

## Relationship Between Interval Between Pregnancies and The Occurrence of Pregnancy Complications

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**Abstract.** *Interpregnancy interval is a modifiable risk factor that may influence pregnancy complications, which remain a significant issue for maternal health despite most women being of ideal reproductive age. This study aimed to analyze the relationship between interpregnancy interval and pregnancy complications at Marisa Health Center. An analytical observational quantitative design with a cross-sectional approach was used. The study population consisted of pregnant women who received antenatal care at the Marisa Community Health Center during the study period. A total of 20 respondents were selected using total sampling according to inclusion criteria. Data were collected through medical record reviews and observation sheets covering maternal characteristics, gestational age, and pregnancy complications. Data analysis was conducted using univariate and bivariate analysis, with Spearman's Rho correlation test. Results showed that most respondents had a pregnancy interval of 1–2 years, and the most common pregnancy complication was anemia. Spearman's Rho test revealed a p-value of 0.542 and a correlation coefficient of  $r = -0.145$ , indicating no statistically significant relationship between pregnancy interval and complications. The study concluded that interpregnancy interval was not a dominant factor related to pregnancy complications in the respondents. Preventing pregnancy complications requires a comprehensive approach, including improving antenatal care quality, early detection of risk factors, and continuous pregnancy planning counseling.*

**Keywords:** Antenatal Care; Birth Spacing; Midwifery; Pregnancy Complications; Pregnant Women.

### 1. INTRODUCTION

Pregnancy is a complex and dynamic physiological process, but it still has the potential to cause various complications that can have serious effects on the health of the mother and fetus. Pregnancy complications such as anemia, preeclampsia, antepartum bleeding, premature rupture of membranes, and fetal growth disorders are still the leading causes of maternal and perinatal morbidity in many countries. One risk factor consistently discussed in maternal health literature is the interpregnancy interval (IPI), which is the time interval between the previous birth and the occurrence of the next pregnancy. The interpregnancy interval is considered a modifiable risk factor through family planning and reproductive health counseling, thus having important implications for efforts to prevent pregnancy complications (WHO, 2022).

Globally, various epidemiological studies show that both too short and too long pregnancy intervals are associated with an increased risk of adverse pregnancy outcomes. A meta-analysis involving dozens of cross-country studies reported that short IPI, especially <12 months, is associated with an increased risk of preterm birth, low birth weight, small for gestational age, and neonatal and perinatal mortality (Rezaie-Keikhaie et al., 2020; Hassen et al., 2024). In addition to the impact on the fetus, short pregnancy intervals are also associated with complications in the mother, such as pregnancy anemia and physiological fatigue, which can worsen the condition of subsequent pregnancies (Wang et al., 2022).

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excessively long pregnancy intervals (>60 months) have also been reported to increase the risk of certain complications, suggesting that the relationship between pregnancy spacing and pregnancy outcomes is curvilinear with an optimal interval in the middle (AOGS, 2023).

The World Health Organization recommends that women wait at least 24 months after live birth before attempting to conceive again, or approximately 33 months between births, to reduce the risk of maternal and perinatal complications (WHO, 2022). This recommendation is based on evidence that the mother's body needs sufficient time to restore nutritional reserves, hormonal balance, and reproductive organ function after pregnancy and childbirth. Therefore, birth spacing is considered an important indicator of the quality of pregnancy planning and maternal health services.

Theoretically, the relationship between birth spacing and pregnancy complications can be explained through several clinical mechanisms. In short pregnancy intervals, the maternal depletion theory explains that the mother's body has not fully recovered from the previous pregnancy, particularly in terms of iron, folate, and metabolic energy reserves, thereby increasing the risk of anemia, placental disorders, and other obstetric complications (Wang et al., 2022; Hassen et al., 2024). Additionally, the healing process of the endometrium and vascular adaptation of the uterus after childbirth may not be optimal, which can affect implantation and fetal growth in subsequent pregnancies. In long pregnancy intervals, the physiological regression theory states that the beneficial physiological adaptations from the previous pregnancy may disappear, so that the risks of the subsequent pregnancy resemble those of the first pregnancy, including an increased risk of certain complications (AOGS, 2023).

Previous research findings show relatively consistent results regarding the impact of birth spacing on perinatal outcomes, but evidence regarding pregnancy complications in mothers still shows variation. Several studies report that short IPI is associated with an increased risk of pregnancy anemia and bleeding, while the association with pregnancy hypertension or preeclampsia is not always consistent across studies (Beyene et al., 2025; Wang et al., 2022). This variation indicates that the relationship between birth spacing and pregnancy complications is complex and influenced by confounding factors such as maternal age, parity, nutritional status, and socioeconomic conditions.

In the Indonesian context, this topic is highly relevant given the significant challenges surrounding maternal health. According to data from the Central Statistics Agency, Indonesia's maternal mortality rate (MMR) in 2020 reached 189 per 100,000 live births, highlighting the need to strengthen efforts to prevent pregnancy complications based on modifiable risk factors (BPS, 2023). Additionally, the results of the Indonesian Ministry of Health's 2023 Indonesian

Health Survey (SKI) show that anemia and pregnancy complications remain high, especially among mothers with suboptimal birth spacing (Kemenkes RI, 2023).

Studies in Indonesia also report that short birth intervals (<12 months) are associated with an increased risk of perinatal mortality compared to intervals of 24–35 months (Gayatri et al., 2026). However, most national studies still focus on infant outcomes, while studies that specifically analyze the relationship between birth spacing and maternal complications are still limited. In fact, maternal complications such as anemia, pregnancy-induced hypertension, and hemorrhage are the main causes of obstetric referrals and contribute significantly to maternal morbidity.

Thus, there is a research gap that needs to be addressed. First, there is still limited research that comprehensively examines the relationship between birth spacing and the spectrum of pregnancy complications in mothers, especially at the primary health care level. Second, variations in the definition of birth spacing and cut-off intervals used in previous studies make it difficult to translate the results into clinical practice and policy. Third, contextual evidence in Indonesia that considers local confounding factors such as maternal age, parity, and access to health services is still needed to strengthen postpartum family planning counseling recommendations.

The urgency of this research is increasing because birth spacing is a risk factor that is relatively easy to modify through health service interventions, such as preconception counseling, postpartum contraception, and monitoring of high-risk pregnancies. With strong evidence of the relationship between birth spacing and pregnancy complications, health workers can provide more targeted education to women of reproductive age and their families, thereby supporting safer and healthier pregnancies.

Based on the above description, the purpose of this study is to analyze the relationship between pregnancy spacing and the occurrence of pregnancy complications. The results of this study are expected to contribute scientifically to strengthening evidence-based midwifery care and to form the basis for planning preventive interventions in an effort to reduce pregnancy complications and improve maternal health in Indonesia.

## **2. RESEARCH METHOD**

This study is a quantitative study with an analytical observational approach, which aims to analyze the relationship between pregnancy spacing and the occurrence of pregnancy complications in pregnant women at the Marisa Community Health Center. A quantitative approach was chosen because the study focuses on measuring variables objectively and analyzing the relationship between variables using inferential statistical methods.

The research design used was cross-sectional, in which measurements of independent and dependent variables were conducted at the same time. This design was considered appropriate for identifying the relationship between birth spacing and the incidence of pregnancy complications without providing intervention to respondents, and was in line with the health service data available at the Marisa Community Health Center.

The study was conducted at the Marisa Community Health Center, considering that this health center is a primary health care facility that provides routine antenatal care and records pregnancy complications. The study period included the preparation stage, data collection, data processing, statistical analysis, and preparation of the research report.

The population in this study consisted of all pregnant women who were registered and received antenatal care at the Marisa Community Health Center during the study period. The study sample consisted of pregnant women who met the inclusion and exclusion criteria. The inclusion criteria included pregnant women with a history of previous pregnancies so that the interval between pregnancies could be determined, who had complete medical records, and who were willing to participate in the study. The exclusion criteria included pregnant women with unclear pregnancy interval data or incomplete medical records.

The sample size was determined using total sampling, whereby all pregnant women who met the inclusion criteria during the study period were included as respondents. This technique was chosen because the population size was relatively limited and the researchers wanted to obtain a comprehensive picture of the relationship between pregnancy spacing and pregnancy complications at the Marisa Community Health Center.

The independent variable in this study is pregnancy spacing, which is the time interval between the previous birth and the current pregnancy. Pregnancy spacing is categorized based on criteria commonly used in obstetric practice, such as short pregnancy spacing (<24 months) and ideal pregnancy spacing ( $\geq$ 24 months). The dependent variable is the occurrence of pregnancy complications, which include medical conditions that occur during pregnancy such as pregnancy anemia, hypertension in pregnancy, preeclampsia, antepartum hemorrhage, premature rupture of membranes, or other complications recorded in medical records.

Data collection was conducted using observation sheets or checklists compiled based on medical records and maternal and child health (MCH) books, as well as antenatal care records at the Marisa Community Health Center. The data collected included maternal characteristics (age, parity), pregnancy spacing, and the presence of pregnancy complications. Data collection was conducted systematically while maintaining the confidentiality of respondents' identities.

Data analysis was conducted in stages. Univariate analysis was used to describe the frequency distribution and percentage of respondent characteristics, pregnancy interval categories, and the occurrence of pregnancy complications. Next, bivariate analysis was conducted to determine the relationship between pregnancy interval and the occurrence of pregnancy complications.

The statistical test used in bivariate analysis is the Chi-Square test because the variables of pregnancy distance and pregnancy complications are categorical. If there are cells with an expected count of less than 5, Fisher's Exact test is used as an alternative. A p-value  $< 0.05$  is set as the statistical significance threshold. To strengthen the interpretation, the analysis results can also be presented in the form of Odds Ratio (OR) values to describe the risk of pregnancy complications based on pregnancy distance categories.

The entire research process was conducted in accordance with the principles of health research ethics. Respondents were given an explanation of the purpose and benefits of the research and were assured of the confidentiality of their identities. The data was used solely for the purposes of research and the development of obstetrics science.

With this research method, it is hoped that a clear picture of the relationship between pregnancy spacing and the occurrence of pregnancy complications at the Marisa Community Health Center can be obtained, so that the research results can be used as a basis for strengthening postpartum family planning counseling and monitoring high-risk pregnancies in midwifery practice.

### 3. RESULTS AND DISCUSSION

**Table 1.** Demographic data.

Var	n	F (%)
Age	< 20 years old	0
	20-35 years old	19
	>35 years old	1
Parity	1	6
	2	6
	3	7
	4	1
Occupation	Housewife	20
	Employee	0
Last labor (years)	1	10
	2	10
	3	0
Labor complications	None	5
	Anemia	8
	Premature	2
	Low birth weight	2
	Severe preeclampsia	3
<b>Total</b>	<b>20</b>	<b>100</b>

(source: primary data, 2025)

This study involved 20 pregnant women as respondents. Respondent characteristics included age, parity, occupation, pregnancy spacing (based on the year of last birth), and pregnancy complications. Based on age group, almost all respondents were in the 20–35 age range, namely 19 people (95.0%), which is the ideal reproductive age. Only 1 respondent (5.0%) was older than 35 years, and there were no respondents younger than 20 years. This distribution shows that the majority of respondents were in an age group that is biologically relatively safe for pregnancy, although the risk of complications remains.

In terms of parity, respondents with parity 3 constituted the largest group, namely 7 people (35.0%). Respondents with parity 1 and parity 2 numbered 6 people each (30.0%), while parity 4 numbered only 1 person (5.0%). This variation in parity shows that most mothers have had previous pregnancy experiences, which allows for varying pregnancy intervals. All respondents in this study were housewives, namely 20 people (100%), and there were no respondents who worked as employees or civil servants. This condition shows the homogeneity of the respondents' employment characteristics, which could potentially affect their activity patterns, access to health services, and use of time for pregnancy check-ups.

Based on the pregnancy interval measured from the time of the last birth, it was found that 10 respondents (50.0%) had a pregnancy interval of 1 year, and 10 respondents (50.0%) had a pregnancy interval of 2 years. There were no respondents with a pregnancy interval of  $\geq 3$  years. This distribution shows that all respondents had relatively short to moderate pregnancy intervals, which clinically could affect their current pregnancy conditions.

## Incidence of Pregnancy Complications

The distribution of pregnancy complications shows that only 5 respondents (25.0%) did not experience complications during pregnancy. In contrast, most respondents experienced one or more forms of pregnancy complications. The most common pregnancy complication was pregnancy anemia, which occurred in 8 respondents (40.0%). In addition, 3 respondents (15.0%) experienced severe preeclampsia, 2 respondents (10.0%) experienced premature labor, and 2 respondents (10.0%) gave birth to babies with low birth weight (LBW). These findings indicate that pregnancy complications remain relatively high among respondents with relatively short intervals between pregnancies.

Overall, these descriptive results show that although the majority of pregnant women are of ideal reproductive age, the incidence of pregnancy complications remains quite high, especially anemia and preeclampsia. This condition indicates that other factors, including pregnancy spacing, need to be further analyzed as risk factors for pregnancy complications. This descriptive narrative forms the basis for conducting a bivariate analysis to determine the relationship between birth spacing and the occurrence of pregnancy complications at the Marisa Community Health Center.

**Table 2.** Statistical Analysis.

Independent variable	N	P Value	r	Dependent variable
Last labor (years)	20	0.542	-145	Labor complication

*Spearman's Rho*

\*significant

(source: primary data, 2025)

To determine the relationship between pregnancy spacing (based on the year of last birth) and the incidence of pregnancy complications, a bivariate analysis was performed using Spearman's Rho correlation test. This test was chosen because the pregnancy spacing variable is ordinal and the pregnancy complication variable is categorical, and the data did not meet the assumption of normal distribution.

The analysis results show a p-value of 0.542 ( $p > 0.05$ ) with a correlation coefficient of  $r = -0.145$ . A p-value greater than 0.05 indicates that there is no statistically significant relationship between birth spacing and the incidence of pregnancy complications among the study respondents. Thus, the null hypothesis ( $H_0$ ) is accepted and the alternative hypothesis ( $H_1$ ) is rejected.

The correlation coefficient is negative and very weak ( $r = -0.145$ ), indicating a weak negative relationship, namely that the longer the pregnancy, the lower the incidence of

pregnancy complications tends to be. However, the relationship is not strong enough and is not statistically significant, so it cannot be concluded that there is a real relationship between the two variables.

These results indicate that the occurrence of pregnancy complications in respondents was not only influenced by the interval between pregnancies, but most likely influenced by other factors such as maternal nutritional status, hemoglobin levels, parity, health status before pregnancy, and the quality of antenatal care. Therefore, the interval between pregnancies was not the only determining factor for the occurrence of pregnancy complications in this study.

## **Discussion**

This study shows that there is no statistically significant relationship between pregnancy spacing (based on the year of last birth) and the incidence of pregnancy complications at the Marisa Community Health Center ( $p = 0.542$ ), with a very weak negative correlation ( $r = -0.145$ ). These findings indicate that, in the context of the study population and sample size, birth spacing is not a dominant factor that directly determines the occurrence of pregnancy complications. However, the negative trend albeit very weak suggests that longer birth spacing may be associated with a slightly lower risk of complications, but the effect is not strong enough to reach statistical significance.

The insignificance of this relationship can be understood through the characteristics of the respondents. The majority of mothers were of ideal reproductive age (20–35 years) and all respondents had a pregnancy interval of 1–2 years, with no variation in longer intervals. This relatively narrow range of intervals has the potential to reduce the detectability of the relationship, as much evidence suggests that the most pronounced increase in risk occurs at very short intervals (e.g., <6–12 months) or very long intervals (>60 months). When exposure variability is low, statistical associations become difficult to capture even though biologically there may be an effect.

Clinically, the maternal depletion theory explains that short intervals can increase the risk of complications because the recovery of nutritional reserves (iron/folate), vascular adaptation, and tissue recovery are not yet optimal. However, at intervals of 1–2 years, some mothers may have recovered sufficiently especially if their nutritional status and antenatal care are adequate so that the effects of "depletion" are not prominent. This is consistent with findings showing that certain maternal risks do not always increase consistently at 12–23-month intervals compared to more extreme intervals. In addition, the theory of physiological regression at long intervals is not relevant in this study because there were no respondents with long intervals.

The results of this study differ from a number of meta-analyses and large population studies that report a significant association between short pregnancy intervals and adverse outcomes particularly perinatal outcomes as well as several maternal complications. These differences are likely due to differences in design (cross-sectional service vs. national population), small sample size, heterogeneous definitions of complications, and limited control of confounding factors. Many large-scale studies are able to control for age, parity, nutritional status, and comorbidities; while primary care-based studies with small samples are more susceptible to residual confounding.

Interestingly, the distribution of complications in this study shows pregnancy anemia as the most common complication. Anemia is multifactorial and greatly influenced by nutritional status, infection, iron supplementation compliance, and ANC quality. Thus, although pregnancy spacing plays a biological role, its more immediate determinants (e.g., initial Hb, iron intake, and Fe tablet compliance) are likely to be more decisive in this population. These findings are consistent with the literature, which places anemia as the result of interactions between nutritional factors, infections, and healthcare services, rather than solely the pregnancy interval.

The absence of a significant relationship may also reflect the protective role of antenatal care. In primary care, routine screening and early intervention (iron tablets, nutrition education, blood pressure monitoring) can reduce the risk of complications even if the pregnancy interval is relatively short. This is in line with the World Health Organization's approach to quality maternal care, which emphasizes that the prevention of complications requires an integrated package of interventions throughout the continuum of care, rather than relying on a single risk factor.

Although the main results were not significant, this study still provided contextual added value. First, it confirmed that in populations with an interval of 1–2 years and ideal reproductive age, birth spacing alone may not sufficiently explain the variation in complications. Second, it draws attention to other factors that are more actionable in primary care such as nutritional status, supplementation adherence, early detection of hypertension, and quality of ANC visits which may have a greater impact. Third, these findings highlight the importance of sample size and exposure variation in association studies.

The clinical implications are clear: pregnancy interval counseling remains important as part of family planning, but should not stand alone. Health workers need to integrate pregnancy interval counseling with the strengthening of quality ANC, anemia monitoring, and

management of individual risk factors. At the local policy level, these results support a focus on interventions that can be modified directly at the health center for example, iron compliance, hypertension screening, and nutrition education while continuing to promote the recommended pregnancy interval.

Going forward, further research with larger samples, more diverse interval categories (including <12 months and >60 months), and multivariate analysis (e.g., logistic regression) is needed to clarify the relationship between birth spacing and maternal complications more precisely. Such an approach will help separate the effects of interval from major confounding factors and yield more precise recommendations for obstetric practice.

#### **4. CONCLUSION**

This study concluded that there was no statistically significant relationship between birth spacing and the occurrence of pregnancy complications at the Marisa Community Health Center. Although there was a very weak negative correlation, these results indicate that birth spacing was not a dominant factor in determining the occurrence of pregnancy complications among the study respondents. These findings indicate that pregnancy complications are influenced by various other factors, such as maternal nutritional status, adherence to iron supplementation, pre-pregnancy health conditions, quality of antenatal care, and other obstetric factors. Therefore, efforts to prevent pregnancy complications need to be carried out comprehensively through strengthening quality antenatal care, early detection of risk factors, and continuous health education, accompanied by appropriate pregnancy planning counseling.

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