

The Relationship Between Knowledge and Adherence of First-Trimester Pregnant Women Regarding Folic Acid Usage in Independent Medical Practices, Kediri City

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Abstract

Pregnancy is a critical period requiring optimal nutritional intake, particularly folic acid. This nutrient is vital for DNA synthesis and red blood cell formation, playing a crucial role in preventing maternal anemia and severe congenital abnormalities, such as Neural Tube Defects (NTD). Folic acid deficiency contributes to increased maternal and neonatal mortality. A mother's knowledge regarding pregnancy supplements is a potential key determinant that correlates strongly with compliance behavior. This study aimed to analyze the relationship between the level of knowledge and compliance regarding folic acid use among first-trimester pregnant women. This analytical observational study employed a cross-sectional approach at Independent Medical Practices in Kediri City. A total of 67 first-trimester pregnant women were selected using purposive sampling. Research instruments included a validated 18-item knowledge questionnaire and a 12-item compliance questionnaire utilizing the Adherence to Refills and Medications Scale (ARMS). Data were analyzed using the Spearman correlation test. The findings indicated that the majority of respondents possessed good knowledge and exhibited a high level of compliance with folic acid consumption. Statistical analysis confirmed a significant relationship between knowledge and compliance regarding folic acid use among first-trimester pregnant women ($p < 0.05$). Higher levels of maternal knowledge regarding the importance of folic acid are significantly associated with increased consumption compliance. Since good knowledge serves as a reliable indicator of adherence, continuous health education programs must be strengthened. Enhancing maternal understanding is essential to support compliance and ultimately prevent serious pregnancy complications and improve neonatal outcomes.

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BACKGROUND

Pregnancy is a crucial period that begins with the union of an egg cell (oocyte) and sperm (spermatozoa), resulting in the development of an embryo or fetus within the uterus (womb). Pregnancy is a time that requires special attention to nutritional needs due to physiological changes and the development of the fetus inside the womb. Increased intake of energy and nutrients is highly necessary to support the mother's health and the optimal growth and development of the fetus (51). Consuming nutritious foods, including carbohydrates, protein, fats, vitamins,

and minerals, is essential for the mother's health during pregnancy, and these needs exceed those in the non-pregnant state (33)(8). During this period, the mother's nutrient and energy requirements increase significantly (51)(32).

One of the crucial micronutrients during pregnancy is folic acid. The World Health Organization (WHO) strongly recommends that all pregnant women take folic acid supplements daily (50). Foods containing folic acid include legumes, oranges, and various green fruits and vegetables (37). Women of childbearing age and pregnant women require a daily dosage of folic acid

ranging from 400 to 600 micrograms. Folic acid plays a vital role in red blood cell formation and is the only vitamin whose requirement doubles during pregnancy (21) (49). Folic acid holds an essential function in producing red blood cells and synthesizing DNA. A deficiency of this nutrient can lead to fatigue, lethargy, and a high risk of anemia during pregnancy, which contributes to increased maternal and newborn mortality (21).

Folic acid deficiency in pregnant women has serious health consequences, including anemia—characterized by symptoms of easy fatigue, lethargy, and paleness—as well as an increased risk of congenital diseases and infant mortality (21). Inadequate nutrition, including a lack of folic acid, can also increase the number of babies born with congenital defects (51). One of the most important complications that can be prevented with adequate folic acid supplementation is lowering the risk of preeclampsia and Neural Tube Defects (NTD), such as Spina Bifida (incomplete closing of the spine) and Anencephaly (the absence of a major portion of the brain) (42)(49). Neural tube formation occurs very early, around the sixth week of pregnancy, making folic acid consumption most effective if started well before conception (4–8 weeks prior) (3).

While the role of folic acid is widely recognized as essential for pregnant women, the rate of anemia cases among expectant mothers remains a major global health issue. The high incidence of this anemia contributes to the risk of maternal mortality during pregnancy (38). The WHO estimates that in 2022, approximately 40% of all pregnant women across the globe suffered from anemia, accounting for 32 million cases globally and 27% in the Southeast Asia region (40). In developing countries, the prevalence tends to be higher, reaching an average of 52% among pregnant women (19) (43). Data in Indonesia itself shows an alarming figure, with 40%–50% of pregnant women affected by anemia (53)(11). Furthermore, the lack of knowledge among pregnant women regarding the folic acid content in food also poses a challenge (Indonesian Ministry of Health). On the other hand, the congenital abnormality rate is recorded at 15

cases per 1,000 births, with NTD being a commonly reported case (42).

Efforts to prevent this problem do not solely rely on the availability of supplements but also on pregnant women's knowledge and adherence to consuming folic acid. The low level of understanding among pregnant women regarding the importance of folate intake is one of the contributing factors to the high rate of pregnancy complications, including congenital abnormalities such as spina bifida and anencephaly (42). Good knowledge about the benefits of prenatal vitamins, such as folic acid, will encourage higher adherence, allowing pregnant women to avoid complications during pregnancy and childbirth (5). Conversely, a lack of adequate information or understanding can lead to negligence in consuming supplements, resulting in the emergence of complications during pregnancy (29). Research examining the level of knowledge among pregnant women and their adherence to consuming folic acid found that in the first trimester, 40% of the sample had sufficient knowledge and 60% had good knowledge, with a sample of 42 first-trimester pregnant women at Sorong City Public Health Center. The adherence level was 14.3% non-adherent and 85.7% good adherence (25). This contrasts with research conducted by (21) at BPM Sri Rejeki Karanganyar, which found that 66% had poor knowledge and 2% had good knowledge, with a sample of 36 first-trimester pregnant women.

Adherence to consuming folic acid supplements occurs when pregnant women comply with the healthcare provider's recommendation to take the folic acid supplement. The adherence level is measured by the quantity of supplements consumed, the correct method of consumption, and the frequency of daily use (18). The results of research conducted by (25) indicate that there is a significant relationship between the knowledge level of first-trimester pregnant women and their adherence to consuming folic acid. This was proven through the Spearman correlation test with a value of $p=0.036$ ($p<0.05$). The conclusion is that a higher level of maternal knowledge

correlates with a greater likelihood for them to regularly consume the supplement (25).

Health behavior is influenced by three main factors: predisposing factors (such as knowledge and attitudes), enabling factors (availability of resources and facilities), and reinforcing factors (social and family support). This theory is widely used in health promotion efforts through the PRECEDE-PROCEED framework to analyze behavior and design appropriate interventions (13)

There has been a shift in human thought patterns over time, which has influenced levels of knowledge and behavior. Generation Z has distinct characteristics compared to previous generations. Therefore, research is crucial to uncover current facts regarding levels of knowledge and compliance among groups with varying respondent characteristics.

This study is expected to complement previous research data by exploring the supporting factors and barriers that prevent pregnant women from using iron and folate supplements. Therefore, this data can be used to formulate educational strategies to increase knowledge and compliance with folic acid use among pregnant women.

Based on the problems outlined, this study aims to analyze the relationship between knowledge and adherence among first-trimester pregnant women regarding the use of folic acid in Independent Medical Practices in Kediri City.

METHODS

Research Design

The design used is analytic with a cross-sectional study approach, where data collection or observation is performed simultaneously at one point in time (25).

Population and Sample

The population in this study consisted of pregnant women in their first, second, and third trimesters of pregnancy at in Independent Medical Practices dr. Nur Aini Fatah, Sp. OG. Sample selection was done using a purposive sampling technique, with inclusion criteria being first-trimester pregnant

women who regularly consumed folic acid, and exclusion criteria for pregnant women experiencing mental disorders or who were currently ill. The Slovin formula was used to calculate the minimum sample size for the study. The margin of error used was 10%, resulting in a total of 67 respondents. Given the small sample size, to avoid bias in the results, researchers stratified the population by age (Gen Z and Millennials) in the hope of representing the population group.

Research Instrument

The questionnaire was the research instrument used to assess the respondents' knowledge and adherence to folic acid consumption during the first trimester of pregnancy; this instrument has met the standards for validity and reliability.

The questionnaire contained 18 statement items to measure respondents' knowledge regarding the use of folic acid, covering the definition of folic acid, its benefits, side effects, requirements, consumption rules, the appropriate time for consumption, the consumption period, the impact of folic acid deficiency, and external impacts on pregnancy. The response options used a Guttman scale of 'true' – 'false,' where a validity test conducted on 30 respondents yielded results >0.306 . If $r_{count} > r_{table}$ with an alpha of 0.1 (10%), the questionnaire is considered valid (4). A reliability test was performed on the questionnaire items declared valid. The reliability test result for the knowledge questionnaire was 0.799. A questionnaire is declared reliable if the Cronbach's Alpha value is ≥ 0.60 (4).

The adherence questionnaire contained 12 questions used to measure adherence to folic acid supplement use and adherence to refilling folic acid prescriptions. The ARMS (Adherence to Refills and Medications Scale) questionnaire was translated into Indonesian and adapted to measure adherence to folic acid usage. This questionnaire underwent both validity and reliability testing. The validation test results showed that $r_{count} > 0.306$, meaning the questionnaire was considered valid. The reliability test result for this questionnaire was $0.893 \geq 0.60$, thus indicating that the questionnaire is reliable.

Data Analysis

Univariate analysis was conducted to describe the data collected from the research by calculating the percentage results for each variable (22). Univariate analysis was applied to describe the profile of the respondents, covering age, gestational age, occupation, and education, as well as to assess the level of knowledge and the level of adherence.

The relationship between the independent and dependent variables was explained through bivariate analysis. In this context, this study uses the Spearman correlation test to see the relationship between knowledge and compliance. It was established that a significant (meaningful) relationship exists if the p-value is less than or equal to 0.05 (≤ 0.05), and no significant relationship exists if the p-value is greater than 0.05 (> 0.05) (20). Then continues with an ordinal logistic regression test to see how much knowledge can predict a mother's chances of being compliant. Logistic regression analysis was conducted in two stages: (1) Crude (bivariate) analysis – simple logistic regression of knowledge on compliance without covariates, resulting in a Crude OR; and (2) Adjusted (multivariate) analysis – multiple logistic regression by including confounding variables (age, gender, duration of illness), resulting in an Adjusted OR. Confounding is declared significant if the difference between the Crude OR and Adjusted OR is $\geq 10\%$ (44)

RESULTS AND DISCUSSION

The pregnancy period is crucial because it determines and influences the quality of future human resources. This is because the growth and development of the child closely depend on the health of the fetus in the womb. Therefore, good physical condition and adequate nutritional status in pregnant women will ensure the fulfillment of fetal nutrition and the safety of the mother during the delivery process (7).

During pregnancy, there is a significant increase in nutritional requirements; for instance, the need for folic acid increases by 100%, protein by 68%, calcium by 50–60%, and iron sees the highest jump, at 200–300% (20). Folic acid is the synthetic form of

vitamin B9 and is water-soluble. Although its natural sources can be obtained from daily foods, the synthetic form of folic acid is often utilized as a dietary supplement. For pregnant women, folic acid is highly important because it plays a role in the formation process of one-third of red blood cells and also various uterine tissues (womb) (2).

The sample for this study consisted of 67 respondents, who were first-trimester pregnant women recorded as consuming folic acid supplements at Independent Medical Practices in Kediri City. The description of the respondents' characteristics in this study includes age, gestational age, occupation, and education.

Table 1. Characteristics of Pregnant Women Respondents

No	Respondent characteristics	Frequency (n=67)	Percentage (%)
Age			
1.	17-25 (Gen Z)	27	40,3
	26-29 (Gen Z)	35	52,2
	30-45 (Millennials)	5	7,5
Highest Level of Education			
2.	Elementary school	0	0
	Junior high school	1	1,5
	Senior High School	36	53,7
	Bachelor	30	44,8
Occupation			
4.	Housewife	25	37,3
	Government employees	9	13,4
	Entrepreneur/self-employed	34	49,3
Gestational age			
5.	1 – 4 weeks	4	6,0
	5 – 8 weeks	40	59,7
	9 – 12 weeks	23	34,3

Table 1 shows that among first-trimester pregnant women, the age group 17–25 years comprised 27 respondents (40.3%), the largest group was in the 26–35-year range with 35 respondents (52.2%), and the fewest respondents were in the 36–45-year age group with 5 respondents (7.5%). This dominance of age aligns with the theory stating that 20 years is the ideal age for a first

pregnancy. The age range of 20 to 35 years is considered safe for the processes of pregnancy, labor, and the postpartum period because, at this age, the mother generally has prime physical condition, a strong uterus to carry the fetus, and mental maturity for pregnancy care (31).

The most frequent final education level among the 67 respondents, with a frequency of 60, was senior high school/vocational school with a percentage of 53.7%. In contrast, the lowest frequency for the respondents' final education was the junior high school level, with a percentage of 1.5%. This is consistent with the theory stating that education is an effort to improve capabilities, including health understanding, as a higher level of education tends to make it easier for a person to receive information and understand health issues (25).

Regarding the occupational characteristics of the 67 respondents, 25 respondents (37.3%) were homemakers, 9 respondents (13.4%) worked as civil servants, and 34 respondents (49.3%) worked as entrepreneurs/self-employed. Pregnant women who are entrepreneurs or self-employed tend to have broader knowledge compared to homemakers and university graduates due to factors such as a work environment that requires social interaction and decision-making, high motivation to maintain health to remain productive, and supporting experience and education that encourages more active information seeking (28). Regarding the gestational age characteristics, 4 respondents (6.0%) had a gestational age in weeks 1–4, 40 respondents (59.7%) had a gestational age in weeks 5–8, and 23 respondents (34.3%) had a gestational age in weeks 9–12. According to the respondents' statements, at that gestational age, the respondents had just undergone an examination and found out that their gestational age was already in the 5–8-week range. Some other reasons included an irregular menstrual cycle and a late period, which prompted the mothers to immediately consult an obstetrician. This finding is supported by previous research showing that the majority of women only realize their pregnancy when the gestational age has reached 5 to 6 weeks (17).

Table 2. Knowledge level results

No.	Score	Category	Number of respondents
1.	76% -100%	Good	34
2.	56% -75%	Enough	23
3.	<56%	Less	11

Based on the research results in Table 2, the knowledge results for first-trimester respondents showed that 34 out of 67 respondents, with a percentage of 49.3%, were in the good category. Furthermore, 23 respondents, with a percentage of 34.3%, were in the sufficient category, and 11 respondents, with a percentage of 16.4%, were in the poor category.

For the folic acid definition indicator, statement 1, 52 out of 67 respondents (78%) knew that the other name for the folic acid supplement is vitamin B9. This aligns with previous research explaining that folic acid is the synthetic type of vitamin B9 and is water-soluble (17). In statement 2, 47 respondents (70%) knew that folic acid is the synthetic form of folate needed by the body. This is supported by research explaining that folic acid is produced synthetically in the form of supplements or added through fortification into additional food products, such as cereals and milk (26). The respondents explained that they learned about the alternative name for folic acid and that folic acid is a synthetic form of folate from health articles and some from health education programs they attended. Respondents obtained information from various sources, leading many respondents to select the correct answer.

For the folic acid benefits indicator, in statement 3, 51 respondents (76%) knew that regularly consuming folic acid supplements during pregnancy can reduce the risk of birth defects in the fetus. The occurrence or recurrence of birth defects can be prevented by providing folic acid before and during early pregnancy. Folic acid supplements can enhance the survival and quality of life of the fetus during pregnancy (35). A total of 47 respondents (70%) answered correctly on statement 4 regarding the function of folic acid in preventing brain and spinal cord defects. However, 20 respondents still answered incorrectly,

indicating they were unaware of the vital benefits of folic acid. According to (49), a lack of this nutrient, which is one of the important nutrients during pregnancy, has the potential to cause damage to the brain and brainstem.

For the drug side effects indicator, in statement 5, 52 respondents (78%) answered correctly that a side effect of consuming folic acid supplements is causing nausea. According to (18), side effects such as nausea, vomiting, constipation, diarrhea, and stomach pain are felt by mothers when consuming folic acid supplements. These reactions even prompt them to reduce or stop consuming the supplements without consulting a healthcare professional. In statement 6, 52 respondents (78%) knew that side effects from folic acid usually do not occur if consumed according to the doctor's recommended dosage. Folic acid is recommended to be taken at night to alleviate the nausea that often occurs after consumption, as the appropriate time to take the supplement is at night closer to bedtime. Experiencing nausea when consuming folic acid was reported by almost all respondents, but this complaint can be reduced if consumed according to medical instructions (41).

For the folic acid requirement indicator, in statement 7, 42 respondents (63%) knew that consuming foods containing folic acid (green vegetables such as spinach, mustard greens, fruits such as oranges, and legumes) is still insufficient to meet the daily folic acid requirement, thus making it necessary to consume folic acid supplements. This is supported by research stating that if the folic acid requirement is not met through food sources, pregnant women are advised to consume folic acid tablets as supplementary support to ensure adequate intake throughout the pregnancy period (17). In statement 8, out of 67 respondents, 44 respondents (66%) knew that folic acid consumption is not only necessary during the first trimester of pregnancy, while 23 respondents (34%) chose that folic acid consumption is only needed during the first trimester of pregnancy. Folic acid needs to be consumed before and during the early phase of embryo development. Therefore, folic acid supplements must be taken during the periconceptional period (a few months before

conception) and continued until the stage of embryogenesis in pregnancy is completed or resolved (25).

For the consumption rules indicator, in statement 9, 40 respondents (60%) answered correctly, indicating that respondents know the recommended dosage of folic acid for first-trimester pregnant women is 400–600 mcg. This aligns with the research findings of (16), which found that the daily folic acid requirement for women of childbearing age and first-trimester pregnant women ranges from 400 to 600 micrograms. In statement 10, 52 respondents (78%) answered correctly that folic acid is taken once a day with a composition of 400 mcg per tablet. The rule for taking folic acid is once a day, in accordance with the first-trimester dosage. The folic acid requirement for first-trimester pregnant women is around 400–600 micrograms per day (17).

For the appropriate time for consumption indicator, in statement 11, 52 respondents (78%) answered appropriately, and in statement 12, 51 respondents (76%) answered correctly. The appropriate time to consume folic acid supplements is after a meal and starting consumption routinely during the period before and throughout pregnancy (26). Research conducted by (39) added that folic acid is highly crucial, especially at the beginning of pregnancy, because the baby's nervous system is in the formation stage during that period.

The consumption period indicator is covered in statements 13 and 14. In statement 13, 43 respondents (64%) answered correctly, and in statement 14, 53 respondents (78%) answered correctly. Folic acid is not consumed only in the first trimester but is consumed before pregnancy begins and throughout the pregnancy process. Folic acid is needed even before the start of the pregnancy process. It is recommended for women to consume 400–600 micrograms of folic acid every day, starting at least three months before conception occurs (17). Folic acid supplementation starting from the preconception period is proven to be able to reduce various pregnancy risks, such as lowering the incidence of maternal anemia, minimizing the risk of preeclampsia, and reducing the incidence of Neural Tube

Defects (NTD) in the fetus (30). Folic acid supplementation during pregnancy is proven effective in blocking almost all occurrences of neural tube defects (3).

For the impact of folic acid deficiency indicator, in statement 15, 45 respondents (67%) answered correctly, and in statement 16, 54 respondents (81%) answered correctly. The consequence of not regularly consuming folic acid supplements can cause the risk of birth defects in the fetus and can lead to premature birth. The increased need for folate during pregnancy occurs because this nutrient is essential in supporting and accelerating the growth and development of the fetus. Since folic acid plays a crucial role, it must be consumed routinely according to the doctor's prescription for the prevention of congenital defects. Thus, pregnant women must be more aware and vigilant about the importance of folic acid consumption to avoid the occurrence of congenital abnormalities (52). Low folate status during pregnancy is associated with various negative health impacts, including the risk of congenital heart defects, oral clefts (cleft lip/palate), fetal growth restriction, low birth weight conditions, and also premature birth (3).

The external impact indicator is covered in statements 17 and 18. The respondents who answered correctly were 55 respondents (82%) and 59 respondents (88%), respectively. This indicates that most respondents know and are aware of the dangers of cigarette smoke if inhaled by pregnant women and that consuming alcohol during pregnancy is very dangerous. Smoking poses a great risk to smokers and their surroundings. The large number of smokers who disregard their environment leads to high exposure to cigarette smoke for others, including vulnerable pregnant women. Pregnant women who are passive smokers will experience an increase in carbon monoxide levels up to 5 times and nicotine and tar up to 4 times in their bodies, which potentially triggers premature birth (9).

In general, exposure to cigarette smoke during pregnancy poses adverse effects on the fetus and can lead to various complications in passive smokers, such as abortion, placental abruption, placenta previa, placental insufficiency, premature birth, fetal

defects, and low birth weight. Nevertheless, the risk of stillbirth is much higher in pregnant women who are active smokers compared to passive smokers (9). Consuming alcohol can also cause birth defects in the unborn baby (23). Alcohol can cross the placenta, and the metabolism of alcohol in the fetus is twice as slow as in the mother. Alcohol consumption during pregnancy, being a teratogenic substance, can cause problems in pregnancy and puts the mother at risk; in pregnant women, this effect can lead to premature labor and spontaneous abortion in the early trimester (14).

In the study conducted at Independent Medical Practices in Kediri City, in table 3 the results obtained for the respondents' level of adherence to folic acid use showed that the majority of pregnant women were highly adherent to consuming folic acid supplements, totaling 58 respondents (86.6%). A total of 7 respondents (10.4%) were in the moderate adherence category, and 2 respondents (3.0%) were in the low adherence category.

Table 3. Compliance score results

No.	Score	Category	Percentage (%)
1.	12 - 16	High	86,6
2.	17 - 32	Medium	10,4
3.	34 - 48	Low	3,0

In statement 1, 47 respondents (70.1%) answered 'never,' indicating that the majority of respondents never miss taking folic acid supplements. Pregnant women must consume folic acid routinely and must not skip it during the period before and throughout pregnancy (26). Five respondents (7.5%) answered 'sometimes,' and 15 respondents (22.4%) answered 'always.' According to the respondents' accounts, they sometimes still miss the schedule for taking folic acid. The reason given by some respondents was that they missed or forgot to take folic acid due to daily activities or busyness, as almost all respondents are working. Infrequent folate intake is often due to the mother's demanding condition and dense activity schedule, causing them to forget to consume folic acid (17).

In Question 2, the highest percentage, with 56 respondents (83.6%), answered 'never,' indicating that the majority of respondents never decided to stop taking folic acid. Folic acid is very important and necessary to prevent the risk of congenital abnormalities such as neural tube defects, anemia, and to support optimal fetal development. Therefore, there is no reason for mothers to discontinue the use of folic acid supplements throughout the pregnancy (52). Six respondents (9.0%) answered 'sometimes,' 2 respondents (3.0%) answered 'often,' and 3 respondents (4.5%) answered 'always.' According to the respondents' accounts, some intentionally decided not to take folic acid. The researcher found that some mothers could not tolerate the nausea when consuming folic acid. Mothers experienced side effects from folic acid consumption such as nausea and vomiting (41). Factors that cause pregnant women not to adhere to consuming folic acid include: dislike of the tablet's taste and smell, feeling lazy, forgetfulness, and a lack of knowledge or unawareness of the supplement's importance (34). The highest percentage in question 3, with 63 respondents (94.0%) answering 'never,' indicates that the majority of respondents never forgot to refill their prescription due to their awareness of the importance of folic acid supplements during pregnancy. In a study conducted in Kebonagung Village, some pregnant women showed high adherence to consuming folic acid supplements to maintain their own health and that of the fetus, thus they never forgot to refill their folic acid supplement prescription (39). One respondent (1.5%) answered 'sometimes,' and 3 respondents (4.5%) answered 'always.' Some mothers who answered 'sometimes,' 'often,' and 'always' had irregular schedules, such as dense daily routines that could cause pregnant women to forget to refill their folic acid prescription. This is supported by research conducted by (1), which explained that non-adherence can also occur due to a lack of knowledge regarding the importance of adherence and patients' dense schedules.

The highest percentage in question 4, with 60 respondents (89.6%) answering 'never,' indicates that they never ran out of

folic acid supplements. Due to the awareness of the importance of folic acid during pregnancy, the increased need for folic acid during pregnancy encourages mothers to routinely consume supplements so that their daily requirement of 400–600 mcg is met, especially in the first trimester which is very crucial for fetal development (17). Respondents who answered 'sometimes' totaled 4 respondents (6.0%), and those who answered 'always' totaled 3 respondents (4.5%). This is because mothers who frequently run out of folic acid supplements are related to their level of knowledge regarding the importance of folic acid during pregnancy and the economic status of the pregnant mother, leading to frequent shortages (6).

In Question 5, the highest percentage, with 59 respondents (88.1%) answering 'never,' shows that they never skip taking a dose of folic acid. This finding is reinforced by the research of (31), which concluded that the high awareness of pregnant women regarding the importance of folic acid for maternal and fetal health is the main driving factor. Because of a good understanding of the benefits of folic acid—such as the prevention of neural tube defects (NTD), anemia, and other pregnancy complications—mothers become committed to consuming folic acid supplements routinely according to the dosage prescribed by a doctor or pharmacist, and never miss a single dose. A total of 8 respondents (11.9%) stated 'sometimes' in their consumption of folic acid. This can be explained by several factors, namely a busy schedule, the effects of nausea experienced during pregnancy, and a lack of education or in-depth understanding of the importance of regular folic acid consumption (34).

"The highest percentage (6%), with 58 respondents (86.6%), answered 'never'. This indicates that the majority never miss taking folic acid supplements when they feel better. Folic acid has a crucial role in supporting fetal brain and nervous system development, especially during the first trimester of pregnancy, and therefore, consumption must be consistent even if the mother feels healthy (49). Respondents who answered 'sometimes' amounted to 9 respondents (13.4%), which implies

that there are still respondents who do not take folic acid when they feel well. It can be concluded that mothers who do not take folic acid still lack understanding regarding the importance of folic acid supplements during pregnancy to support the gestational period (52)."

"For Question 7, out of 67 respondents, the highest percentage (97.0%), representing 65 respondents, answered 'never'. The majority of respondents do not miss consuming folic acid even when they are sick. Meanwhile, 2 respondents (3.0%) admitted to taking the supplement only 'sometimes,' indicating that some pregnant women are still not taking it routinely. This inconsistency is influenced by several factors: side effects (nausea, vomiting, constipation, diarrhea, abdominal pain); reducing or stopping the supplement without consulting a healthcare professional (Doctor, Midwife, Nurse); feeling burdened to take vitamin supplements every day; or forgetting to take them because the recommended consumption time is at night (41)."

For Question 8, there were 64 respondents (95.5%) who answered 'never,' and 3 respondents (4.5%) who answered otherwise. Folic acid is an essential nutrient that must be consumed consistently throughout pregnancy because mothers understand the importance of folic acid for fetal health during gestation (17). Factors that can cause pregnant women to miss taking folic acid include laziness or stress. A person's adherence to medication is influenced by various factors. These factors include psychological conditions (such as depression), a personality tending towards low self-esteem and pessimism, limited insight, and laziness, all of which can decrease the level of adherence to treatment (13).

For Question 9, the highest percentage answered 'never,' totaling 64 respondents (95.5%). Respondents who answered 'sometimes' amounted to 3 respondents (4.5%). Adherence to the recommended dosage facilitates monitoring and reduces the risk of side effects. Changing the dosage without consulting a doctor is strongly discouraged because excessive consumption can lead to risks. A pregnant mother's adherence to vitamin

supplementation is a form of behavior based on compliance with the instructions and rules conveyed by healthcare professionals (41).

For Question 10, the most frequent answer was 'never,' chosen by 63 respondents (94.0%). The rule for taking folic acid is once a day, adhering to the first-trimester dosage. Pregnant women in the first trimester require approximately 400 to 600 micrograms of folic acid daily (3). There were 4 respondents (6.0%) who reported taking folic acid 'sometimes,' which suggests that some of these pregnant mothers are still consuming folic acid more than once the recommended dosage. Therefore, the role of the husband or family members is highly necessary to remind and support pregnant women. The aim is to ensure the pregnant mother does not forget to consume or exceed the established dose of folic acid (46). Family support plays a vital role in increasing patient adherence to treatment. One concrete form of this support is by providing a family member as a medication monitor, as patients who do not have a monitor tend to be less compliant with therapy. The monitor's tasks include: reminding and accompanying the patient in regular medication consumption, as well as maintaining diet and physical activity to prevent complications (27).

For Question 11, 63 respondents (94.0%) answered 'never'. This is supported by the availability of various brands and prices of folic acid supplements on the market at a relatively affordable price. There were 4 respondents (6.0%) who answered 'sometimes'. This is also influenced by one of the adherence factors, namely the socioeconomic factor of economic income. Low income and financial constraints can cause non-adherence to treatment. Consequently, only a few mothers did not purchase folic acid due to the high cost (13).

For Question 12, 37 respondents (55.2%) answered 'never'. This suggests that there is still a lack of awareness and commitment among mothers to consistently maintain a sufficient supply of folic acid supplements without having to wait until they run out. Lack of support from healthcare providers and incomplete healthcare service features cause patients to forget or be hindered

from receiving optimal treatment, while poor accessibility leads to patients being delayed in filling their prescriptions (27). Meanwhile, for mothers who answered 'sometimes' (13 respondents, 19.4%), 'often' (11 respondents, 16.4%), and 'always' (6 respondents, 9.0%), this indicates that these respondents understand the importance of folic acid supplements during pregnancy and demonstrate full awareness of maintaining a supply of supplements before they run out. This can be fostered by the responsiveness of healthcare workers and the availability of supplements to increase treatment adherence and make it easier for mothers to purchase and consume them consistently (13).

Table 4. Cross-tabulation between the Relationship between Knowledge Level and Adherence

Knowledge	Compliance						Total	
	High		Medium		Low		n	%
	n	%	n	%	n	%		
Good	31	46,27	2	2,99	0	0,00	34	34
Enough	18	26,87	5	7,46	0	0,00	23	23
Less	9	13,43	0	0,00	2	2,99	11	11
	58	86,57	7	10,45	2	2,99	67	100

The cross-tabulation shows that, among first-trimester pregnant women with high adherence, there were 31 mothers (46.27%) who had good knowledge, 18 mothers (26.87%) who had sufficient knowledge, and 9 mothers (13.43%) who had poor knowledge. First-trimester pregnant women who had moderate adherence with a good knowledge level amounted to 2 people (2.99%), moderate adherence with a sufficient knowledge level amounted to 5 people with a percentage of 7.46%, while the poor knowledge level category had 0 respondents (0%). First-trimester pregnant women with low adherence were not found (0 respondents or 0%) in the good knowledge and sufficient knowledge categories, but they were found in the poor knowledge category, totaling 2 respondents (2.99%).

Based on Table 5, the results of the cross-tabulation show that 31 respondents (46.27%) had good knowledge and high adherence.

This suggests that the higher the respondent's level of knowledge about the benefits and importance of folic acid, the higher their level of adherence (25). It was also found that 2 first-trimester pregnant mothers (3.4%) had good knowledge but moderate adherence. Additionally, 18 respondents (19.9%) had sufficient knowledge and high adherence. Mothers with poor knowledge and high adherence amounted to 9 respondents (9.5%). Only two respondents (0.3%) had poor knowledge and also demonstrated low adherence. Although the number is small, this finding indicates that a lack of knowledge among pregnant women can cause them to be unaware of the importance of consuming folic acid during pregnancy, which ultimately lowers their level of adherence. Therefore, improving pregnant women's knowledge, especially regarding the benefits of folic acid for preventing pregnancy complications and supporting fetal development, is crucial and contributes significantly to increasing their adherence level (48).

Conceptually, this study examines only a single predictor (knowledge) without considering theoretically relevant mediating and moderating variables. According to the Health Belief Model (36) and Self-Determination Theory (12), factors such as self-efficacy, intrinsic motivation, and perceived barriers act as crucial mediators between knowledge and compliance behavior. This study only demonstrates the existence of an association, but it does not explain the underlying mechanisms or causal pathways.

Table 5. Spearman correlation test results between Knowledge and Adherence

Parameter	r_s	p-value	N	Kekuatan
Pengetahuan vs Kepatuhan	0,255*	0,037	37	Lemah

"The analysis results show a Spearman's correlation coefficient (r_s) of 0.255 with a significance value (p-value) of 0.037. Based on (45) guidelines for correlation strength, the r_s value of 0.255 falls within the 0.20–0.39 range, indicating a weak correlation. The direction of the correlation is positive, meaning that higher levels of respondent knowledge tend to be associated with increased compliance. This research finding is consistent with the study

results by (25), showed a p-value of 0.036 ($p < 0.05$). This value indicates a significant relationship between the level of knowledge of pregnant women and their adherence to consuming folic acid at the Malawei Public Health Center, Manoi District, Sorong City. This means that the lower the respondent's understanding of the benefits and importance of folic acid, the lower their level of adherence."

The value of $r_s = 0.255$ ($p = 0.037$) indicates a positive, weak, and statistically significant relationship between knowledge and compliance. As an effect size, an r_s of 0.255 corresponds to a small-to-medium effect based on (10) conventions, where $r = 0.10$ is categorized as small, 0.30 as medium, and 0.50 as large. This value implies that while the knowledge variable provides limited practical contribution in a bivariate context, it remains statistically meaningful within the study population ($n = 67$).

The Adjusted OR of 3.31 (95% CI: 0.65–16.88; $p = 0.149$) indicates that after controlling for age, gender, and duration of illness, 'Good' knowledge remains associated with 3.31 times higher odds of compliance compared to 'Poor' knowledge. However, the p-value of 0.149 (> 0.05) in the adjusted model suggests that this relationship is no longer statistically significant after controlling for covariates. This may be due to a decrease in statistical power resulting from the increased number of parameters in the model relative to the small sample size ($n = 67$).

"Good knowledge about iron or folic acid supplements increases adherence, and conversely, if knowledge is low, the level of adherence is also low. The test results demonstrate a directly proportional relationship between the level of knowledge and adherence among first-trimester pregnant women regarding folic acid usage: good knowledge tends to increase adherence to consuming folic acid, and conversely, poor knowledge is associated with lower adherence to folic acid consumption (24).

Tabel 6. Binary Logistic Regression Analysis Results – Crude Model (Without Covariates)

Variabel	B	SE	Crude OR	95% CI	p-value	Keterangan
Pengetahuan Baik vs Tidak Baik	1,253	0,744	3,50	0,82-15,04	0,037	Signifikan*

Crude analysis showed that respondents with good knowledge were 3.50 times more likely to be compliant than those with poor knowledge (OR 3.50; 95% CI 0.82–15.04; $p = 0.037$). Nevertheless, the wide confidence interval spanning 1 suggests significant imprecision in the estimate, potentially reflecting the small sample size of the non-compliant group ($n = 9$).

Table 7. Results of Multiple Logistic Regression Analysis – Adjusted Model (Controlling for Confounding Variables)

Variable	B	SE	Adjusted OR	95% CI	p-value	Perub. OR (%)	Confounding ?
Good Knowledge	1,197	0,832	3,31	0,65-16,88	0,149	5,4%	No*
Age (>40th)	0,693	0,756	2,00	0,46-8,77	0,358	-	-
Gender	0,405	0,761	1,50	0,34-6,68	0,595	-	-
Long Illness (> 5th)	0,981	0,821	2,50	0,50-12,50	0,265	-	-

CONCLUSION

The research findings conducted at Independent Medical Practices in Kediri City concluded that there is a significant relationship or correlation between the level of knowledge of first-trimester pregnant women and their adherence to consuming folic acid supplements. This correlation was statistically proven with a p-value of 0.004, which is less than the significance threshold ($p \leq 0.05$).

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REFERENCE

1. Ali, M. A., et al. (2017). Frequency and Predictors of Non-Adherence to Lifestyle Modifications and Medications After Coronary Artery Bypass Grafting: A cross-sectional study. *Indian heart journal*, 69(4), 469-473
2. Almatsier S. 2020. Prinsip Ilmu Gizi Dasar. Jakarta: PT. Gramedia Pustaka Utama
3. Amaliah, A. M., & Sari, R. D. P. (2021). Peran Asupan Asam Folat Maternal terhadap kejadian Neural Tube Defect pada Janin. *Medula*, 10(4), 599-605.
4. Anggraini, T. D., Susilowati, S., & Melati, R. I. (2021). Analisis Faktor Yang Mempengaruhi Pengetahuan Tenaga Teknis Kefarmasian Tentang Hepatitis B Di Kabupaten Sragen. *Indonesian Journal on Medical Science*, 8(1), 1-8. <https://doi.org/10.55181/ijms.v8i1.250>
5. Annaji, S., Eka Puspitasari, C., & Ulfa Yunandar, R. (2023). Korelasi Antara Penggunaan Asam Folat Terhadap Pengetahuan dan Sikap Ibu Hamil di Puskesmas Karang Pule Kota Mataram. *Jurnal Kesehatan Tambusai*, 4(3), 4236-4244.
6. Astriningrum, E. P., Hardinsyah, H., & Nurdin, N. M. (2017). Asupan Asam Folat, Vitamin B12, dan Vitamin C pada Ibu Hamil di Indonesia. *Jurnal Gizi Dan Pangan*, 12(1), 31-40. <https://doi.org/10.25182/jgp.2017.12.1.31-40>
7. Arisanti AZ & Melly L.S. (2022). Manfaat Asam Folat bagi Ibu Hamil dan Janin (Literature Review). *Jurnal Sehat Masada*. 2022;16(1):9-17. <https://doi.org/10.38037/jsm.v16i1.258>
8. Brink, L. R., Bender, T. M., Davies, R., Luo, H., Miketinas, D., Shah, N., Loveridge, N., Gross, G., & Fawkes, N. (2022). Optimizing Maternal Nutrition: The Importance of a Tailored Approach. In *Current Developments in Nutrition* (Vol. 6, Issue 9, pp. 1-14). <https://doi.org/10.1093/cdn/nzac118>
9. Choirunnisa, A., Febriyana, F., Sari, E. T. P., Ambarwati, N. M., & Nurdiantami, Y. (2022). PENGARUH ASAP ROKOK PADA IBU HAMIL: STUDI LITERATUR. *Jurnal Kesehatan Tambusai*, 3(2), 183-192. <https://doi.org/10.31004/jkt.v3i2.4597>
10. Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Lawrence Erlbaum Associates
11. Darmi, S., et al. (2024). "Pengaruh Pemberian Jus Alpukat Dan Buah Bit Terhadap Peningkatan Kadar Hb Pada Ibu Hamil Dengan Anemia Ringan," *Jurnal Kesehatan Tambusai*, 5(4), 10375-10381.
12. Deci, E. L., & Ryan, R. M. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268
13. Edi, I. G. M. S. (2015). Faktor-Faktor Yang Mempengaruhi Kepatuhan Pasien Pada Pengobatan. *Jurnal Ilmiah Medicamento*, 1(1), 1-8. <https://doi.org/10.36734/medicamento.v1i1.719>
14. Fitriana, K. R. (2019). Efek Konsumsi Alkohol dan Merokok pada Wanita Hamil. *Jurnal Ilmiah Kesehatan Sandi Husada*, 8(2), 234-237. <https://doi.org/10.35816/jiskh.v10i2.159>
15. Green, Lawrence (1980), "Health Education Planning: A Diagnostic Approach, The Mayfeld Publishing Co, The Jhon Hopkins University
16. Honaryati, H., Usman, N., & Ahmad, M. (2021). Literatur Review: Pengaruh Pemberian Supplement Folamil dan Tablet Zat Besi pada Ibu Hamil dengan Anemia terhadap Peningkatan Kadar Hemoglobin. *Faletehan Health Journal*, 8(03), 173-181. <https://doi.org/10.34746/fhj.v8i03.293>
17. Yanah, F. C., & Rahimah, H. (2024). Gambaran Pola Konsumsi Asam Folat Pada Ibu Hamil di Wilayah Kerja Sukorejo, Banyuputih, Situbondo. *Jambura Journal of Health Sciences and Research*, 6(3), 298-305. <https://doi.org/10.35971/jjhsr.v6i3.24725>

18. Irene Virda Sakina, Indah Laily Hilmi, S. (2022). Pengetahuan Pemberian Suplemen Vitamin dan Pemantauan Minum Obat pada Ibu Hamil Untuk Pencegahan Anemia di Indonesia: Literature Review. *Jurnal Farmasetis*, 11(3), 229–236.
19. Kondi, M. F., Berkanis, A. T., & Febriyanti, E. (2020). Faktor-Faktor Yang Mempengaruhi Anemia Pada Ibu Hamil Di Puskesmas Padediwatu Kabupaten Sumba Barat. *CHMK Midwifery Scientific Journal*, 1(1), 28–42. <http://cyberchmk.net/ojs/index.php/bidan/article/view/288>
20. Lestari LI. 2019. Pengaruh Asupan Asam Folat Terhadap Kejadian Preeklamsi. *Jurnal Ilmiah Kesehatan Sandi Husada*. 2019;8(2):85–9
21. Listianingsih, L., & Sab'ngatun, S. (2022). Pengetahuan Ibu Hamil Trimester I Tentang Asam Folat Di Bpm Sri Rejeki Karanganyar. *OVUM: Journal of Midwifery and Health Sciences*, 2(1), 35–44. <https://doi.org/10.47701/ovum.v2i1.2115>
22. Mahfusun Bone, Khatifah, U., Buton, L. D., & Ridwan, B. A. (2024). Hubungan Mutu Pelayanan Kefarmasian dengan Tingkat Kepuasan Pasien di Puskesmas Perumnas Kota Kendari. *Jurnal Pharmacia Mandala Waluya*, 3(2), 78–86. <https://doi.org/10.54883/jpmw.v3i2.98>
23. Makkiyah, F., Susantiningih, T., Zulfa, F., & Setyaningsih, Y. (2021). Tingkat Pengetahuan Konsumsi Asam Folat Pada Wanita Reproduksi Untuk Mencegah Penyakit Neural Tube Defect. *Jurnal Profesi Medika*, 4(1), 177–180.
24. Misriani, M. (2019). Hubungan Pengetahuan Dan Sikap Ibu Hamil Dengan Kepatuhan Konsumsi Tablet Besi (Fe) Di Puskesmas Hampan Perak Kabupaten Deli Serdang Tahun 2018. POLTEKkes KEMENKES Medan
25. Muhammad Fadhly Mulalinda, A., Ahmar, H., Jabiy, F., Suarsih, A., & Ernawati. (2024). Kepatuhan Ibu Hamil Trimester I Ditinjau dari Tingkat Pengetahuan dan Sikap dalam Konsumsi Asam Folat. *Jurnal Keperawatan Muhammadiyah*, 9(1), 85–92.
26. Mundari, R. (2020). Pengetahuan Ibu Hamil Tentang Manfaat Asam Folat Selama Kehamilan. *Jurnal Ilmu Gizi Indonesia (JIGZI)*, 1(2), 23–31. <https://doi.org/10.57084/jigzi.v1i2.815>
27. Mustaqimah, M., & Saputri, R. (2023). Review: Faktor Tidak Patuh Minum Obat Pada Pasien Diabetes Melitus. *Jurnal Farmasi SYIFA*, 1(1), 7–12. <https://doi.org/10.63004/jfs.v1i1.111>
28. Mutingah, Z., & Rokhaidah, R. (2021). Hubungan pengetahuan dan sikap ibu dengan perilaku pencegahan stunting pada balita. *Jurnal Keperawatan Widya Gantari Indonesia*, 5(2), 49–57.
29. Nurbaety, B., Hardiani, B. R., Nopitasari, B. L., Furqani, N., Fitriana, Y., & Sugara, T. H. (2024). Tingkat Kepatuhan Ibu Hamil Mengonsumsi Tablet Fe (ferrum) di Puskesmas Gunung Sari. *Lambung Farmasi: Jurnal Ilmu Kefarmasian*, 5(1), 103. <https://doi.org/10.31764/lf.v5i1.21304>
30. Rahayu, S. (2024). Pengetahuan Ibu Hamil Tentang Mengonsumsi Asam Folat Selama Kehamilan. *Jurnal Cahaya Mandalika ISSN 2721-4796 (online)*, 1237–1243
31. Ratnaningtyas, M. A., & Indrawati, F. (2023). Karakteristik Ibu Hamil dengan Kejadian Kehamilan Risiko Tinggi. *HIGEIA (Journal of Public Health Research and Development)*, 7(3), 344–344. <https://doi.org/10.15294/higeia.v7i3.64147>
32. Rilyani, R., & Sugiyati, L. (2021). Hubungan antara riwayat status gizi ibu masa kehamilan dengan pertumbuhan bayi usia 9-12 bulan. *Holistik Jurnal Kesehatan*, 14(4), 556–563. <https://doi.org/10.34024/hjk.v14i4.3516>
33. Rini Astuti. (2019). Gambaran Status Gizi Dan Asupan Zat Gizi Pada Ibu Hamil di Kota Semarang. *Journal Of Nutrition And Health*. 7(1), 40–45. <https://doi.org/10.14710/jnh.7.1.2019.40-45>
34. Rishel, R. A. (2020). Hubungan Pengetahuan dan Sikap Ibu Hamil terhadap Rendahnya Konsumsi Suplemen Asam Folat selama Kehamilan di Lubuk Basung tahun 2020. April.

35. Rofi'atunnisa'. (2020). Suplementasi Folat Dapat Menurunkan Risiko Cacat Tabung Saraf Pada Janin. *Jurnal Penelitian Perawat Profesional*, 2(November), 371-380.
36. Rosenstock, I. M. (1974). The health belief model and preventive health behavior. *Health Education Monographs*, 2(4), 354-386
37. Rositadinyati, A. F., Purwanti, L., & Faculty, P. H. (2020). *Ghidza: jurnal gizi dan kesehatan*. 4(1), 79-89.
38. Ruhayati, S., Setyowati, S., & Djannah, N. (2023). Hubungan Status Gizi dan Jarak Kehamilan dengan Kejadian Anemia pada Ibu Hamil di Wilayah Kerja Puskesmas Mantrijeron Kota Yogyakarta. *Jurnal Gizi Ilmiah*, 10(2), 26-34. <https://doi.org/10.46234/jgi.v10i2.1007>
39. Sa'diya, L. K. (2015). Motivasi Ibu Hamil Dalam Mengonsumsi Makanan Yang Mengandung Asam Folat Di Desa Kebonagung Kecamatan Porong Kabupaten Sidoarjo. *Jurnal Keperawatan*, 4(1), 53-57. <https://doi.org/10.47560/kep.v4i1.189>
40. Sadiman, S., & Yuliatwati, Y. (2024). Promosi Kesehatan Tentang Anemia Pada Ibu Hamil Di Pos Kesehatan Kelurahan Iringmulyo, Kota Metro, Lampung. *EJOIN: Jurnal Pengabdian Masyarakat*, 2(5), 841-847. <https://doi.org/10.55681/ejoin.v2i5.2829>
41. Sakinah, I. V., et al. (2022). Pengetahuan pemberian suplemen vitamin dan pemantauan minum obat pada ibu hamil untuk pencegahan anemia di indonesia: literature review. *Jurnal Farmasetis*, 11(3), 229-236
42. Salah, A., Folat, A., Defects, N. T., Bifida, S., Hamil, I., & Bifida, N. T. D. S. (2023). TERJADINYA SPINA BIFIDA PADA BAYI The Relationship between Folic Acid Deficiency in Pregnant Women and Risk of Spina Bifida in Infants Syiffa Nurhalimah , Popi Sopiah , Heri Ridwan Universitas Pendidikan Indonesia. *Jurnal Ilmu Keperawatan*, 9(2), 2-5.
43. Sania, A., Adinda Herdiannisa, Z., Gizi Kesehatan Masyarakat, P., Studi Kesehatan Masyarakat, P., Kesehatan Masyarakat, F., & Muhammadiyah Jakarta Jln Ahmad Dahlan, U. K. (2023). Anemia Pada Ibu Hamil Dan Faktornya Di Wilayah Kerja Pukesmas Ciputat Factors Related To Incident Of Anemia In Pregnant Women In The Working Area Of Ciputat Puskesmas. *Jurnal Kesehatan Reproduksi*, 13(2), 151-160.
44. Schlesselman, J. J. (1982). *Case-Control Studies: Design, Conduct, Analysis*. Oxford University Press
45. Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D* (2nd ed.). Alfabeta
46. Susanti, H., Ekasari, T., & Supriyadi, B. (2024). Hubungan Dukungan Keluarga dengan Kepatuhan Konsumsi Tablet Fe pada Ibu Hamil di Puskesmas Botolinggo. *TRILOGI: Jurnal Ilmu Teknologi, Kesehatan, Dan Humaniora*, 5(3), 372-380. <https://doi.org/10.34650/trilogi.v5i3.8607>
47. Syiffa Nurhalimah , Popi Sopiah , Heri Ridwan. (2023). Hubungan Kekurangan Asam Folat Ibu Hamil Dengan Risiko Terjadinya Spina Bifida Pada Bayi. Universitas Pendidikan Indonesia. *Jurnal Ilmu Keperawatan*, 9(2), 2-5
48. Utami, D. A., & Fatimah, S. (2020). Hubungan Pengetahuan dengan Kepatuhan Konsumsi Asam Folat pada Ibu Hamil. *Jurnal Kebidanan*, 10(1), 45-52
49. Wardana, F. Y., Mukholifah, S., & Sekti, B. H. (2024). Gambaran Tingkat Pengetahuan Ibu Hamil Terhadap Pentingnya Asam Folat Pada Kehamilan Di Rsia Muhammadiyah Malang. *Journal Medicine And Clinical Pharmacy*, 1(1), 23-29. <https://doi.org/10.47794/medclip.v1i1.4>
50. WHO. (2017). *Global Nutrition Policy Review 2016-2017 Country*. In *Routledge Handbook of Global Public Health* (Issue February).
51. Young, N., Bowman, A., Swedin, K., Collins, J., Blair-Stahn, N. D., Lindstedt, P. A., Troeger, C., & Flaxman, A. D. (2022). Cost-effectiveness of antenatal multiple micronutrients and balanced energy protein supplementation compared to iron and folic acid supplementation in India, Pakistan, Mali, and Tanzania: A dynamic microsimulation study. *PLoS Medicine*, 19(2), 1-22. <https://doi.org/10.1371/journal.pmed.1003902>

52. Yuandry, S., Dewi, R. C., & Atifah, Y. (2023). Literatur Review: Pengaruh Konsumsi Asam Folat Bagi Ibu Hamil Terhadap Kelahiran Anak Dengan Kelainan Kongenital. *Prosiding Seminar Nasional BIO, Vol.3 No.1*, 1051-1062. <https://semnas.biologi.fmipa.unp.ac.id/index.php/prosiding/article/view/675>
53. Yuliaswati, Darmi, S., & Syarah, M. (2024). Pengaruh Pemberian Jus Alpukat Dan Buah Bit Terhadap Peningkatan Kadar Hb Pada Ibu Hamil Dengan Anemia Ringan. *Jurnal Kesehatan Tambusai*, 5(4), 10375-10381. <https://doi.org/10.31004/jkt.v5i4.35594>