

## Pregnancy Examination with Postpartum Hemorrhage: SDKI Data Analysis 2017

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### ABSTRACT

**Introduction:** Postpartum haemorrhage is one of the leading causes of maternal mortality in Indonesia. Adequate pregnancy screening (Antenatal Care/ANC) plays a vital role in preventing and managing pregnancy complications, including postpartum bleeding.

**Objective:** This study aims to analyze the relationship between pregnancy examination (ANC) and the incidence of postpartum bleeding based on data from the Indonesian Demographic and Health Survey (SDKI) 2017.

**Methods:** This research method is quantitative observational analytic through cross-sectional techniques with research.

**Result:** shows a relationship between quantity or frequency and the incidence of bleeding with a p-value of 0.05. However, there is no relationship with the quality of the pregnancy checkup (p-value 0.548). Even though it is not related, the quality of the pregnancy checkup has a risk of bleeding incidents with POR: 0.872 (CI 95%: 0.558-1.363), which means that mothers who do not receive services according to the 10T standard have a 1.3 times risk of bleeding during childbirth.

**Conclusion:** Adequate pregnancy screening (ANC), both in terms of frequency and quality, plays a vital role in reducing the risk of postpartum bleeding. Efforts to improve access and quality of ANC should be a priority in maternal health programs in Indonesia.

**Keywords:** antenatal care, maternal health, pregnancy checkup, postpartum haemorrhage.



## INTRODUCTION

Reducing the Maternal Mortality Rate (MMR) is one of the main agendas of the Sustainable Development Goals (SDGs), and it is essential to see the success of maternal health efforts. The Maternal Mortality Rate (MMR) is the ratio of maternal mortality during the pregnancy to postpartum process (the reason for death is still related to the pregnancy to postpartum process is not an accident and so on) in every 100,000 live births (Mgawadere, Kana and van den Broek, [2017](#)). Maternal health indicators from assessing the maternal mortality rate (MMR) can determine the degree of public health because of their sensitivity to improving health services. The issue of maternal mortality is an international and national concern in the global scope; it is a point discussed in the 3rd point of the Survey Development Goals (SDGs) regarding healthy and prosperous life and the national scope in the 2020-2024 National Medium-Term Development Plan (RPJMN) (Nurlatifah, [2020](#)). The United Nations (UN), in the Survey Development Goals (SDGs) program, targets that by 2030, the global maternal mortality ratio is expected to be less than 70 per 100,000 live births. The national scope, namely Indonesia in the 2020-2024 National Medium-Term Development Plan (RPJMN), targets the Maternal Mortality Rate (MMR) to reach 183 per 100,000 live births in 2024 (Organization, [2019](#)). Data from the 2020 Population Census shows that the maternal mortality rate in Indonesia reaches 189 per 100 thousand live births. This makes Indonesia rank second highest in ASEAN regarding maternal mortality, much higher than Malaysia, Brunei, Thailand, and Vietnam which are already below 100 per 100 thousand live births (BPS, [2020](#)). Based on data from the Maternal Perinatal Death Notification (MPDN), the Ministry of Health's maternal death recording system, the number of maternal deaths in 2022 reached 4,005, and in 2023, it increased to 4,129. The direct cause of maternal mortality (MMD) is 14,623 cases (Maternal Mortality Rate (AKI) is 305 per 100,000 live births), which is caused by preeclampsia and bleeding (BPS, BKKBN, Kemenkes, [2017](#)).

Knowing the cause of death is one of the efforts to reduce the death rate and achieve the targets achieved in the programs set both nationally and internationally. About 830 women die every day from preventable pregnancy and childbirth complications, and 99% of maternal deaths occur in developing countries. One of the leading causes of almost 75% of maternal mortality in the world is bleeding, especially postpartum haemorrhage, known as Haemorrhagia Postpartum (HPP) (Organization and Fund, [2020](#)), and it is estimated that one woman dies every 4 minutes as a result of this case (Sebghati and Chandharan, [2017](#)). The definition of postpartum bleeding is blood loss of more than 500 ml after childbirth per vagina or more than 1000 ml after cesarean delivery. Recently, postpartum bleeding has been redefined as cumulative blood loss of 1000 ml or more or blood loss accompanied by signs or symptoms of hypovolemia, regardless of the route of delivery. Typical clinical signs and symptoms of hypovolemia (e.g., hypotension and tachycardia) due to postpartum bleeding may not appear until blood loss exceeds 25% of the total blood volume (>1500 ml during late pregnancy) (Ozakin *et al.*, [2020](#)). Postpartum bleeding is considered primary if it occurs within the first 24 hours after delivery and secondary if it occurs between 24 hours to 12 weeks after delivery. The causes of postpartum bleeding can be summarized by four "T's": tonus (uterine atonia), trauma (laceration or rupture of the uterus), tissue (placenta or retained clot), and thrombin (clotting factor deficiency) (McLintock, [2020](#)). The most common cause is uterine atonia (accounting for about 70% of cases), followed by obstetric laceration (about 20%), retained placental tissue (about 10%), and clotting factor deficiency (<1%). Postpartum bleeding can lead to severe anaemia requiring blood transfusions, disseminated intravascular coagulopathy, hysterectomy, multisystem organ failure, and death (Almutairi, [2021](#)). Postpartum bleeding due to uterine atonia is often preceded by chorioamnionitis, therapeutic magnesium sulfate use, prolonged or rapid labour, induction or augmentation of labour, uterine fibroids, or excessive uterine stretching due to multiple pregnancies, fetal macrosomia, or polyhydramnios (ACOG, [2017](#)).

Antenatal Care (ANC) reduces maternal and perinatal morbidity and mortality both directly, through the detection and treatment of pregnancy-related complications, and indirectly, through

the identification of women and girls at high risk of complications during childbirth, thus ensuring referral to the appropriate level of health services therapy (Dessu and Dawit, 2020). In addition, because indirect causes of maternal pain and death, such as HIV infection and malaria, contribute to approximately 25% of maternal mortality and near-death, ANC also provides a significant opportunity to prevent and treat co-occurring diseases through integrated delivery services (Haninger-Vacariu *et al.*, 2024). Research on the relationship between Antenatal Care (ANC) service quality and neonatal mortality: a meta-analysis of individual participant data from 60 low- and middle-income countries with neonatal mortality in developing countries by Subase (2020) stated that there was a 34% lower risk of neonatal mortality in children of mothers cared for in ANC by skilled workers (health workers) and comprehensive ANC could reduce the risk of neonatal mortality by 20% (Tiruye and Shiferaw, 2023).

Regulation of the Minister of Health (PMK) Number 97 of 2014 states that the Integrated Antenatal Care (ANC) service, according to the standards, includes quantity and quality standards. The quantity of pregnancy examinations is the frequency of visits by pregnant women to carry out pregnancy examinations; the recommendation from WHO is that in average pregnant women, ANC is carried out at least 8x, and after adaptation to related professions and programs, it is agreed in Indonesia, ANC is carried out at least 6 times with a minimum contact with a doctor 2 times for pregnancy risk factors/complications screening in the 1st trimester and 1x pregnancy risk factor screening in the 3rd trimester. The quality of pregnancy examination is the standard of service carried out during the visit, namely the standard of 10 T or 10 activities, namely, weighing and measuring height, measuring blood pressure, assessing nutritional status, measuring uterine fundus height, determining fetal presentation and fetal heart rate (DJJ), screening and administering Tetanus Toxoid (TT), administering blood supplement tablets, laboratory examinations, case management, and counselling. The government's efforts to conduct pregnancy checks in reducing maternal and infant mortality are indirectly related to reducing the incidence of bleeding in saline beds; this study aims to determine the relationship between pregnancy checks and bleeding events in Indonesia based on the analysis of demographic and health survey data in Indonesia in 2017.

## METHOD

This study uses an analytical observational quantitative research method through cross-sectional techniques by simultaneously measuring research variables by analyzing secondary data from SDKI in 2017. The scope of the area explored in the SDKI data includes all provinces in Indonesia recorded in the survey results. The bound variable in this study is the incidence of postpartum bleeding (postpartum). The independent variable in this study is examining pregnant women in terms of quantity and quality. The source of data in this study is secondary data from SDKI 2017 (dataset birth recode (IDBR51V)) obtained from The Demographic and Health Survey Program (Measure DHS). The sample in this study is the last child born during the period before the previous survey (2012) until the time of the 2017 SDKI survey. The population of this study is the entire sample of the 2017 SDKI, which includes 1,970 urban and rural census blocks (BKKBN, 2018). The sample used in this study establishes inclusion and exclusion criteria; inclusion criteria are the characteristics of sample data taken from the population and have met the criteria that can be taken as a sample, while exclusion criteria are the characteristics of population members who cannot be sampled (Notoatmodjo, 2022). The inclusion and exclusion criteria in this study are Sample Inclusion Criteria: Pregnant women who have given birth, pregnant women who have undergone pregnancy checks, Children born in the last 5 years, and the previous child with childbirth conditions are recorded in the 2017 SDKI. Sample Exclusion Criteria: Pregnant women did not complete the questionnaire answers, and there was incomplete data in the dataset (missing) or unknown answers from the resource persons.

## RESULTS

**Table 1 Overview of Pregnancy Examination and Bleeding Incidence based on SDKI 2017 data**

	Information	Frequency (n)	%
<b>Incidence of Post Partum Bleeding</b>	Bleeding	1167	6.6
	No bleeding	16559	93.4
<b>Pregnancy Screening quantity</b>	< 6 visits	15345	86.6
	≥ 6 visits	2381	13.4
<b>Quality of Pregnancy Screening</b>	10 T	397	2.2
	Tidak 10T	17329	97.8
Pregnancy examination quality details (10T) :			
T1 (Weigh your body weight and measure your height)	done	2077	11.7
	are not done	15649	88.3
T2 (Measure blood pressure)	done	2861	16.1
	are not done	14865	83.9
T3 (Measure upper arm circumference)	done	2439	13.8
	are not done	15287	86.2
T4 (Measure the height of the uterine fundus)	done	2505	14.1
	are not done	15221	85.9
T5 (DJJ dan Leopold)	done	2839	16.0
	are not done	14887	84.0
T6 (Giving Tetanus Shots)	done	2673	15.1
	are not done	15053	84.9
T7 (Administration of fe tablets)	done	2598	14.7
	are not done	15128	85.3
T 8 (Laboratory examination)	done	878	5.0
	are not done	16848	95.0
T 9 (Case management)	done	1808	10.2
	are not done	15918	89.8
T 10 (Interview)	done	2496	14.1
	are not done	15230	85.9

In Table 1 about the univariate test, it is explained that there have been 1,167 events of bleeding in maternal childbirth in the last 5 years with a prevalence of 6.6%. In the independent variable, pregnancy examinations for 15,345 pregnant women made more than 6 visits with a percentage of 86.6%, and those that met the standard were 10 T; as many as 397 pregnant women received 10 T, with a rate of only 2.2%. In the quality of pregnancy examinations examined, there are 10T activities described in Table 1, namely; Weight weighing activities and weight measurement (T1) in as many as 2,077 pregnant women with a percentage of 11.7%, Blood Pressure Measurement (T2) as much as 2,861 (16.1%), T3 (Upper Arm Circumference Measurement (LILA)) as many as 2,439 mothers (13.8%), T4 (Uterine Fundus Height Measurement) as many as 2,505 mothers (14.1%), T5 (DJJ and Leopold) as many as 2,839 mothers (16%), T6 (Tetanus Injection) as many as 2,673 mothers (15.1%), T7 (Fe Tablet Administration) as many as 2,598 mothers (14.7%), T8 (Laboratory Examination) as many as 878 (5%), T9 (Case Management) 1,808 mothers (10.2%), and T10 (Speech Meeting) as many as 2,946 mothers (14.1%).

**Table 2 Relationship between Pregnancy Examination and Bleeding Incidence based on SDKI 2017 data**

Variable	$\beta$	Bleeding		POR (95% CI)	p-value
		yes	no		
		n (%)	n (%)		
ANC quantity ( $\geq 6$ times)	-.295	125 (5,2%)	2256 (94,7%)	0,745 (0,697-0,913)	0,05
ANC quantity ( $< 6$ times)		1042 (6,79%)	14303 (93,2)		
ANC Quality (10T)	-.137	24 (6%)	373 (94%)	0,872 (0,558-1,363)	0.548
ANC quality (not yet 10T)		1143 (6,59%)	16186 (93,4%)		
Constant	2.915			18.441	.000

In Table 2 about bivariate and multivariate tests between variables, the p-value of the quantity (frequency) of pregnancy examinations for bleeding events was 0.05 and POR: 0.745 (CI 95%: 0.697-0.913), which stated that there was a relationship with a negative logistic regression relationship which meant that the more quantity of pregnancy examinations (6 times or more), the fewer the incidence of postpartum bleeding. In the quality of pregnancy examination, a p-value of 0.548 and POR: 0.872 (CI 95%: 0.558-1.363) was obtained, which stated that there was no relationship, but there was a 1.3 times risk of bleeding events in pregnant women who were not examined according to the standard (10T). Frequency of pregnancy screening: there was a statistically significant relationship between the frequency of pregnancy screening and the incidence of postpartum bleeding. Mothers who have more frequent pregnancy checkups (6 or more) have a lower risk of postpartum bleeding. Regarding the quality of pregnancy examination, there was no statistically significant relationship between the quality of pregnancy examination and the incidence of postpartum bleeding. Although there is an indication of a slightly higher risk for mothers who do not get a standard examination (10T), this association is not significant and should be interpreted with caution. Efforts to increase the frequency of pregnancy checkups should be the focus of maternal health programs to reduce the risk of postpartum bleeding. As for the quality of the examination, although it is not statistically significant, it is essential to ensure still adequate examination standards to minimize the risk of pregnancy complications.

## DISCUSSION

Researchers revealed that in the frequency of bleeding events of 1,167 pregnant women, 1,042 pregnant women did not visit 6 times, and 1,143 were not qualified for pregnancy examination services (10T). The population of pregnant women who receive quality services is only 2.2%, with an average of 13.08% for each activity in 10T. This explains that the quality of pregnancy examination services is still not adequate. In contrast to the number of pregnancy checks, the frequency of pregnancy checkup visits is quite good; namely, 86.6% of mothers make 6 or more visits. There is a need for monitoring in every implementation of pregnancy service standards in every visit of pregnant women, considering that there are not many pregnant women who get 10T services; pregnant women need to get all 10T services to determine the risks of pregnancy, childbirth, and postpartum. Antenatal Care (ANC) is a promotive, preventive, and curative action in pregnancy, so cooperation between pregnant women, health workers, and the government are needed to achieve 10T services effectively. Knowing the cause of maternal death is essential, but knowing whether the program is running well needs to be reconsidered, considering that the results of the study show that pregnancy examination services are still not running effectively at the 10T service standard or the quality of service is still not running well



with data showing only 397 pregnancy checks according to the 10T standard with a percentage of only 2.2%, with an average success of 13.08% of each activity in 10T. This shows the need for monitoring and monitoring programs related to the pregnancy examination program that has been running to accelerate the reduction of maternal and infant mortality (Haza'a *et al.*, [2024](#)).

The quality of pregnancy examination has a risk of 1.3 times the incidence of bleeding if pregnant women are not examined according to the standard (10T). This aligns with the WHO statement on integrated ANC, which states the importance of quality in every pregnancy checkup visit. Quantity and quality have an influence and risk on mortality and morbidity, so a mother needs to be able to understand each service in a pregnancy checkup. The frequency of pregnancy screening (ANC) has a statistically significant association with the incidence of postpartum bleeding. Mothers who have more frequent pregnancy checkups (six or more) have a lower risk of postpartum bleeding. This emphasizes the importance of regular and frequent pregnancy checkups in preventing severe complications such as postpartum bleeding. The quality of pregnancy screening did not show a statistically significant association with the incidence of postpartum bleeding; the results of the analysis showed that mothers who did not receive standard screening (10T) had a 1.3 times higher risk of developing postpartum bleeding. This aligns with the WHO statement on integrated ANC, which emphasizes the importance of quality in every pregnancy screening visit. The quality and quantity of pregnancy examinations affect the risk of maternal mortality and morbidity (Wijayanto *et al.*, [2024](#)). Therefore, a mother needs to understand each service in pregnancy checkups. Increasing the frequency and quality of pregnancy checkups should be a priority in maternal health programs to reduce the risk of postpartum bleeding. Ensuring that each pregnancy test is performed according to the set standards is essential to minimize the risk of pregnancy complications and improve maternal safety (Shi *et al.*, [2024](#)).

More frequent pregnancy screenings allow for early detection of pregnancy complications, including conditions that can cause postpartum bleeding. Regular maternal and fetal health monitoring helps in quick and informed medical decision-making (Koldewei *et al.*, [2024](#)). Following the WHO statement on integrated ANC, the quality of pregnancy screening at each visit is essential. Good quality includes various tests such as blood pressure, urine tests, and anemia checks. Examinations performed according to standards help in identifying and managing risk factors that can cause postpartum hemorrhage and other complications (Wang *et al.*, [2024](#)). Provide periodic training to health workers on the importance of the frequency and quality of pregnancy checkups following WHO standards and national health protocols. Improve access to health services, especially in remote areas so that all pregnant women can carry out pregnancy checkups regularly and according to standards (Masembe *et al.*, [2024](#)). They educate pregnant women and their families about routine and quality pregnancy checkups. Health campaigns and extension programs can increase public awareness and understanding (Radu, Efrim, and Matei, [2021](#)). Conduct periodic monitoring and evaluation of pregnancy screening programs to ensure service standards are met and identify areas needing improvement. Increasing the frequency and quality of pregnancy checkups is essential to minimize the risk of postpartum bleeding and other pregnancy complications (Munggaran *et al.*, [2020](#)). Ensuring that each pregnancy test is carried out following the set standards will help improve the safety of both mother and baby (Koletzko *et al.*, [2015](#)). Strategies involving health worker training, increased access, community education, and program monitoring and evaluation can support achieving these goals (Albitres-Flores *et al.*, [2024](#)).

Early detection of complications frequent and quality pregnancy checkups allows for early detection of complications that can lead to postpartum bleeding, such as anemia, preeclampsia, or infection (Haslan and Trisutrisno, [2022](#)). With early detection, healthcare workers can provide quick and precise treatment, which in turn can reduce the risk of severe complications and maternal death (Rusli *et al.*, [2023](#)). Pregnant women's education Quality pregnancy checkups also include education for pregnant women about the danger signs and steps to take if they experience

problems (Abdilahi *et al.*, 2024). This education helps pregnant women to be more prepared and aware of potential complications. Fetal health monitoring Regular pregnancy checkups are also essential to monitor fetal health, ensure average growth and development, and identify and treat potential problems. Psychological support Frequent and quality pregnancy checkups also provide psychological support for pregnant women, helping them feel safer and supported during pregnancy. In line with the WHO recommendations on integrated ANC, ensuring that every pregnancy test is carried out according to the established standards, including tests that include essential aspects such as blood pressure, urine tests, and blood tests, is critical to minimize the risk of complications and improve maternal and infant safety. Thus, focusing on increasing the frequency and quality of pregnancy checkups should be a key component of maternal health policies and programs to reduce the risk of postpartum bleeding and other pregnancy complications.

## CONCLUSION

This study showed that the frequency of pregnancy checkups (ANC) had a statistically significant relationship with the incidence of postpartum bleeding. Mothers who undergo pregnancy checkups more frequently, i.e., six or more times, have a lower risk of developing postpartum bleeding. This emphasizes the importance of regular and frequent pregnancy checkups in preventing severe complications such as postpartum bleeding. On the other hand, the quality of pregnancy screening did not show a statistically significant association with the incidence of postpartum bleeding. Although the analysis showed indications that mothers who did not get a standard pregnancy test (10T) had a slightly higher risk of developing postpartum bleeding, this association was not significant and needed to be interpreted with caution. Overall, increasing the frequency of pregnancy checkups should be a priority in maternal health programs to reduce the risk of postpartum bleeding. Although the examination quality does not show a significant relationship, it is essential to ensure that the pregnancy examination is carried out according to the set standards to minimize the risk of pregnancy complications.

## Conflicts of Interest:

The authors declare no conflict of interest.

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