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RELATIONSHIP BETWEEN POSTPARTUM ANXIETY AND BABY BLUES SYNDROME AT UNIVERSITAS AIRLANGGA HOSPITAL

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Abstract

Background: Postpartum mothers are vulnerable to mental health problems, including baby blues syndrome, which occurs in the first week. Baby blues syndrome has the potential to predict postpartum depression, and if left untreated, it can lead to more severe mental disorders. This study aims to determine the relationship between the level of postpartum maternal anxiety and the occurrence of baby blues syndrome at Universitas Airlangga Hospital. **Method**: This was a quantitative study with an observational analytic method and a cross-sectional design. The population in this study was mothers 1-2 days postpartum who were treated at Universitas Airlangga Hospital in December 2023. The study involved 33 postpartum mothers sampled using the consecutive sampling method. The instruments used were questionnaires, the Perinatal Anxiety Screening Scale (PASS) to measure anxiety and the Edinburgh Postnatal Depression Scale (EPDS) to measure symptoms of baby blues syndrome. The analysis method used was the chi-square test. **Results**: Respondents with anxiety without symptoms were 12 (36.36%), none of whom experienced baby blues syndrome. Out of 16 respondents with mild to moderate anxiety and experienced baby blues syndrome, one person (3.03%) did. And out of 5 respondents with severe anxiety and experienced baby blues syndrome, one person (3.03%). The p-value of 0.289 based on the chi-square test. **Conclusion**: The level of anxiety in postpartum mothers is not related to the incidence of Baby Blues Syndrome.

Keyword : anxiety postpartum, baby blues syndrome, postpartum psychological disorder.

INTRODUCTION

The postpartum period is the stage of labor that begins after the birth of the baby and placenta and lasts up to 6 weeks or 42 days, marked by the cessation of bleeding (Azizah & Rosyidah, 2019). During this period, postpartum mothers experience many physical and psychological changes, requiring them to adapt to these changes and their new roles. Intense changes can disrupt mood, as certain hormones after childbirth can lead to feelings of anxiety, stress, and even depression (Lim, 2021). The prevalence of postpartum anxiety in Indonesia reaches 28.7%

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(Agustin & Septiyana, 2018). When a mother experiences fear, worry, and anxiety, it can increase the risk of psychological disorders, one of which is baby blues syndrome. Baby blues syndrome is a feeling of sadness that occurs after childbirth, with symptoms appearing two or three days postpartum. If left untreated, baby blues syndrome can develop into long-term postpartum depression (NIMH, 2023). Mothers experiencing depressive symptoms may struggle to care for their babies optimally due to feelings of inadequacy and helplessness, which can undermine their sense of responsibility toward their child (Istiqomah et al., 2021).

The global prevalence of baby blues syndrome is approximately 70-80%, with nearly 13% progressing to postpartum depression. In Indonesia, baby blues syndrome ranks fourth, affecting about 31 births per 1,000 population (WHO, 2018). According to data from the Surabaya City Health Office, maternal mortality declined from 87 to 57 per 100,000 live births during the 2015-2020 period. Efforts to accelerate the reduction of maternal mortality can be achieved by ensuring that all mothers have access to quality maternal healthcare services during pregnancy, childbirth, and the postpartum period. In Surabaya, 99.08% of births in 2020 were assisted by healthcare professionals in health facilities, while 109 births at Universitas Airlangga Hospital involved 61 spontaneous deliveries and 49 by cesarean section.

Factors influencing baby blues syndrome result from a multifactorial mechanism, including age, parity, education, occupation, family support, type of delivery, and other aspects. Previous studies, such as Arisani and Noordiati in 2021 at Dr. Doris Sylvanus General Hospital in Palangka Raya revealed that anxiety, delivery method, and onset of lactation accounted for 45.1% of the factors influencing baby blues syndrome, with the remaining 54.9% due to other factors. According to Bidayati's (2022) study, 31% of respondents experienced moderate anxiety, 34.5% experienced baby blues syndrome, and there was a significant relationship between postpartum anxiety levels and baby blues syndrome at the Ungaran Health Center.

Research into the relationship between postpartum anxiety and the incidence of baby blues syndrome has highlighted significant connections between maternal mental health and postpartum psychological challenges. Studies, such as

those by Alifah (2016) and Arisani & Noordiati (2021), have examined how psychosocial factors influence postpartum blues in various hospital settings, noting a correlation between high anxiety levels and the onset of baby blues symptoms. Alifah's study specifically identified that postpartum anxiety can increase the risk of emotional instability and mild depressive episodes common in baby blues syndrome. Meanwhile, Istiqomah et al. (2021) explored postpartum anxiety levels in mothers and found a direct impact on the mother's adaptation to new motherhood, often resulting in emotional disturbances and stress. These previous findings suggest a basis for understanding the link between postpartum anxiety and baby blues, though research specific to Universitas Airlangga Hospital is still needed to clarify this relationship further within its patient population. Based on the background presented, this research is crucial to determine the correlation between postpartum anxiety levels and the occurrence of baby blues syndrome at Universitas Airlangga Hospital.

METHOD

The research design used in this study was observational analytic with a cross-sectional approach. The sampling technique was consecutive sampling, where the sample consists of postpartum mothers who were on the first or second day after delivery and admitted to Universitas Airlangga Hospital during December 2023. A total of 33 respondents were included in the study. The inclusion criteria for this study were as follows mothers with married status, mothers who could read and write, and mothers who were willing to participate as respondents.

Data collection was carried out using two standardized questionnaires: the Perinatal Anxiety Screening Scale (PASS) and the Edinburgh Postnatal Depression Scale (EPDS). These instruments were distributed to the respondents to assess their levels of anxiety and symptoms of baby blues syndrome. The PASS is used to screen for perinatal anxiety, while the EPDS assesses the likelihood of postpartum depression and related mood disorders. The analysis of the collected data was performed using the chi-square statistical test to evaluate the association between postpartum anxiety and baby blues syndrome. The level of significance was set at 0.05 (5%), indicating that results with a p-value less than 0.05 would be considered statistically significant. The study variables include postpartum anxiety levels

(measured by PASS scores) and the incidence of baby blues syndrome (measured by EPDS scores). The analysis procedures were carried out to determine the correlation between the anxiety levels of the respondents and the occurrence of baby blues syndrome during the specified postpartum period. Ethical approval for this study was obtained from the Institutional Review Board of Airlangga University Hospital, ensuring that all protocols complied with the hospital's ethical guidelines (177/KEP/2023). Informed consent was acquired from all participants prior to inclusion in the study.

RESULT AND DISCUSSION

Table 1 Frequency Distribution of Postpartum Mother's Characteristics on the First and Second Day at Universitas Airlangga Hospital

Respondent Characteristics	Frequency	Percentage
Age		
20 – 35 years	28	84,84
>35 years	5	15,16
Education		
Primary school	1	3,0
Middle school	4	12,1
High school	19	57,6
Associate degreee	2	6,1
Bachelor's degree	7	21,2
Occupation		
Housewife	22	66,6
Private sector	11	33,4
Gravida status		
Primigravida	14	42,42
Multigravida	19	57,58
Comorbid conditions		
No	20	60,6
Yes	13	39,4
Family opposed to pregnancy		
No	31	93,9
Yes	2	6,1
Type of delivery		
Normal	16	48,5
Caesarean section	17	51,5
Days of hospitalization		
First day	12	36,4
Second day	21	63,6
Total	33	100,0

Table 2 Anxiety Levels of Postpartum Mothers at Universitas Airlangga Hospital

Anxiety Level	Frequency	Percentage
No symptoms	12	36,4
Mild - moderate	16	48,5
Severe	5	15,2
Total	33	100,0

Table 3 Baby Blues Syndrome at Universitas Airlangga Hospital

Baby blues syndrome	Frequency	Percentage
Yes	2	6,1
No	31	93,9
Total	33	100,0

Based on age characteristics, the results show that 28 postpartum mothers (84.84%) were aged between 20 and 35 years. Among these, 10 mothers did not experience anxiety, 13 had mild to moderate anxiety, and 5 experienced severe anxiety. Meanwhile, 5 postpartum mothers (15.16%) were over 35 years old, with 2 not experiencing anxiety and 3 experiencing mild to moderate anxiety. During pregnancy, the safe age range for mothers is considered to be between 20 and 35 years. Ages outside this range, such as below 20 years or above 35 years, are categorized as high-risk for pregnancy, from both physical and psychological perspectives (Hafid, 2021).

In this study, no mothers over 35 years old experienced severe anxiety, whereas 5 mothers aged between 25 and 35 years did experience severe anxiety. This aligns with research conducted by Tearne (2016) in Australia, which found that older maternal age was not significantly associated with anxiety compared to younger maternal age. This finding is consistent with Morris (2016), who reported no increased risk of anxiety in older women becoming mothers.

Therefore, a person's readiness for parenthood is not solely determined by age but can also be influenced by other factors that contribute to being more prepared for motherhood, thus reducing the likelihood of experiencing anxiety during the postpartum period. This study was conducted at Universitas Airlangga Hospital (RSUA), one of the referral centers for childbirth in Surabaya. Consequently, mothers over 35 years old, who are at higher risk during pregnancy and postpartum, especially concerning physical and mental health, may have anxiety levels influenced by these conditions.

Regarding educational background, the highest frequency was observed among mothers with a high school education, comprising 19 mothers (57.6%).

Among them, 5 postpartum mothers did not experience anxiety symptoms, 11 had mild to moderate anxiety, and 3 experienced severe anxiety. The second most common educational level was diploma/bachelor's degree (D4/S1), comprising 7 postpartum mothers (21.2%), with 4 not experiencing anxiety symptoms and 3 experiencing mild to moderate anxiety. At the junior high school level, there were 4 mothers (12.1%), with 1 not experiencing anxiety, 2 having mild to moderate anxiety, and 1 experiencing severe anxiety. Furthermore, 6.1% or 2 postpartum mothers did not experience anxiety at the diploma level (D3). In this study, one mother (3.0%) had an elementary education level and experienced severe anxiety.

Educational attainment can enhance an individual's understanding of health. Thus, the higher the education level, the broader the knowledge and ability to utilize available healthcare services (Muzayyana & Saleh, 2021). Mothers with higher education levels tend to have a deeper understanding of pregnancy and are better equipped to manage stress during pregnancy. Some studies show that individuals with higher education levels tend to respond more rationally than those with lower or no education (Rinata & Andayani, 2018).

These findings are consistent with this study, as there was no severe anxiety observed among postpartum mothers with D3 and D4/S1 education levels. The research was conducted at RSUA, located in Surabaya, the capital city of East Java Province. Surabaya is also ranked second in East Java for the highest level of education (BPS, 2022). Furthermore, recent government policies require a minimum of a high school education to apply for jobs. Therefore, residents of Surabaya, one of Indonesia's largest cities, pursue higher education levels to improve their quality of life and obtain employment in this major city.

Based on occupation characteristics, the majority (22 mothers or 66.6%) were housewives, with 8 postpartum mothers not exhibiting anxiety symptoms, 10 experiencing mild to moderate anxiety, and 4 experiencing severe anxiety. The remaining 33.4% (11 mothers) were private sector employees, with 4 not experiencing anxiety symptoms, 6 experiencing mild to moderate anxiety, and 1 experiencing severe anxiety.

According to Hafid (2021), personal knowledge and experience can enhance informal information through social interactions or work environments. Working

mothers tend to have greater access to information and experiences compared to housewives, who may have limited exposure. This could lead to higher anxiety levels among housewives.

However, in this study, working mothers did not significantly experience severe anxiety. This may be due to other factors influencing the occupational characteristics of mothers, reducing the likelihood of anxiety. Surabaya still maintains a strong patriarchal tradition, which may contribute to most respondents being housewives while their husbands work. Additionally, some respondents in this study were first-time mothers (primigravida), experiencing the transition to being a mother and wife, with some deciding to resign from their jobs to focus on caring for their babies and husbands.

Regarding gravidity status, 19 mothers (57.58%) were multigravida, with 9 mothers not experiencing anxiety symptoms, 9 experiencing mild to moderate anxiety, and 1 experiencing severe anxiety. Among the 14 primigravida mothers (42.42%), 3 did not experience anxiety, 7 experienced mild to moderate anxiety, and 4 experienced severe anxiety.

Every woman undergoes different experiences during pregnancy (Siregar, 2021). There are differences in emotional state, physical condition, and psychosocial aspects between first-time mothers (primigravida) and those who have had previous pregnancies (multigravida). Almost all pregnant mothers feel some level of anxiety, particularly among first-time mothers, which differs from women who have had previous pregnancies (Wulandari & Perwitasari, 2021). This finding aligns with this study, as 4 primigravida mothers experienced severe anxiety. Multigravida mothers have more experience in caring for babies compared to first-time mothers, who tend to have a higher risk of anxiety. This study was conducted at RSUA in Surabaya, where the education level is higher compared to other districts in East Java. Moreover, multigravida mothers who have had children before are better able to understand pregnancy, childbirth, and the postpartum period, which may explain the lower occurrence of severe anxiety.

Regarding comorbidities, 20 postpartum mothers (60.6%) did not have any comorbid conditions during pregnancy, with 7 mothers not experiencing anxiety, 9 experiencing mild to moderate anxiety, and 4 experiencing severe anxiety. The

remaining 13 mothers (39.4%) had conditions such as hypertension, asthma, gestational diabetes, preeclampsia, vertigo, stomach issues, and hepatitis B. Among them, 5 did not experience anxiety, 7 experienced mild to moderate anxiety, and 1 experienced severe anxiety.

The relationship between pregnancy and postpartum health status is one factor that can trigger anxiety (Dewi, et al., 2022). Mothers experiencing health issues tend to be more vulnerable to anxiety than healthy mothers. Anxiety levels in mothers tend to double when there are other health problems present (Dewi, et al., 2022). However, this was not consistent with the findings of this study, as mothers without comorbid conditions also experienced anxiety. This may be due to various factors influencing postpartum mothers' anxiety levels.

In this study, some mothers had infectious and non-infectious diseases because RSUA is one of the maternity referral centers. Among the 13 mothers with comorbid conditions, all experienced anxiety, either mild to moderate or severe. This could be due to the numerous procedures these mothers had to undergo during pregnancy or childbirth, such as various tests or taking medication to prevent worsening health conditions that could affect their babies.

Regarding family support, the study examined whether families supported or opposed the pregnancy. The results showed that almost all (31 mothers or 93%) received full support from their families. Among them, 7 mothers did not experience anxiety, 9 experienced mild to moderate anxiety, and 4 experienced severe anxiety. Meanwhile, 2 postpartum mothers did not receive family support during pregnancy due to economic issues and failed contraception, with 1 mother not experiencing anxiety and the other experiencing mild to moderate anxiety.

Family support plays a crucial role in alleviating anxiety by providing material or emotional assistance (Utomo & Sudjiwanati, 2018). The involvement of family members and husbands significantly impacts the social support felt by the mother (Utomo & Sudjiwanati, 2018). Postpartum mothers need not only support from their husbands but also from their families and surrounding community. However, other people around the mother can also act as stressors. For example, giving advice that tends to restrict the mother may be a source of stress, even if the mother is not lacking knowledge about postpartum or baby care. Instead of overwhelming the

mother with advice, providing direct support through concrete assistance would be more beneficial.

Most respondents in this study had full support during their pregnancy and childbirth because the majority of Surabaya's population is aware of these issues and has access to information through various media, including social media. The high internet usage in Java, which accounts for 65% of the internet users in Indonesia, supports this (Surabaya City Government, 2017). Thus, families are more knowledgeable about supporting mothers during pregnancy.

Regarding the type of delivery, 17 mothers (48.5%) had spontaneous vaginal deliveries, with 5 mothers not experiencing anxiety symptoms, 11 experiencing mild to moderate anxiety, and 1 experiencing severe anxiety. In addition, 16 mothers (51.5%) underwent cesarean section (CS), with 7 not experiencing anxiety, 5 experiencing mild to moderate anxiety, and 4 experiencing severe anxiety.

Cesarean section is a potential risk factor for emotional disorders during the pre-and postnatal periods, with pain levels being an indicator of potential severity (Ilska & Basista, 2020). Emotional instability can occur after delivery, whether vaginal or cesarean. However, it is more common following cesarean sections (Moyo & dan Djoda, 2020). RSUA serves as a referral center for mothers requiring either emergency or elective cesarean section (SC). Mothers who undergo SC tend to experience higher levels of anxiety compared to those who give birth vaginally, due to concerns related to the type of delivery they will face, especially if it was not initially planned.

Table 4 The Relationship Between Anxiety Levels of Postpartum Mothers and Baby Blues Syndrome at Universitas Airlangga Hospital Using Chi-Square

Anxiety Level	Baby blues syndrome				Total	%	P value
	No	%	Yes	%			
No symptoms	12	100	0	0	12	100	0,289
Mild - moderate	15	93,75	1	18,75	16		
Severe	4	80	1	20	5		
Total	31	273,75	2	38,75	33	100	

The study found that 12 respondents experienced no symptoms of anxiety, and none of them developed baby blues syndrome. Most of these respondents were aged 20-35 years (75%), worked as housewives (66.67%), had a high school education (41.67%), did not have any comorbid conditions (58.3%), received full family support (91.67%), underwent SC delivery (58.3%), and were on the second day of postpartum hospitalization (66.8%).

The findings suggest that postpartum mothers who did not experience anxiety were not at risk of developing baby blues syndrome. Anxiety can exacerbate symptoms of baby blues syndrome, such as mood changes and emotional instability. Thus, when postpartum mothers can manage their anxiety levels, the likelihood of experiencing baby blues syndrome may decrease.

Among 16 respondents who had mild to moderate anxiety, one developed baby blues syndrome. This individual was 25 years old, had a bachelor's degree, was a housewife, primigravida, had a history of preeclampsia during pregnancy, received family support, underwent SC, and was on the second day of hospitalization. Out of the five respondents with severe anxiety, one experienced baby blues syndrome. This respondent was 25 years old, had only an elementary school education, worked as a private employee, was multigravida, had no comorbid conditions, received family support, underwent SC, and was on the first day of hospitalization.

The results indicate that mothers with mild to moderate and severe anxiety who developed baby blues syndrome shared a common characteristic: they had undergone SC. The potential risk of post-SC complications may increase maternal anxiety. Additionally, some working mothers who had SC expressed concerns about how the procedure might affect their job performance and quality of life.

Based on the chi-square test results, the p-value was 0.289, indicating that p-value > 0.05. Therefore, it can be concluded that the level of anxiety was not significantly associated with the occurrence of baby blues syndrome. However, postpartum mothers who experienced anxiety were more likely to develop postpartum blues compared to those who did not, although not significantly. High anxiety scores during the postpartum period can disrupt women's lives, particularly in terms of child development.

The discrepancy between this study and previous research may be due to differences in sample size, location, and characteristics of the respondents. For example, studies conducted by Bidayati (2022) at Puskesmas Ungaran, Semarang, and by Noordiati and Arisani (2021) at BLUD RSUD dr. Doris Sylvanus Palangka Raya, showed a significant relationship between postpartum anxiety, delivery method, and the onset of lactation with the incidence of postpartum blues.

Children born to mothers with anxiety disorders are at an increased risk for adverse outcomes during childhood, including difficult temperament, emotional and behavioral problems, and cognitive difficulties (Newman, Judd, & Komiti, 2017). These children may also develop anxiety disorders and other psychopathologies later in life (Telman, van Steensel, Maric, & Bögels, 2018).

CONCLUSION

The majority of postpartum mothers at RSUA were aged 20-35, had a high school education, worked as housewives, and were multigravida. They had no history of psychological or comorbid conditions, had a desired pregnancy, delivered vaginally, and were on the second day of hospitalization. Twelve respondents experienced no symptoms of anxiety, and none developed baby blues syndrome. Among the 16 respondents with mild to moderate anxiety, one developed baby blues syndrome, while one out of the five respondents with severe anxiety experienced baby blues syndrome. The study concludes that the level of anxiety among postpartum mothers was not significantly associated with the incidence of baby blues syndrome at RSUA.

DECLARATION

Conflict of Interest

Authors declare no conflict of interest regarding the publication of this research.

Authors' Contribution

All authors contributed significantly to the research, analysis, and writing of this article. Author designed the study and supervised data collection, performed

statistical analysis, and contributed to data interpretation and manuscript preparation. All authors reviewed and approved the final version.

Ethical Approval

Ethical approval for this study was obtained from the Institutional Review Board of Universitas Airlangga Hospital, ensuring that all protocols complied with the hospital's ethical guidelines (177/KEP/2023). Informed consent was acquired from all participants prior to inclusion in the study.

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Data Availability

The data supporting the findings of this study are available upon reasonable request from the corresponding author, with restrictions due to participant confidentiality.

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THE EFFECT OF SPINACH CONSUMPTION ON INCREASING HAEMOGLOBIN IN PREGNANT WOMEN

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Abstract

Background: Anemia is a symptom of a lack of red blood cells due to low hemoglobin levels. Based on the performance assessment report of the Tuban Regency Senori Community Health Center East Java Indonesia in 2022, it was found that 36.65% of pregnant women experienced anemia. This shows that there are still many pregnant women who experience anemia and need treatment. The aim of this research is to determine the effect of spinach consumption on increasing hemoglobin levels in pregnant women. **Method:** quasi experiment with One Group Pretest-Posttest design. The sample in this study was 16 pregnant women with anemia in the Senori Community Health Center Tuban Regency East Java Indonesia, who met the inclusion criteria. The research instrument used an observation sheet to determine hemoglobin levels in the blood before and after consuming green spinach, an easy touch Hb level check tool. Data were analyzed using paired T-test. **Result :** The average Hb level of pregnant women before the intervention was 10.20 gr% and after the intervention was 11.18 gr%, the results of the paired t-test showed a significance value = 0.000, so the significance value (2-tailed) < α (0 .05) which shows that there is an effect of spinach consumption on increasing hemoglobin levels in pregnant women. **Conclusion :** There is an effect of spinach consumption on increasing Hb levels in pregnant women. Integrated ANC activities are expected to be carried out routinely so that pregnant women who experience anemia can be detected early and health workers can provide explanations to pregnant women about the dangers of anemia during pregnancy and the consumption of spinach and its benefits.

keyword : Anemia, Hemoglobin, Pregnant women, Spinach Consumption,

INTRODUCTION

Iron has a function in forming hemoglobin, minerals and enzymes. Pregnant women who are deficient in iron can experience fetal death, abortion, birth defects, low birth weight, reduced iron reserves in children or children born with nutritional anemia. This condition causes a high infant mortality rate, as well as maternal mortality, because anemia can cause bleeding during childbirth which is the main cause (28%) of maternal/natal maternal deaths in Indonesia.

Anemia is a major health problem in developing countries and is associated with increased maternal and infant mortality rates, premature births, low birth

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weight babies and other adverse effects. Anemia in pregnancy is often called "potential danger to mother and child". WHO classifies anemia in pregnant women into four categories: 1) not anemic if the Hb level is ≥ 11 gr%, 2) mild anemia if the Hb level is 9-10 gr%, 3) moderate anemia if the Hb level is 7-8 gr% and 4) severe anemia if the Hb level is <7 gr%.

According to the regulations, iron tablets or what can be called the method given to pregnant women must be consumed every day. Side effects caused by consuming iron tablets include discomfort in the pit of the stomach, nausea, vomiting, diarrhea and constipation (Is Susiloningtyas, 2018). One alternative to meet iron needs apart from consuming iron tablets can be done in a non-pharmacological way, by increasing the consumption of foods rich in iron and protein, such as liver, eggs, poultry, meat, fish, nuts and green vegetables (Herlin & Aryaneta, 2019).

Several vegetables are included in food sources that contain high iron, such as potatoes which contain iron of 1.9 mg/100 g, pumpkin of 1.4 mg/100 g, asparagus of 2.2 mg/6 stems, fruit beets amounting to 1.6 mg/g, and spinach which has a fairly high iron content, 3.9 mg/100 g. (Yudhistira et al., 2019). Green spinach (Amaratus sp) is a plant that is usually cultivated for consumption as a vegetable companion to rice. the harvest cycle is very fast (2 weeks) and the price is cheap. Spinach has many benefits for the body because it contains calcium, vitamin A, vitamin E, vitamin C, fiber and also beta-carotene. Apart from that, spinach also has high iron content to prevent anemia. Because the iron content in spinach is quite high, plus the content of B vitamins, especially folic acid, if there are people who are deficient in iron, they are usually advised to consume this vegetable regularly and in ancient times spinach was consumed by pregnant women and mothers giving birth

METHOD

The research design used in this study was a quasi experiment with a One Group Pretest-Posttest research design. Respondents in this study were all pregnant women with anemia in November 2023 at the Senori Community Health Center with a sample of all pregnant women with anemia in the Senori Community Health Center area Tuban Regency East Java Indonesia with a total of 16 respondents. To

obtain the necessary data, Give 250g of green spinach per day for 2 weeks or 14 days. The Green spinach cooked by the pregnant women before consuming it. Data collection techniques start from the preparation stage and the implementation stage to respondents. Everyday researcher evaluate the consuming by Online to the women. The hemoglobin level has been collected an easy touch Hb level check tool before consuming green spinach and 14 after. Then data processing is carried out using the stages of editing, coding, data entry, data cleaning. The data analysis technique used in this research is the Wilcoxon test using 95 % significancy.

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RESULT AND DISCUSSION

Table 1. Frequency Distribution of Hb Level of Pregnant Women before consuming Green Spinach

Hb levels	Frequency	Percentage (%)
Mild Anemia (Hb 9 – 10.9 gr%)	15	93.75
Moderate Anemia (Hb 7 – 8.9 gr%)	1	6.25
Severe Anemia (Hb < 7 gr%)	0	0
Total	**16**	**100**

it is known that before consuming green spinach, almost all respondents, 15 people (93.75%) experienced mild anemia (Hb levels 9-10.9 gr%).

According to the World Health Organization (WHO), anemia in pregnant women is a condition in which the mother has an Hb level of less than 11 gr%, mild anemia with an Hb level of 9-10.9 gr%, moderate anemia with an Hb level of 7-8.9 g% and severe anemia if the Hb level is <7 gr%. Anemia in pregnancy causes serious complications for pregnant women both in pregnancy, childbirth and postpartum, it can cause miscarriage, easy infection, postpartum bleeding, intrapartum and postpartum infectious shock. Meanwhile, the effect of anemia on the fetus can reduce the body's metabolic ability so that it interferes with the growth and development of the fetus in the womb, the fetus can be born with low birth weight, there are congenital defects, easy to get infections and can cause perinatal death (Zuiatna et al., 2021).

Hemoglobin levels during pregnancy are very important to be checked regularly by checking hemoglobin levels and consuming healthy and balanced nutrition so that during pregnancy there is no decrease in hemoglobin levels. Low hemoglobin levels are mostly caused by diet, so that nutritional intake is

insufficient, for example, not consuming enough food that contains important nutrients or substances such as iron, vitamin B12, vitamin C to folic acid as part of red blood cell production, lack of nutrients or important substances such as iron, vitamin B12, vitamin C to folic acid has an impact on anemia in pregnancy (Dhilon et al., 2020).

During pregnancy, the body experiences significant changes, the amount of blood in the body increases by about 20-30%, thus requiring an increase in the need for iron and vitamin supplies to make hemoglobin. Anemia in pregnancy occurs due to hemodilution. In addition to physiological changes during pregnancy, a common cause of anemia in pregnant women is malnutrition or inadequate iron intake (malnutrition) which is associated with increased iron requirements during pregnancy. The cause of pregnant women experiencing anemia is also due to a lack of consumption of foods containing iron, during pregnancy the fetus continues to grow so that the need for iron increases if the food eaten by pregnant women does not contain enough iron, it can cause anemia (Pudiastuti, 2016).

Based on the results of research and theory, researchers argue that the occurrence of anemia in pregnancy can certainly be caused by various factors, the occurrence of hemodilution which is a physiological change in the body of pregnant women is the main cause where the Hb levels of pregnant women decrease, the decrease in Hb levels of pregnant women will be even worse if pregnant women do not have good knowledge about fulfilling nutrition during pregnancy so that mothers do not pay attention to nutritional needs during pregnancy so that pregnant women are susceptible to anemia.

Giving spinach is an effective way that can increase the hemoglobin levels of pregnant women. (Sumiati et al., 2021). Every 100 grams of green spinach (Amaratushibridus sp.) contains 2.3 mg of protein, 3.2 mg of carbohydrates, 8.3 mg of iron and 81 mg of calcium. Spinach is very rich in various vitamins and minerals, vitamin A, vitamin C, niacin, thiamine, phosphorus, sodium, ribolvin, potassium and magnesium. Spinach is a vegetable that has complete nutrition for anemia sufferers, the vitamin C contained in spinach also has an important role in iron absorption so that iron can be utilized optimally.

Table 2. Frequency Distribution of Hb Levels of Pregnant Women After Consuming Spinach

Hb levels	Frequency	Percentage (%)
No anemia (Hb ≥ 11 gr%)	11	68.75
Mild Anemia (Hb 9 – 10.9 gr%)	5	31.25
Moderate Anemia (Hb 7 – 8.9 gr%)	0	0
Severe Anemia (Hb < 7 gr%)	0	0
Total	**16**	**100**

The results of this study illustrate that the intervention of giving green spinach vegetables can increase the Hb levels of pregnant women who experience anemia, although based on the results of the study each respondent experienced a different increase in Hb levels even though the intervention given was the same, this can be caused by the body's ability to reabsorb iron in each pregnant woman is different, the type of food consumed by pregnant women also plays a role in the absorption of iron by the body. Absorption of iron from food is influenced by the condition of the digestive tract and the content of ingredients in the food (Susiloningtyas, 2012). Therefore, it is important for pregnant women to continue taking Fe tablets regularly, drinking in the right way, for example when taking Fe tablets, do not drink coffee because it will inhibit iron absorption.

The adequacy of iron needs in the body can be met by pharmacological and non-pharmacological methods. Pharmacologically by giving Fe tablets to pregnant women regularly, pregnant women are required to take at least 90 Fe tablets during pregnancy in addition to taking Fe tablets regularly, iron needs can be met with non-pharmacological therapy. Giving spinach is one effective way that can increase the hemoglobin levels of pregnant women. (Sumiati et al., 2021) . Green spinach (Amaratushibridus sp.) per 100 grams contains 2.3 mg of protein, 3.2 mg of carbohydrates, 8.3 mg of iron and 81 mg of calcium. Spinach is very rich in various vitamins and minerals, vitamin A, vitamin C, niacin, thiamine, phosphorus, sodium, riboflavin, potassium and magnesium. Spinach is a vegetable that has complete nutrition for anemia sufferers, vitamin C contained in spinach also has an important role in the absorption of iron so that iron can be utilized optimally.

Consuming spinach leaves regularly is efficacious in curing several types of diseases, so pregnant women are expected to consume spinach leaves as an alternative so that hemoglobin levels do not decrease (Tombokan et al., 2022).

Spinach is effective in increasing Hb levels in pregnant women with anemia if consumed fresh and washed with clean water, then cooked not for too long or more than 4 minutes, because it will remove half of the iron content in spinach, after cooking spinach cannot be consumed for more than 4 hours, because the content in spinach can turn into poison (Soleha et al., 2022).

Based on the results of the study and theory, the researcher argues that it is important for pregnant women to continue to monitor Hb levels during pregnancy so that if anemia occurs, it can be treated immediately. Adequate iron needs in the body can be met by pharmacological and non-pharmacological means, by taking Fe tablets regularly and in the right way and consuming foods that contain a lot of iron.

Table 3. Frequency Distribution of Hb Levels of Pregnant Women Before and After Consuming Spinach

Hb levels	Before Intervention		After Intervention	
	f	%	f	%
No anemia (Hb ≥ 11 gr%)	0	0	11	68.75
Mild Anemia (Hb 9 – 10.9 gr%)	15	93.75	5	31.25
Moderate Anemia (Hb 7 – 8.9 gr%)	1	6.25	0	0
Severe Anemia (Hb < 7 gr%)	0	0	0	0
Total	**16**	**100**	**16**	**100**

The results of this study are in line with the research conducted by Istianah et al. in 2019 entitled The Effect of Spinach on the Incidence of Anemia in Pregnant Women at the Fatimah Medika Clinic, Terung Kulon Krian, Sidoarjo, obtained a Significance value of 0.000, which means that spinach has an effect on the incidence of anemia in pregnant women at the Fatimah Medika Clinic (Istianah et al., 2019). In Lidia Herlin's study entitled The Effect of Consuming Green Spinach (Amaranthus Sp) on Hb Levels in Pregnant Women with Mild Anemia in the Kundur Barat Health Center Work Area in 2019, the results of the Paired Sample T Test obtained a P Value = 0.000 so it was concluded that there was a difference between before consuming green spinach (Amaranthus sp) and after consuming green spinach (Amaranthus sp). (Herlin & Aryaneta, 2019)

The body of a pregnant woman physiologically experiences many changes due to the adaptation of pregnancy hormones. All systems in the body work to adjust to the conditions that occur. One of them is the cardiovascular system, the system related to the heart and blood circulation. During pregnancy, the blood of pregnant women experiences dilution (hemodilution) due to the addition of blood

plasma volume (hypervolemia) which is not balanced with the number of red blood cells. This causes the Hb levels of pregnant women to decrease (Handayani, 2021). Therefore, the adequacy of iron requirements in pregnant women is not only met by giving Fe tablets, but it is necessary to provide foods that contain a lot of iron or foods that accelerate (enhancer) iron absorption and reduce the consumption of foods that inhibit (inhibit) iron absorption (Rimawati et al., 2018).

Giving spinach to pregnant women is one way to increase Hb levels in pregnant women. Spinach is given to pregnant women after pregnant women are given IEC about the benefits of spinach which are useful for increasing Hb levels and how to process or cook spinach. Pregnant women are given green spinach to be consumed per day as much as 250 grams for 14 days from this amount pregnant women have consumed as much as 290.5 mg of iron. In addition, pregnant women also consume Fe tablets every day containing 60 mg of iron. So that the total iron consumed by pregnant women for 14 days is 1,130.5 mg or as much as 80.75 mg / day. This amount is sufficient for the daily iron needs used by normal humans to produce red blood cells (20-25 mg / day) (Tombokan et al., 2022). In addition, the vitamin C content in spinach can help the absorption of iron by reducing ferric to ferrous which is easily absorbed, therefore consuming spinach and Fe tablets can increase the production of red blood cells so that hemoglobin levels also increase.

Pregnant women who have experienced increased Hb levels are expected to be able to continue to maintain their condition. Although there has been an increase in Hb levels in pregnant women, the increase is still within minimal limits, so pregnant women must routinely check their condition and continue to consume Fe tablets during pregnancy and maintain adequate nutritional intake during pregnancy.

CONCLUSION AND SUGGESTION

is an effect of spinach consumption on increasing Hb levels in pregnant women in the Senori Health Center work area. Integrated ANC activities are expected to be carried out routinely so that pregnant women who experience anemia can be detected early and health workers can provide explanations to pregnant

women about the dangers of anemia during pregnancy and the consumption of spinach and its benefits.

DECLARATION

Conflict of Interest

There is no conflict of interest in this research.

Authors' Contribution

The lead researcher is responsible for the entire research, from planning, implementation, data analysis and dissemination of results. Research member 1 is responsible for data analysis and discussion. Research member 2 is responsible for respondent selection, data collection and discussion.

Ethical Approval

This research has been approved by the Research Ethics Board of the Nahdlatul Ulama Tuban Health Sciences Institute with the number 110/0084223523/LEPK.IIKNU/X/2023.

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Data Availability

The researcher is willing to be contacted if other researchers carry out deeper follow-up on this research in the future, and we are ready to support this

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AN ANALYTICAL STUDY OF NUTRITIONAL STYLE, NUTRITIONAL STATUS, AND MENTAL HEALTH IN THE PRECONCEPTION PERIOD : (TOWARDS OPTIMAL PREGNANCY OUTCOMES)

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Abstract

Background: The preconception period is a crucial period to optimize maternal and fetal health. Preconception nutrition can affect nutritional status and mental health which has an impact on pregnancy readiness. This study aims to analyze the correlation between nutrition and nutritional status and mental health during the preconception period. **Method:** This study used a prospective cohort study involving women of childbearing age selected by stratified random sampling to obtain 129 respondents. Nutritional Style data were collected through FFQ questionnaires, nutritional status was measured through anthropometry and Hemoglobin examination, and mental health was measured using the DASS questionnaire. Data collection was carried out three times and analyzed using the Pearson correlation test, multiple linear regression and the Wilcoxon test for longitudinal analysis. **Result:** The results showed that there was no significant correlation between Nutritional Style and BMI (p-value>0.05). However, there was a significant correlation between Nutritional Style and the incidence of anemia, the strongest correlation in the first measurement (p-value 0.001) and the second measurement (p-value 0.049). A significant correlation was found between Nutritional Style and mental health, especially anxiety in the first measurement (p-value 0.022), the second measurement (p-value 0.006) and the third measurement (p-value 0.029), but not with stress and depression. There was a significant increase in nutritional status from the first to the second measurement (p-value 0.020) and the first to the third measurement (p-value 0.003). There was a significant decrease in anxiety from the first to the second measurement (p-value 0.034) and the first to the third measurement (p-value 0.000). **Conclusion :** Good Nutritional Style during preconception can improve nutritional status and minimize mental health risk. Nutrition intervention programs are needed to improve knowledge and implementation of healthy food nutrition. In addition, regular monitoring of nutritional status and mental health is also needed to optimize pregnancy readiness.

keyword : Nutritional Style, Preconception, Nutritional Status, Mental Health, Pregnancy Readiness

INTRODUCTION

The preconception period or the period before conception is a crucial time to optimize the health of the mother and the baby (Bhutta et al., 2013). During this time, various factors including lifestyle and diet can affect mental health and nutritional status which can impact pregnancy readiness and fetal health.

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Nutritional Style, which refers to eating habits and habits related to food, can be a determining factor for mental health and nutritional status. Research shows a strong correlation between Nutritional Style and mental health. Unhealthy eating habits, such as consuming processed foods high in sugar and fat, are associated with an increased risk of depression and anxiety (Firth et al., 2019). Chen found that diets high in fat and sugar, and low in fruit and vegetable intake were associated with a higher risk of depressive and anxiety symptoms (Chen et al., 2023). Meanwhile, a diet containing fruits, vegetables, and whole grains is associated with better mental health (Lassale et al., 2019). Khaled et al (2021) found that intake of fruits, vegetables, nuts and seeds was significantly negatively associated with stress in women of childbearing age.

Nutritional Style also has a significant effect on nutritional status. Insufficient nutrient intake can cause micro and macro nutrient deficiencies that can have a negative impact on the health of the mother and fetus. Deficiencies in iron, folic acid, and vitamin D can increase the risk of anemia, birth defects, and other pregnancy complication (Bhutta et al., 2013). Obeid et al (2019) confirmed that low folate status is associated with congenital birth defects including NTDs, congenital heart defects, LBW and preterm birth.

Although there is evidence of an association between nutritional lifestyle and mental health and nutritional status, there is little research examining this association specifically in the preconception period. Most studies focus on the effects of nutritional lifestyle during pregnancy, while the preconception period is often neglected (Amini, P., Asif, H., & Jeyaseelan, 2020). In fact, the preconception period is an important period to prepare yourself to be ready to undergo a healthy pregnancy. Interventions during the preconception period can provide significant benefits in improving maternal and child health (Stephenson, 2018). This problem is significant in Tuban Regency, considering that the prevalence of anemia and malnutrition in Women of Childbearing Age is still quite high because. Data from the Tuban Regency Health Office in 2023, the prevalence of anemia in Women of Childbearing Age reached 10.09% while the prevalence of malnutrition reached 18.07% (Tuban Regency Health Office and P2KB, 2023).

Therefore, this study aims to analyze the correlation between Nutritional Style and nutritional status and mental health during the preconception period in Tuban Regency. This study is expected to provide an important contribution to understanding the role of Nutritional Style in optimizing pregnancy readiness, as well as developing effective nutritional and mental health intervention strategies to improve the health of Women of Childbearing Age, so as to reduce the risk of pregnancy complications and improve the health of future generations.

METHOD

This study used a quantitative analytical approach with a prospective cohort study design to analyze the correlation between Nutritional Style and nutritional status and mental health during the preconception period. The population in this study were all women of childbearing age (18-35 years) in Tuban Regency, East Java Indonesia who were planning a pregnancy, with a total of 192 respondents who met the criteria. The inclusion criteria in this study include: women of childbearing age (18-35 years), planning a pregnancy, not yet pregnant when the study began, have a normal menstrual cycle and are willing to be respondents. While the exclusion criteria include: having a clinical medical condition that can affect nutritional status and mental health, undergoing treatment, having an eating disorder status. To obtain accurate and representative data, this study used a stratified random sampling technique based on age as a stratification variable that had met the criteria. This age grouping was carried out because age can affect nutritional status, mental health and eating habits. Age is divided into three strata: 18-24 years, 25-29 years and 30-35 years. Then the proportion of each stratum was calculated based on the number of Women Of Childbearing Age in each group by considering the sample size, a total sample of 129 respondents was obtained using the stratified random sampling method.

Nutritional Style data was collected through FFQ questionnaire, nutritional status was measured through anthropometry (height, weight, arm circumference, waist circumference) and Hemoglobin examination, and mental health was measured using the DASS questionnaire. Data were collected three times in a row with an interval of one month, then the data were analyzed using the Pearson

correlation test to determine the correlation between Nutritional Style and nutritional status and mental health, then multiple linear regression analysis was carried out to determine the most influential factors and longitudinal analysis using the Wilcoxon test to see changes in nutritional status and mental health. This research has been approved by the Research Ethics Board of the Nahdlatul Ulama Tuban Health Sciences Institute.

RESULT AND DISCUSSION

Table 1. Distribution of Respondent Characteristics

Characteristics	Category	f	%
Age	18 -24 years old	43	33.3
	25 – 29 Years	43	33.3
	30 – 35 Years	43	33.3
TOTAL		**129**	**100**
Education	Elementary School	2	1.6
	Junior High School	19	14.7
	Senior High School	72	55.8
	Diploma	12	9.3
	Bachelor	24	18.6
TOTAL		**129**	**100**
Work	Housewife	71	55.0
	Self-employed	18	13.9
	Private employees	14	10.9
	Civil Servant	1	0.8
	Other	25	19.4
TOTAL		**129**	**100**
Knowledge	Not enough	35	27.1
	Enough	6	4.7
	Good	88	68.2
TOTAL		**129**	**100**
Attitude	Not enough	27	20.9
	Enough	21	16.3
	Good	81	62.8
TOTAL		**129**	**100**

Based on table 1, it can be seen that the proportion of respondents' ages is equal because respondents have been selected based on age strata. While in terms of education level, it is dominated by high school graduates (55.8%) with the majority of respondents (55%) working as housewives.

From the distribution table above, it shows that most respondents (68.2%) have good knowledge about Nutritional Style. Also, most respondents (62.8%) have a good attitude about Nutritional Style.

Table 2. Distribution of Respondents Nutritional Status

Indicator	Category	Measurement 1		Measurement 2		Measurement3	
		f	%	f	%	f	%
IMT	Thin	17	13.2	13	10.1	9	7.0
	Normal	87	67.4	88	68.2	94	72.9
	Fat	25	19.4	28	21.7	26	20.2
TOTAL		**129**	**100**	**129**	**100**	**129**	**100**
LILA	KEK	23	17.8	23	17.8	23	17.8
	Normal	106	82.2	106	82.2	106	82.2
TOTAL		**129**	**100**	**129**	**100**	**129**	**100**
LP	Excess	49	38.0	49	38.0	49	38.0
	Normal	80	62.0	80	62.0	80	62.0
TOTAL		**129**	**100**	**129**	**100**	**129**	**100**
Hemoglobin levels	Anemia	21	16.3	21	16.3	18	14.0
	No Anemia	108	83.7	108	83.7	111	86.0
TOTAL		**129**	**100**	**129**	**100**	**129**	**100**

Table 2 show prevalence of nutritional status based on BMI most respondents have normal nutritional status. Respondents with normal BMI experienced an increase at each measurement time to reach 72.9%, while respondents with thin BMI decreased. The prevalence chronic lack of energy based on arm circumference was recorded at 17.8%, while the prevalence of excess abdominal circumference reached 38%. Hb levels showed a prevalence of anemia of 16.3% and decreased to 14%.

Table 3. Distribution of Respondents Mental Health

Indicator	Category	Measurement 1		Measurement 2		Measurement3	
		f	%	f	%	f	f
Anxiety	Normal	81	62.8	82	63.6	94	72.9
	Light	27	20.9	29	22.5	24	18.6
	Currently	14	10.9	13	10.1	6	4.7
	Critical	6	4.7	4	3.1	5	3.9
	Very Severe	1	0.8	1	0.8	0	0.0
TOTAL		**129**	**100**	**129**	**100**	**129**	**100**
Stress	Normal	124	96.1	124	96.1	123	95.3
	Light	3	2.3	4	3.1	5	3.9
	Currently	1	0.8	0	0.0	0	0.0
	Critical	1	0.8	1	0.8	1	0.8
	Very Severe	0	0.0	0	0.0	0	0.0
TOTAL		**129**	**100**	**129**	**100**	**129**	**100**
Depression	Normal	125	96.9	126	97.7	125	96.9
	Light	4	3.1	3	2.3	4	3.1
	Currently	0	0.0	0	0.0	0	0.0
	Critical	0	0.0	0	0.0	0	0.0
	Very Severe	0	0.0	0	0.0	0	0.0
TOTAL		**129**	**100**	**129**	**100**	**129**	**100**

Table 3 shows that the majority of respondents did not experience depression, but a small number of respondents (3.1%) experienced mild depression.

For anxiety, the distribution of respondents' anxiety levels was even from normal to severe anxiety. Most respondents (62.8%) were in the normal category and this category continued to increase to 72.9% in the third measurement. While at the mild, moderate and severe anxiety levels there was a decrease in percentage, in mild anxiety it decreased from 20.9% to 18.6% although it had increased in the second measurement. In moderate anxiety there was a significant decrease in percentage from 10.9% to 4.7%. While in severe anxiety it decreased from 47% to 3.9%. Finally, the majority of stress levels fall into the normal category, but there are still respondents who experience mild, moderate to severe stress, although the percentage is very small.

Table 4. Distribution of Respondents Nutritional Style Patterns

Indicator	Category	Measurement 1		Measurement 2		Measurement 3	
		f	%	f	%	f	%
Healthy food	Good	59	45.7	58	45.0	60	46.5
	Not good	70	54.3	71	55.0	69	53.5
TOTAL		**129**	**100**	**129**	**100**	**129**	**100**
Unhealthy Food	Good	81	62.8	80	62.0	80	62.0
	Not good	48	37.2	49	38.0	49	38.0
TOTAL		**129**	**100**	**129**	**100**	**129**	**100**

Table 4 shows the Nutritional Style measurements on three different measurements. It can be seen that healthy eating habits increased during the three measurements from 45.7% to 46.5%. In addition, unhealthy eating habits showed a lower average percentage.

Table 5. Correlation between Nutritional Style and Nutritional Status

1st Measurement					
Nutritional Style Healthy food	**Nutritional Status (BMI)**				**p-Value**
	Thin	**Normal**	**Fat**	**Total**	
Not good	11	48	11	70	0.179
Good	6	39	14	59	
Total	**17**	**87**	**25**	**129**	
Nutritional Style Unhealthy Food	**Nutritional Status (BMI)**				**p-Value**
	Thin	**Normal**	**Fat**	**Total**	
Not good	4	38	6	48	0.756
Good	13	49	19	81	
Total	**17**	**87**	**25**	**129**	
2nd Measurement					
Nutritional Style Healthy food	**Nutritional Status (BMI)**				**p-Value**
	Thin	**Normal**	**Fat**	**Total**	
Not good	10	48	13	71	0.093
Good	3	40	15	58	
Total	**13**	**88**	**28**	**129**	
Nutritional Style Unhealthy Food	**Nutritional Status (BMI)**				**p-Value**
	Thin	**Normal**	**Fat**	**Total**	
Not good	4	36	9	49	0.820
Good	9	52	19	80	
Total	**13**	**88**	**28**	**129**	
3rd Measurement					
Nutritional Style Healthy food	**Nutritional Status (BMI)**				**p-Value**
	Thin	**Normal**	**Fat**	**Total**	
Not good	7	50	12	69	0.154
Good	2	44	14	60	
Total	**9**	**94**	**26**	**129**	
Nutritional Style Unhealthy Food	**Nutritional Status (BMI)**				**p-Value**
	Thin	**Normal**	**Fat**	**Total**	

Not good	2	38	9	49	
Good	7	56	17	80	0.847
Total	**9**	**94**	**26**	**129**	

The results of the analysis showed that there was no significant correlation between Nutritional Style and nutritional status (BMI) in preconception women in Tuban Regency East Java Indonesia. This can be seen from the p-value obtained in all measurements (p-value >0.05)

Table 6. Correlation between Nutritional Style and the Incidence of Anemia

1st Measurement				
Nutritional Style Healthy food	**Anemia (Hb)**			**p-Value**
	Anemia	**No Anemia**	**Total**	
Not good	10	60	70	
Good	11	48	59	0.001
Total	**21**	**108**	**129**	
Nutritional Style Unhealthy Food	**Anemia (Hb)**			**p-Value**
	Anemia	**No Anemia**	**Total**	
Not good	8	40	48	
Good	13	68	81	0.928
Total	**21**	**108**	**129**	
2nd Measurement				
Nutritional Style Healthy food	**Anemia (Hb)**			**p-Value**
	Anemia	**No Anemia**	**Total**	
Not good	10	61	71	
Good	11	47	85	0.459
Total	**21**	**108**	**129**	
Nutritional Style Unhealthy Food	**Anemia (Hb)**			**p-Value**
	Anemia	**No Anemia**	**Total**	
Not good	12	37	49	
Good	9	71	80	0.049
Total	**21**	**108**	**129**	
3rd Measurement				
Nutritional Style Healthy food	**Anemia (Hb)**			**p-Value**
	Anemia	**No Anemia**	**Total**	
Not good	9	60	69	
Good	9	51	60	0.179
Total	**18**	**111**	**129**	
Nutritional Style Unhealthy Food	**Anemia (Hb)**			**p-Value**
	Anemia	**No Anemia**	**Total**	
Not good	10	39	49	
Good	8	72	80	0.751
Total	**18**	**111**	**129**	

The results of the analysis showed that there was no significant correlation between Nutritional Style and the incidence of anemia in preconception women in Tuban Regency, especially in the 1st measurement (p-value = 0.001) and the 2nd

measurement (p-value = 0.049). However, in the 3rd measurement there was no correlation between Nutritional Style and the incidence of anemia.

Table 7. Modeling Multiple Logistic Regression Nutritional Style factors that influence nutritional status based on BMI anthropometry at the 1st measurement

Variables	Unstandardized Coefficients		p-Value	Exp (B)
	B	Std Error		
Nutritional Style healthy food	0.144	0.105	0.172	1,372
Nutritional Style unhealthy food	0.092	0.107	0.394	856
Knowledge	0.287	0.137	0.038	2,093
Attitude	0.266	0.149	0.077	1,785
Constant	0.987	0.187	0,000	5.285

The results of the regression analysis are shown in table 8. In the first measurement, the variable that significantly influenced the nutritional status of pre-conception women was Nutritional Style knowledge with a p-Value of 0.038 <0.05. The results of the Odds Ratio analysis of the knowledge variable were 2,093, meaning that women who lacked knowledge about Nutritional Style had a 2,093 times risk of experiencing abnormal nutritional status compared to those with good knowledge about Nutritional Style.

Table 8. Correlation between Nutritional Style and Mental Health

1st Measurement							
Nutritional Style Healthy food	**Anxiety**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	50	12	7	0	1	70	0.022
Good	31	15	7	6	0	59	
Total	**81**	**27**	**14**	**6**	**1**	**129**	
Nutritional Style Unhealthy Food	**Anxiety**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	26	11	9	2	0	48	0.207
Good	55	16	5	4	0	81	
Total	**81**	**27**	**14**	**6**	**0**	**129**	
Nutritional Style Healthy food	**Stress**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	69	1	0	0	0	70	0.090
Good	55	2	1	1	0	59	
Total	**124**	**3**	**1**	**1**	**0**	**129**	
Nutritional Style Unhealthy Food	**Stress**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	45	2	1	0	0	48	0.594
Good	79	1	0	1	0	81	
Total	**124**	**3**	**1**	**1**	**0**	**129**	
Nutritional Style	**Depression**						

Healthy food	Normal	Light	Currently	Critical	Very Severe	Total	p-Value
Not good	69	1	0	0	0	70	0.236
Good	56	3	0	0	0	59	
Total	**125**	**4**	**0**	**0**	**0**	**129**	
Nutritional Style Unhealthy Food	**Depression**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	46	2	0	0	0	48	0.594
Good	79	2	0	0	0	81	
Total	**125**	**4**	**0**	**0**	**0**	**129**	
2nd Measurement							
Nutritional Style Healthy food	**Anxiety**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	52	14	4	0	1	71	0.006
Good	30	15	9	4	0	58	
Total	**82**	**29**	**13**	**4**	**1**	**129**	
Nutritional Style Unhealthy Food	**Anxiety**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	28	13	6	2	0	71	0.395
Good	54	16	7	2	0	58	
Total	**82**	**29**	**13**	**4**	**0**	**129**	
Nutritional Style Healthy food	**Stress**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	69	2	0	0	0	71	0.298
Good	55	2	0	1	0	58	
Total	**124**	**4**	**0**	**1**	**0**	**129**	
Nutritional Style Unhealthy Food	**Stress**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	47	2	0	0	0	49	0.705
Good	77	2	0	1	0	80	
Total	**124**	**4**	**0**	**1**	**0**	**129**	
Nutritional Style Healthy food	**Depression**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	70	1	0	0	0	71	0.448
Good	56	2	0	0	0	58	
Total	**126**	**4**	**0**	**0**	**0**	**129**	
Nutritional Style Unhealthy Food	**Depression**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	48	1	0	0	0	49	0.868
Good	78	2	0	0	0	80	
Total	**126**	**3**	**0**	**0**	**0**	**129**	
3rd Measurement							
Nutritional Style Healthy food	**Anxiety**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	56	10	1	2	0	69	0.029
Good	38	14	5	3	0	60	
Total	**94**	**24**	**6**	**5**	**0**	**129**	

Nutritional Style Unhealthy Food	Anxiety						
	Normal	Light	Currently	Critical	Very Severe	Total	p-Value
Not good	33	12	2	2	0	49	0.530
Good	61	12	4	3	0	80	
Total	**94**	**24**	**6**	**5**	**0**	**129**	
Nutritional Style Healthy food	**Stress**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	66	3	0	0	0	69	0.489
Good	57	2	0	1	0	60	
Total	**123**	**5**	**0**	**1**	**0**	**129**	
Nutritional Style Unhealthy Food	**Stress**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	45	4	0	0	0	48	0.593
Good	78	1	0	1	0	81	
Total	**123**	**5**	**0**	**1**	**0**	**129**	
Nutritional Style Healthy food	**Depression**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	68	1	0	0	0	69	0.249
Good	57	3	0	0	0	60	
Total	**125**	**4**	**0**	**0**	**0**	**129**	
Nutritional Style Unhealthy Food	**Depression**						
	Normal	**Light**	**Currently**	**Critical**	**Very Severe**	**Total**	**p-Value**
Not good	48	1	0	0	0	49	0.590
Good	77	3	0	0	0	80	
Total	**125**	**4**	**0**	**0**	**0**	**129**	

The results of the analysis showed that there was a significant correlation between Nutritional Style and anxiety in preconception women in Tuban Regency, in the 1st measurement (p-value = 0.022), in the 2nd measurement (p-value = 0.006) and in the 3rd measurement (p-value = 0.029). However, there was no correlation between Nutritional Style and stress and depression.

Table 9. Multiple Logistic Regression Modeling of Nutritional Style Factors that Influence Mental Health (Anxiety) in Measurements 1, 2 and 3

1st measurement				
Variables	**Unstandardized Coefficients**		**p-Value**	**Exp (B)**
	B	**Std Error**		
Nutritional Style healthy food	0.344	0.168	0.043	2,047
Nutritional Style unhealthy food	0.099	0.172	0.568	573
Knowledge	0.216	0.220	0.328	981
Attitude	0.294	0.239	0.220	1.232
Constant	1,310	0.299	0,000	4.376
2nd measurement				
Variables	**Unstandardized Coefficients**		**p-Value**	**Exp (B)**
	B	**Std Error**		
Nutritional Style healthy food	0.415	0.157	0.009	2,641
Nutritional Style unhealthy food	0.003	0.161	0.986	18
Knowledge	0.246	0.204	0.229	1.209

Attitude	0.309	0.222	0.166	1,394
Constant	1.212	0.269	0,000	4,504
3rd measurement				
Variables	**Unstandardized Coefficients**		**p-Value**	**Exp (B)**
	B	**Std Error**		
Nutritional Style healthy food	0.291	0.136	0.035	2.136
Nutritional Style unhealthy food	0.020	0.140	0.884	146
Knowledge	0.142	0.182	0.435	783
Attitude	0.210	0.198	0.290	1,062
Constant	1.108	0.243	0,000	4,554

The results of the regression analysis showed that healthy food Nutritional Style had a significant effect on anxiety in preconception women in all measurements (p-value <0.05). Knowledge and attitude also had an effect on the 1st and 2nd measurements, but were not significant in the 3rd measurement. Healthy food Nutritional Style had an effect on anxiety with an Odds Ratio between 2,047 and 2,641, which means that women who have a healthy food Nutritional Style have a high chance of reducing their anxiety levels.

Table 10. Longitudinal Analysis of Changes in Nutritional Status and Mental Health

	Nutritional Status 2 and 1	Nutritional Status 3 and 1	Mental Health (Anxiety) 2nd and 1st	Mental Health (Anxiety) 3rd and 1st
Z	-2.333b	-3,000b	-2.121c	-4.452c
Asymp. Sig. (2-tailed)	.020	.003	.034	.000

Table 10 shows the results of significant changes in nutritional status and mental health with the optimization of Nutritional Style Pre-Conception including changes in nutritional status from the first measurement to the second measurement with a p-Value of 0.020 <0.05 and changes in nutritional status from the first measurement to the third measurement with a p-Value of 0.003 <0.05, which means that there is a Nutritional Style factor according to the regression analysis, namely that increasing pre-conception Nutritional Style knowledge makes pre-conception nutritional status normal.

There was a change in mental health (anxiety) from the first measurement to the second measurement with a p-Value of 0.034 <0.05 and a change in mental health (anxiety) from the first measurement to the third measurement with a p-Value of 0.000 <0.05. which means that there is a Nutritional Style factor according to the regression analysis, namely a good healthy food Nutritional Style further reduces anxiety disorders.

The correlation between Nutritional Style and nutritional status based on Body Mass Index and Anemia Incidence

Results this study shows that Nutritional Style (diet) during the preconception period has varying effects on nutritional status and anemia in preconception women. Correlation analysis shows that there is no significant correlation between Nutritional Style and BMI, but there is a significant correlation between healthy food Nutritional Style and the incidence of anemia in the measurement first (p-value 0.001) and in the second measurement (p-value 0.049). Logistic regression analysis showed that in the first measurement, knowledge about Nutritional Style had a significant effect on nutritional status, where women with less knowledge about Nutritional Style had a 2.093 times higher risk of experiencing abnormal nutritional status.

The theory supporting these findings suggests that nutritional status before and during pregnancy plays an important role in pregnancy readiness and fetal health. Mertinez Galiano et al (2020) explained that preconception nutrition has long-term effects on maternal and infant health, where unhealthy eating patterns can cause pregnancy complications and impaired fetal development. This study strengthens the view that preconception nutritional intake has a significant impact on maternal health conditions, especially in reducing the risk of anemia and abnormal nutritional status.

Macedo et al (2021) study emphasized the importance of managing diet during pregnancy, where 66.6% of pregnant women had a higher prevalence of overweight and obesity than the average. This emphasizes the importance of preconception nutrition education to prevent abnormal increases in nutritional status during pregnancy. The study also found that higher consumption of sweet foods in low-risk women, indicating the need for monitoring diet to ensure balanced nutritional intake.

In addition, a study by Aschauer et al (2021) showed that preconception micronutrient supplementation can increase spontaneous pregnancy rates in women of advanced reproductive age with unexplained infertility. These findings support the importance of adequate nutritional intake before pregnancy to improve pregnancy chances and reproductive health.

Researchers argue that healthy eating patterns and knowledge about Nutritional Style are essential to improve preconception health and pregnancy readiness. Focused preconception nutrition interventions, including education about healthy eating patterns and micronutrient supplementation, should be a priority to ensure optimal nutritional status, reduce the risk of anemia and increase the chances of a healthy pregnancy.

In this study, there was no significant correlation between Nutritional Style and nutritional status (BMI). This may be due to several factors, including good knowledge of Nutritional Style among preconception women. Most preconception women have good knowledge of Nutritional Style, which may contribute to a healthier diet although it does not always have a direct impact on improving nutritional status.

In line with research conducted by Paratmanitya (2012) which stated that there is a significant correlation between body image and nutritional status, some respondents in this study were prospective brides who may feel social pressure to achieve certain beauty standards that often focus on body shape and weight. This pressure can lead to unhealthy eating behaviors, such as excessively reducing calorie intake or having an unbalanced diet. This study was only conducted for three measurements. It may take a longer time to see a significant impact of Nutritional Style on nutritional status.

The correlation between Nutritional Style and mental health

This study shows that Nutritional Style (in this case a healthy diet) has a significant correlation with anxiety levels in preconception women, but not with stress and depression levels. This finding is interesting because not all aspects of mental health are influenced by Nutritional Style (healthy diet). This shows that mental health factors are also influenced by other factors, such as genetic factors, traumatic experiences, social support which may be more dominant in determining stress and depression levels in preconception women. Research conducted by Dennis et al (2022) strengthens this, showing that individuals with depression, anxiety, and comorbidities have many high-risk behaviors that affect health. These include poor eating habits, decreased physical activity, increased

use of addictive substances, and internet addiction. This shows that preconception mental health is influenced by more complex factors, not just Nutritional Style.

A meta-analysis conducted by Firth et al (2019) provides strong evidence for the effectiveness of dietary interventions in reducing depressive symptoms. The study found that dietary interventions had small to moderate positive effects on depressive symptoms, and these effects were more pronounced in women than men. The meta-analysis also showed that interventions conducted by professional dietitians had significant benefits for depression and anxiety.

These findings open up new perspectives on the complex correlation between diet and mental health. While Nutritional Style does not directly affect stress and depression, its significant impact on anxiety suggests that nutritional intake may play a role in maintaining emotional balance and supporting overall mental health. Therefore, considering Nutritional Style as one of the important aspects in maintaining health is very necessary. Comprehensive interventions, including improving diet, addressing psychosocial factors and social support may be an effective solution to overcome the various mental health challenges faced by preconception women. Therefore, collaboration between midwives, nutritionists, psychologists and other health workers is needed to provide integrated support during the preconception period. Through this collaborative effort, it is hoped that it can create an environment that is more supportive of preconception women to achieve optimal physical and mental well-being in building a healthy and happy family.

Changes in Nutritional Status and Mental Health

This study shows that optimizing Nutritional Style can significantly affect nutritional status and mental health during the preconception period. There is a significant increase in nutritional status from the first, second and third measurements. This is associated with an increase in preconception Nutritional Style knowledge, indicating that better knowledge of preconception nutrition contributes to more optimal nutritional status. In addition, there is a significant decrease in anxiety levels from the first, second and third measurements. The

decrease in anxiety is associated with the implementation of good healthy food Nutritional Style, a healthy diet helps reduce anxiety disorders.

The article from Role A Bekdash (2021) highlights the role of DNA methylation and the influence of diet on mental health throughout life. Epigenetic changes caused by consuming a healthy diet rich in micronutrients such as folate, choline and B vitamins have the potential to influence gene expression and may contribute to better mental health. This is in line with research findings that increased preconception Nutritional Style knowledge resulted in improved nutritional status and decreased anxiety, reflecting the importance of a quality diet to mental wellbeing.

A study by Sunita Taneja et al (2020) demonstrated the importance of comprehensive nutritional interventions during the preconception to early adolescence period in influencing child health outcomes and maternal nutritional status. This is relevant to the findings of this study, where the implementation of good Nutritional Style has been shown to improve nutritional status, which has the potential to have a positive impact on pregnancy readiness and mental health of preconception women.

Furthermore, O'Neil et al (2014) found that healthy eating patterns were consistently associated with better mental health in children and adolescents. This study supports the association between consuming a high-quality diet and reduced anxiety levels found in the current study. Hill et al (2019) also emphasized the importance of preconception diet in promoting optimal health and reducing the risk of complications during pregnancy.

A study by Firth et al (2019) found that dietary interventions can significantly reduce depressive symptoms, although their effect on anxiety is not large. This suggests that a proper nutritional approach can help reduce mental health symptoms, consistent with the results of this study showing a decrease in anxiety with the implementation of a healthy food Nutritional Style.

Cebrino et al (2021) highlighted that poor quality diet is a risk factor for CMD (Common Mental Disorders), supporting the findings of this study that healthy eating patterns are associated with better mental health in the preconception period. Bremer et al (2020) demonstrated the complex correlation

between diet, stress and mental health, reinforcing the importance of proper nutritional management in supporting mental health.

Overall, this study is in line with previous findings that optimal nutrition and good nutisyle implementation play an important role in improving nutritional status and mental health, which in turn can improve pregnancy readiness. The results of this study provide evidence that optimizing Nutritional Style during the preconception period not only has a positive impact on reducing anemia, but also improves mental health, especially in reducing anxiety levels. These findings strengthen the importance of nutritional interventions that focus on the preconception period.

The implementation of good Nutritional Style is not only by avoiding unhealthy foods, but also by understanding the body's nutritional needs and choosing foods that support overall health. Increasing knowledge about preconception nutrition is key in implementing a diet. A comprehensive education program involving prospective mothers, families and health workers must be a priority. By increasing awareness of the importance of preconception Nutritional Style, it will encourage the realization of a healthy and intelligent future generation.

The limitation of this study is that there was no direct observation of the food consumed by the respondents. This makes it difficult to control food intake in detail and potential bias in measuring eating patterns.

CONCLUSION AND SUGGESTION

There is no significant correlation between Nutritional Style and BMI, but there is a significant correlation between Nutritional Style healthy food and the incidence of anemia. There is significant correlation between Nutritional Style and mental health (anxiety) during the preconception period. Good Nutritional Style during preconception can improve nutritional status and minimize mental health risk. This suggests that optimizing Nutritional Style during the preconception period has great potential in improving pregnancy readiness. A nutritional intervention program focused on the preconception period is needed to improve knowledge and implementation of a healthy nutritional diet among

women during the preconception period. It is necessary to monitor the nutritional status and mental health of women during the preconception period regularly. Further research is needed over a longer period of time to see the long-term impact of optimizing Nutritional Style on maternal and fetal health.

DECLARATION

Conflict of Interest

There is no conflict of interest in this research.

Authors' Contribution

The lead researcher is responsible for the entire research, from planning, implementation, data analysis and dissemination of results. Research member 1 is responsible for data analysis and discussion. Research member 2 is responsible for respondent selection, data collection and discussion.

Ethical Approval

This research has been approved by the Research Ethics Board of the Nahdlatul Ulama Tuban Health Sciences Institute with the number 150/0084223523/LEPK.IIKNU/VI/2024

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CORRELATION BETWEEN MATERNAL EDUCATION AND EMPLOYMENT STATUS WITH EXCLUSIVE BREASTFEEDING HISTORY

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Abstract

Background: In 2022, the sole lactation coverage rate in Indonesia was recorded at 67.96%. According to the East Java Provincial Health Office, 67.54% of women in the province of East Java were exclusively nursing in 2022. This falls very short of the 80% goal set by the Republic of Indonesia's Ministry of Health in 2020. Infants require breast milk and adequate nutrition to increase their nutrient levels during growth. Exclusive breastfeeding cannot be optimally provided due to various factors such as maternal education history, which influences the mother's limited knowledge about the importance of exclusive breastfeeding maternal employment. These two factors affect the provision of exclusive breastfeeding to infants. Given the foregoing context, the study's goal was to discover how a mother's job description affected her history of exclusive breastfeeding. **Method:** The study employed a cross-sectional strategy and a quantitative, analytical observational design. Purposive sampling was used to choose 111 participants for the study, who were all mothers with infants between the ages of 6 and 12 months. The study will be carried out in Madiun City's Public health Service Tawangrejo East Java, Indonesia. operational region. This study was conducted from February to April 2024. Data collection utilizes questionnaires. The chi-square test was used to analyze the data. **Result:** The p-value is 0.03 or less than 0.05, showing that the history of exclusive breastfeeding was significantly correlated with the mother's employment position and educational attainment. Mothers with a history of exclusive breastfeeding have a poor association between their employment status and education, as indicated by their correlation coefficient (R) value of 0.362. **Conclusion :** there is a relationship between education, employment level, and history of exclusive breastfeeding at the Tawangrejo Community Health Center in Madiun, East Java, Indonesia.

keyword : breastfeeding, education level, employment status

INTRODUCTION

Exclusive breastfeeding is a natural food given to infants at birth. For the first six months of life, a baby is exclusively breastfed and not given any other food or beverage than breast milk. ASI is the best food for infants, but many mothers, especially working mothers, often neglect this aspect. Exclusive breastfeeding is a way to reduce infant morbidity and mortality (Safitri and Puspitasari, 2019).

According to data released by the World Health Organization (WHO) in 2021, approximately 44% of infants aged 0-6 months globally were exclusively breastfed between 2015 and 2020; this falls short of the global goal of 50%

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exclusive breastfeeding coverage. . According to the 2020 Riskesdas data, 66.1% of babies in Indonesia received exclusive breastfeeding (Kementrian Kesehatan RI, 2018). In East Java province, exclusive breastfeeding coverage, as reported by the Provincial Health Department, reached 71.63% in 2023. In the city of Madiun East Java Indonesia, the coverage rate of exclusive breastfeeding (EBF) reached 73.6% in 2023 (Dinas Kesehatan PP dan KB Kota Madiun, 2022). At the Tawangrejo Community Health Center East Java Indonesia, the coverage rate of EBF reached 61.5% in 2023. The coverage of exclusive breastfeeding at Puskesmas Tawangrejo is not yet optimal. One reason is the mother's job. The working mother has limited time to provide exclusive breastfeeding. The short maternity leave period requires mothers to return to work before the exclusive breastfeeding period ends.

Stunting risk can be decreased in infants who are exclusively breastfed. This is corroborated by research showing that infants who are not exclusively breastfed until they are six months old are more likely to get respiratory and gastrointestinal diseases (WHO, 2020). Breastfeeding can prevent 1/3 of upper respiratory tract infections, reduce diarrhea incidence by up to 50%, and decrease severe gut diseases in premature babies by 58%. In mothers, the risk of breast cancer decreases by 6–10%. Exclusive ASI enhances a child's IQ, potential for better job prospects, and optimal income. Infants who do not receive enough breast milk will experience slower growth, affecting their weight, length, and head circumference. Breast milk also contains antibodies that protect babies from infections, such as ear, respiratory, and gastrointestinal infections (Sembiring, 2022).

However, the reality in the field reveals several astonishing facts. A mother's understanding of exclusive breastfeeding methods increases with her educational attainment. Mothers with higher education tend to seek information about exclusive breastfeeding more effectively than mothers with lower education. Mothers with low education tend to provide breastfeeding based on the culture and customs inherited from their parents. In line with this, mothers who work outside the home may face limitations and opportunities in breastfeeding their baby. This limitation may manifest in various forms, such as constraints on space and time as well as a lack of lactation facilities at the workplace. This will affect the provision of exclusive breastfeeding to their baby (Ramli, 2020).

In light of the background information provided above, the researcher intends to investigate the association between the job status and educational attainment of mothers who have a past of breastfeeding exclusively in the Tawangrejo Community Health Center's operating area in Madiun City, East Java Indonesia.

METHOD

The research project included a cross-sectional procedure and a quantitative, analysing empirical design. Purposive sampling was used to choose 111 respondents for the study, who were all mothers with infants between the ages of 6 and 12 months. The study will be undertaken in Madiun City's Puskesmas Tawangrejo East Java Indonesia. This study was conducted from February to April 2024. The following eligibility requirements were used when sampling was done: Mothers with infants 6–12 months old; Mothers who are open to participating; Mothers and infants in the Tawangrejo Health Center's East Java Indonesia. Data collection utilizes questionnaires. The chi-square test has been employed for assessing the data.

RESULT AND DISCUSSION

Based on the data collected and analyzed, the study "Correlation Between Maternal Education And Employment Status With Exclusive Breastfeeding History" found the following results:

Table 1. Level of mother's education

Criteria	Frequency (f)	Percebtage (%)
Basic education (SD)	14	16,1
Secondary education (SMP,SMA)	40	46
Higher education (D1,D2,D3,34,S1,S2,S3)	33	37,9
Total number	87	100

Table 1 highlights that, of the 87 respondents, has secondary Education provides the greatest percentage of Ibu education, with about 40 respondents (46.0%).

External factors that can hinder breastfeeding include education, knowledge, occupation, income, family support, and the role of healthcare providers. Mothers with higher education tend to introduce complementary feeding (MP-ASI) earlier than mothers with lower education, who introduce MP-ASI after

the baby is 4 months old. High levels of education without knowledge of exclusive breastfeeding practices can impact exclusive breastfeeding rates (Bakri *et al.*, 2022).

Table 2. employment status of respondent

Criteria	Frequency (f)	Percentage (%)
Working	42	48,3
Not Working	45	51,7
Total number	87	100

Table 2 explains that, of the 87 respondents, 45 (51.7%) are mothers, revealing that the majority of them have job opportunities.

This is in agreement with studies that reveal a negative relationship between the success of breastfeeding exclusively and the professional standing of the mother. Time restrictions, the quality of the bond with the infant, workload, stress, and breastfeeding confidence are some of the issues that working mothers frequently deal with. On the flip side, compared to working mothers, non-working women are four times more likely to exclusively breastfeed (Asih Dwi Astuti, Siti Rochmaedah and Rahma Tunny, 2022).

The working mother has limited time to breastfeed her baby due to commitments outside the home. While still able to provide exclusive breastfeeding with pumping, this is often hindered by a lack of knowledge about expressing breast milk and a lack of support from family or the work environment, resulting in mothers being less motivated to pump (Muhammada and Anasril, 2020).

Table 3. History of Exclusive Breastfeeding of respondent

Criteria	Frequency (f)	Percentage (%)
Not Breastfeeding	43	49,4
Breastfeeding	44	50,6
Total number	87	100

Table 3 illustrates how a number of mothers (44 responses, or 50.6%) out of the 87 respondents stated exclusive breastfeeding. Of the women who responded, 43 (49.4%) did not exclusively breastfeed.

Based on data, exclusive breastfeeding rates are still suboptimal despite its numerous benefits for infants. Exclusive breastfeeding reduces the risk of infant mortality by providing colostrum with antibodies and proteins for immunity and germ-killing capabilities. Formula milk excludes these enzymes, and absorption is

dependent on the baby's intestinal enzymes. In contrast, breastfeeding contains these enzymes, which aid in food absorption without interfering with other intestinal enzymes (Kemenkes, 2021).

It is disheartening that the number of mothers of exclusive breastfeeding is still low, recognizing the numerous benefits it offers. A number of things, particularly cultural views, education, and understanding, can affect exclusive breastfeeding. Maternal health, time availability, and family income are supporting variables. Support from family members and health care professionals provides inspirational aspects(Kebo, Husada and Lestari, 2021).

The significance level. If the p-value is less than 0.03 ($p > 0.05$), it can be interpreted that there is a significant relationship between the education level and employment status of mothers on exclusive breastfeeding history. The value of R (correlation coefficient) is 0.362, thus it can be concluded that the relationship between the education and employment status of mothers and the history of exclusive breastfeeding is low.

External factors that may impede breastfeeding include education, knowledge, occupation, income, family support, and the influence of healthcare providers (Bakri *et al.*, 2022). A working mother is experiencing difficulty in providing exclusive breastfeeding due to having to juggle her time with work. It can be observed that the busier mothers are with work, the fewer of them exclusively breastfeed. In working mothers, not providing exclusive breastfeeding indicates a tendency due to limited opportunities to exclusively breastfeed, conflicting with the obligations of work (Ramli, 2020).

The low awareness of working mothers to provide exclusive breastfeeding at the Tawangrejo Community Health Centre may be influenced by limited time for mothers to breastfeed due to having to go to the office. In addition, the lack of knowledge and support from family and the work environment are equally important as contributing factors. This may be due to the lack of breastfeeding rooms or lack of breastfeeding storage facilities. Many companies do not have breastfeeding rooms or breastfeeding storage facilities, managers or colleagues lack support, and support from family and work environment is lacking.

CONCLUSION AND SUGGESTION

there is a significant low relationship between the education and employment status of mothers with a history of exclusive breastfeeding in the Tawangrejo Health Center in Madiun City. Other researchers are expected to further develop this study by exploring other factors that influence exclusive breastfeeding using different samples and study periods to provide a broader picture.

DECLARATION

Conflict of Interest

The author states that there were no conflicts in this study.

Authors' Contribution

All autor contribute from concept in writing draf article.

Ethical Appraoval

Research Ethics Committee of Faculty Health, Institut Ilmu Kesehatan Bhakti Wiyata Kediri 09/FKes/TK/2024

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Data Availability

The data supporting this resesrch are available from the authors on reasonable requerst

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HEALTH EDUCATION ON MATERNAL KNOWLEDGE AND ATTITUDES IN BABY MASSAGE INDEPENDENTLY

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Abstract

Background: Baby massage is a comfortable form of communication between mother and baby. Benefits of regular baby massage with proper techniques include increased baby weight gain, improved breast milk production, reduced maternal anxiety, and stronger bonding. **Method:** Quantitative research using a cross-sectional approach. Data analysis was conducted using univariate and bivariate techniques with chi-square statistical tests. The sample in this study consisted of 45 mothers with babies aged 0–12 months in Kedak Village, Semen, Kediri Regency. Sampling technique with accidental sampling. Respondents were given a questionnaire before and after participating in a health education session conducted using audiovisual media and leaflets. **Result:**The bivariate analysis using the chi-square test showed the value of Asymp. A significant relationship was found between pre-health education and the knowledge and attitude of mothers in massaging their baby independently, with a p-value of 0.000. Post-health education, the Asymp. significance level of p-value 0.001 indicates a relationship between mothers' knowledge and their attitude towards independently massaging their babies after health education. **Conclusion:** There is a relationship between health education and mothers' knowledge and attitude towards independently massaging their babies.
keyword : Baby massage, health education, knowledge, and attitudes.

INTRODUCTION

Comfortable communication between mother and baby is through baby massage (Rohmah & Aryaneta, 2020). Touch is also an early interaction for humans, as babies respond to physical stimuli felt by the skin as an active sense. Regular baby massage using proper techniques can be a therapy with numerous benefits for both the baby and parents (Nurlaily & Oktariani, 2018). The benefits include physical, physiological, and psychological aspects. Benefits for baby physical health are weight gain and increased breast milk production, as proven by research conducted by T. Field and Scafidi from the University of Miami, USA. The study showed that 20 premature babies experienced a weight gain of 20–47% every 3 days after being massaged for 3x15 minutes for 10 days. Babies aged 1-3 months who received 15 minutes of massage twice a week for six weeks showed greater weight gain compared to those who did not receive massage (Rohmah & Aryaneta, 2020). The baby's development progresses rapidly between the ages of 0 and 12 months (Stern, 2019). According to American psychoanalyst John Bowlby, stronger attachment will begin soon after the baby is born; the interaction

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between the baby and its mother will develop the baby's ability to respond to his mother's behavior (Bowly J., 1979).

It has been proven that mothers who interact with their babies by giving them baby massages while hospitalized experience decreased anxiety and stronger attachment. The increased attachment is also evident in a study by Gurol A. dan Holditch-Davis (Gürol & Polat, 2012). This benefit can be associated with the hormone oxytocin that is secreted due to physical contact (Matthiesen, et al., 2001). Both mother and baby will experience an increase in oxytocin levels during infant massage. Previous literature reviews have found some evidence of the effects of infant massage on reducing pain (Fitri, et al., 2021), decreasing jaundice (Lei & Liu, 2018) and increasing weight gain (Niemi, 2017).

The fact is that, although baby massage has significant benefits for both the baby and the mother if done independently, nowadays few mothers are willing to massage their babies themselves for fear of making mistakes and feeling unsatisfied with self-massage. The cause is the mother's lack of knowledge about independently performing baby massage, resulting in negative attitudes and behaviors towards self-perform baby massage stimulation (Nurlaili & Oktariani, 2018). In Indonesia, the practice of infant massage in rural communities is often carried out by traditional infant healers. Massage is not only done on healthy babies but also on sick or fussy babies and has become a routine postnatal care practice. Infant massage is a form of touch communication that initially has positive effects on a baby's growth and development. However, for some babies, massage can be painful or have negative effects, causing them to fear being touched (Zuliana, et al., 2023).

Given that many mothers are unaware of the benefits of infant massage, they often resort to traditional massage therapists when their baby is sick. These mothers are hesitant to perform massage themselves due to a lack of knowledge about infant massage techniques. Massage done too forcefully and roughly on a baby by a traditional healer can result in bleeding in the soft tissues and cause bruising on the baby's skin. Infants with bloated stomachs should not be massaged indiscriminately. Massaging could worsen any intestinal blockage causing the bloating. Knowledge is an essential factor in shaping an individual's behavior. If behavior occurs through a process based on knowledge, awareness, and a positive attitude, then the behavior is direct (Zuliana, et al, 2023).

METHOD

This study is quantitative research with a cross-sectional approach. The population for this study consists of all mothers with babies aged 0–12 months in the Kedak Village, Semen, Kediri, with a sample size of 45 mother-baby pairs. The sampling technique using accidental sampling was conducted in June-July 2024 by inviting participants to a health education socialization event at the Poskesdes Desa Kedak. Questionnaires were distributed before the Health Education socialization on infant massage for mothers of infants. Socialization is conducted using audiovisual media, and leaflets are distributed for easy recall when respondents have returned home. After conducting the health education session on infant massage independently, the mothers of the infants were also given a pre-test questionnaire. Mothers of infants who meet the inclusion criteria are selected as research respondents. Prior to

questionnaire completion, all respondents are briefed on the study and asked to sign a consent form to participate. The data obtained was then analyzed using univariate and bivariate analysis with the chi-square test.

RESULT AND DISCUSSION

A. **Frequency Distribution Based on Age, Education, Occupation, and Baby Massage Information.**

Table 1. Frequency Distribution Based On Age, Education, Occupation, And Baby Information

Characteristics of respondents	N	(%)
Mother's Age		
24-31	22	48,9
32-38	23	51,1
Education Level		
Junior high school	13	28,9
High school	21	75,6
College	11	24,4
Occupation		
Employee (Swasta)	16	35,6
Housewife	13	64,4
Entrepreneur	11	88,9
Civil (ASN)	5	11,1
Information on Baby Massage		
Ever	14	31,1
Never	31	68,9

Distribution of respondents based on mother's age shows that the majority of respondents are in the 32-38 age group, with 23 respondents (51.1%) classified as adults. The highest level of education is high school, with 21 respondents (75.6%). The highest occupation is in the employee, with 16 respondents (35.6%). Furthermore, the distribution of respondents who have never received baby massage information shows the highest at 31 respondents (14.1%).

B. Univariate Analysis

Maternal Knowledge of Baby Massage Before and After Health Education

Table 2. Frequency Distribution of Maternal Knowledge on Baby Massage Independently Before and After Health Education

Knowledge of Maternal Baby Massage Independently Before Health Education	f	%
Good knowledge	9	20
Lacking knowledge	36	80
Total	45	100
Knowledge of Maternal Baby Massage Independently After Health Education	**f**	**%**
Good	42	93,3
Lacking	3	6,7
Total	45	100

From the table above, it can be seen that the majority of mothers had is lacking knowledge about baby massage before receiving health education, with 36 mothers (80%) having lack knowledge and only 9 mothers (20%) having good knowledge. After receiving health education on baby massage, mothers' knowledge changed as follows: 42 mothers (93.3%) had good knowledge, while only 3 mothers (6.7%) had lack knowledge.

Table 3. Frequency Distribution Of Maternal Attitudes Toward Baby Massage Before and After Receiving Health Education

Maternal Attitudes towards Baby message Before Health Education	**f**	**%**
Positife	5	11,1
Negative	40	88,9
Total	45	100
Maternal Attitudes towards Baby message After Health Education	**f**	**%**
Positive	38	84,4
Negative	7	15,6
Total	45	100

From the table above, it can be seen that the data shows that the majority of mothers have a negative attitude towards baby massage before receiving health education, with 40 mothers (88.9%) having a negative attitude and only 5 mothers (11.1%) having a positive attitude. After receiving health education about independent baby massages, mothers' attitudes changed. The majority, 38 mothers (84.4%), had a positive attitude, while a small portion, 7 mothers (15.6%), had a negative attitude towards baby massage implementation.

C. Bivariate Analysis

Analysis of correlation between variables using a bivariate test. This analysis utilizes cross-tabulation and chi-square testing. Cross-tabulation between knowledge and attitudes of mothers before health education.

Table 4. Cross-tabulation between Maternal Knowledge and Maternal Attitudes towards Independent Baby Massage Before Receiving Health Education

Crosstab

			Maternal Attitudes Before Health Education		
			Positive	Negative	Total
Maternal Knowledge Before Health Education	Good Knowledge	Count	5	4	9
		Expected Count	1.0	8.0	9.0
	Lacking knowledge	Count	0	36	36
		Expected Count	4.0	32.0	36.0
Total		Count	5	40	45
		Expected Count	5.0	40.0	45.0

The table provides information that before receiving health education, 36 mothers had lacking knowledge and negative attitudes towards practicing baby massage independently. However, 9 other mothers had good knowledge on baby massage before receiving health education, and their attitudes included 4 mothers with negative attitudes and 5 mothers with positive attitudes towards independent baby massage.

Table 5. Chi-Square Test Between Mother's Knowledge And Mother's Attitude

Before Health Education

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	22.500[a]	1	.000		
Continuity Correction[b]	17.227	1	.000		
Likelihood Ratio	19.030	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	22.000	1	.000		
N of Valid Cases	45				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.00.

Based on the test results in the table above, it is noted that the p-value is 0.000 (<0,05). Therefore, it can be concluded that there is a significant relationship between a mother's knowledge and attitude before health education.

Table 6. Cross-Tabulation Between Maternal Knowledge And Maternal Attitudes After Health Education.

Crosstab

			Maternal Attitudes Before Health Education		
			Positive	Negative	Total
Maternal Knowledge Before Health Education	Good Knowledge	Count	38	4	42
		Expected Count	35.5	6.5	42.0
	Lacking Knowledge	Count	0	3	3
		Expected Count	2.5	.5	3.0
Total		Count	38	7	45
		Expected Count	38.0	7.0	45.0

The table shows that after receiving health education, 42 mothers have good knowledge; among them, 38 mothers have a positive attitude and 4 mothers have a negative attitude towards independent baby massage implementation. While the remaining 3 mothers who received health education after demonstration have lacking knowledge and negative attitudes towards independent baby massage practice.

Table 7. Chi-Square Test Between Mother's Knowledge And Mother's Attitude After Health Education

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	17.449[a]	1	.000		
Continuity Correction[b]	11.241	1	.001		
Likelihood Ratio	12.483	1	.000		
Fisher's Exact Test				.002	.002
Linear-by-Linear Association	17.061	1	.000		
N of Valid Cases	45				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .47.

Based on the test results in the table above, it is known that the p-value is 0.001 (<0,05). Therefore, it can be concluded that there is a significant relationship between mothers' knowledge and their attitudes after receiving health education

DISCUSSION

A. MATERNAL KNOWLEDGE AND ATTITUDE IN BABY MASSAGE INDEPENDENTLY BEFORE HEALTH EDUCATION

As mentioned in the research results, before receiving health education, the majority of 36 mothers had lacking knowledge and negative attitude towards baby massage independently, with a chi-square test result showing a p-value of 0.000. This is in line with Debora et al. (2024) research on the influence of baby massage health education on maternal knowledge and attitudes towards massaging their babies independently. The results showed that before receiving Health Education, the majority of mothers' knowledge was lacking, with 20 individuals (87%), while the minority had sufficient knowledge, with 3 individuals (13%). Before receiving Health Education, the majority of mothers had a negative attitude (43.5%, n=13) while a minority had a positive attitude (8%, n=10). The obtained p-value of 0.002 indicates a significant influence of Health Education on mothers' knowledge in massaging their babies. The p-value of 0.000 shows a significant impact of Health Education on mothers' attitudes towards massaging their babies. (Paninsari, et al., 2024)

This research is in line with the study by Zuliana et al. (2023) on baby massage behavior independently by respondents before health education was conducted, all included in the less category (100%). There is a significant influence of health education on baby massage on mothers' behavior in independently massaging their babies. Simple health promotion processes include health education that can be optimally used to enhance people's knowledge and attitudes toward maintaining body health. A medium is needed to deliver health education. Health promotion media is used to convey health messages or information to individuals in order to increase knowledge and encourage positive behavior change (Debora. et al. 2024). Adding literature findings, research by Dina MR. (2020) also mentioned that the majority of mothers exhibited poor behavior, with 29 respondents (96.7%) performing baby massages independently. This is due to the lack of knowledge mothers have about baby massage, leading them to feel afraid to massage their own baby and still believe it is better to go to a baby healer for the massage. Therefore, parents need to be equipped with education on the benefits and proper techniques of baby massage (Rohmah & Aryaneta, 2020).

The assumption of researchers is that information is crucial in life because it can influence one's behavior. The less information acquired, the lower the ability to motivate oneself. With information, individuals can gain a better understanding, comprehend, and perform the necessary actions while avoiding harmful behaviors toward themselves and their children.

B. MATERNAL KNOWLEDGE AND ATTITUDE IN BABY MASSAGE INDEPENDENTLY AFTER HEALTH EDUCATION

As mentioned in the research findings, after receiving health education, the majority of 42 mothers showed good knowledge. Among them, 38 mothers had a positive attitude, while 4 mothers had a negative attitude towards independently performing baby massage. Meanwhile, the remaining 3 other mothers, after

receiving health education, showed lacking knowledge and a negative attitude towards independent baby massage. The chi-square test resulted in a p-value of 0.001. This is in line with a study by Iramaya (2024), which indicated that after receiving counseling, the knowledge of mothers increased by 29 respondents (72.5%) and the positive attitude of mothers increased by 28 respondents (70%). Other research has shown that respondents with a good level of knowledge mostly perform infant massage, with a statistical test revealing a p-value of 0.039 (<0,05) (Sinulingga & Patriani, 2023).

The research conducted in Dusun Brajan, Tamantirto Village, Bantul Regency, Yogyakarta, especially in Posyandu A and B, revealed that after receiving health education on baby massage, the majority of mothers (100%) have good knowledge, and the majority of respondents (56.67%) perform baby massage according to the technique. This is possible because mothers have not been exposed to information on baby massage that can be done by themselves, or many respondents still massage their babies by traditional healers. An individual's skills can be determined by their knowledge, attitude, availability of facilities, and the behavior of healthcare providers as health facilitators (Ekawati & Anggraini, 2018). In line with the study by Syefira (2020), respondents' knowledge after receiving health education showed good knowledge in 44 respondents (88%), and positive attitudes in 35 respondents (70%) after receiving health education. (Johar, 2020).

Assuming researchers have a more positive attitude towards baby massage, the better the actions of mothers towards implementing baby massage. Information on baby massage obtained from a mother's knowledge of baby massage supported by the baby's condition will serve as a stimulus for the mother to determine her attitude, whether she supports baby massage behavior or rejects it.

CONCLUSION AND SUGGESTION

Based on the research on health education on the knowledge and attitudes of mothers in massaging babies independently in the village of Kedak Semen, Kediri Regency, with a sample of 45 mothers of babies, it can be concluded that before being given health education, 36 mothers had lacking knowledge and negative attitudes towards independent baby massage, and 9 other mothers had good knowledge of baby massage, with 4 displaying a negative attitude and 5 displaying a positive attitude towards self-administered baby massage. A chi-square test with a p-value of 0.000 (<0,05). Therefore, it can be concluded that there is a significant relationship between a mother's knowledge and her attitude before health education.

Knowledge and attitudes of mothers after receiving health education show that out of 42 mothers, 38 have good knowledge and attitudes, with 38 mothers having a positive attitude and 4 mothers having a negative attitude towards independent baby massage implementation. However, the remaining 3 mothers who received health education had lacking knowledge and a negative attitude towards performing independent baby massages, with a p-value of 0.001 (<0,05). Therefore, it can be concluded that there is a significant relationship between a mother's knowledge and her attitude after receiving health education.

DECLARATION

Conflict of Interest

The author declares no conflict of interest in this research.

Authors' Contribution

CD wrote a conceptual study, developed the methodology, collected data, and wrote and revised the manuscript. NDH is gathering data and preparing a manuscript.

Ethical Approval

Research ethics committee of Bhakti Wiyata Kediri Institute of Health Science nomor 08/Fkes/TK/2024

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Data Availability

The data supporting this research are accessible from the authors upon request.

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PRE-CONCEPTION READINESS AMONG PROSPECTIVE BRIDES

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Abstract

Background: Preconception is the best preparation time for the First 1000 Days of Pregnancy. Prospective brides are a group that must receive attention and monitoring regarding health conditions, including nutritional status, to prepare for pregnancy and the birth of a healthy baby. This research aims to determine the preconception nutritional readiness of prospective brides. **Method**: This type of research was quantitative with a cross-sectional descriptive design. The population in the study was 30 prospective brides and was obtained using a consecutive sampling technique of 20 prospective brides. The variables studied were the bride and groom's sociodemographic data, including age, highest level of education, work status, and sources of nutrition and health information. Other variables studied were body mass index nutritional status, chronic lack of energy status, anemia status, energy, protein, iron, calcium, folic acid intake, ferro supplementation and folic acid supplementation, and preconception nutritional knowledge. The collected data will be entered and processed using Microsoft Excel and SPSS, then analyzed univariately using a descriptive frequency test. **Results**: The results of this study show that the sociodemographics of the majority of prospective brides are in the early adult age category (55%), have secondary education (75%), are not working (75%), and receive health and nutritional information from health workers (45%). Adequate energy intake level (75%), insufficient protein (55%), insufficient iron (85%), insufficient calcium (95%), insufficient folic acid (100%), no supplementation (85%), nutritional status of each -respectively normal and obese (35%), not CED (60%), not anemic (80%), lacking knowledge (70%), and lacking preconception nutritional readiness (85%). **Conclusion**: Most prospective brides cannot meet at least half of the preconception nutritional readiness indicators measured.

Keywords: Preconception, Prospective woman bride, Intake

INTRODUCTION

Pregnancy is part of the First 1000 Days of Life, which determines the quality of a child's health and growth in the future. Health and nutritional problems that are not intervened before conception will affect the pregnancy and the child born. Interventions carried out during conception or when pregnancy occurs are too late to carry out (Dieny et al., 2019). Preconception is the best time to prepare for

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the First 1000 Days of Pregnancy, namely the pregnancy period (270 days) and two years (730) of the baby's life after birth. Therefore, preconception is the main period for preventing nutritional problems in pregnant women, which impacts future generations (Afifah et al., 2022). Women of reproductive age are a group that must receive attention and monitoring regarding health conditions, including nutritional status, to prepare for pregnancy and the birth of a healthy baby.

Women of reproductive age are women in the 15-49 years age group who are still in their reproductive age and are married or unmarried, young women, pregnant/postpartum women, adult women who are not pregnant, and prospective brides (Nurachma, 2022; Sulaeman, 2021). Nutritional problems that women of reproductive age often experience are anemia and chronic lack of energy. Anemia in pregnant women is at risk of causing bleeding, which is the main factor in maternal mortality in Indonesia (Angrainy, 2017). Meanwhile, Chronic Energy Deficiency (CED) experienced by pregnant women is at risk of causing low birth weight (LBW), and there is a high possibility of stunting in the children they give birth to (Laura et al., 2022). Insufficient nutritional intake is a direct cause of dietary problems and is influenced by indirect causal factors such as inadequate knowledge about preconception nutrition (Umisah, 2017). Preconception nutritional knowledge is essential in preparing for pregnancy to prevent dietary deficiencies (Umisah, 2017). Chronic lack of energy and anemia are closely related to chronic energy and protein deficiencies. Besides energy and protein, iron, folic acid, and calcium are very important to prepare before pregnancy (Angraeni and Ayuningtyas, 2017).

The reproductive health of the prospective bride is the starting point for a picture of pregnancy and the child being born, where preparations can be made early before the wedding (Yulivantina et al., 2021). Minister of Health Regulation Number 97 of 2014 states that preconception health services are provided to prospective brides and couples of reproductive ages to prepare for a healthy and safe pregnancy and birth and to obtain a healthy baby (Wirenviona et al., 2021). Preconception preparations for prospective brides in Indonesia are still limited to physical examinations. It is infrequent to measure preconception nutritional readiness regarding the adequacy of food intake, nutritional status, knowledge

about preconception nutrition, or consumption of folic acid supplements (Paratmanitya et al., 2021). This research aims to determine the preconception nutritional readiness of prospective brides.

METHOD

This type of research was quantitative research with a cross-sectional descriptive design. The population in this study were prospective brides who registered their marriage at the Religious Affairs Office Tenggarang District, Bondowoso Regency, from March to April 2024, with 30 prospective brides. The sampling technique was consecutive sampling, in which all samples that came and met the inclusion criteria in the form of prospective brides who registered their marriage at the Religious Affairs Office Tenggarang District in March-April 2024, women of reproductive age aged 19-49 years, never married and married in an unregistered marriage, willing to be a respondent and the exclusion criteria were prospective brides who were pregnant, suffering from chronic diseases such as tuberculosis, and who could not read.

The variables studied were the bride and groom's sociodemographic data obtained through sociodemographic questionnaire interviews, which included age, highest level of education, work status, and sources of nutritional and health information. Other variables studied were Body Mass Index (BMI) nutritional status obtained through measurements using scales and microtones, chronic lack of energy status obtained from Mid-upper arm circumference (MUAC) measurements using Medline, Hb levels obtained based on the results of the health examination of the prospective bride and groom at the Community Health Center or measured using easy-touch Glucose; Cholesterol; Hemoglobin (GCHb) if the prospective bride and groom did not undergo examination health, nutritional intake including energy, protein, iron, calcium and folic acid based on the results of a 2x24 hour recall interview, supplementation history based on a questionnaire on supplementation consumed in the last three months and level of preconception nutritional knowledge based on a preconception nutritional knowledge questionnaire. Assessment of nutritional readiness is based on the nutritional readiness score obtained according to the assessment criteria set out in Table 1. This

research has undergone an ethical test by the Health Research Ethics Commission (KEPK) of the Faculty of Dentistry, University of Jember, with number 2463.UN25.8/KEPK/DL/2024 . The collected data will be entered and processed using Microsoft Excel and SPSS, then analyzed univariately using the descriptive frequency test.

Table 1. Adjustment Criteria on Nutritional Status of Prospective Brides

Indicators	Category	Score
Nutritional status	BMI <18,5 kg/m^2	0
	BMI 18,5-25,0 kg/m^2	1
	BMI >25,0 kg/m^2	0
Risk of chronic energy deficiency	MUAC <23,5 cm	0
	MUAC ≥23,5 cm	1
Anemia status	<12,0 g/dl	0
	≥12,0 g/dl	1
Energy intake	<80% daily energy requirements	0
	80%-110% daily energy requirements	1
	>110% daily energy requirements	0
Protein intake	<80% daily protein requirements	0
	80%-110% daily protein requirements	1
	>110% daily protein requirements	0
Iron intake	<80% RDA	0
	≥80% RDA	1
Folic acid intake	<80% RDA	0
	≥80% RDA	1
Calcium intake	<80% RDA	0
	≥80% RDA	1
Preconception nutritional knowledge	Less (<75% questions correct)	0
	Good (≥75% of questions correct)	1
Iron and/or folic acid supplementation	No	0
	Yes	1

RESULTS AND DISCUSSION

Research result

The sociodemographic characteristics of the prospective bride are shown in Table 2, including the prospective bride's age at marriage, highest level of education, work status, and source of nutritional and health information for the prospective bride.

Table 2. Sociodemographic Characteristics of Prospective Brides

Sociodemographic	Frequency (n)	Percentage (%)
Age		
Late teens	9	45
Early adulthood	11	55
Total	20	100
Last education		
Intermediate	15	75
Tall	5	25
Total	20	100
Working status		
No	15	75
Yes	5	25
Total	20	100
Source of preconception health and nutrition information		
Health workers	9	45
Electronic media	3	15
There isn't any	8	40
Total	20	100

The characteristics of the prospective bride are that she is married in the early adulthood group (55%) and has secondary education (75%), namely junior high and high school levels. Most prospective brides do not work (75%) and receive preconception health and nutrition information from health workers (45%) when conducting health checks for prospective brides at the Community Health Center. The following are the achievements of preconception nutritional readiness indicators obtained by prospective brides related to energy intake, protein intake, iron intake, calcium intake, folic acid intake, iron and/or folic acid supplementation,

Body Mass Index (BMI), Mid-upper Arm Circumference (MUAC), anemia status, and preconception nutritional knowledge.

Figure 1. Percentage of Achievement of Preconception Nutritional Readiness Indicators

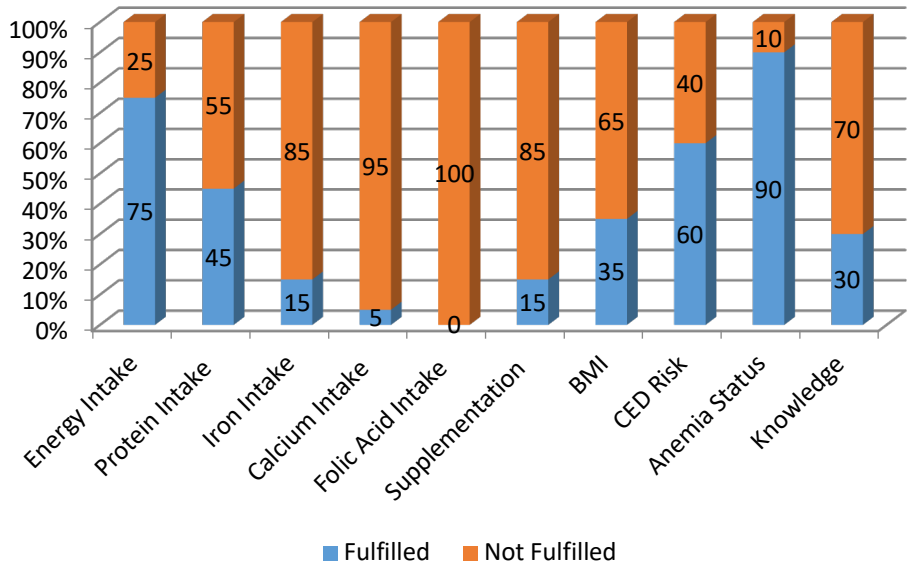


Figure 1 shows that the majority of indicators achieved by prospective brides are related to energy intake (75%), anemia status (90%), and MUAC (60%). Meanwhile, the indicators with the lowest achievements were folic acid intake (0%) and calcium intake (5%). The majority of prospective brides' protein intake indicators do not reach 80-110% of an individual's daily protein requirement (55%), and the majority of prospective brides cannot meet their iron needs (15%) according to the nutritional adequacy figure (RDA). There is (35%) of prospective brides who have normal nutritional status. The majority of prospective brides do not supplement with TTD and/or folic acid (75%), and the level of preconception

nutritional knowledge of prospective brides is dominated by the poor category (70%).

The indicators achieved by each prospective bride and groom will be added up to determine the level of preconception nutritional readiness of the prospective bride and groom from a score of 0 to 10.

Figure 2. Preconception Nutritional Readiness Score of the Bride-To-Be

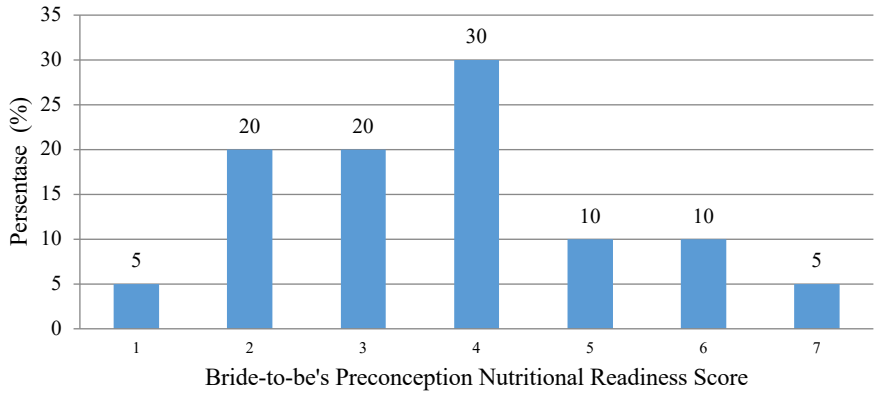


Figure 2 shows that the accumulated score for preconception nutritional readiness indicators for prospective brides in this study was between 3.0 and 4.0 (median = 3.7), with the highest score being seven and the lowest being 1. A score of 7 was obtained by one prospective bride (5%), scores 5 and 6 were obtained by each of the two prospective *brides* (10%), a score four was received by six vans (30%), scores 2 and 3 were obtained by each of the four prospective brides (20%), and score one was obtained by one prospective bride and groom (5%).

Based on the preconception nutritional readiness score obtained by each prospective bride and groom. The preconception nutritional readiness of 20 prospective brides was categorized using the indicator media value (5); prospective brides who did not reach at least half of the measured indicators had a level of insufficient readiness, and prospective brides who had a score exceeding half of the measured indicators were categorized as having poo*r* nutritional readiness. In Table 2, 17 prospective brides (85%) have insufficient preconception nutritional readiness, and three (15%) have sufficient nutritional readiness.

Table 2 Frequency distribution of preconception nutritional readiness of prospective brides

Preconception Nutritional Readiness of the Bride and Groom	Frequency (n)	Percentage (%)
Not enough	17	85
Enough	3	15
Total	20	100

Figures 3 and 4 show that the average intake of energy, protein, iron, and calcium tends to increase along with the increase in the preconception nutritional readiness score obtained. Prospective brides who achieve a one indicator score tend to have lower intake than those with a higher score. Figure 5 shows a graph of BMI that fluctuates due to the presence of prospective bride with fat nutritional status, affecting their daily food intake. A higher ~~more excellent~~ nutritional readiness score indicates an increase in the length of MUAC.

Figure 3. Average Energy, Calcium, and Folic Acid Intake Based on Preconception Nutritional Readiness Score

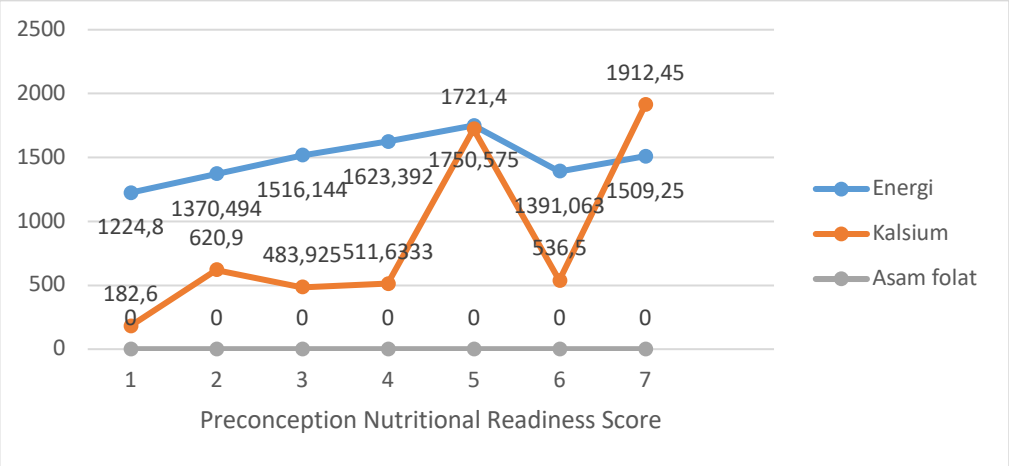


Figure 4. Average Protein and Iron Intake Based on Preconception Nutritional Readiness Score

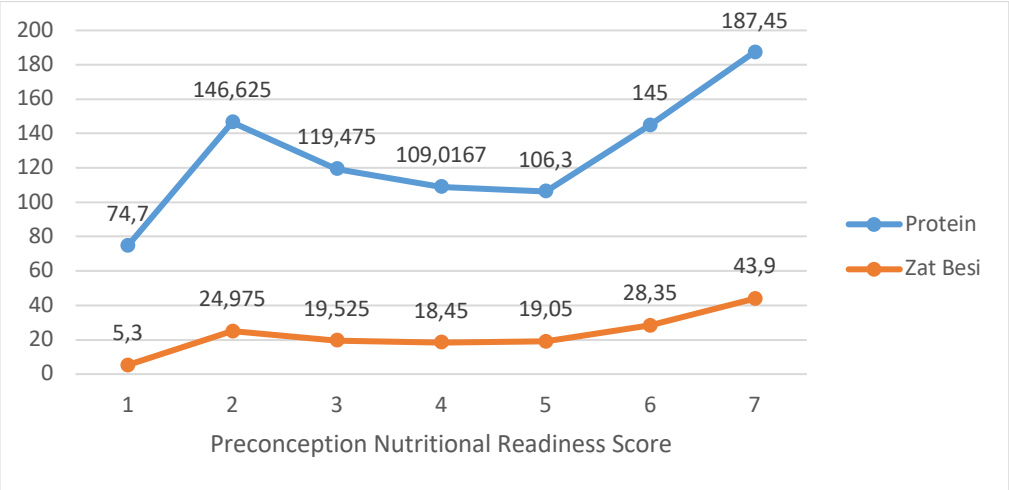
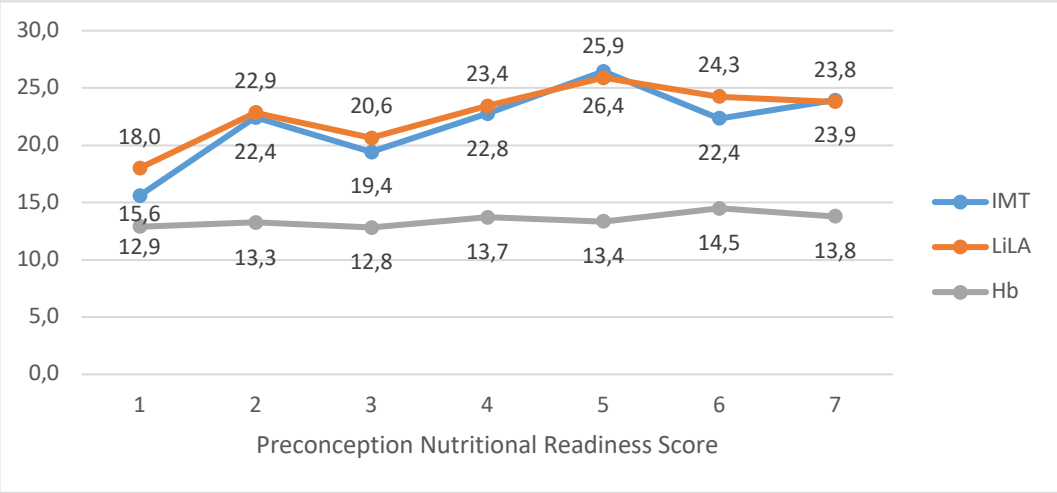


Figure 5. Average BMI, MUAC, and Hb Levels Based on Preconception Nutritional Readiness Score



Discussion

Sociodemographics of Prospective Brides

Based on the results of research on 20 prospective brides, it is known that at the marriage age of prospective brides at the Religious Affairs Office Tenggarang, there are 11 prospective brides (55%) who are married in the early adult age group, based on the education level of 15 prospective brides (75%) are secondary education, most of prospective brides (75%) women do not work, , and the source of information on the health and nutrition of prospective brides is limited from health workers as many as nine prospective brides (45%). The marriage age of the prospective bride is the ideal age for marriage and a good reproductive age for women, e.g. 21-25 years, according to the National Population and Family Planning Agency in 2017. The reproductive organs of women at that age are physiologically well-developed and ready to give birth (BKKBN, 2017).

Pregnancy is very possible after marriage. The best age for pregnancy and childbirth is 20-30 years, where if pregnancy occurs at less than 20 years or more than 30 years, there is a risk of experiencing pregnancy problems (Sukma & Sari, 2020). This is in line with previous research, which states that women who marry young have lower post-marital readiness compared to those who marry at a more mature age, so there is a need to increase efforts to mature the marriage age by institutions that oversee the field of the family (Mawaddah et al., 2019).

After determining the ideal age for marriage (Hamdi & Syahniar, 2019), readiness for marriage is an essential factor for early adult individuals. Readiness for marriage can be viewed from seven aspects, namely intellectual, social, emotional, moral, individual, financial, and mental aspects of the wife (Syeptiana et al., 2018). Their latest level of education influences a person's knowledge. A prospective bride with high level of education can increase their decision-making in accessing more optimal health care before marriage. The level of education has quite an influence on their acceptance of newly acquired knowledge and information (Firda et al., 2021). Education significantly affects the prospective bride and groom's knowledge because it can influence the perspective in receiving health information (Dini & Nurhelita, 2020).

Preconception nutritional readiness can be seen from the food intake the prospective bride and groom consumes. Meeting nutritional needs is greatly influenced by the availability of food ingredients and the ease of accessing food. The better the income, the better the food consumed in terms of quality and quantity, and vice versa (Duha, 2018). This will have an impact on the level of food consumed. Good food intake is seen from the quantity and quality of food consumed. Knowledge of nutrition and health is needed to prepare nutritional intake and reproductive health to support the preconception nutritional preparation of the prospective bride and groom. The sources of information for prospective brides in this study were limited to health workers due to a lack of awareness of accessing nutritional and health information via the Internet. The more information you get, the better prepared a woman will be before becoming a mother. Providing materials to the prospective bride and groom before marriage and exposure to information from the mass media can help prepare the prospective bride and groom for life after marriage (Adyani et al., 2023).

Preconception Nutritional Readiness of the Prospective Brides

Brides are a group of preconception women who need to prepare their bodies for adequate nutrition before conception to achieve optimal nutritional status. The bride and groom's good dietary status will impact the fetus's growth development and safety during the birthing process (Paratmanitya et al., 2021). In line with the LCT (Life Course Theory), which states that the birth output of a child

is greatly influenced by the long-term relationship of the woman's genes, behavior, and environment (healthy food) before pregnancy (Dieny et al. 2019).

The bride and groom's nutritional adequacy can be met with a quality diet. A quality diet is a healthy, nutritious, balanced, safe, and hygienic eating pattern that can meet individual nutritional needs to achieve optimal body condition (Anggraeny Nawiza et al., 2023). Intake of instant and frozen food affects the nutritional adequacy of future bride and groom. These foods tend to be high in calories but low in nutrients. So, only energy intake meets the needs, while the bride and groom's nutritional intake of protein, iron, calcium, and folic acid is not met. Apart from that, the lack of diverse sources of protein consumed also affects the level of iron and calcium intake. Brides-to-be who eat fish, chicken, and beef tend to meet their iron and calcium requirements. Meanwhile, folic acid intake was not met in this study due to insufficient consumption of food sources of folic acid, such as green vegetables and fruit, so additional folic acid intake was needed through supplementation. However, prospective Brides-to-be still do not have the awareness to carry out supplementation in this study. This is similar to research in Bantul, which showed that supplementation in women of reproductive age was relatively low (23.4%) (Paratmanitya et al., 2021). Supplementation is essential for pregnant women and women of reproductive age and must also be paid attention to. There is a need to provide education regarding the importance of getting women of reproductive age into the habit of consuming ferrous iron and/or folic acid supplement tablets from an early age to create a habit of consuming ferrous iron supplement tablets and/or folic acid from an early age.

Food intake will directly affect nutritional status. Nutritional status results from the balance of nutrients consumed and nutrients released as an energy source (Supariasa and Purwaningsih, 2019). The majority of prospective brides in this study were not at risk of developing chronic lack of energy because they had normal nutritional status and were obese. This differs from research on women of reproductive age in the Bantul area, which showed that most samples had normal nutritional status and were not at risk of developing a chronic lack of energy (Paratmanitya et al., 2021). Good nutritional status is needed to ensure that the mother's body has sufficient nutritional reserves to be shared with her child

(Anggraeny Nawiza et al., 2023). When women enter the breastfeeding phase, the woman's nutritional status plays an essential role in the long-term growth and development of the child. This is because, during the critical 1000-day period for a child, especially from conception to 6 months of birth, the mother is the only source of nutrition for the developing child.

A nutritional problem often experienced by prospective brides apart from chronic lack of energy is anemia. Prospective brides are prone to anemia due to inadequate dietary intake and menstruation every month (Mantika & Mulyati, 2014). The results of this study show that most of the intake of protein, iron, calcium, and folic acid does not meet needs. However, the number of prospective brides who experienced anemia in this study was deficient.

Preconception women who experience chronic lack of energy are at risk of developing anemia. In this study, prospective brides who experienced anemia were also indicated to have chronic lack of energy. Anemia is closely related to a deficiency in the intake of macro and micronutrients, which affects the hemoglobin (Hb) synthesis process. Energy and protein are the macronutrients that play a role in the Hb process. Energy has a significant role in the body's physiological processes and Hb synthesis, which, if its needs continue to be unmet, can disrupt body performance, and protein breakdown occurs. The main factors influencing Hb levels are energy intake and nutritional status (Nisa et al., 2019). If inadequate energy intake occurs continuously, there is a risk of decreased nutritional status. The breakdown of protein as an energy source due to chronic energy deficiency risks disrupting iron transport, storage, and Hb formation (Mantika et al., 2019). The prospective bride and groom are closely related to the pregnancy and breastfeeding period, so the body must be in normal nutritional status and free from anemia.

Nutritional knowledge has an essential role in efforts to fulfill a person's dietary needs. Preconception nutritional knowledge is an indirect factor in nutritional problems in prospective brides. Adequate nutritional knowledge will influence behavior in selecting and processing food ingredients (Hubu et al., 2018). The low knowledge of preconception nutrition in this study was due to not all prospective brides receiving preconception nutrition counseling and low awareness

of accessing information related to health and food via the internet. This research has the same results as research conducted at the Religious Affairs Office in Wanasaba, which shows that prospective brides who have the same characteristics (age at marriage, highest level of education, and working status) have low knowledge before being given health education (Faizzaturrahmi and Aprianti, 2023).

Based on the indicators measured to assess preconception nutritional readiness, no single bride and groom could meet the ten indicators. This is the same as the awareness of the importance of preconception nutritional preparation in previous research, which showed similar results in which not a single women of reproductive age could meet the ten indicators of preconception nutritional readiness (Paratmanitya et al., 2021). The reason women still have a low awareness of preparing for preconception nutrition is that pregnancy has not yet occurred (Dieny et al., 2019). This is to the results of this study, which show that the majority of prospective brides cannot fulfill the minimum five indicators of preconception nutritional readiness, so it can be said that awareness of preconception nutritional readiness among women of reproductive age, especially among prospective brides, is still low.

The attitude of being ready to get married among women of reproductive age who register their marriage must be balanced with awareness of the importance of preparing preconception nutrition. It is considered that prospective brides are a group that will enter the pregnancy phase after the wedding. This aims to create a healthy pregnancy with minimal risk for the mother, fetus, and baby born later. So, it is necessary to provide assistance and monitor the prospective bride's preconception nutritional readiness to prepare for a healthy and smooth pregnancy and birth. The National Population and Family Planning Agency (BKKBN, 2022) has established a mandatory mentoring, counseling, and screening program (height, weight, upper arm circumference, and Hb levels) starting three months before marriage, which is carried out at community health centers (Novita et al., 2022).

This program aims to detect nutritional problems at risk of causing problems in pregnancy and impaired growth and development of children born. Badan Kependudukan dan Keluarga Berencana Nasional or National Population and

Family Planning Board (BKKBN) launched the Elsimil (Electronic Ready for Marriage and Pregnancy) application to support this program. This application contains information about premarital readiness, preconception readiness, reproductive health, contraception, cancer prevention, and nutrition-related consultations for prospective brides, which prospective brides can access independently as a source of information to prepare for pregnancy. The Elsimil application is also practical as a medium for recording the results of health examinations and the nutritional status of the prospective bride and groom. Each prospective bride and groom will be accompanied by a Family Assistance Team consisting of family planning cadres, Family Welfare Empowerment'cadres, or midwives who will direct the use and monitor the results of filling out the questionnaire at Elsimil after the prospective bride and groom undergo an examination at a health facility (Nasution and Zulkarnain, 2019). Filling out the questionnaire on Elsimil will produce a marriage certificate, which will later become one of the administrative files when registering for a marriage at the Religious Affairs Office (Nasution, 2023).

CONCLUSION AND SUGGESTION

The sociodemographics of women are dominated by the early adulthood age group with secondary education and not working and receiving nutritional and health information from health workers. Women's nutritional intake is met with energy, and protein, iron, calcium, and folic acid do not meet their needs. Most prospective brides are not supplemented with ferrous iron and/or folic acid supplement tablets. The nutritional status of female cats is normal and fat, with most prospective brides not experiencing CED or being anemic. The preconception nutritional knowledge level of the majority of women is poor. Most women's preconception nutritional readiness levels are less or cannot meet at least half of the nutritional readiness indicators measured. It is hoped that further research can expand the study area to a broader area, using a more in-depth research design, such as looking for relationships or influences and adding other factors, such as knowing dietary patterns through the Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ) and culture on pre-conception nutritional readiness.

DECLARATION

Conflict of Interest
The authors declare that they have no competing interests.

Authors' Contribution
SM and DAK conceived the study idea. SM, DAK, and SNR designed the study and planned its implementation. SM collected, prepared, analyzed, and interpreted results. SM and DAK drafted the manuscript and read the entire manuscript critically. DAK revised the manuscript. All authors read and approved the final manuscript.

Ethical Approval
This research has undergone an ethical test by the Health Research Ethics Commission (KEPK) of the Faculty of Dentistry, University of Jember, with number 2463.UN25.8/KEPK/DL/2024.

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Data Availability
The datasets used and analyzed during the current study are available from the corresponding author upon request.

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DETERMINANT FACTORS AFFECTING THE INCIDENCE OF PLACENTA ACCRETA

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Abstract

Background: Placenta accreta is a rare condition during pregnancy characterized by abnormal placentation that can increase maternal morbidity and mortality. The increase in the incidence of placenta accreta is directly related to the increase in section caesarean rates. The maternal mortality rate in NTB in 2021 was 15% due to hemorrhage, in 2022 there was an increase in the incidence of placenta accreta at the NTB Provincial Hospital. The aim of the research is to identify the determinant factors affecting the incidence of placenta accreta at the NTB Provincial Hospital in 2022. **Methods:** This was a descriptive observational study. The population in this study were all mothers who delivered at the NTB Provincial Hospital from January to December 2022. The sample number was 50 patients diagnosed with placenta accreta. The sampling technique used was total sampling with the research variable of maternal characteristics. Data were collected from the medical records of mothers with placenta accreta from January to December 2022, and the results were analyzed using descriptive analysis. **Results:** Placenta accreta patients were more common in mothers with age ≤ 35 years with a median of 34.34 ± 4.28, multiparous parity (76%), overweight BMI (54%), 3-9 years labour spacing (82%), history of SC < 2 times (52%) and ≥ 2 times (48%), and with a history of uterine surgery 24%. **Conclusion:** Determinant factors that affect the incidence of placenta accreta in NTB Provincial Hospital in 2022 are mothers with age < 35 years, multigravida, overweight body mass index, mostly with a parity of 3-9 years, without degenerative diseases, all have a history of cesarean section and almost a quarter have a history of other operations on the uterus.

Keywords: placenta accreta, determinant factors, section Caesarea, hemorrhage

INTRODUCTION

Placenta accreta is a rare condition during pregnancy characterized by abnormal placentation (Morlando and Collins 2020). Placenta accreta is a problem in labour because it can cause morbidity and mortality. Around 7-10% of maternal deaths in the world are caused by placenta accreta. Maternal morbidity in placenta accreta is high. Studies show that 35% of patients with placenta accreta are rushed to the Installation Care Unit (Farquhar *et al.* 2017).

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The incidence of placenta accreta has increased worldwide in the last ten years with approximately 3 in 1,000 pregnancies experiencing placenta accreta (Belfort *et al.* 2018). In Ireland, a cohort study found that cesarean section (CS) birth rates increased from 4.1% in 1975 to 20.7% in 2010. Cesarean section births also increased from 17% to 64% during the same period. Cesarean section birth rates are also growing in Asia, including Indonesia. Studies in Asia found that the incidence rate of placenta accreta is 1 per 1,000 pregnancies. The incidence rate of placenta accreta in Indonesia has touched 2% since 2016 and continues to rise (Jauniaux *et al.* 2018)

In 2021 maternal deaths in NTB were mostly caused by hemorrhage at 15%, second by hypertension at 14%, and third by Covid-19 at 11% (DinKes 2022). NTB Provincial Hospital is a referral center hospital in West Nusa Tenggara which is a referral center in NTB, especially for obstetrics and gynecology cases. According to medical record data at the NTB Provincial Hospital, from January to August 2022 there were 40 women giving birth at the NTB Provincial Hospital who were diagnosed with placenta accreta, which showed a significant increase from the previous year.

The development of placenta accreta appears to be most strongly predicted by a history of cesarean section, low-lying placenta previa, in vitro fertilization pregnancies, and elevated levels of α-fetoprotein and β-human chorionic gonadotropin in the second trimester (Balayla and Bondarenko 2013). The incidence of placenta previa also increases by 3.2 to 14.6 percent as maternal age increases (Liang *et al.* 2022). However, other researchers showed that maternal age was not associated with placenta accreta in a control group with a history of cesarean section and placenta previa (Bowman *et al.* 2014). In addition, short pregnancy spacing is considered to increase the risk of uterine rupture in women with a history of cesarean section. This is associated with poor wound healing after cesarean section which can lead to placenta accreta (Bowman *et al.* 2014). Based on this background, the researchers wanted to study the determinant factors affecting the incidence of placenta accreta at the NTB Provincial Hospital.

METHOD

The type of research used is descriptive research with a retrospective approach where researchers do not intervene or treat variables and aim to see a description of the phenomena that occur in a population in a particular population. The population in this study were mothers who gave birth at the NTB Provincial Hospital in 2022. Samples in this study were taken using the inclusion criteria of laboring mothers who were clinically diagnosed with placenta accreta from January to December 2022 and the exclusion criteria of incomplete medical records. Samples were taken with a total sampling technique of 54 people, then 50 samples were obtained that met the inclusion criteria. The data used is secondary data collected from medical record data then the data is processed starting from editing, data coding, data entry and data cleaning, then the results of data processing are presented in the form of tables and narratives. Research ethics were obtained from the Ethics Committee of the NTB Provincial Hospital (No. 00.9.1/10/KEP/2023**).**

RESULT AND DISCUSSION

Based on the results of research on univariate analysis of sample data based on age, parity, body mass index, delivery distance, degenerative diseases, history of sc, and history of curettage. This can be seen in the following table :

Table 1.Sample Characteristics

Variable	Category	Amount (n)	Percentage (%)
Maternal age	≤ 35 years	31	62
	35 years	19	38
Parity	Primipara	12	24
	Multiparous	38	76
IMT	Underweight	1	2
	Normal	11	22
	Overweight	27	54
	Obesity	11	22
Delivery Distance	≤ 2 years	8	16
	3-9 years	41	82
	10 years	1	2
Degenerative disease	Hypertension	1	100
	Diabetes Mellitus	0	0
History of SC	2 times	26	52
	≥ 2 times	24	48
Curettage History	Yes	12	24
	No	38	76

According to research data, placenta accreta was found to be most prevalent in patients aged 35 years or younger at the NTB Provincial Hospital in 2022, with 31 (62%) patients affected. The least affected age group was patients over 35 years old, with only 19 (38%) patients affected. The youngest patient affected was 23 years old, while the oldest was 43 years old, with an average age of 34.34 years. The standard deviation was 4.28 and the mode was at the ages of 34 and 36 years. The majority of this research sample was in the age range of 20-35 years because this is a good age range for a woman to get pregnant and give birth. The results of this study are almost similar to the research (Ilvira 2021) with the average age of placenta accreta patients being 33.4 with a standard deviation of 4.46. Likewise, the results of research from (Erfani *et al.* 2019) found that the average age of placenta accreta patients was 33 years, as well as in research by (Dwi Putri *et al.* 2022) obtained research results that most patients with placenta accreta occurred at the age of 20-35 years, namely 67.8%.

In this study, it was found that 38% of the total sample was over 35 years old, which is an age group that is at risk of experiencing pregnancy complications such as placenta accreta. There is an increase in proliferation as the mother ages, which causes the placenta to grow deeper into the myometrium and other organs such as the urinary bladder (Zheng, Liu, and Xing 2019). Research conducted by (Qatrunnada 2018) shows that placenta accreta patients mostly occur in the age group over 35 years, namely 57%. Likewise with the research (Ornaghi *et al.* 2021) where it was reported that the age group that experienced more placenta accreta was the age group over 35 years at 52.1%. Research conducted by (Ming *et al.* 2022) found that the prevalence of placenta accreta increased by 2.2% as the mother's age increased. Several studies have explained that there is no significant relationship between maternal age and the incidence of placenta accreta, such as in research conducted by (Imafuku *et al.* 2021). The same thing was also conveyed in research by (Kyozuka *et al.* 2019) which shows that there is no relationship between maternal age and the incidence of placenta accreta.

In terms of maternal parity, 38 (76%) patients had the most multiparous parity, while only 12 (24%) patients had primiparous parity. Repeated pregnancies in multigravidas result in stretching and scarring of the uterine wall which can

increase the possibility of abnormal placental implantation. These results are directly proportional to the results of research conducted by research (Ming *et al.* 2022) that the incidence of placenta accreta occurs more often in mothers with parity more than equal to 3. Likewise, research (Zheng, Liu, *and* Xing 2019) found that mothers with multiparity have a significant relationship with the incidence of placenta accreta. Research (Farquhar *et al.* 2017) showed that of 295 samples of mothers with placenta accreta, 249 samples were mothers with multigravida parity. Fibrosis that occurs at the site of placental implantation in previous pregnancies results in multiparous mothers having a greater risk of experiencing placenta accreta in subsequent pregnancies (Silver and Barbour 2015).

According to body mass index, the average body mass index was 27.6 kg/m2, with the highest frequency distribution being overweight patients 27 (54%). Patients with a normal body mass index were 11 (22%), while the same number of patients were obese. Body mass index describes a person's nutritional status which is calculated from the comparison between body weight and height. The body mass index of the sample in this study was dominated by mothers with a body mass index above normal, namely overweight and obese. Obesity can increase the risk of complications in pregnancy such as gestational diabetes, pre-eclampsia, and an increased risk of cesarean section, so maternal BMI has an indirect impact on the incidence of placenta accreta. Research (Iacovelli *et al.* 2020) shows that there is a relationship between the incidence of placenta accreta and maternal obesity. In line with research results (Farquhar *et al.* 2017) where mothers who experience an increase in body mass index are more at risk of experiencing placenta accreta. In contrast, research (Bowman *et al.* 2014) shows that there is no relationship between an increase in a mother's body mass index and the incidence of placenta accreta she experiences. Research (Farquhar *et al.* 2017) shows almost the same frequency distribution between normal body mass index and body mass index *overweight* and obesity in mothers with placenta accreta. Body mass index is not an independent cause of placenta accreta (Vieira *et al.* 2021). Having an ideal body weight is one of the things that mothers must prepare before becoming pregnant to have a healthy and safe pregnancy.

The frequency of previous childbirth distance was greatest in patients with a previous delivery distance of 3-9 years (41 or 82%), followed by those with a delivery distance of ≤ 2 years (8 or 16%), and the least at a pregnancy distance of > 10 years (1 or 2%). The delivery distance that is too close can have an impact on the condition of the uterus and other reproductive organs not being optimal in preparing for pregnancy. The same results were also obtained in research (Prasetyo 2021), amounting to 70.6% of mothers with placenta accreta had a previous delivery between the ages of 3-9 years. Comparable to the results of (Bowman *et al.* 2014) which show that the average delivery distance in placenta accreta patients is 4.9 with a standard deviation of 4.0. There are not many studies that provide an overview of the influence of delivery distance on the incidence of placenta accreta. In some studies, it only explains the risk of uterine rupture if the birth distance is too close, which is due to the inadequate healing process of the cesarean section wound in the previous birth (Santoso *et al.* 2018). Research conducted by (McLaughlin *et al.* 2022) shows that a short birth interval is not associated with the incidence of placenta accreta.

Only 1 patient suffered from hypertensive degenerative disease, while no patients experienced diabetes mellitus degenerative disease. Degenerative diseases in pregnant women that are often associated with placenta accreta are hypertension and diabetes mellitus. The results of this study showed that of the 50 samples, only 1 person had the degenerative disease hypertension. In research (Bowman *et al.* 2014) of the total cases of placenta accreta, it was found that 2% of the sample had hypertension and 8.7% had diabetes mellitus. Endothelial damage in hypertensive patients and failure to heal cesarean section wounds in diabetes mellitus patients are associated with an increased risk of placenta accreta. (Bowman *et al.* 2014), diabetes mellitus has an indirect relationship with the incidence of placenta accreta which can be explained by the fact that diabetes increases pregnancy complications (macrosomia, preeclampsia, hypertension, and cardiovascular complications) and the frequency of obstetric interventions and cesarean sections.

All patients had a history of previous cesarean section, with 26 (52%) patients having a history of cesarean section less than 2 times and 24 (48%) patients having a history of cesarean section more than 2 times. The comparison between

those who have a history of less than 2 cesarean operations and those who have more than 2 times is very small. This shows that a history of cesarean section in a previous delivery is the most dominant determining factor that can cause placenta accreta. Poor surgical wound healing in previous deliveries may be a risk factor for placneta accreta in subsequent pregnancies. The presence of a surgical scar causes tissue damage in the uterus which causes hypoxic scar tissue in the cesarean section scar, triggering the invasion of placental trophoblasts deeper into the myometrium to obtain adequate oxygen supply. (Carusi 2018, Piñas Carrillo *and* Chandraharan 2019). The results of this study are similar to research (Ming *et al.* 2022) which shows that mothers with a history of CS more than equal to 2 are the dominant risk factor for placenta accreta. Research conducted in Japan by (Imafuku *et al.* 2021) involved 4,146 pregnant women where a significant relationship was found between the incidence of placenta accreta and the mother's history of CS. A study in Iran also showed that more than 97% of mothers with placenta accreta had a history of cesarean section in a previous delivery (Kasraeian *et al.* 2021). Each cesarean section experienced by the mother contributes to the formation of scar tissue and changes to the uterine wall, making it more difficult for the placenta to attach normally in subsequent pregnancies.

The greatest frequency of patients who experienced placenta accreta had no history of uterine curettage in previous pregnancies (80%), while only 12% had a history of other operations on the uterus in previous pregnancies. The same results were also shown in research by (Dwi Putri *et al.* 2022) where 39% of mothers who experienced placenta accreta had a history of other operations on the uterus such as curettage. Comparable to the results of (Kharisma *et al.* 2022) which shows that the majority of mothers with placenta accreta do not have a history of uterine curettage. In research (Bluth *et al.* 2021) found that more than half (52%) of mothers who experienced placenta accreta had undergone uterine curettage. As with cesarean section, uterine curettage also results in injury to the endometrial wall which can interfere with placental implantation and be a risk factor for placenta accreta in subsequent pregnancies. (Jauniaux *et al.* 2019)

CONCLUSION

The determinant factors affecting the incidence of placenta accreta in NTB Provincial Hospital in 2022 are mothers with age below 35 years, multigravida, overweight body mass index, mostly with a delivery interval of 3-9 years, without degenerative diseases, all have a history of previous cesarean section and almost a quarter have a history of other operations on the uterus. One effort that can be maximized by health workers, especially in preventing the increase in the incidence of placenta accreta, is by helping couples of childbearing age to prepare for pregnancy well, such as getting pregnant at a productive age, arranging birth spacing and several births, as well as physically preparing the mother for nutritional status. The ideal. A well-prepared pregnancy can reduce the risk of complications during pregnancy and childbirth so that the number of deliveries by cesarean section can decrease and the incidence of placenta accreta can also be reduced. Strict supervision during pregnancy also needs to be carried out for pregnant women who are at risk of placenta accreta with regular ANC, pregnancy screening with 10 T, and immediate consultation with an obstetrics and gynecology specialist if abnormalities are found.

DECLARATION

Conflict of Interest

Author declare there is no conflict interest in this research

Author's Contribution

All author contribute from concept until writing draff article

Ethical Approval

Research Ethics Committee of NTB Provincial Hospital
00.9.1/10/KEP/2023

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Data Avaibility

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THE CHARACTERISTICS OF RISK FACTORS ASSOCIATED WITH LEUKORRHEA IN FEMALE STUDENTS

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Abstract

Background : The importance of reproductive health awareness for women, as women are vulnerable to infectious diseases. One of the reproductive health problems is leukorrhea, which is the discharge of genital fluid that is not blood but is often ignored. In fact, leukorrhea can be fatal if left untreated. According to WHO, around 90% of Indonesian women are at risk of developing leukorrhea. This is due to the tropical climate in Indonesia, which supports the growth of fungi, one of the causes of leukorrhea. **Method**: This study used an observational analytic approach with a cross-sectional research design. The sample size was 131 female students, who were selected by total sampling. The independent variables in this study were age, BMI, stress level, vulva hygiene knowledge, and vulva hygiene behavior. Data analysis was performed using Chi-square, Mann-Whitney, and logistic regression tests **Result**: The results showed that the most common age was 20 years (23.7%), 76 people (58%) had a normal BMI, and 61 people (46.6%) had been living in the boarding school for 1 year. Most of the female students experienced moderate stress (46 people, 35.11%), 114 (87.02%) had good vulva hygiene behavior, 94 (71.75%) had good vulva hygiene knowledge, and 109 (83.20%) had leukorrhea. The Mann-Whitney test results showed a relationship between the incidence of leukorrhea and age (p = 0.001), the Chi-square test results showed a relationship between the incidence of leukorrhea and stress level (p = <0.001), BMI (p = 0.344), vulva hygiene knowledge (p = 0.088), and vulva hygiene behavior (p = 1.000). **Conclusion**: Age and stress level were associated with the incidence of leukorrhea, and stress level was the most associated factor with the incidence of leukorrhea in female students at the Pondok Pesantren Mahasiswa Khoirul Huda Surabaya, Indonesia.

Keywords : leukorrhea, age, BMI, stress levels, vulva hygiene knowledge, vulva hygiene behavior.

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INTRODUCTION

Maintaining reproductive organs is important as an effort to maintain the quality of human survival. Reproductive health is not only a condition that is free from disease or disability, but how a person can have the ability to reproduce. Reproductive health should be a concern for all people, especially women, because women are very vulnerable to infectious diseases. One of the reproductive health problems that is often experienced by most women is leukorrhea. Leukorrhea is a discharge from the genitals that is not blood. Leukorrhea is a complaint that will continue to disturb the comfort of the female reproductive organs and does not recognize age. Discomfort due to itching and odor caused by leukorrhea can interfere with daily life, reduce self-confidence and attract social interaction. This can lead to psychosocial problems that cause stress. In addition to impacting stress levels, normal leukorrhea that continues to be ignored and considered mild can become fatal if treated late, namely becoming abnormal/pathological leukorrhea (Mulyanti, 2022).

Leukorrhea can be normal physiologic or pathologic. Under normal circumstances, the discharge from the cervix and vagina is accompanied by the presence of bacteria or normal flora. Normal leukorrhea usually occurs before and after a woman's menstruation. Whereas pathological leukorrhea if not treated properly can lead to infertility, pregnancy outside the uterus and is an early symptom of cervical cancer which can lead to death (Mulyanti, 2022).

In Indonesia, about 90% of women have the potential to experience leukorrhea, this is due to the tropical climate, so that fungal growth is easy to develop and results in many cases of leukorrhea. The incidence of leukorrhea in Indonesia continues to increase every year to reach 70%. Research conducted by Wulaningtyas, D., & Widyawati, S. (2018) shows that factors associated with vaginal discharge are not only the level of knowledge and behavior, but can be influenced by age, marital status and also a history of sexually transmitted infections. Wardani's research (2022) showed that 79.5% of 950 women of childbearing age experienced vaginal discharge, and ages 20-35 years had the highest prevalence of vaginal discharge.

Other factors besides BMI, such as hormones, personal hygiene, and certain medical conditions, can also play a role in the occurrence of vaginal discharge (Wardani, 2022). As initial data at Pondok Pesantren Mahasiswa Khoirul Huda Surabaya, 12 out of 23 female students (52.12%) experienced leukorrhea and the cause was unknown. Based on the above background, the researcher is very interested in conducting research on the Characteristics of Risk Factors Associated with the Incidence of Leukorrhea in Female Students of Khoirul Huda Surabaya Islamic Boarding School.

METHOD

This study used observational analytic research with a cross sectional approach. In this study, data collection was carried out. The population used in this study were female students of Pondok Pesantren Khoirul Huda Surabaya in 2023. The variables studied were age, BMI, stress level, vulva hygiene knowledge and vulva hygiene behavior. The sample used in this study were 131 female students of the khoirul huda Surabaya student boarding school in 2023 who had met the inclusion and exclusion criteria set by the researcher. The sample size has been taken according to calculations that are adjusted to the variables to be studied. The inclusion criteria in this study were already menstruating, had received a study on thaharah and were willing to be respondents. The exclusion criteria in this study were female students who were receiving antibiotic therapy, for example sulfonamides, ampicillin, cephalosporin, chloramphenicol, tetracycline, and rifampicin. The sample size in the study was all female students. The sampling technique in this study was total sampling. Data collection related to risk factors associated with the incidence of leukorrhea was carried out at the time of observation. This research was conducted from October 2022 - January 2024. Data collection was carried out in August 2023. Data analysis was performed using Chi-square, Mann-Whitney, and logistic regression tests.

RESULT AND DISCUSSION

Table 1 Frequency Distribution of General Data Characteristics

No	Type Characteristics	Amount (%)
1	**Age (years)**	
	17	1 (0.8)
	18	9 (6.9)
	19	30 (22.9)
	20	31 (23.7)
	21	24 (18.3)
	22	20 (15.3)
	23	12 (9.2)
	24	3 (2,3)
	25	1 (0.8)
2	**BMI (Body Mass Index)**	
	Thin	36 (27.5)
	Normal	76 (58.0)
	Fat	16 (12.2)
	Obesity	3 (2,3)
3	**Long time Live in the Cottage Islamic Boarding School (year)**	
	1	61 (46.6)
	2	34 (26.0)
	3	28 (21.4)

Based on Table distribution general data frequency subject study in accordance with age , BMI and duration live in the cottage boarding school . Range age youngest female students namely 17 years old and the oldest 25 years old . Age the most is 20 years old (23.7%). BMI status of the subject study part normal size , that is as many as 76 people (58.0%). Lowest BMI is 14.86 kg/m ^{2} and the highest BMI value is 28.19 kg/m ^{2} . Average BMI whole is 20.7 kg/m ^{2} . Most of the female students (46.6%) have located live in the cottage boarding school during One year .

Table 1Frequency Distribution of Specific Data Characteristics

No	Type Characteristics	Amount (%)
1	**Stress Level**	
	Normal	43 (32.82)
	Stress Light	18 (13.74)
	Stress Currently	46 (35.11)
	Stress Heavy	15 (11.45)
	Stress Very Heavy	9 (6.87)
2	**Behavior *Vulva hygiene***	
	Good	114 (87.02 %)
	Bad	17 (12.97 %)
3	**Knowledge *Vulva hygiene***	
	Good	94 (71.75 %)
	Bad	37 (28.24 %)

Based on Table 2 distribution frequency of the specific data being studied covers stress levels , behavior *vulva hygiene* and knowledge *vulva hygiene* . the data show that 46 (35.11%) of 131 female students experiencing moderate stress currently . Most of the female students (71.75%) who behaved Good to *vulva hygiene* own also good knowledge about _ *vulva hygiene* , ie as many as 114 (87.02%) female students .

Table 2Identification of Leukorrhea Incidents by Age

Incident Leukorrhea	Frequency (n)	Median (Min – max)	p value
Leukorrhea	109	20.00 (17 – 25)	0.001
No Leukorrhea	22	20.00 (18 – 24)	
Amount	131		

Based on the data obtained in table 5.3, it is known that of the 109 female students who experienced it leukorrhea , value the middle that is 20 years old . On research This is the age that is experienced leukorrhea that is between aged 17 – 25 years . The results of *the Mann-Whitney Test* were used obtained mark *p* is 0.001 (p < 0.05). This matter show exists meaningful relationship _ between age with incident leukorrhea to female students Cottage Boarding school Student Khoirul Huda Surabaya in 2023.

Table 3Identification of Leukorrhea Incidents by Body Mass Index

Type Characteristics	Leukorrhea		No Leukorrhea		p value
	F	%	f	%	
Thin	29	26.60	7	31.81	0.344
Normal	62	56.88	14	63.64	
Fat	18	16.51	1	4.54	
Amount	109	100	22	100	

Based on table 4 above obtained results that female students who experience it leukorrhea part big own index mass a body that is classified as normal, namely as many as 62 people (56.88%). The results of the *Chi-Square* statistical test were used obtained mark *p* is 0.344 (p > 0.05). This matter show No exists meaningful relationship _ between index mass body with incident leukorrhea in female students Cottage Boarding school Student Khoirul Huda Surabaya in 2023.

Table 4Identification of Leukorrhea Incidents by Stress Level

Type Characteristics	Leukorrhea		No Leukorrhea		p value
	F	%	f	%	
Normal	27	24.77	16	72.72	
Stress Light	13	11.92	5	22.73	< 0.001
Stress Currently	45	41.28	1	4.54	
Stress Heavy	15	5.5	0	0	
Stress Very Heavy	9	8.25	0	0	
Amount	109	100	22	100	

Based on table 5 above obtained results that 24 out of 109 female students experience stress heavy and stressful very heavy , all of it experience leukorrhea . Statistical test results The *Chi-Square* used is obtained mark $p < 0.05$. So from this data can concluded that exists meaningful relationship _ between level stress with incident leukorrhea in female students Cottage Boarding school Student Khoirul Huda Surabaya in 2023. Increasingly tall stress level , then opportunity happen leukorrhea the more big .

Table 5Identification of Leukorrhea Events Using *Vulva Hygiene Knowledge*

Type Characteristics	Leukorrhea		No Leukorrhea		p value
	f	%	f	%	
Knowledge *Vulva hygiene* Good	82	75.22	12	54.54	0.088
Knowledge *Vulva hygiene* Bad	27	24.88	10	45.46	
Amount	109	100	22	100	

Based on table 6 above obtained results that 82 (75.22%) of 109 female students experienced it leukorrhea own knowledge good *vulva* hygiene . Statistical test results *Chi-Square* is used obtained mark *p* is 0.088 (p > 0.05). This matter show that No There is meaningful relationship _ between knowledge *vulva hygiene* with incident leukorrhea in female students Cottage Boarding school Student Khoirul Huda Surabaya in 2023. So , more and more Good knowledge *vulva hygiene* , then opportunity leukorrhea the more big .

Table 6Identification of Leukorrhea Events with *Vulva Hygiene Behavior*

Type Characteristics	Leukorrhea		No Leukorrhea		p value
	f	%	f	%	
Behavior *Vulva hygiene* Good	95	87.15	19	86.36	1,000
Behavior *Vulva hygiene* Bad	14	12.85	3	13.64	
Amount	109	100	22	100	

Based on table 7 is obtained results that 95 (83.3%) of 109 female students experienced it leukorrhea own good attitude _ to *vulva hygiene* . Statistical test results *Chi-Square* is used obtained mark *p* is 1.000 (p > 0.05). Based on the data above can concluded that No There is meaningful relationship _ between behavior *vulva hygiene* with incident leukorrhea in female students Cottage Boarding school Student Khoirul Huda Surabaya in 2023.

Table 7Results of analysis of factors most related to the incidence of leukorrhea

				95 % CIfor EXP(B)	
	B	***Sig.***	***Exp (B)***	***Lower***	***Upper***
Stress Level	3,590	0.001	36,225	4,694	279,583
Constant	0.644	0.017	1,905		

Analysis results regression logistics obtained mark coefficient determination (R^2) of 0.339, p This means stress levels can explain incident leukorrhea the remaining 33.9% (66.1%) was influenced by other factors. So that can concluded that stress level is the most influential factor to incident leukorrhea in female students at Pondok Boarding school Student Khoirul Hudan Surabaya 2023. For _ know big opportunity stress level towards incident leukorrhea done calculation as following :

Table 8 Opportunities for Stress Levels on Leukorrhea

Stress	Y	e^{-y}	P	%
0	0.644	0.525	0.655	65.5 %
1	0.644	0.014	0.986	98.6%

Information :
0: normal until stress light
1: stress currently to the point of being very stressed heavy

Based on table 9 can concluded that female students who experience moderate stress to the point of being very stressed heavy own 98.6% chance of happening leukorrhea . Research result showing majority female students (109 of 131 female students , namely 83.20%) experienced leukorrhea , then although in normal condition or mild stress still own opportunity happen leukorrhea amounting to 65.5%.

Relationship between Age and Leukorrhea

Age will affect the ability to catch and understand something, so that it will affect a person's knowledge, attitudes and actions. In this study, age is one of the risk factors for leukorrhea, namely in the age range of 17-25 years. This age is the age of adolescents entering productive age, where at that age adolescents are pursuing college education and starting to work (Ministry of Health, 2018). The burden of being a student as well as a santri which causes a lack of balance between activities and unbalanced rest will trigger stress. Stress that occurs will trigger stress hormones that have negative consequences. In some women, the burden of stress that is too heavy will cause vaginal discharge. Some experts argue that vaginal discharge in working women is caused by high levels of stress hormone production. In addition, adolescence is a phase that is widely referred to as a vulnerable period because of the transition of growth and development from child to adult. Adolescents experience changes including physical, sexual, behavioral, cognitive development which will have an emotional impact on the teenager (Cahyono, 2015); (Sakit, 2015).

Adolescents who are experiencing physical and emotional changes are very vulnerable to mental health problems. Human reproductive organs in adolescence undergo maturation, and this phase is often referred to as puberty. During puberty, the body produces hormones that can affect the reproductive organs. The hormonal changes that occur and accompanied by productive activities in adolescents can increase stress, thus affecting vaginal secretions and increasing the occurrence of leukorrhea.

Based on the 2018 Basic Health Research (Riskesdas), more than 19 million people aged more than 15 years experience mental emotional disorders, and more than 12 million people aged more than 15 years experience depression (Aisyaroh,

2010). Therefore, productive age is very vulnerable to leukorrhea. This is in line with research conducted by Kristina (2022) which shows that the age of 16-20 years which is reinforced by health education regarding leukorrhea is related to the incidence of leukorrhea. This is in accordance with a survey conducted by Yulfitria that in the age range of 17-21 years or called late adolescence, including women of childbearing age who are prone to leukorrhea because at this time it is the peak of reproductive organ maturity so that better vaginal hygiene is needed.

The incidence of vaginal discharge is influenced by age, which is caused by changes in the hormonal cycle, in accordance with the theory stating that physiological discharge is more influenced by normal hormonal factors. In the life cycle of women, the production of estrogen hormone begins to manifest at the time of puberty until menoupose. In the period of reproductive life, the hormone circulates in the blood so that it reaches a sufficient amount and affects the development and function of several organs. n normal vaginal secretions will be felt to increase with or without complaints in a state of high estrogen in the body (Hyperestrogenism) (Istarofah, 2023).

Relationship between Body Mass Index and Incidence of Leukorrhea

Body Mass Index (BMI) is a simple index of body weight to height used to classify overweight and obesity in adults. BMI is defined as a person's weight in kilograms divided by the square of height in meters (kg/m). BMI is the most commonly used indicator to detect nutritional problems in a person. The classification of BMI is divided into thin, normal, fat and obese. Someone who is obese can affect the incidence of leukorrhea because they usually experience friction in their thigh area and cause wounds, so that the skin around the groin becomes hot and humid (Saputra, 2020). Germs can thrive in the area and vaginal discharge can occur. After the research, most of the female students who experienced leukorrhea (56.88%) had normal BMI. This shows that BMI is not associated with the incidence of leukorrhea.

The results of this study are in line with Aldriana's research (2023), that out of 140 respondents the average BMI was 19.21 with the results of the T test p = 0, 862, which shows that there is no relationship between BMI and the incidence of

leukorrhea. Obesity has a complex nature, the mechanisms that contribute to the increased incidence of Bacterial Vaginosis in obese women are expected to be multifactorial. Obesity can create a favorable environment for the development of Bacterial Vaginosis through disturbances in hormonal, metabolic and/or immune system function. Diet can also influence the relationship between BMI (Body Mass Index) and Bacterial Vaginosis due to certain dietary patterns. In addition, there is the role of gut microbiota in Bacterial Vaginosis. The gut microbiota has been thought to influence the composition of the vaginal microbiota by serving as a reservoir of bacteria outside the vagina. The high prevalence of menstrual irregularities in obese women can alter the vaginal flora (Saputra, 2020).

Relationship between Stress Level and Leukorrhea Incidence

Stress is a feeling that can generally be felt when under pressure, feeling overwhelmed, or having difficulty dealing with a situation. Stress within certain limits can be positive and motivating to achieve a goal. However, excessive stress that is difficult to control can have a negative impact on mood, physical and mental health, and relationships with others. Stressful conditions, both physical stress and psychological stress, will affect the work of hormones contained in the female body, one of which can lead to an increase in the hormone estrogen (Dewi, 2023). This increase in estrogen will cause leukorrhea in women. Stress can also cause a decrease in glucocorticoid and catecholamine production and will affect the performance of the hypothalamus gland which causes immunity to decrease. When immunity decreases, it can make bacteria in the vagina easier to develop rapidly and also suppress the growth of normal vaginal flora which will cause pathological vaginal discharge.

Based on table 5 which describes the results of measuring stress levels with the occurrence of leukorrhea in female students, it can be concluded that female students who experience mild stress to moderate stress have leukorrhea and some are not leukorrhea. However, all santri who experienced severe stress and very severe stress, all experienced leukorrhea. This shows a significant relationship between the level of stress and the incidence of leukorrhea in female students. The higher the stress level, the greater the possibility of leukorrhea.

The results of this study are in line with the results of Judha's research (2019) which states that there is a relationship between stress levels and the incidence of physiological vaginal discharge. This statement is also supported by the research of Hanifah et.al (2023) that there is a significant relationship between stress levels and leukorrhea. In this study, the respondents were students who lived in boarding schools. As students who live in boarding schools, daily activities are more than students who live in boarding houses, because students who live in boarding schools must participate in various activities at the pesantren, which will reduce rest time and reduce time to do college assignments.

Moreover, students are required in academics, such as exams or quizzes, semester assignments, final assignments and others. This condition can be a stressor for students who live in boarding schools, both in terms of time management, health, and also lectures. All obstacles that must be faced by students can put pressure, as a result they are at risk of experiencing stress symptoms. In an Islamic boarding school environment that requires adaptation and facing academic and social challenges, the support system and personality of adolescents play an important role in reducing stress levels and improving their well-being. Emotional, social, and support support in dealing with change will have a positive impact on the level of stress experienced by adolescent santri and santriwati in Pondok Pesantren (Andani, 2018); (Rahmawaty, 2022).

According to research by Izza et.al (2023), stress coping that can be done is using two forms of coping, namely emotion-focused coping and problem-focused coping. In the emotion-focused coping section, efforts to divert stress use reading the Qur'an, reading Sufism books, listening to murottal, and sholawat which is more of a spiritual approach to informants. While in problem-focused coping used in the form of tahajud prayers and prayers, as well as seeking solutions or advice by telling stories to ustadzah at the cottage, as an effort to seek help to relieve the stress experienced by informants, another stress resolution is to keep their time as well as possible and not waste time such as reducing scrolling tiktok, not hanging out, and other useless things to keep time and make it easier for informants to manage time well.

Relationship between knowledge of vulvar hygiene and the incidence of leucorrhea

Knowledge about vulva hygiene can influence vulva hygiene behavior. Early teaching to adolescent girls about maintaining intimate organ hygiene is very important. Through adequate teaching, adolescent girls will have adequate knowledge. Other studies have shown that with adequate knowledge about vulvar hygiene, a woman is less likely to experience abnormal leukorrhea (Yulianti, 2021). In addition, knowledge can also be a motivating factor. aini comes from within an adolescent who becomes the reason or motivation to perform a behavior. The importance of adolescents knowing about leukorrhea is so that women, especially adolescents, know about vaginal discharge, signs and symptoms of vaginal discharge causes, and can distinguish between physiological and pathological vaginal discharge so that women can prevent, treat and immediately conduct examinations if there are signs and symptoms of abnormal vaginal discharge.

Based on the research results listed in table 5.6, that vulva hygiene knowledge is not related to the incidence. This is not in accordance with research conducted by Nengsih (2022) that there is a relationship between knowledge about vaginal discharge and the incidence of vaginal discharge (p value = 0.000). Strengthening the role of health workers in the school setting is very important to conduct health promotion on reproductive health to provide health education, conduct screening, and maintain healthy behavior of adolescent girls, especially regarding vulva hygiene (Patimah, 2022).

In this study, most respondents had good knowledge. Although adolescent girls have good knowledge about vaginal discharge, they still experience vaginal discharge, possibly due to poor attitudes in maintaining genital hygiene due to lack of understanding in preventing vaginal discharge. Other factors such as motivation also affect the occurrence of vaginal discharge, if the motivation of adolescent girls is good there will be a desire that encourages them to prevent vaginal discharge such as maintaining the cleanliness of their genital organs so that vaginal discharge does not occur. In addition, there are other factors that also affect vaginal discharge, namely diet. As often consuming sweet foods has an effect on experiencing vaginal

discharge, the factor of heavy physical activity, such as exercising, can indeed be one of the triggers for excessive vaginal discharge (Oriza, 2018).

Factors that influence the occurrence of vaginal discharge are hormonal factors, physical and psychological fatigue, and the presence of foreign objects in the reproductive organs. Other precipitating factors are economic status, the use of antiseptics that disturb the pH balance, daily water use, the use of pads or pantyliners and vulva hygiene behavior (Putri, 2021).

Relationship between Vulvar Hygiene Behavior and Leukorrhea Incidence

Reproductive health has a very important role for women, one of which is the behavior of maintaining vaginal hygiene (vulva hygiene). Lack of genital hygiene is one of the causes of leukorrhea. Excessive leukorrhea accompanied by itching is apparently experienced by many adolescent girls and is thought to be the cause because it is related to vulvar hygiene behavior (Pawennei, 2022).

Based on table 7, it shows that vulvar hygiene behavior is not associated with the incidence of leukorrhea. This is not in line with the research of Cahyaningtyas (2019) which states that there is a relationship between several vaginal hygiene behaviors and the incidence of vaginal discharge. Vaginal hygiene behaviors that affect the incidence of leukorrhea are the frequency of changing underwear, the behavior of using alternating underwear, how to wash the vagina after defecating, the use of tissue after washing the vagina, and the frequency of changing pads during menstruation. The behavior of choosing the type of underwear, using vaginal cleansers, and using towels alternately were not associated with the incidence of leukorrhea.

A person in good hygiene behavior requires facilities and infrastructure, such as bathrooms, sufficient and clean water, equipment (such as soap, shampoo, etc.). This requires costs and will affect a person in fulfilling and maintaining good personal hygiene. The existence of facilities and infrastructure in the form of health facilities and other facilities that support vulva hygiene genitalia behavior is also one of the factors that influence hygiene behavior. The existence of various facilities and infrastructure makes it easy for individuals to get things that support vulvar hygiene genitalia behavior, such as wet wipes, clean and comfortable towels,

clean water facilities for cleaning the vagina and so on, the ease of getting these items will make it easier for individuals to carry out good vulvar hygiene genitalia behavior (Vivianti, 2019).

In women with good hygiene behavior, the likely cause of abnormal leukorrhea is infection. However, there are several other factors that can also cause leukorrhea, despite good hygiene behavior. These factors include hormonal changes, medication use, certain diseases, irritation, and foreign bodies.

These factors include hormonal changes, medication use, certain diseases, irritation, and foreign bodies. Based on research published in the Journal of Obstetrics & Gynecology (2019) found that hormonal changes, such as those that occur during pregnancy, breastfeeding, or menopause, can cause changes in vaginal fluid. Vaginal discharge during pregnancy is usually more abundant and thicker. Vaginal discharge during breastfeeding is usually more fluid. Vaginal discharge during menopause is usually less and dry. According to the Journal of Fertility & Sterility (2020) the use of medications, such as birth control pills, corticosteroid drugs, and antibiotics, can cause changes in vaginal discharge. Certain diseases, such as diabetes, cervical cancer, and HIV infection, can cause vaginal discharge. Vaginal irritation, such as from using inappropriate body wash, can cause vaginal discharge. Foreign objects entering the vagina, such as tampons left behind, can cause vaginal discharge (Nurhidayati, 2020).

CONCLUSION AND SUGGESTION

Based on the results of research conducted on 131 female students of the Khoirul Huda Islamic boarding school in Surabaya in 2023, it was found that 109 (83.20%) female students experienced leukorrhea, and it can be concluded that stress levels are most related to the incidence of leukorrhea. For further researchers, to find out other factors that influence the incidence of leukorrhea in female students, further research needs to be carried out, it is necessary to conduct a clinical examination to determine whether the leukorrhea is physiological/pathological and conduct in-depth interviews regarding stress triggers in female students.

DECLARATION

Conflict of Interest
This study has no conflicts of interest.

Authors' Contribution
All contributors were involved in every stage of the study, from the initial concept to the drafting of the article, so collaborative efforts were required in this study.

Ethical Approval
This research received approval from the ethics committee, confirming it adheres to required ethical guidelines, with ethics number 140/EC/KEPK/FKUA/2023.

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Data Availability
In this part, Data supporting the research findings are available upon request.

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FACTORS INFLUENCING HEALTH CARE PROVIDER IN CODUNCTING PREECLAMPSIA SCREENING

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Abstract

Background: Preeclampsia is responsible for maternal health globally due to its high morbidity and maternal mortality rates, especially in low-income countries such as Indonesia. Primary care providers, including general practitioners, midwives, and nurses, have a crucial role to play in the early assessment of preeclampsia screening. It was noted that factors affecting mortality were the lack of preparedness of officers in managing and responding to pregnancy emergencies, delayed recognition of worsening clinical signs of preeclampsia, as well as inadequate assessment and treatment for preeclampsia. This study aims to analyze the driving factors that influence health care provider in conducting preeclampsia screening in Gresik District. **Methods:** This research was an observational analytical study with a cross-sectional approach. The population in this study consisted of all doctors and midwives at the primary health facilities in the Gresik Regency area. The sample was taken from 159 respondents who were service providers in 20 primary health facilities in Gresik using simple random sampling. The variables in this study were the knowledge and attitudes of healthcare workers toward implementing preeclampsia screening. Data collection in this study used an online questionnaire conducted after issuing the Ethical Approval Letter until October 2023, which was then analyzed using a chi-square test with a significance level of 0.05. **Results:** Only 27% of respondents demonstrated a good level of knowledge about preeclampsia, which affected the effectiveness of preeclampsia screening (p-value 0.04). A total of 86.2% of respondents showed a high level of attitude toward preeclampsia screening. However, this study found no significant relationship between healthcare workers' attitudes and preeclampsia screening (p-value 0.171). **Conclusion:** There is a significant link between the knowledge of the healthcare provider and the optimization of preeclampsia screening so new methods of training are needed that are assessed as effective and accompanied by rigorous monitoring and evaluation to enhance healthcare provider knowledge, especially concerning preeclampsia screening.

keyword : Attitude, health care provider, knowledge, preeclampsia screening, primary health facilities

INTRODUCTION

Preeclampsia is responsible for maternal health globally due to its high morbidity and maternal mortality rates, especially in low-income countries such as

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Indonesia. (Aldika Akbar et al., 2018). The global maternal death rate from preeclampsia is around 50,000 every year, with different frequencies in each geographical area. (Lamma et al., 2021). The incidence of preeclampsia in Indonesia itself is 128.273/year or about 5.3%.

Preeclampsia is a serious pregnancy complication characterized by hypertension and damage to other organs, most commonly the liver and kidneys. It usually develops after 20 weeks of gestation and is a leading cause of maternal and neonatal morbidity and mortality worldwide. The exact etiology of preeclampsia remains unclear, but factors such as placental dysfunction, immune system irregularities, and genetic predisposition are believed to contribute. Several risk factors have been identified, including obesity, advanced maternal age, multiple gestations, and pre-existing conditions like hypertension and diabetes (Garovic et al., 2022).

Healthcare providers play a crucial role in the early detection and management of preeclampsia. Routine antenatal care that includes blood pressure monitoring and urine testing for proteinuria is essential for timely diagnosis. Providers' knowledge and attitudes significantly influence patient outcomes, as they are responsible for implementing screening protocols and educating patients on modifiable risk factors. However, challenges in resource-limited settings, such as lack of access to diagnostic tools and inconsistent provider knowledge, can impede effective care. Studies have underscored the need for enhanced training for healthcare workers to improve preeclampsia management and reduce its associated risks (Pasternak et al., 2021; Tarca et al., 2022).

Primary care providers, including general practitioners, midwives, and nurses, have a vital role to play in the early assessment of preeclampsia screening, early intervention in women with high risk factors for preeclampsia for prevention and related complications. (Laura Costa et al., 2022). One study showed that 76% of women who died from preeclampsia had an adequate frequency of ANC visits. It was noted that factors affecting mortality were the lack of preparedness of officers in managing and responding to pregnancy emergencies, delayed recognition of worsening clinical signs of preeclampsia, as well as inadequate assessment and treatment for preeclampsia (Morton et al, 2019).

The number of maternal deaths in Gresik district alone reached 315.75 per 100,000 live births where the figure has not reached the SDGs target (DinKes Province, 2021). The preeclampsia incidence in Gresik in 2021 is two cases. Maternal death due to preeclampsia in 2021 of two cases (Dinkes Province, 2021) while in 2022 the case of preeclampsia has increased to six cases. (Dinkes Gresik, 2022). Therefore, researchers are interested in analyzing the factors that influence the screening of preeclampsia in the Gresik district.

METHOD

This research was an observational analytical study with a cross-sectional approach. The population in this study consisted of all doctors and midwives at the primary health facilities in the Gresik Regency area. The sample was taken from 159 respondents who were service providers in 20 primary health facilities in Gresik using simple random sampling. The variables in this study were the knowledge and attitudes of healthcare workers toward implementing preeclampsia screening. Data collection in this study used an online questionnaire adapted from Jayanti et al.'s 2018 research, which analyzed the influence of healthcare providers on the implementation of preeclampsia screening. The questionnaire was modified and had undergone validity and reliability tests. Data collection was conducted after the issuance of the Ethical Approval Letter by the Ethics Committee of the Faculty of Medicine, Universitas Airlangga, and continued until October 2023. The data were then analyzed using a chi-square test with a significance level of 0.05.

RESULT AND DISCUSSION

The respondents in this study were midwives and doctors from 20 public health centers in Gresik District, totaling 159 individuals. The samples were taken from respondents who met the predetermined inclusion and exclusion criteria. The respondents were grouped based on profession, age, education, length of service, and employment status. The complete characteristics of the respondents are presented in the table below.

Table 1. Frequency Distribution of Respondent Characteristics

Respondent characteristics	Frequency	Percentage (%)
Profession		
Midwife	141	88.7
Doctor	18	11.3
Age		
21-30	21	13.2
31-40	61	38.4
41-50	56	35.2
51-60	21	13.2
Education level		
D III	115	72.3
D IV	15	9.4
S1	7	4.4
Midwive Profession	8	5.0
General practitioner	14	8.8
Length of service		
0-9	59	37.1
10-19	41	25.8
20-29	41	25.8
30-35	18	11.3
Employment status		
Civil servant (PNS)	116	73.0
Temporary employee (PTT)	4	2.5
Contract employee	22	13.8
Honorary staff	16	10.1
Volunteer	1	0.6

Characteristic of majority respondents is health workers with the age range of 31 – 40 years. The majority of respondents to this study are midwifes. Most of the respondents' education is D-III. Based on the length of working hours, the majority of respondents were in the time range of 0 to 9 years. Based on employment status, the majority of respondents have civil servant status.

Table 2. Analysis of the Relationship Between Knowledge Level and Optimality of Preeclampsia Screening

Knowledge	Frequency	Percentage (%)	p value
Less	77	48.4	0.044
Enough	39	24.5	
Good	43	27.0	
Total	159	100	

Based on the table above, the knowledge variable indicates that the majority of respondents have a knowledge level categorized as insufficient, with 77

respondents (48.4%), while a small proportion are at a sufficient knowledge level, totaling 39 respondents (24.5%).

Based on the results of the exact fisher test for the relationship of knowledge level with preeclampsia screening of 0.044, it can be concluded that there is a significant relationship between the level of knowledge of health care and preeclampsia screening. Similar research by Tahir et al shows that the knowledge and skills of midwives and screening, prevention, and treatment of early preeclampsia are closely linked. (Mardiar Tahir, Catherine Jusuf and Halomoan Simarmata, 2023). Good knowledge of preeclampsia by officers and midwives has a direct impact on the quality of childbirth, childcare, and efforts to reduce maternal mortality rate (Khodijah et al., 2021).

Table 3. Analysis of the Relationship Between Attitude Level and Optimality of Preeclampsia Screening

Attitude level	Frequency	Percentage (%)	p value
Low	5	3.1	0.171
Moderate	17	10.7	
High	137	86.2	
Total	159	100	

The independent variable analysis showed that the majority of respondents were at a high level of attitude, which was 137 respondents (86.2%). Followed by a moderate level of 17 respondents (10.7%). Then the low level became a minority in this study, which is only 5 respondents (3.1%).

The exact fisher value for the relationship of the attitude level with the preeclampsia screening is 0.171, it can be concluded that there is no significant relationship between the level of health energy attitude and the screening of preeclampsia. This research line with Jayanti's (2018) study that states that midwife attitudes have no significant impact on the success of preeclampsia screening programs. (Jayanti, Prasetyo and Chalidyanto, 2018).The results of this study contradict Green's theory, which states that attitude is a predisposition component that affects one's behavior. The level of organization, such as workload and work environment, including supervision that supports employment relationships and the availability of infrastructure and facilities, are other components that influence

attitudes. Community cultural beliefs can also influence the views and behaviour of healthcare providers. (Mannava et al., 2015).

The role of healthcare providers in the screening and management of preeclampsia is crucial, as they are on the front lines of monitoring maternal health during pregnancy. Effective screening requires not only adequate knowledge and training of providers but also systematic approaches to care. A qualitative study in Ghana indicated that obstetric providers faced challenges in diagnosing preeclampsia due to limited resources and inadequate support systems for managing hypertension during pregnancy, highlighting the importance of provider training and resources to ensure timely interventions and improve maternal outcomes (Atluri Namratha AND Beyuo, 2023). Furthermore, several factors contribute to the incidence of preeclampsia, including maternal age, obesity, and a history of hypertension. Research suggests that higher maternal age is associated with increased risk, particularly in women over 35 years, while lifestyle factors and pre-existing health conditions also significantly impact the development of preeclampsia (Chaiworapongsa et al., 2014; Garovic et al., 2022). Addressing these risk factors through comprehensive healthcare provider training and public health initiatives can enhance the effectiveness of preeclampsia screening and management efforts.

CONCLUSION AND SUGGESTION

Based on the results of research, one of the factors influencing the health examination is the knowledge of the health care provider. Characteristic of majority respondents is health workers with the age range of 31 – 40 years. The majority of respondents to this study are midwifes. Most of the respondents' education is D-III. Based on the length of working hours, the majority of respondents were in the time range of 0 to 9 years. Based on employment status, the majority of respondents have PNS status. There is a relationship between the level of health care knowledge and preeclampsia screening. There is no relationship between the level of health energy attitude and the screening of preeclampsia. The majority of respondents showed a high level of attitude, but the majority were less informed, so this was indicated as a cause of an insignificant link between health care attitude and preeclampsia

screening. Provide training of health workers with new methods that are judged to be effective in improving the knowledge and skills of the health workers in the Gresik district followed by strict monitoring and evaluation by the coordinator midwife, the head of the primary health care, and the health service needs to be done in an effort to improve the knowledge of health personnel, especially related to preeclampsia screening.

DECLARATION

Conflict of Interest

Author declare there is no conflict of interest in this research

Authors' Contribution

All authors contributed significantly from the beginning to the end of the research, including study design, data collection, analysis, article writing, and final revisions and approval.

Ethical Approval

Ethical Approval Letter by the Ethics Committee of the Faculty of Medicine, Universitas Airlangga.
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Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request. The datasets generated and analyzed during the current study are not publicly available due to privacy concerns but may be made available by institutional policies.

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THE IMPACT OF TELEHEALTH ON PSYCHOSOCIAL WELL-BEING AND PATIENT SATISFACTION DURING PREGNANCY: A LITERATURE REVIEW

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Abstract

Background: Telehealth has rapidly evolved as a critical tool in healthcare, particularly during the COVID-19 pandemic, enhancing access to care across various medical fields, including prenatal care. While telehealth offers potential benefits such as improved healthcare access and reduced travel for pregnant women, its impact on psychosocial well-being and patient satisfaction during pregnancy remains insufficiently explored. This literature review aimed to explore the impact of telehealth on psychosocial well-being and patient satisfaction during pregnancy. **Methods**: This literature review employed the PICO method to develop the review question, focusing on randomized controlled trials published between 2020 and 2024, identified through SCOPUS, PubMed, and Google Scholar using specific keywords related to telehealth, pregnancy, and well-being. **Result:** Six relevant articles meeting the inclusion criteria. The review found that telehealth interventions during pregnancy improved psychosocial well-being by reducing stress and anxiety, enhancing social support, and increasing patient satisfaction compared to conventional prenatal care methods. **Conclusion:** The literature review concludes that telehealth may an effective approach to pregnancy care, providing accessible and continuous support through online consultations that overcome geographical challenges. The evidence suggests that telehealth enhances patient satisfaction and psychological well-being by offering a convenient, flexible, and personalized alternative to conventional in-person visits.

Keywords: pregnancy, psychosocial, satisfaction, telehealth, and well-being

INTRODUCTION

During the COVID-19 pandemic, physical distancing measures and restrictions have led to an increase in the usage of telehealth and digital health platforms (Bouabida et. al., 2022). The telehealth and medical industries have found several uses for this technology, which has proven beneficial and indispensable (Haleem et. al., 2021). Telehealth encompasses a range of technologies and services that facilitate remote health interactions between patients and providers (Haleem et.

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al., 2021). This model of care has demonstrated improvements in access to healthcare (Haleem et. al., 2021). However, the impact on psychosocial well-being and patient satisfaction, especially in the context of pregnancy, remain underexplored. One aspect of telehealth is telemedicine, which involves the remote delivery of healthcare services by professionals using information and communication technology (Haleem et. al., 2021). This includes the exchange of diagnostic information, treatment, disease and injury prevention, research and evaluation, and continuing education for healthcare providers, which all aimed to improve individual and community health (Necualu et. al., 2022). Factors influencing patient use of telemedicine include its perceived usefulness and suitability compared to conventional care, as well as cost reduction and decreased travel requirements (Riyanto, 2021). During the COVID-19 pandemic, patients found telemedicine essential, supporting its continuation even after the pandemic (Riyanto, 2021).

According to James (2027) in his book, it is stated that Pregnancy is a critical period that requires careful monitoring and support in both physical and psychological health aspects (Mirzakhani et. al., 2020). Conventional prenatal care has been well-established for ensuring maternal and fetal health; however, the integration of telehealth into prenatal care is a relatively new phenomenon. Emerging research suggests that telehealth can offer benefits such as enhanced access to healthcare services, reduced travel time, and improved management of routine prenatal consultations (Hawkins, 2023). Despite these advantages, the effects of telehealth on psychosocial aspects of pregnancy—such as emotional well-being, stress levels, and overall patient satisfaction—are not yet fully understood. As telehealth becomes more common in healthcare, it is important to understand its application within maternal care. In Indonesia, before the COVID-19 pandemic, all antenatal visits have been conducted face-to-face, but the pandemic has facilitated a rapid and widespread shift towards telehealth (Atkinson, 2023).

Telehealth interventions have shown promising results in improving access to care and mental health outcomes for pregnant and postpartum women (Hanach, 2021). A pilot study found high patient satisfaction with maternal mental health and substance use disorder treatment via telemedicine, significantly reducing travel

time and distance compared to in-person care (Guille et al., 2022). Another randomized controlled trial demonstrated that low-intensity psychosocial maternal sessions effectively reduced antenatal anxiety, although no significant effects were observed for depression or COVID-19-specific phobia (Naja et al., 2022).

During the COVID-19 pandemic, adaptation of perinatal mental health programs to telehealth modalities maintained or even increased participation rates (Paul et al., 2022). Notably, the Mother-Infant Therapy Group saw a reduction in non-completion rates from 36% for in-person services to 17% for telehealth services (Paul et al., 2022). These findings suggest that telehealth can be an effective and accessible option for providing mental health support to pregnant and postpartum women, particularly during challenging circumstances like the COVID-19 pandemic (Hawkins, 2023).

A literature review discussing the implementation of telehealth in Indonesia during the COVID-19 pandemic highlights some benefits, such as enabling remote care and limiting direct contact (Putri et al., 2023). Telehealth has had a positive impact, allowing patients to receive care effectively through phones, computers, the internet, and video and audio conferencing (Putri et al., 2023). A recent research highlights the potential benefit of telehealth to enhance patient satisfaction by providing convenience and personalized care (Amjad, 2023). However, concerns remain regarding the quality of interpersonal relationships between patients and healthcare providers, which is crucial for effective prenatal care (Dietl et. al., 2023). Additionally, psychosocial impacts, including anxiety, depression, and social support, are also critical to examine as they play a significant role in maternal health outcomes (Bedaso et. al., 2021). Therefore, it is essential to evaluate safety outcomes when replacing face-to-face visits and physical examinations with telehealth, as there is concern that such changes may compromise care, particularly if diagnoses are delayed or missed (Atkinson, 2023).

This literature review aims to synthesize current evidence on the effects of telehealth on psychosocial well-being and patient satisfaction during pregnancy. By analyzing recent research findings, this review will provide insights into how telehealth influences the prenatal care experience and offer recommendations for optimal maternal care.

METHOD

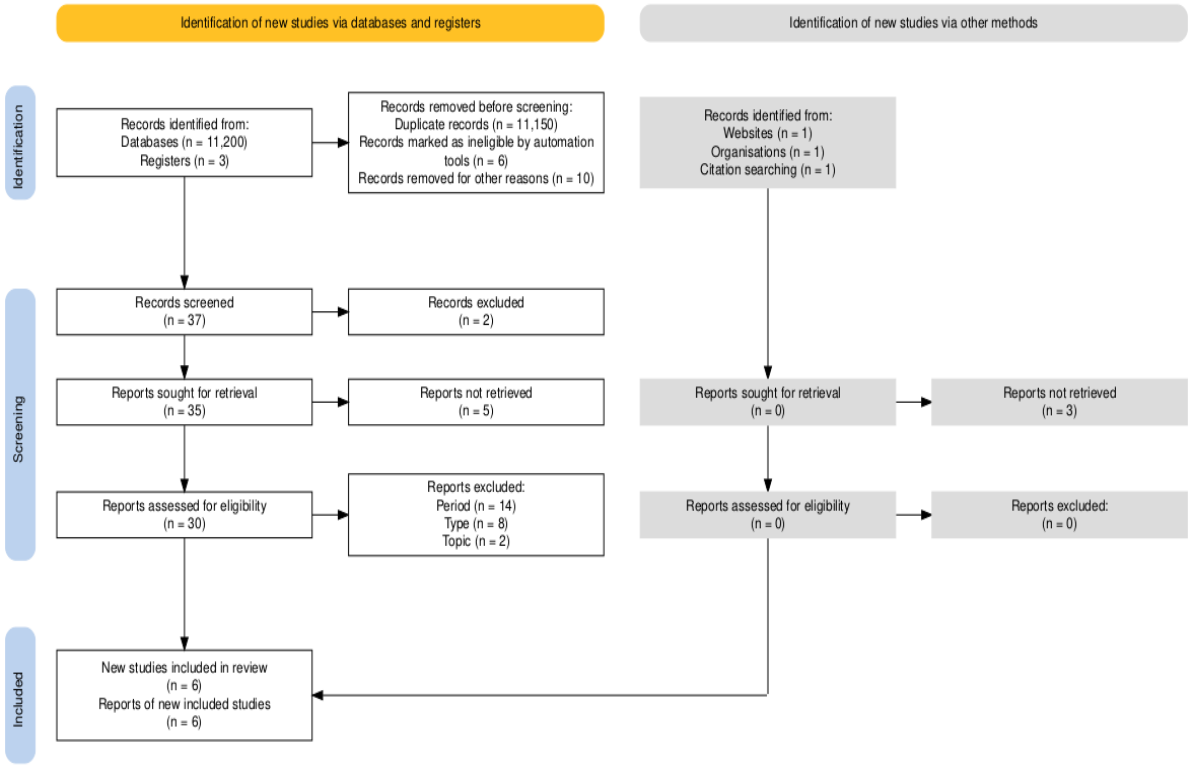
This literature review implemented the PICO (Population, Intervention, Comparison, and Outcome) guideline to develop the review question.

The question for this review: What is the impact of telehealth on psychosocial well-being and patient satisfaction during pregnancy?

The breakdown of the PICO from the developed question is as follows.

Population	Intervention	Comparison	Outcome
Pregnant women, either with low-risk or high-risk pregnancies.	The implementation of telehealth, including by using an application and remote consultation services during pregnancy.	Conventional or in-person Ante Natal Care.	1. Psychosocial experiences during pregnancy, including stress, anxiety, and social support. 2. Patient satisfaction with their prenatal care services.

The search terms used in this review: “Telehealth,” AND “Impact” AND “Pregnancy” AND “Satisfaction” AND “Psychosocial” AND “Well-being.” During the search process, 11,200 relevant articles published since 2020 were identified. The literature search process was conducted through SCOPUS, PubMed, and Google Scholar databases. The selection process of the article included in this review was conducted using the Elicit (elicit.com) to identify relevant articles. The articles reviewed are open access, published between 2020 and 2024, and Randomized Controlled Trials. Six relevant articles meeting the criteria were identified. A modified PRISMA flowchart framework tools from Haddaway et. al 2022 in https://estech.shinyapps.io/prisma_flowdiagram/ capturing the literature search process can be seen in the picture 1.


Identification of new studies via databases and registers
Identification of new studies via other methods
Identification
Records identified from:
Databases (n = 11,200)
Registers (n = 3)
Records removed before screening:
Duplicate records (n = 11,150)
Records marked as ineligible by automation tools (n = 6)
Records removed for other reasons (n = 10)
Records identified from:
Websites (n = 1)
Organisations (n = 1)
Citation searching (n = 1)
Screening
Records screened
(n = 37)
Records excluded
(n = 2)
Reports sought for retrieval
(n = 35)
Reports not retrieved
(n = 5)
Reports sought for retrieval
(n = 0)
Reports not retrieved
(n = 3)
Reports assessed for eligibility
(n = 30)
Reports excluded:
Period (n = 14)
Type (n = 8)
Topic (n = 2)
Reports assessed for eligibility
(n = 0)
Reports excluded:
(n = 0)
Included
New studies included in review
(n = 6)
Reports of new included studies
(n = 6)

RESULT AND DISCUSSION

Author	Title	Objective	Population	Intervention	Outcome and Result
Askari, S., et al, 2023	Impact of Telehealth on Pregnant Women's Self-care, Self-efficacy, and Satisfaction during the COVID-19 Pandemic: A Quasi-experimental Study	The present study aimed to assess the impact of telehealth on pregnant women's self-care, self-efficacy, and satisfaction during the COVID-19 pandemic	Quasi-experimental study design with 150 participants were assigned to 3 groups : WhatsApp training group (n=50), Phone call training group (n=50), and Control group (n=50)	Four face-to-face prenatal care sessions for all three groups. Four additional virtual training sessions for the WhatsApp and phone call groups.	Raising the awareness of pregnant women through telephone counseling was found to not only increase theu self-efficacy, self-care, and satisfaction but also reduce the need for in person visits during the COVID-19 pandemic. Furthermore, a moderate positive correlation was observed between self-efficacy and self-care scores, moreover, they have a relatively negative weak correlation with face-to-face visits

Author	**Title**	**Objective**	**Population**	**Intervention**	**Outcome and Result**
Guille, C., et al, 2022	A Pilot Study Examining Access to and Satisfaction with Maternal Mental Health and Substance Use Disorder Treatment via Telemedicine	The purpose of this study is to evaluate patient satisfaction with, and accessibility to, a maternal MH and SUD telemedicine service delivered to obstetric practices.	Patient satisfaction with telemedicine among obstetric patients was assessed via Likert scale surveys, with paired t-tests comparing travel time and distance to in-person care.	The intervention in this study was the provision of maternal mental health and substance use disorder treatment via telemedicine, delivered to participants at their local obstetrics clinic.	Patient satisfaction with the maternal mental health and substance use disorder telemedicine service, measured using a 5-point Likert scale. Accessibility to the telemedicine service, measured by comparing the round trip travel time and distance between the patient's home and the academic medical center versus their local obstetrics clinic where they received the telemedicine services.

Author	Title	Objective	Population	Intervention	Outcome and Result
Naja, S., et all, 2023	The impact of telemental health interventions on maternal mental health outcomes: a pilot randomized controlled trial during the COVID-19 pandemic	The objective of this pilot study is to assess the efficacy of video low-intensity psychosocial telemental maternal intervention on COVID-19-specific phobia, antenatal depression, and anxiety among pregnant women	A parallel-design randomized controlled trial enrolled 58 English- or Arabic-speaking pregnant women in their second trimester to assess antenatal anxiety, depression, and COVID-19-specific phobia, with 33 completing the 4-week follow-up.	The intervention was a "low-intensity psychosocial telemental maternal session" provided to the intervention group. The abstract does not provide any further details on the frequency, duration, or amount/dose of the intervention.	Antenatal anxiety: - Intervention group: 2.4 ± 2.2 - Control group: 4.2 ± 1.6 - Statistically significant difference (p = 0.013) - Large effect size (Hedges' g = 0.96, 0.22–1.74) - Absolute risk reduction: 27.27% - Antenatal depression: No statistically significant effect - COVID-19-specific phobia: No statistically significant effect

Author	**Title**	**Objective**	**Population**	**Intervention**	**Outcome and Result**
Paul, J. J. *et al.* (2022)	Telehealth adaptation of perinatal mental health mother–infant group programming for the COVID-19 pandemic	The methodology of this study involved a comparison of in-person perinatal mental health services in 2019 versus telehealth services in 2020 during the COVID-19 pandemic.	The study assessed enrollment, completion rates, and demographics of pregnant and postpartum women in support groups, comparing EPDS scores for the Mother-Infant Therapy Group before and after the pandemic.	1. Pregnancy Group 2. Maternal Postpartum Peer Support Group 3. Mother-Infant Therapy Group (M-ITG), which was a 12-week multicomponent program.	The study found that telehealth services in 2020 led to increased warmline contacts, higher participation in the Maternal Postpartum Peer Support Group, and a significant reduction in the non-completion rate of the Mother-Infant Therapy Group from 36% to 17%.

Author	Title	Objective	Population	Intervention	Outcome and Result
Latendress, G., et al, 2021	A Group Videoconference Intervention for Reducing Perinatal Depressive Symptoms: A Telehealth Pilot Study.	This pilot study evaluated the feasibility and preliminary results of an 8-week facilitated group videoconference intervention.	The 8-week videoconference mindfulness-based cognitive behavioral intervention targeted pregnant and postpartum women at outpatient clinics who screened positive for perinatal depression or were at high risk, assessing attendance and EPDS completion rates.	The intervention was an 8-week facilitated group videoconference program, with weekly 1-hour sessions, using a mindfulness-based cognitive behavioral approach. Participants used their own electronic devices to attend the sessions and completed the Edinburgh Postnatal Depression Scale (EPDS) at several time points.	The primary outcome indicated promising trajectories in perinatal depressive symptoms, with 51.1% of the 47 enrolled women experiencing mild to moderate depression, and 70% attending at least 5 of 8 sessions, showing a decrease in EPDS scores among those currently symptomatic.

Author	Title	Objective	Population	Intervention	Outcome and Result
Alanazi, A.T., et al, 2022	Telemedicine Patient Satisfaction and Cost: A Comparative Study in the COVID-19 Era	This study aimed to assess the impact of telemedicine technology from the patient perspective by comparing patient satisfaction and cost savings of follow-up visits through telemedicine with those of FTF clinical visits.	The cross-sectional study employed convenience sampling of adults living over 90 km from the clinic, comparing a telemedicine group with a face-to-face control group through a survey assessing demographics, visit costs, and patient satisfaction.	The "intervention" in this study was the use of telemedicine for follow-up visits, compared to the control group who had traditional in-person face-to-face (FTF) visits at the tertiary healthcare facility. The paper does not provide any details on the frequency, duration, or other specifics of the telemedicine visits.	The study found no significant difference in overall patient satisfaction between telemedicine and face-to-face care; however, telemedicine resulted in significantly lower costs, reduced time absent from work, and shorter travel distances for patients.

The research literature highlights the positive effects of telemedicine on maternal care, especially amidst the COVID-19 pandemic, making a strong case for the effectiveness of virtual healthcare solutions. Overall, these studies underscore the various advantages of telehealth interventions, not just in enhancing patient results but also in improving access and lessening practical challenges.

Furthermore, Askari et al. (2023) found that telephone counseling significantly improved self-efficacy, self-care, and patient satisfaction in pregnant women, while also reducing the need for in-person consultations. This outcome underscores the crucial role of telehealth in reducing physical interactions during the pandemic, ensuring the safety of both patients and healthcare providers. Moreover, the positive relationship between self-efficacy and self-care emphasizes the interconnected nature of these factors in promoting better health outcomes, while the negative association with in-person visits supports the notion that telemedicine can effectively replace face-to-face care in many cases.

Recent research highlights the significant potential of telemedicine services in improving maternal mental health and addressing substance use disorders. Guille et al. (2022) emphasize the accessibility of telemedicine, with consistently high patient satisfaction ratings, as well as reduced travel time and distance to medical facilities, particularly benefiting rural or underserved communities. Naja et al. (2023) demonstrate the effectiveness of telemedicine interventions in managing antenatal anxiety, reporting a statistically significant decrease in anxiety levels within the intervention group compared to the control group. However, the limited impact on antenatal depression and COVID-19-specific phobia suggests the need for tailored interventions for specific psychological conditions. Paul et al. (2022) observe a marked increase in participation in maternal support groups and a reduction in non-completion rates for the Mother-Infant Therapy Group (M-ITG) during the telehealth period in 2020, indicating the enhanced accessibility provided by telemedicine. Similarly, Latendress et al. (2021) report positive outcomes in reducing perinatal depressive symptoms among women engaged in telehealth support groups, with 70% of participants attending at least five sessions, thus affirming the acceptability and feasibility of telemedicine in promoting maternal mental health during the perinatal period.

The study by Alanazi et al. (2022) underscores the cost-effectiveness of telemedicine services, as it found no significant difference in patient satisfaction between telemedicine and face-to-face (FTF) consultations. However, it noted significantly lower costs and reduced work absences among telemedicine users. Additionally, the study highlighted the substantially shorter travel distances for telemedicine patients ($p = 0.001$), illustrating the economic and logistical advantages of virtual care, particularly for patients residing far from medical facilities.

In summary, these studies collectively affirm that telemedicine offers substantial benefits for maternal healthcare, particularly in terms of accessibility, patient satisfaction, and cost-effectiveness. Nevertheless, certain areas, such as antenatal depression and condition-specific phobias, may necessitate more tailored interventions that extend beyond the current scope of telemedicine practices. Therefore, further research is warranted to explore these gaps and optimize telehealth models for maternal mental health care.

The literature review highlights the evolving role of telehealth in antenatal care, categorizing it primarily into real-time and remote monitoring modalities. Real-time telehealth involves direct, synchronous communication, such as video calls or phone conversations between pregnant women and clinicians, designed to replace some traditional face-to-face consultations without entirely eliminating them (Mechanic, 2022). In contrast, remote monitoring uses technology to replicate aspects of clinical examinations that would typically occur during in-person visits. Basic forms of remote monitoring include home-based blood pressure checks and fetal heart rate recordings via Doppler devices, while more advanced techniques such as home cardiotocography and tele-ultrasound are emerging as promising alternatives to conventional monitoring methods (Kern, 2020; Recker, 2022).

The American College of Obstetricians and Gynecologists (ACOG) has published formal guidance on telehealth models, categorizing them into synchronous (real-time communication), asynchronous (deferred analysis of transmitted medical data), and remote monitoring (ACOG, 2020). The COVID-19 pandemic notably accelerated the adoption of telehealth in prenatal care, prompting healthcare systems to adapt by substituting a portion of traditional in-person visits

with virtual consultations while maintaining the overall number of antenatal appointments (Nakagawa, 2020). In most implementations, face-to-face visits are strategically scheduled at key pregnancy milestones, including the initial visit, the 28-week mark, and 36 weeks of gestation, where comprehensive planning for childbirth often occurs.

Patient satisfaction with telehealth during pregnancy has been consistently reported as high across various studies. Konnyu et al. (2023) explored the experiences of 251 pregnant women using telehealth, identifying that while some concerns persisted—such as delays in receiving timely information, increased personal responsibility due to fewer visits, and safety considerations—patients generally felt that telehealth could be better tailored to meet their needs compared to traditional care. Ghimire et al. (2023) extended this analysis through a comprehensive review encompassing over 15,000 pregnant women from 23 studies conducted between 2011 and 2021. Their findings indicated a clear preference for video conferencing over telephone consultations, highlighting the importance of straightforward, flexible, and user-friendly technologies. Additionally, women favored telehealth when it was offered in their native language and expected it to be more cost-effective than conventional prenatal care. The study also revealed a strong preference for a hybrid model combining in-person and virtual visits (Ghimire et al., 2023).

Despite these positive insights, several barriers to telehealth utilization were identified. Ghimire et al. (2023) noted significant obstacles, including inconsistent internet access, limited digital literacy, language barriers, privacy concerns, and a perceived lack of empathy from providers. Other studies corroborated these findings, emphasizing technological challenges and a reduced sense of connection between patients and clinicians as critical limitations of telehealth (Davis, 2022). However, the review also highlighted enablers of telehealth adoption, such as improved access to care, reduced travel time and work absences, enhanced self-management capabilities, cost savings, minimized exposure to COVID-19, and increased patient confidence and engagement.

The provider perspective on telehealth also reflects overall positivity, though concerns remain. Konnyu et al. (2021) included 674 healthcare providers in

their review, found that many valued telehealth for its convenience and the ability to optimize clinic time for high-risk pregnancies. Hofmann et al. (2022) surveyed 56 maternity care providers, reporting that most found telehealth feasible (94%), appropriate (80%), and acceptable (83%). In addition, a significant proportion of providers expressed satisfaction with telehealth, with 89% favoring its continued use in future practices (Hargis-Villanueva et al., 2022). However, concerns included inadequate equipment, insufficient clinic support, poor quality of images and sound, and apprehensions about the potential for telehealth to exacerbate existing healthcare inequities (Hofmann, 2022; Holman, 2023).

The synthesis of these findings underscores the potential of telehealth as a transformative approach in antenatal care, offering benefits such as enhanced patient satisfaction, cost reduction, improved accessibility, and overall efficiency in healthcare delivery. However, to fully realize these benefits, it is essential to address the technological, educational, and systemic challenges associated with telehealth. Ensuring equitable access, enhancing technological infrastructure, and providing comprehensive training for both patients and providers are critical steps in optimizing telehealth integration into antenatal care models. This approach not only promises to improve clinical outcomes but also addresses the psychosocial needs of pregnant women, thereby enhancing their overall well-being during pregnancy.

CONCLUSION AND SUGGESTION

The literature review of the literature reveals that telehealth serves as an effective modality for pregnancy care, particularly in facilitating online face-to-face consultations that bridge geographical barriers and provide continuous support to expectant mothers. Evidence from multiple studies indicates that telehealth enhances patient satisfaction by offering a flexible, accessible, and personalized approach to healthcare, which is often perceived as more convenient than traditional in-person visits. This model of care not only addresses immediate healthcare needs but also fosters a sense of empowerment and psychological well-being among pregnant mothers, as it allows for frequent and timely communication with healthcare providers.

Furthermore, the integration of telehealth into pregnancy care has been shown to reduce overall healthcare costs by minimizing the need for physical visits, thus conserving time and financial resources for patients and providers alike. The efficiency gained through telehealth is further reflected in the improvement of healthcare quality, as it enables more consistent monitoring and rapid response to emerging concerns, contributing to better maternal and fetal outcomes. Importantly, the positive impact on psychosocial well-being extends beyond clinical effectiveness, as telehealth supports mental health by reducing stress associated with logistical challenges and enhancing the overall pregnancy experience. These findings underscore the potential of telehealth to transform pregnancy care by making it more patient-centered, cost-effective, and high-quality care, ultimately improving the holistic well-being of pregnant women.

DECLARATION

Conflict of Interest

The authors declare that there is no conflict of interest in this research.

Authors' Contribution

All contributors were involved in every stage of the research, from the initial concept to the drafting of the article.

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Ethical Approval

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Data Availability

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Acknowledgments

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