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Maternal Fetal Attachment (MFA) in Pregnant Women with Chronic Energy Deficiency (CED) A Qualitative Study

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Abstract

Mothers with a strong emotional bond with their fetuses are more likely to adopt a healthier lifestyle, follow a nutritious diet, consistently take supplements, attend regular antenatal visits, and avoid risky behaviours. This study aims to explore maternal-fetal attachment in the broader context of maternal health, particularly in pregnant women with chronic energy deficiency (CED). This study contributes new insights into the qualitative experiences of MFA among pregnant women with CED in Indonesia, a population that has been underexplored in prior research, and provides practical implications for midwives and healthcare providers in enhancing MFA education during antenatal care. A generic qualitative research approach was used, involving six pregnant women with CED who attended antenatal care visits at 'Aisyiyah Moyudan Clinic, Sleman, in May 2024. Data were analyzed using thematic analysis following the six-step framework by Clarke and Braun. Four themes were identified: 1) Pregnancy conditions that Mothers experienced discomfort in the first and third trimesters, along with physiological and emotional changes. 2) Psychological aspects: Mothers express various emotions during pregnancy and adopt different strategies for emotional management. 3) Social support: Support from husbands and families played a crucial role during pregnancy. 4) Maternal-Fetal Attachment (MFA). Most mothers were unfamiliar with the concept of MFA, yet they naturally interacted with their fetus. Healthcare providers should offer more detailed information on physiological and psychological changes during pregnancy and maternal-fetal attachment. They should also educate mothers on practical ways to enhance MFA in daily life.

Keywords: *Chronic Energy Deficiency; Maternal Fetal Attachment; Pregnancy*

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1. Introduction

Pregnancy and the preparation for welcoming the birth of a first child are joyful periods for a woman. However, this phase is also a sensitive time, during which women are at risk of experiencing a decline in psychological well-being (UNICEF, WHO, & World Bank Group, 2023). Maternal health is a crucial factor in determining the quality of life of the baby to be born. One key aspect of maternal health is maternal-fetal attachment (MFA), which refers to the emotional bond that develops between a mother and her fetus during pregnancy (Hruschak, Palopoli, Thomason, & Trentacosta, 2022). A stronger maternal-fetal attachment has been proven to mitigate the negative impact of stress on maternal well-being (Navon–Eyal & Taubman - Ben-Ari, 2023).

Maternal-fetal attachment has significant implications for maternal psychological well-being, fetal development, and a mother's successful adaptation to caring for her baby after birth (Id, Townsend, & Id, 2019). Various factors influence this attachment, ranging from psychological conditions and social support to the mother's physical condition during pregnancy (Čėsnaitė, Domža, Ramašauskaitė, & Volochovič, 2019). One crucial factor is the nutritional status of pregnant women. Malnutrition during pregnancy, including deficiencies in essential nutrients, can negatively affect the fetus, leading to low birth weight, increased risk of chronic diseases, and developmental delays (Naaz & Muneshwar, 2023).

Indonesia has a high prevalence of malnourished pregnant women, along with maternal and infant mortality rates that remain a concern (UNICEF, 2023). One of the indicators of maternal nutritional issues is Chronic Energy Deficiency (CED), with a prevalence of 16.9% in

Indonesia (Badan Kebijakan Pembangunan Kesehatan, 2023). Pregnant women with CED suffer from nutritional deficiencies characterized by an Upper Arm Circumference (UAC) of less than 23.5 cm or a pre-pregnancy/first-trimester Body Mass Index (BMI) of less than 18.5 kg/m² (Kemenkes RI, 2025). Babies born to mothers with CED have a 1.6% higher risk of experiencing growth impairment compared to those born to mothers without CED (Kpewou et al., 2020). Poor child growth due to CED can ultimately lead to stunting later in life (World Health Organization, 2023).

Stunting is a growth disorder in children under the age of five, characterized by a height-for-age measurement below the WHO standard (≤-2 SD) due to chronic malnutrition, recurrent infections, and suboptimal caregiving practices from pregnancy until the child reaches two years old (UNICEF et al., 2023). This condition can affect cognitive development and academic performance, ultimately reducing work productivity and hindering economic growth (Lestari, Siregar, Hidayat, & Yusuf, 2024). According to the 2019 Indonesia Nutrition Status Survey (SSGI), the stunting rate in Indonesia was 27.7%. Although it declined to 24.4% in 2021 and 21.6% in 2022, these figures have not yet met the national target, prompting the government to continue its efforts to reduce stunting prevalence through various approaches (Kemenkes, 2023).

One of the key strategies in preventing stunting is ensuring optimal nutrition during the first 1,000 days of life (HPK), from pregnancy to the child's second birthday (UNICEF, 2021). In this context, maternal-fetal attachment (MFA) can serve as a preventive approach against CED. Mothers with a strong emotional bond with their fetus tend to adopt a healthier lifestyle, adhere to a nutritious diet, consistently take supplements, attend regular antenatal visits, and avoid risky behaviors. These factors contribute to healthier pregnancies, reducing the risk of low birth weight, premature births, and, ultimately, the likelihood of stunting in early childhood (Sukriani, Suryaningsih, & Linh, 2020; Branjerdporn, Meredith, Wilson, & Strong, 2022). Moreover, MFA supports the mental well-being of pregnant women, fosters a sense of responsibility in maintaining their health and that of the fetus, and enhances awareness of their role as future mothers (Anjarwati & Suryaningsih, 2021).

Several previous studies have examined maternal-fetal attachment and its influencing factors. For instance, (Maddahi, Dolatian, Khoramabadi, & Talebi, 2016) found that maternal-fetal attachment has a positive and significant relationship with neonatal birth outcomes. The stronger a mother's emotional bond with her fetus, the better the birth outcomes. Furthermore, research by (Sophie Huey-Ming Guo, 2019) identified pregnancy-related stress as the most significant factor influencing maternal-fetal attachment. Mindfulness has both direct and indirect effects on attachment by reducing stress levels during pregnancy. Additionally, some studies indicate that poor maternal nutritional status can affect mental health, increase stress and anxiety risks, and impact a mother's emotional attachment to her fetus (Naaz & Muneshwar, 2023).

This study provides new insights by exploring in greater depth the factors influencing the emotional bond between mother and fetus among pregnant women with CED. Beyond addressing psychological and social aspects, this research also highlights the physiological factors associated with CED and its impact on maternal-fetal interactions. However, a clear gap remains in the literature: qualitative studies specifically examining MFA among pregnant women with CED in the Indonesian context are scarce, and most existing studies rely on quantitative approaches that do not capture the lived experiences and emotional dimensions of this population (Purwati, Pramono, Hakimi, & Anggorowati, 2023; Suryaningsih & Gau, 2020). This study, therefore, addresses that gap by employing a qualitative approach to explore MFA holistically among this vulnerable group. The contribution of this study lies in generating context-specific, evidence-based insights that can guide midwives and healthcare providers in developing targeted MFA promotion strategies for pregnant women with CED during antenatal care. Thus, this study contributed to exploring maternal-fetal attachment in pregnant women, in the broader context of maternal health, particularly among those with chronic energy deficiency (CED). The article is organized as follows: Section 2 describes the research method, Section 3 presents the results and discussion, and Section 4 provides the conclusion and suggestions.

2. Method

This study is a generic qualitative research (Creswell & Creswell, 2023) using in-depth interviews to explore the experiences of pregnant women with Chronic Energy Deficiency (CED) regarding Maternal-Fetal Attachment (MFA). This research has received ethical approval from Universitas Aisyiyah Yogyakarta with No 3838/KEP-UNISA/VII/2024.

The research sample was selected using purposive sampling among pregnant women attending antenatal care visits at ‘Aisyiyah Moyudan Clinic, Sleman. The inclusion criteria for this study consisted of pregnant women in their second and third trimesters with Chronic Energy Deficiency (CED), both primigravida and multigravida, who were willing to participate.

Meanwhile, the exclusion criteria included pregnant women with a history of serious illnesses such as heart disease, asthma, or cancer, those taking certain medications such as rifampicin, and those experiencing pregnancy complications such as oligohydramnios, polyhydramnios, gestational diabetes, hypertension, preeclampsia, placenta previa, multiple pregnancies, or pregnancy-related infections. Additionally, women who were unwilling to participate and those living alone without a partner were excluded. Six pregnant women with CED were interviewed sequentially through semi-structured face-to-face interviews from May 2024 until data saturation was achieved.

The interviews were based on an interview guide that was thoroughly developed and reviewed from the literature and researcher discussions. The questions covered topics related to maternal-fetal attachment, pregnancy complaints, social support, nutritional intake and eating patterns, and psychological changes during pregnancy. Researchers also used probes and prompts for each research topic to ensure depth and detail in participants' responses by clarifying, elaborating, illustrating, or explaining previous answers to the interview questions (Robinson, 2023). Rincian sosiodemografis dikumpulkan langsung dari peserta.

Sociodemographic details were collected directly from participants. The interviews were recorded in audio format using an audio recorder, and video recordings were also used to capture participant behaviour during the interviews. The tapes were then transcribed verbatim and anonymized to protect participant identities (Stahl & King, 2020). Additionally, interviews were conducted with midwives providing ANC services to validate participants' responses.

All transcripts were compared with the original audio recordings to ensure the validity and quality of the transcribed data. Data saturation regarding key perspectives was achieved, as evidenced by the decreasing number of new issues emerging during the final interviews and confirmed during the initial coding process. Thematic analysis was employed using the six-step framework of (Braun & Clarke, 2019). SM identified initial codes, and following discussion and cross-checking with the research team, these codes were merged and refined to generate a set of themes. Transcripts were independently coded by researchers (ES and KK) to ensure data consistency. The transcripts were reread multiple times, and discrepancies were discussed until a consensus was reached. The overall research process is summarised in the flowchart below (Figure 1), which illustrates the sequential steps from participant recruitment and data collection through transcription, thematic coding, and theme generation to final verification of findings.

3. Results and Discussion

Table 1. Participant Characteristics

Initials	Ages	Parity	Education	UAC (cm)
E	24 years old	G1P0A0	Senior high school	22
A	20 years old	G1P0A0	Vocational high school	22
I	34 years old	G3P0A0	Senior high school	23
EA	23 years old	G1P0A0	Junior High School	19
W	21 years old	G2P0A0	Vocational high school	23
K	26 years old	G2P0A1	Vocational high school	22.5

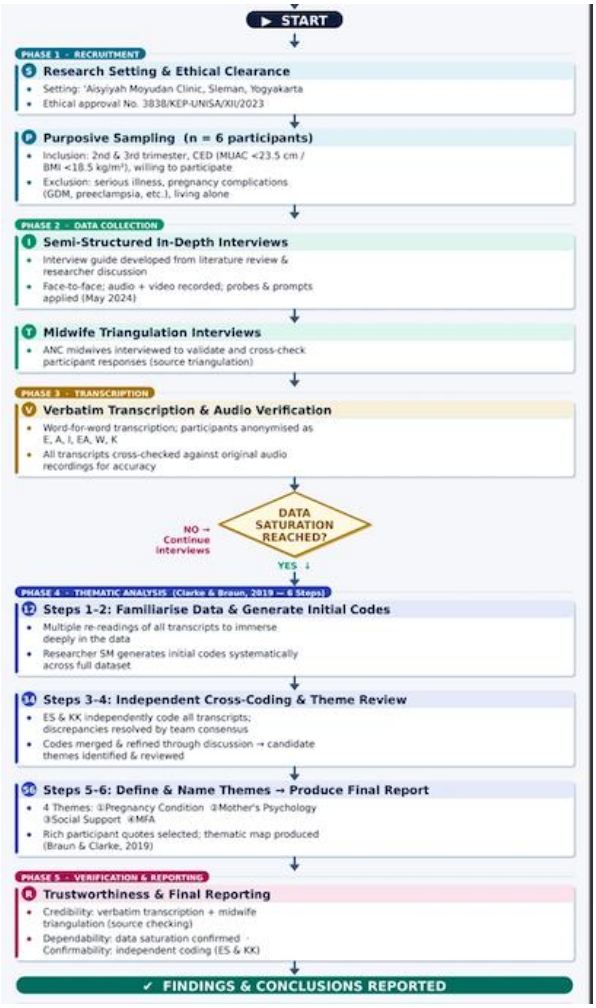

Figure 1. Flowchart the steps

Based on the data in Table 1. All participants were aged 20-35 years, which is the ideal age range. For parity, 3 (50%) of participants were pregnant with their first child. All participants' education is high school, and all participants' mid-upper arm circumferences are below normal (<23.5 cm). Five people were living with their parents.

Table 2. Theme and Subtheme

Theme	Sub Theme
Pregnancy Condition	Discomfort during pregnancy
	Changes during pregnancy
Mother's Psychology	Feelings during pregnancy
	Emotional management
Social Support	Husband's support
	Family support
Maternal Fetal Attachment	Knowledge and understanding of MFA
	Interaction with the fetus

Theme 1: Pregnancy Condition

This theme highlights the mother's experience during pregnancy, which was full of discomfort. The participants expressed their complaints in the first trimester, namely nausea and vomiting, weakness, blood spots, and decreased appetite, which required the mother to consume vitamins from the midwife. Furthermore, in the third trimester, the mother also experienced discomfort, back pain, and fatigue.

"During the fourth month of the pregnancy, I had spotted. Then I was taken by the husband to PKU, but it's okay, Alhamdulillah" (Participant EA)
"Of course, during pregnancy, I had a complaint. In the morning, like that, I'm nauseous. But after 6 months, the nausea disappeared. Sometimes, it's cause my body is tired, and then it just feels sore" (Participant W)
"For the first trimester only, Sis, I had nausea and vomiting. But now, it's just back pain at most" (Participant K)
"I think this complaint is still normal. It also means dizziness was a normal cramp in the leg and groin" (Participant EI)
"Nausea and vomiting occurred 5 times during sweeping, but often contractions. For the first time, it was just water, but I would feel nauseous" (Participant EA)

Mothers also highlighted changes during pregnancy and weight gain.

"How many kilos? This isn't much. Maybe only 56 kilos, ma'am" (Participant I)
"I only gained 5 kg, sis" (Participant A)
"I gained 4-5 kg at 20 weeks of pregnancy, sis." (Participant EI)
"From 40 to 52 kg for the last." (Participant K)
"Before pregnant, I was 38 kg, now I'm 42 kg." (Participant EA)
"Now it's 9-10 kg." (Participant W)

During pregnancy, mothers experienced changes in eating patterns and nutrition, such as an increased frequency of meals, changes in portion sizes, and a shift in food preferences from animal protein to a preference for vegetables.

"Before pregnancy, I rarely ate, usually only twice a day. In early pregnancy, I was forced to eat three times a day. But during pregnancy, I actually rarely consumed animal protein. Normally, I would eat at least three times a day, sometimes even four times. I usually ate soupy dishes like clear spinach soup. If not, I would have simple stir-fried or fried foods like tempeh or fried fish. As for snacks, I often ate chocolate and bread. Lately, I rarely eat fruit, and my source of animal protein comes from eggs." (Participant W)
"Now I eat three to four times a day, but still in small portions. I like seafood the most, but I don't enjoy chicken or meat." (Participant K)
"For meals three times a day, I usually eat rice with vegetables or rice with a side dish. It's a complete meal, but the portions are not too big." (Participant I)
"Yes. Besides that, I eat different kinds of fruit, sometimes apples and mangoes. I also eat meat once a week, sometimes once every two weeks." (Participant EA)
Three times. Lately, I get hungry easily, so I eat frequently but in small amounts. I usually eat vegetables because I don't eat fish often, and I don't like chicken. Mostly, I eat vegetables, snacks, and fruit." (Participant EI)
"I usually replace it with bread if I don't eat fruit. Just a little, but I still feel nauseous." (Participant A)

Theme 2: Mother's Psychology

Besides the discomfort and physical changes experienced by mothers, some also faced emotional challenges during pregnancy, becoming more sensitive, which could affect their psychological well-being and the health of their fetus. One of the emotional challenges was caused by the discomfort of pregnancy, such as nausea and vomiting, which led to stress because they were unable to eat anything.

"I felt stressed and weak because even drinking water would not stay down, and I would immediately vomit." (participant EI)
"I became easily emotional, Miss. Ordinary words suddenly felt piercing." (Participant I)

> *"I felt sad, Miss, because I was still experiencing nausea and vomiting. Honestly, I was afraid of how my labor would go later since some of my friends ended up having a C-section."* (Participant A)
> *"Sometimes, when I felt sensitive, and I cried, it was like my baby responded that something didn't feel right."* (Participant EI)

Pregnant women had various ways to manage their emotions during pregnancy. Most of them chose to stay positive, pray, and seek support from their closest people.

> *"For me, if I had any troubling thoughts or saw distressing images, videos, or anything on TV, I would rather skip them to avoid overthinking. I tried to focus on positive thinking instead."* (Participant I)

A similar approach was taken by Participant K, who felt more emotional during pregnancy. She said, *"When I felt sad or scared, I usually shared my feelings with a friend who was also pregnant or distracted myself by using my phone."*

> Meanwhile, Participant W chose to remain calm when suddenly sad in the early stages of her pregnancy and said, *"I forced myself to stay calm, but sometimes I tried to forget about it so I wouldn't feel sad all the time. I reminded myself of happy things instead."*

This emotional management demonstrated how each pregnant woman strived to maintain her mental balance, whether through introspection, spiritual beliefs, or social support.

Theme 3: Social Support

Mothers received primary support from their husbands, although some husbands had a passive involvement in their wives' pregnancies. The support they received included emotional support through listening. Although the majority of women did not share everything they experienced, they were able to discuss and express some complaints and discomforts during pregnancy with their husbands as their closest confidants. A small number also shared their experiences with their mothers, while others sought friends in similar situations to talk to. The support provided by husbands was not only physical but also emotional, such as listening, offering support, and accommodating mood changes during pregnancy.

> *"Usually, when I come home from work in the evening, someone is there to accompany me, so if I vomit, I have someone by my side. When it comes to sharing stories, I usually talk to my mother but rarely with my father. But with my mother, it's just when there's free time—more often, I talk to my husband. Yes, I usually share things with my husband, like telling him that I'm scared about giving birth tomorrow, and he responds to me."* (Participant A)
> *"Yes, I talk to my husband, but only when we are chatting or talking about something. But I don't share everything because I feel bad for him—if I told him everything, it would be too much. So, I usually think about it myself first, and if I really can't handle it, then I talk to my husband."* (Participant I)
> *"I usually share things with my mother or husband. My husband usually comforts me by stroking or massaging me. I've never shared my problems with anyone else—only with my husband or mother."* (Participant IA)
> *"Usually, when my thoughts are all over the place, my husband calms me down. He is the one involved because my parents would feel too worried."* (Participant EA)
> *"I share my thoughts often, usually with my husband. My husband also feels bad for me, but he helps as well. For example, he strokes me or gives me a little massage. We don't talk much—only when I want something, then we talk. But when it comes to problems outside, I rarely discuss them. If I have any complaints, I tell my husband. It's okay, he massages me right away. I don't talk about it with my in-laws or parents—I only tell my husband."* (Participant K)

Behind the husband being the closest person to the pregnant mother, there were times when certain words spoken by the husband hurt her feelings. These conditions made the mother feel even sadder and more prone to crying. As a result, she felt uncomfortable talking directly with her husband to discuss what she was experiencing during pregnancy. She chose not to share everything or kept more of her feelings to herself throughout the pregnancy. Sometimes, she preferred to confide in a close friend who was also pregnant.

> *"I easily get emotional, Sis. Like, words that usually don't bother me suddenly feel like a deep stab. My husband also sometimes says things that feel hurtful."*
> *"I only confide in my friends. My friends are also pregnant, so we share our feelings."* (Participant K)

Some pregnant mothers received social support from their families. They mentioned how their mothers or mothers-in-law provided emotional support during pregnancy and considered this support crucial for their pregnancy. This condition was reflected in their parents' concern throughout their pregnancy.

"There were changes. I was given more attention. Sometimes, I was not allowed to do certain things or engage in heavy activities. So, whenever I wanted to do something, my parents would always step in first, to the point that I couldn't do my usual activities." (Participant W)
"Just happy—another grandchild!" (Participant I)
"Oh, yes. Happy, definitely happy. If my in-laws are supportive, they often remind me to eat or invite me to go for a walk. As for my parents, I feel happy too, Sis. Their support is the same as my in-laws'." (Participant K)
"My parents were happy, thank God. If I had any complaints, they told me to get checked, like that time when I had some bleeding." (Participant EI)
"When I felt nauseous and vomited, they panicked—maybe because this was their first grandchild, so they were very worried about what might happen. They were pleased, Sis, maybe because it was their first grandchild, so they tended to worry a lot, especially when I had nausea and vomiting. My in-laws were also supportive since this was their first child, too." (Participant A)

However, there were some issues in the relationship between pregnant mothers and their mothers-in-law, who provided little emotional and physical support during pregnancy

"Yes, I accept it normally. it doesn't mean anything" (Participant I)

Theme 4: ***Maternal Fetal Attachment (MFA)***

This theme highlighted mothers' knowledge and understanding of Maternal-Fetal Attachment (MFA). Many mothers were initially unaware of MFA, but after the interviewer's explanation, they began to understand that MFA involved an emotional and behavioral connection with the fetus.

"I don't know. It still feels unfamiliar, Sis." (Participant W)
"I don't know. I haven't heard about it before, Sis, never." (Participant K)
"I don't know." (Participants EA, EI, dan A)

Additionally, one participant already had a basic understanding of MFA, which she had previously learned from a midwife during an antenatal care visit.

"I don't really understand. Yesterday, the midwife explained it to me. What was it about? Emotional closeness or something like that? Yesterday, it seemed to be about bonding with the fetus." (Participant I)

At first, the mothers did not know the concept of MFA. Still, naturally, they had already engaged in practices that indicated an emotional bond with the fetus, such as talking to the baby and touching the belly.

"In the morning, I usually just say 'good morning' to wake the baby up. If the baby stays still for a long time, I say, 'Move, little one,' and sometimes, after a few seconds, the baby moves." (Participant W)
"Often at night, before sleeping, I gently stroke my belly. Sometimes I talk to the baby, saying, 'Stay healthy, little one.' When I do that, the baby usually kicks." (Participant A)
"In the morning, I say, 'Hey, little one, what are you doing?' or 'Sit down.' I've been stroking my belly from the third month of the pregnancy." (Participant EA)
"Yes, I stroke my belly and talk to the baby, just anything that comes to mind. Sometimes, I recite prayers or talk. When I have complaints, like cramps, I stroke my belly and say, 'Don't be naughty,' and things like that. It feels like the baby listens." (Participant EI)
"The interaction is just stroking my belly, sometimes saying, 'Little one, hey.'" (Participant I)
"I like talking to the baby while stroking my belly." (Participant K)

Husbands interacted with the fetus by communicating and gently stroking the mother's belly.

"My husband talks to the baby on his own without me prompting him." (Participant K)
"My husband sometimes strokes my belly." (Participant I)
"My husband and I usually just stroke my belly, and sometimes he talks to the baby, usually calling the baby's name." (Participant A)
"Yes, we usually talk to the baby, Sis. My husband often talks to the baby. He usually recites prayers when talking, and stroking my belly is something we do every day." (Participant EI).

Moreover, passive involvement in their wife's pregnancy was observed among husbands in long-distance marriages due to work obligations and habits.

"Rarely because he's rarely home." (Participant W)
"But he rarely comes home. Most of the time, he comes home late at night, sometimes only once a week. When he leaves on Friday morning, he says goodbye. At night, he says, 'Little one, what are you doing?'" (Participant EA).

Besides the husband, in multigravida mothers, communication with the fetus was also carried out by their older child, who touched the mother's belly as a way of acknowledging their presence as an older sibling.

> *"Yes, my husband and our child interact with the baby. The little one, who is in preschool, kisses my belly."* (Participant I)

Triangulation

Based on the interview results, several themes were identified, including factors that inhibited and supported maternal-fetal attachment, as well as efforts to enhance maternal-fetal attachment. According to the midwives' statements, in the implementation of MFA among pregnant women, several supporting factors were present, such as the involvement and support of husbands. Pregnant women were often accompanied by their husbands to the clinic. If the husband was unable to attend, other family members provided support and education regarding the importance of communicating with the fetus.

> *"We often encounter pregnant patients whose husbands accompany. It is scarce for them to be accompanied by other family members, except in cases where the husband works out of town." The midwife also provided various educational sessions when mothers came for check-ups, including information on nutritional patterns during pregnancy, chronic energy deficiency, and some common complaints experienced by pregnant women.*
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> *"For pregnant women, how do we provide education? Usually, some experience certain complaints, such as loss of appetite or difficulty eating. When a mother has such complaints, I teach her to eat in small portions but more frequently. Especially in terms of nutritional fulfillment, some pregnant women do not know what they should eat to meet their nutritional needs. So, I provide education about several types of food that can fulfill their nutritional requirements to prevent deficiencies and improve their overall nutrition."*
> *"So far, while I educated the pregnant women, Alhamdulillah, no pregnant woman has ever felt offended. Their knowledge about nutrition is still lacking. Most of the pregnant women have an unbalanced diet, consuming mostly carbohydrates. When I provide education, they accept it openly and say, 'InsyaAllah, I will pay more attention to my nutrition.' For me, the most important aspect for pregnant women experiencing chronic energy deficiency (CED) is proper nutrition."*
>
> *"For CED in pregnancy, nutritional intake might be present, but the nutritional content may not be appropriate or sufficient. That is why I emphasize proper nutrition and how to prepare food correctly so that the nutrients are not lost."*

However, psychological or emotional screening for mothers had not yet been conducted as part of maternal-fetal attachment education. Nevertheless, mothers described the presence of their husbands, the interaction between husband and wife, and their engagement with their child.

> *"Regarding bonding, I apologize, but we do not provide detailed information about bonding between mother and fetus. We only cover basic communication between the mother and the fetus, but not in-depth explanations."*
>
> *"Bonding is encouraged for every pregnant mother, but it is not discussed during every check-up. Occasionally, we provide education about bonding because we have a record of maternal examinations in Buku KIA. So, if the mother comes for a check-up, we provide education about bonding since it is important."*
> *"In terms of education, I advise both the mother and father to communicate with each other. Communication can include positive affirmations and talking to the baby. Nowadays, many mothers are focused on gadgets and not on their babies. During specific times, such as during the call to prayer (adhan), mothers should focus on their baby's movements. When the pregnancy is more advanced, they should engage in conversations with their baby so that the baby is not ignored.*
>
> *"*We should be aware of the baby's movements at specific times. Since we are not constantly active during the call to prayer, the mother can take this time to rest and talk to her baby. The father can also interact with the baby in the womb by talking to them and, if applicable, playing *murotal* (Qur'anic recitation) or offering prayers, depending on their religious beliefs. The most important thing is to provide encouragement to the mother and interact with the baby."

The first theme focused on the mother's pregnancy conditions, specifically the discomforts and changes experienced during pregnancy. In the first trimester, mothers experienced nausea and vomiting accompanied by fatigue and a reduced appetite. This condition, known as morning sickness, varies in severity for each individual. Nausea and vomiting made it difficult for mothers

to consume nutritious food, so midwives often recommended taking vitamins or additional supplements to meet their nutritional needs during pregnancy. Morning sickness was a common discomfort in the first trimester, typically occurring in the morning (Gadsby, Ivanova, Trevelyan, Hutton, & Johnson, 2020). Although this condition was considered normal, proper management was necessary to prevent it from progressing to hyperemesis gravidarum. The vitamins provided by midwives served as a preventive measure against worsening nausea and vomiting (Hassan, Dubey, & Bhat, 2019).

Additionally, some mothers reported experiencing spotting, which caused concern. Spotting in the first trimester was commonly observed and often considered normal. It is usually caused by implantation bleeding when the fertilized egg is attached to the uterine wall, hormonal changes, or a sensitive cervix due to pregnancy (Fisher, Couperthwaite, Yang, Essel, & Rowe, 2024). However, a systematic review indicated that in some cases, first-trimester bleeding increased the risk of pregnancy complications (Karimi, Sayehmiri, Vaismoradi, Dianatinasab, & Daliri, 2024). Therefore, this condition required monitoring to ensure that there were no serious risks, such as a threatened miscarriage. This threat often leads to anxiety, especially among first-time pregnant mothers (Richardson, Fenning-Raine, Deb, Campbell, & Vedrhara, 2017).

In the third trimester, pregnant women report experiencing discomfort that differs from that in previous trimesters. Some women report increasing lower back pain as pregnancy progresses. Postural changes often cause this pain due to the growing fetus and pressure on the spine and pelvic joints. According to the center of gravity theory, which states that the center of gravity shifts forward during pregnancy, strong core muscles are required to maintain lumbar spine and pelvic stability (Pan et al., 2019).

The enlarging uterus alters the body's center of gravity and exerts mechanical pressure on the body. Joint weakness develops secondarily due to fluctuating hormone levels. Fluid retention leads to soft tissue compression during pregnancy. As a result, pregnant women are vulnerable to musculoskeletal injuries. It has been suggested that nearly all women experience musculoskeletal issues, such as back pain disorders (Purnamasari, 2019). Most pregnant women suffer from back pain during pregnancy, which is a serious issue that negatively affects their quality of life (Ibanez et al., 2017). Therefore, appropriate management is necessary to reduce maternal back pain.

In addition to lower back pain, pregnant women often complain of feeling easily fatigued, even when performing light activities. This can be caused by weight gain, metabolic changes, and increased oxygen demand, which make women feel exhausted more quickly (Effati-Daryani, Mohammad-Alizadeh-Charandabi, Mohammadi, Zarei, & Mirghafourvand, 2021). If not properly managed, this discomfort can hinder daily activities and affect sleep quality, ultimately impacting a mother's psychological condition before childbirth (Kaya, Özçoban, & Dilbaz, 2024).

Some women also report varying weight gain during pregnancy. Some experience significant increases, while others gain only a little weight. These differences can be attributed to dietary habits and maternal metabolism. A pregnant woman's daily calorie intake directly affects her weight gain. Women who consume more calories than needed to support pregnancy tend to gain more weight. According to IOM guidelines, the recommended weight gain during pregnancy is 12.5–18 kg for underweight women, 11.5–16 kg for normal-weight women, 7–11.5 kg for overweight women, and 5–9 kg for obese women (Lackovic et al., 2024). Pregnant women also report changes in eating patterns and food preferences. Some women report increased meal frequency, changes in portion sizes, and a tendency to choose specific foods during pregnancy. Studies show that pregnant women tend to adopt healthier eating habits, such as consuming more vegetables, fruits, and meat (Faruga-Lewicka, Staśkiewicz-Bartecka, Janiszewska, Grot, & Kardas, 2024). Therefore, it is essential to promote healthy eating habits among expectant mothers from the preconception stage and encourage the consumption of more vegetables, fruits, and fluids.

During pregnancy, women also face emotional challenges that can affect their psychological well-being and fetal health. Some women experience stress due to excessive nausea and vomiting and become more sensitive to their social environment. Research indicates that stress during pregnancy can have adverse effects on fetal development. During pregnancy, the placenta protects the unborn baby and gathers information from the mother's environment. If the placenta detects stressful conditions, it can program modifications in cell proliferation, differentiation, and maturation, leading to significant changes in fetal tissues and organs (Maher et al., 2018). Stress increases the transfer of maternal cortisol through the placenta to the developing fetus, which can cause long-term modifications to the hypothalamic-pituitary-adrenal (HPA) axis after birth. Therefore, exposure to high-stress levels during pregnancy has been linked to autism spectrum disorders, obesity, and infantile colic (Caparros-Gonzalez et al., 2021).

During periods of stress, pregnant women reported managing their emotions using various strategies, including positive thinking, praying, seeking social support, and avoiding stress triggers.

Positive thinking is one method for reducing stress levels, which is part of cognitive behavior therapy (CBT) under the concept of cognitive restructuring. This therapy involves identifying and replacing negative thought patterns with more realistic and positive ways of thinking (Diachkova, Yeremenko, Donets, Klymenko, & Kononenko, 2024). Positive thinking can take the form of self-affirmations, which help women reinforce their self-confidence, reshape their mindset, and positively influence their psychological well-being (Bessaraba et al., 2022). Praying is also a form of spiritual therapy that helps reduce negative emotions (Chehrazi, Faramarzi, Abdollahi, Esfandiari, & Shafie rizi, 2021; Mirzaee, Hasanpoor-Azghady, & Amiri-Farahani, 2022).

Seeking social support is another CBT component under behavioral activation, which aims to help individuals feel more connected and emotionally supported (Lewis et al., 2023). Social support is understood as a form of social interaction provided during challenging situations. Studies have shown that social support received by women during pregnancy and postpartum significantly reduces perceived stress, negative emotions, and anxiety while positively influencing the pregnancy experience (Iwanowicz-Palus, Mróz, Bień, & Jurek, 2021; Mróz, Stobnicka, Marcewicz, Szlendak, & Iwanowicz-Palus, 2024). On the other hand, avoiding stress triggers is part of coping skills training, where individuals learn to recognize and manage stress more adaptively (Haddadi & Abed, 2019). Stress management strategies adopted by pregnant women have been proven to reduce prenatal worries, perceived stress, stress vulnerability, and psychopathology while increasing resilience (Puertas-Gonzalez, Mariño-Narvaez, Romero-Gonzalez, & Peralta-Ramirez, 2021).

Social support is an essential aspect of improving maternal well-being during pregnancy. It is considered a complex and multidimensional concept, defined as the assistance provided by an individual's social network, which includes both emotional and physical support (Woromboni, Ernawati, & Nurafriani, 2022). A lack of partner support, particularly emotional and practical support, can negatively impact a woman's experience by making pregnancy feel unwanted (Al-Mutawtah, Campbell, Kubis, & Erjavec, 2023). The primary source of support for pregnant women comes from their husbands, who are the closest individuals to them. However, some husbands remain passively involved.

As the key figure in supporting their wives, husbands play an important role both physically and emotionally (Emin, Taqiyah, & Asnaniar, 2023). Forms of husband support include accompanying their wives during pregnancy discomforts such as nausea and vomiting, listening to their concerns, and providing light massages to ease discomfort. Women expressed that they felt more comfortable sharing their feelings with their husbands, but some chose not to share everything out of concern that they might burden their partners with what they perceived as trivial issues.

Some women also reported feeling hurt by insensitive remarks from their husbands, making them more emotional and preferring to confide in friends who were experiencing similar situations. This condition indicates a lack of husband support during pregnancy. This situation refers to cases where pregnant women do not receive the emotional, physical, or practical support they need from their partners, which can lead to increased stress, anxiety, and potential negative impacts on their mental and physical well-being (Cheng et al., 2016).

The second form of social support comes from family, especially parents and in-laws. This support plays a significant role in providing both emotional and physical attention to pregnant women. Family support during the first trimester of pregnancy can improve outcomes for both the mother and the fetus. This period is marked by significant physical and emotional changes, making it a vulnerable time for pregnant women. Strong family support has a positive impact on maternal and fetal health outcomes (Mane, Salunkhe, & Kakade, 2024). The support provided includes monitoring the mother's activities, reminding her to maintain her health, and offering emotional encouragement (Arisandi, Budiani, & Armini, 2018). However, not all relationships between pregnant women and their in-laws are harmonious. Some women feel they receive little emotional support from their in-laws, leading them to rely more on their husbands or biological parents during pregnancy.

Maternal-fetal attachment (MFA) is an essential aspect of building an emotional bond between a mother and her unborn child. A strong MFA positively influences a pregnant woman's self-efficacy (Delavari, Mohammad-Alizadeh-Charandabi, & Mirghafurvand, 2018). Findings indicate that most women were unfamiliar with the concept of MFA before the interviewer explained it. However, one participant had a basic understanding of MFA because a midwife had previously provided information about it during an antenatal care visit.

Even though mothers may not be formally aware of MFA as a theoretical concept, they naturally exhibit emotional connections with their unborn babies in daily life. Some everyday interactions include talking to the fetus, stroking the belly, and responding to fetal movements (Suryaningsih & Gau, 2020). This indicates that behaviors supporting MFA can occur intuitively,

even without formal knowledge. Many individuals learn through personal experiences, such as previous pregnancies or observing others around them. This aligns with Bowlby's attachment theory, which defines attachment as a set of internal behaviors that enable a child to develop intimate relationships with their parents. It also refers to an individual's efforts and actions to maintain both physical and emotional attachment to the mother (Bowlby, 1969).

In addition, a husband's involvement with the fetus is also crucial to fostering MFA. Some husbands actively communicate with the fetus and stroke their wives' bellies as a form of emotional support. Social support is the most potent psychological predictor of MFA (Abasi, Borghei, Goli, Farjamfar, & Keramat, 2023; Machmudah, Yunitasari, Triharini, & Rejeki, 2023; Sukriani et al., 2020; Suryaningsih & Gau, 2020). The presence of a supportive partner helps mothers feel safer and more comfortable (Heintzelman & King, 2013). Research shows that husbands who are more involved during pregnancy can reduce maternal anxiety and positively impact a woman's mental health (da Rosa et al., 2021; Hopkins et al., 2018; Suryaningsih, Aryudaningrum, & Linh, 2024). However, some cases still show passive husband involvement, particularly in long-distance marriages due to work commitments. A lack of communication between husband and wife can affect the mother's psychological well-being, making her more sensitive, sad, anxious, worried, and stressed. These negative emotional states are worsened when a woman lacks support from her loved ones (Al-Mutawtah et al., 2023; Sobol, Błachnio, Meisner, Wdowiak, & Sobol, 2023). Mothers who already have children or are experiencing a multigravida pregnancy reported that their older children showed interest in the unborn baby by touching or kissing the mother's belly. This interaction is part of the family bonding process and contributes to MFA.

4. Conclusions and Suggestions

Pregnant women with chronic energy deficiency (CED) often lack knowledge about maternal-fetal attachment (MFA), although, in practice, they fulfil its principles. During pregnancy, mothers with CED experience discomfort, particularly in the first and third trimesters. Pregnant women also undergo psychological and emotional changes, especially those with limited social support from their husbands or families. While most husbands are actively involved during pregnancy, some remain passive. Healthcare providers should provide more detailed information on physiological and psychological changes, as well as maternal-fetal attachment, and teach ways to enhance MFA in daily life. Future research is recommended to explore MFA using larger and more diverse samples across different clinical settings in Indonesia, and to develop and evaluate structured MFA-based interventions for pregnant women with nutritional deficiencies, including those with CED.

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