation by the midwife regarding the results of a comprehensive physical examination from head to toe, especially during the leopold maneuver examination, including involving the husband in the examination; and education, information and communication (EIC), may have influenced the MFA score in this study.

Social support, especially family support, not only impacts the MFA of physiological pregnant women but also impacts pregnant women with high risk. A study in Republic of Korea showed that there is associations between anxiety and depression and maternal-fetal attachment in high-risk pregnant patients admitted to the maternal-fetal intensive care unit (MFICU) were partially mediated by family support (Yoon & Sung, 2021).

Table 2. Overview of Maternal-Fetal Attachment Level

MFA Score	f	%
High	69	81
Low	16	19
Total	85	100

Source: Primary Data

Another factor that may contribute to the majority of the high MFA scores in this study is the existence of pregnant women classes that are facilitated by midwives and routinely held once a week. Physiological changes in pregnant women, preparing for delivery, newborn and postnatal care, choosing contraception, and birth certificates are the material in the pregnant women's classes. Fetal movement education during antenatal visits or pregnant women classes may improve MFA (Güney & Uçar, 2019; Mesgarzadeh et al., 2020; Salehi et al., 2017). Monitoring the movements of the fetus can lead to maternal behavior that is affectionate and focused on the fetus (Lai et al., 2016; Mohapatra et al., 2021). The mother is intuitively stimulated to move, touch, and speak in order to elicit further movements from the fetus, which provides the mother confidence that the fetus is present and alive. The emotional bond between mother and fetus positively affects the uteroplacental circulation and preserves the fetus's health (AlAmri & Smith, 2021; Delaram et al., 2018).

Husbands who are more involved during the pregnancy process have been shown to lower the mother's anxiety levels during pregnancy and have a positive effect on the mental health of the mother during pregnancy (Alan Dikmen & Tetikçok, 2023; Purwati, Pramono, et al., 2023). Midwives in this study also introduced the idea of maternal-fetal attachment, which includes encouraging the husband to speak with the fetus within the mother's womb. Maternal-fetal attachment characteristics include speaking or interacting with the fetus, touching the mother's tummy frequently, preparing items or necessities for the newborn, and deciding on the baby's name (Suryaningsih et al., 2020).

Research on the analysis of innovation required to increase MFA through monitoring fetal well-being has been conducted by (Purwati, Wahyuntari, et al., 2023), where it is necessary to develop a new, useful, effective, and efficient fetal movement counting tool that can be used by pregnant women independently. In addition, MFA reinforcement models have been carried out by some previous researchers, ranging from 4-dimensional (4D) interactive ultrasound models and virtual reality (VR) models that are widely developed and are a new trend in the world today (Benzie et al., 2018; Lee et al., 2023). It is hoped that in the future, there will be more similar studies so that efforts to improve maternal-fetal attachment can be more attractive, effective and efficient. The number of respondents in our study was limited, as is the case with research generally, which may have an impact on the generalizability of the findings to other contexts.

4. Conclusion

The maternal-fetal attachment scores of pregnant women in this study were mostly in the high category. The attributes of midwives can support high MFA scores, both directly and indirectly. Leopold manoeuvre examination, comprehensive IEC, and partner and family involvement are known to increase MFA. However, further research on the correlation needs to be done in future studies. Effective maternal-fetal attachment-related programs in the education of new-reproductive couples are needed to be developed and implemented by health workers, including by midwives. In addition, research on needs analysis for the development of more innovative MFA reinforcement models in the future also needs to be conducted.

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