



# Factors associated with the completion of antenatal care in Indonesia: A cross-sectional data analysis based on the 2018 Indonesian Basic Health Survey

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## Abstract

**Background:** The global incidence of maternal mortality remains high, including in Indonesia, and the utilization of antenatal care services can help reduce these rates. Despite numerous studies examining factors affecting antenatal care utilization, there has been limited focus on identifying factors related to the completion of these services.

**Objective:** This study aimed to analyze factors associated with the completion of antenatal care in Indonesia.

**Methods:** The study used a cross-sectional analysis of secondary data from the Basic Health Research conducted by the Indonesian Ministry of Health in March 2018. The sample consisted of 65,929 pregnant women aged 15 to 49. Descriptive statistics, chi-square tests, and multiple logistic regression were used for data analysis.

**Results:** The majority of respondents (75.2%) completed antenatal care. Factors significantly correlated with antenatal care completion were education level, occupation status, health insurance ownership, place of antenatal care services, travel time to health facilities, area of residence, history of pregnancy, parity, desired pregnancy, and pregnancy complications ( $p < 0.05$ ). The multiple logistic regression test showed that education level was the most dominant factor associated with antenatal care completion ( $p < 0.001$ , OR = 2.023, 95% CI = 1.839-2.225).

**Conclusion:** Completion of antenatal care is influenced by various factors, including education, job status, health insurance ownership, antenatal care services' location, travel time to health facilities, residence area, previous pregnancy history, number of children, desired pregnancy, and pregnancy complications. However, education is crucial in determining a mother's understanding and approach toward using these services. The Indonesian government should enhance public education and awareness initiatives to increase utilization. Healthcare professionals, particularly nurses and midwives, play a vital role in educating pregnant women about the significance of utilizing prenatal care services consistently and facilitating their access to these services efficiently.

## Keywords

antenatal care; cross-sectional studies; female; Indonesia; pregnancy; nurses; midwives

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## Background

A nation's public health is evaluated by various factors, including the maternal mortality rate, which the 2030 Sustainable Development Goals aim to decrease to 70 deaths per 100,000 live births. However, according to a prediction by the World Health Organization (WHO) in 2017, the maternal mortality rate was expected to be 211 deaths per 100,000 live births (World Health Organization, 2020). In 2015, Indonesia's maternal mortality rate was 305 deaths per 100,000 live births, four times higher than the target set in the Sustainable Development Goals (Indonesian Ministry of Health, 2020a). In addition, WHO reports that HIV infection and malaria contribute to morbidity and death in pregnant women (World Health Organization, 2016). In Indonesia, the leading causes

of maternal death are bleeding (1,280 cases), hypertension (1,066 cases), and infections (207 cases) (Indonesian Ministry of Health, 2020a).

The Indonesian Ministry of Health is implementing policies to decrease maternal mortality rapidly, such as improving cross-sectoral collaboration, increasing professional coordination, optimizing the use of national health insurance, and activating standby villages (Indonesian Ministry of Health, 2018b). Antenatal Care (ANC) is provided to ensure all mothers have access to adequate maternal health services, as stated in Regulation of the Indonesian Ministry of Health No. 97 of 2014 on maternal health services, including antenatal care services. Antenatal care involves pregnancy examinations to enhance physical and mental health, prepare for childbirth and postpartum, promote exclusive breastfeeding

and restore reproductive health (Indonesian Ministry of Health, 2018b).

Using antenatal care services can lower maternal mortality (Idris, 2022). In 2002, the World Health Organization introduced the Focused Antenatal Care (FANC) program (World Health Organization, 2016), which has become a standard for high-quality and comprehensive care for pregnant women, requiring at least four visits during the first trimester (Nurlaili, 2019). Antenatal care has several benefits for pregnant women, such as reducing the risk of adverse pregnancy outcomes, perinatal and infant mortality, and morbidity (Brown et al., 2008). It also raises the chances of receiving skilled birth assistance and postnatal care (MI et al., 2012). The number of visits is often used as an indicator of antenatal care use, but other factors, such as the timing of visits, services received, and care provider type, may also be considered (Ataguba, 2018).

In Indonesia, a middle-income country with a large population of 262 million spread across 17,774 islands, pregnant women can receive antenatal health services at primary care facilities, hospitals, or clinics (Mahendradhata et al., 2017). The recommended standards are one visit during the first trimester (0-12 weeks of gestation), one visit during the second trimester (12-24 weeks of gestation), and two visits during the third trimester (24 weeks of gestation up to delivery) to ensure optimal health and safety, as well as to prevent and manage complications from pregnancy (Indonesian Ministry of Health, 2019).

The Indonesian antenatal care standard includes 11 procedures to be completed by nurse-midwives, with guidelines for implementation in each public health center. These procedures are as follows: 1) Weighing, 2) Measuring upper arm circumference, 3) Taking blood pressure, 4) Measuring fundal height, 5) Monitoring fetal heart rate, 6) Identifying fetal presentation, 7) Administering tetanus toxoid vaccine, 8) Providing iron tablets, 9) Conducting laboratory tests, 10) Making appropriate referrals, and 11) Providing health education (Indonesian Ministry of Health, 2020b). To properly implement these procedures, each public health center must create a technical strategy or guideline that outlines how nurse midwives should carry out these procedures promptly. In addition, the communication and clinical skills of nurse-midwives guarantee the effective management of pregnant women during prenatal care (Widyawati et al., 2015).

A systematic review by Simkhada et al. (2008) discovered multiple factors that impact the use of prenatal care in developing countries, including maternal education, husband's education, marital status, accessibility, cost, household income, women's employment, media exposure, and history of obstetric complications. Cultural beliefs and perceptions about pregnancy also play a role, with a significant effect of parity on adequate attendance observed. Women with higher parity tend to use prenatal care less often, but this may vary based on age and religion (Simkhada et al., 2008).

Previous studies have shown that various factors can affect the utilization of complete prenatal care services. For example, in Ethiopia, a study found links between ethnicity, place of residence, education level, and household economic status with the use of prenatal care (Tiruaynet & Muchie, 2019). Similarly, research in Rwanda revealed that older

women, single women or divorcees, and those with insufficient social support were associated with inadequate utilization of prenatal care services (Rurangirwa et al., 2017).

However, despite numerous studies exploring factors that influence prenatal care coverage, there is limited research focused on factors related to the completion of prenatal care. Therefore, this study aimed to identify and analyze the factors associated with the completion of antenatal care in Indonesia.

## Methods

### Study Design

This study utilized a cross-sectional analysis of secondary data obtained from the Basic Health Research (RISKESDAS) conducted by the Indonesian Ministry of Health in March 2018 (Indonesian Ministry of Health, 2018a).

### Samples/Participants

A multi-stage, systematic random sampling approach was used for data collection that was based on the RISKESDAS. In the first stage, census block groups were chosen as the primary sampling units, and then in the second stage, census blocks were selected based on the probability proportional to their enrolment size. In the third stage, ten census buildings were selected through systematic random sampling from each census block, and finally, one household was randomly chosen from each census building. The data analyzed in this study was gathered every three years starting in 2007 by the National Institute of Health Research and Development and the Indonesian Ministry of Health (Indonesian Ministry of Health, 2018a). The sample size of this current study was 65,929 pregnant women aged 15 to 49.

### Measures

The dependent variable in this study was the completion of antenatal care, divided into two categories: complete and incomplete. A woman was considered to have complete antenatal care if she received at least one prenatal care visit during the first trimester, one visit during the second trimester, and two visits during the third trimester. Any other scenario was categorized as incomplete.

The study had 12 independent variables: education level, occupation status, health insurance ownership, place of antenatal care services, travel time to health facilities, area of residence, history of pregnancy, parity, history of abortion, multiple pregnancies, desired pregnancy, and pregnancy complications. The education level was divided into three categories: college, secondary education, and primary education. The occupation status was categorized as either working or not working. Health insurance ownership was divided into two categories: yes and no. The place of antenatal care services was either at health facilities or home. Travel time to health facilities was divided into  $\leq 15$  minutes and  $> 15$  minutes. The area of residence was either urban or rural. The history of pregnancy was divided into two categories: once and more than once. The parity was grouped into two categories: two times and more than two times. The history of abortion was divided into two categories: ever and never. Multiple pregnancies were divided into two categories: yes and no. The desired pregnancy was divided into two categories: yes and

no. Finally, the pregnancy complications were divided into two categories: yes and no.

**Data Analysis**

The data were analyzed using descriptive statistics, chi-square, and multiple logistic regression. The analysis was performed using SPSS 23.0 for Windows.

**Ethical Considerations**

This study was approved by the Ethics Review Center of the Faculty of Public Health, Sriwijaya University, with the Letter of Ethical Qualification No: 042/UN9.FKM/TU.KKE/2021.

**Results**

**Table 1** shows that 75.2% of the participants completed their antenatal care. The majority of the participants had completed their education at the secondary level (60.3%). Of the participants, 40.8% were employed, and 39.2% had health insurance. Nearly all the participants (99.1%) sought ANC services at health facilities. The time to reach these facilities was ≤ 15 minutes for 44.1% of the participants. The majority of the participants (54.3%) lived in urban areas, and 31.8% had a history of one pregnancy. The number of times they had been pregnant was two or fewer (73.6%) in most cases. 14.4% had a history of abortion, and 0.8% had multiple pregnancies. The majority (91.6%) of the participants had desired pregnancy, and 24.8% reported pregnancy complications.

The results of the bivariate analysis using the chi-square test are presented in **Table 2**. The variables of occupation, education, health insurance ownership, place of ANC services, travel time to health facilities, area of residence, history of pregnancy, parity, desired pregnancy, and pregnancy complications showed a significant relationship with the completion of antenatal care ( $p < 0.05$ ). In contrast, the variables of history of abortion and multiple pregnancies were not associated with the completion of antenatal care ( $p > 0.05$ ).

**Table 1** Respondents' characteristics (N = 65,929)

Variables	n	%
<b>Antenatal care completion</b>		
Complete	49,584	75.2
Incomplete	16,345	24.8
<b>Education level</b>		
High	8,131	12.3
Secondary education	39,746	60.3
Primary education	18,052	27.4
<b>Occupation status</b>		
Employed	26,896	40.8
Unemployed	39,033	59.2
<b>Health insurance ownership</b>		
Yes	25,832	39.2
No	40,097	60.8
<b>Place of ANC services</b>		
Health facilities	65,366	99.1
Home	563	0.9
<b>Travel time to health facilities</b>		
≤ 15 minutes	29,100	44.1
> 15 minutes	36,829	55.9
<b>Area of residence</b>		
Urban	35,772	54.3
Rural	30,157	45.7
<b>History of pregnancy</b>		
Once	20,982	31.8
> 1 time	44,947	68.2
<b>Parity</b>		
≤ 2 times	48,521	73.6
> 2 times	17,408	26.4
<b>History of abortion</b>		
Ever	9,480	14.4
Never	56,449	85.6
<b>Multiple pregnancies</b>		
Yes	519	0.8
No	65,410	99.2
<b>Desired pregnancy</b>		
Yes	60,371	91.6
No	5,558	8.4
<b>Pregnancy</b>		
Yes	16,347	24.8
No	49,582	75.2

**Table 2** Bivariate analysis of antenatal care completion and its related factors (chi-square)

Variables	Antenatal care completion				p	OR (95% CI)
	Complete		Incomplete			
	n	%	n	%		
<b>Education level</b>						
High	6,871	84.5	1,260	15.5	<0.001	2.650 (2.418-2.904)
Secondary education	30,563	76.9	9,183	23.1	<0.001	1.617 (1.517-1.712)
Primary education	12,150	67.3	5,903	32.7		
<b>Occupation status</b>						
Employed	21,219	78.9	5,678	21.1	0.006	1.075 (1.021-1.132)
Unemployed	30,261	77.5	8,772	22.5		
<b>Health insurance ownership</b>						
Yes	19,928	77.1	5,904	22.9	<0.001	1.188 (1.128-1.252)
No	29,657	74	10,440	26		
<b>Place of ANC services</b>						
Health facilities	49,276	75.4	16,090	24.6	<0.001	2.526 (2.042-3.125)
Home	309	54.8	254	45.2		
<b>Travel time to health facilities</b>						
≤ 15 minutes	23,192	79.7	5,908	20.3	<0.001	1.552 (1.468-1.642)
> 15 minutes	26,392	71.7	10,437	28.3		
<b>Area of residence</b>						
Urban	28,410	79.4	7,362	20.6	<0.001	1.637 (1.551-1.728)
Rural	21,174	70.2	8,983	29.8		

Table 2 (Cont.)

<b>History of pregnancy</b>						
Once	16,351	77.9	4,631	22.1	<0.001	1.245 (1.173-1.320)
> 1 time	33,233	73.9	11,714	26.1		
<b>Parity</b>						
≤ 2 times	37,845	78	10,676	22	<0.001	1.712 (1.624-1.804)
> 2 times	11,739	67.4	5,669	32.6		
<b>History of abortion</b>						
Ever	7,194	75.9	2,286	24.1	0.253	1.043 (0.970-1.122)
Never	42,390	75.1	15,059	24.9		
<b>Multiple pregnancies</b>						
Yes	393	75.6	126	24.4	0.870	1.023 (0.779-1.344)
No	49,192	75.2	16,218	24.8		
<b>Desired pregnancy</b>						
Yes	46,051	76.3	14,320	23.7	<0.001	1.844 (1.697-2.002)
No	3,533	63.6	2,025	36.4		
<b>Complication of pregnancy</b>						
Yes	12,621	77.2	3,726	22.8	<0.001	1.156 (1.086-1.231)
No	36,963	74.6	12,619	25.4		

**Table 3** further demonstrates the significant relationship between education level, health insurance ownership, place of ANC services at health facilities, travel time to health facilities, the urban area of residence, desired pregnancy, and pregnancy complications with the completion of antenatal care. The most influential variable was education level, with the highest adjusted odds ratio (OR) of 2.023 (95% confidence interval (CI) = 1.839-2.225). The results indicate that respondents with higher levels of education are 2.023 times more likely to complete antenatal care than those with a primary education level, even when controlled for other variables (95% CI = 1.839-2.225).

**Table 3** Multiple logistic regression analysis results

Variables	p	Adjusted OR
<b>Education level</b>		
High	<0.001	2.023 (1.839-2.225)
Secondary education	<0.001	1.356 (1.279-1.439)
Primary education	Ref	
<b>Health insurance ownership</b>		
Yes	<0.001	1.114 (1.056-1.172)
No	Ref	
<b>Place of ANC services</b>		
Health facilities	<0.001	1.926 (1.553-2.389)
Home	Ref	
<b>Travel time to health facilities</b>		
≤ 15 minutes	<0.001	1.241 (1.164-1.324)
> 15 minutes	Ref	
<b>Area of residence</b>		
Urban	<0.001	1.399 (1.315-1.488)
Rural	Ref	
<b>Parity</b>		
≤ 2 times	<0.001	1.500 (1.419-1.586)
> 2 times	Ref	
<b>Desired pregnancy</b>		
Yes	<0.001	1.703 (1.559-1.860)
No	Ref	
<b>Pregnancy complications</b>		
Yes	<0.001	1.143 (1.073-1.218)
No	Ref	

Note: Ref – Reference category

## Discussion

This study analyzed the factors influencing antenatal care completion in Indonesia and found that 75.2% of the respondents completed their antenatal care. In addition, education level, occupation status, health insurance ownership, place of ANC services, travel time to health facilities, area of residence, history of pregnancy, parity, desired pregnancy, and pregnancy complications were found to have significant relationships with antenatal care completion.

Education level was found to play a significant role in the completion of antenatal care. Respondents with a high educational degree were 2.65 times more likely to complete their antenatal care than those with primary education. This finding is consistent with previous research, showing that education level statistically correlates with maternal compliance in antenatal care visits. Mothers with higher levels of education are 3.383 times more likely to attend antenatal care visits than those with primary education (Wulandatika, 2017).

To increase knowledge, mothers should be encouraged to have consultations with health workers, attend pregnancy classes, and learn about pregnancy through various media. Health workers should also conduct counseling and outreach to residential homes to raise public awareness about the importance of utilizing health facilities for antenatal care, especially among expecting mothers. Junga et al. (2017) also found a correlation between education and the regularity of antenatal care visits. A relationship between education and the utilization of antenatal care services (OR = 7.286) was also found by Humokor et al. (2019), meaning that mothers with higher education were 7.286 times more likely to utilize these services than those with lower education.

This study also found a relationship between occupation status and antenatal care completion. Mothers employed had a 1.075 higher chance of completing their antenatal care than non-working mothers. This finding aligns with the research conducted by Dengo and Mohamad (2019), which demonstrates a significant relationship between maternal work and antenatal care visits. This may be due to the fact that working mothers tend to have a higher educational level, thereby having more knowledge about the importance of

regular antenatal care. In addition, working mothers allocate time to visiting health facilities and receiving care at home for their pregnancy. However, this study contradicts the results of research conducted by [Ariestanti et al. \(2020\)](#) and [Putri and Hastutik \(2021\)](#), which found no relationship between work status and maternal behavior during pregnancy.

This study found that health insurance ownership played a role in antenatal care completion. Mothers with health insurance had a 1.188 higher likelihood of completing antenatal care than those without health insurance. Research in Mongolia has established a connection between health insurance ownership and health service utilization ([Gan-Yadam et al., 2013](#)). Similarly, [Kurniawan and Intiasari \(2012\)](#) found a correlation between health insurance ownership and health service utilization. Health insurance makes individuals more likely to use health services, as they do not have to pay for them. Health insurance ownership can improve access to health services.

The study also determined that the place of ANC services impacted antenatal care completion. Mothers who received ANC services at health facilities were 2.526 times more likely to complete antenatal care than those who received services at home. Research supports this finding by showing a correlation between service availability and visits for antenatal care. The presence of health facilities and health workers plays a crucial role in increasing visits for antenatal care. However, inadequate health facilities and health workers may contribute to the low frequency of pregnancy check-up visits. To address this issue, mothers need to be motivated to carry out antenatal care services ([Supliyani, 2017](#)). A study conducted by [Fitrina et al. \(2020\)](#) also revealed a relationship between access to health facilities and antenatal care visits. High-risk pregnant women with easy access to health facilities were nine times more likely to complete antenatal care visits than those without easy access.

The proximity to health facilities affects travel time. This study found a correlation between travel time to health facilities and the completion of antenatal care services. Mothers who had a travel time of less than or equal to 15 minutes to health facilities had a 1.552 higher chance of completing antenatal care compared to mothers who had a travel time of more than 15 minutes to health facilities. Research supports the finding that travel time to health facilities is significantly linked to antenatal care visits. Mothers who spent more than 25 minutes traveling to health facilities had 1.789 times the chance of having less than four pregnancy check-ups ([Supliyani, 2017](#)). Pregnant women who can reach health care facilities faster are more likely to utilize more frequent antenatal care services than those who take a long time to get the facilities. Therefore, having a health facility close to one's home can improve access to health care. This finding is supported by research by [Gamelia et al. \(2013\)](#), who showed a relationship between travel time to health services and behavior toward pregnancy care.

This study highlights the correlation between the area of residence and access to health services. Mothers residing in urban areas have a higher chance (1.637 times) of completing antenatal care services than those in rural areas. Similarly, [Fatali and Budyanra \(2020\)](#) affirm this by stating that the location of residence significantly impacts pregnancy visits. Expectant mothers in urban areas have 2.065 times more

chances to undergo pregnancy checks than those in rural areas. The proximity of the location of residence to such facilities determines the ease of access to health services. Housing with adequate infrastructure, such as proper roads and transportation, facilitates access to health services in urban areas ([Fatali & Budyanra, 2020](#)). As such, the government should ensure that health facilities are developed evenly in both rural and urban areas.

This study also found a significant relationship between a history of pregnancy and the completion of antenatal care. Mothers with at least one previous pregnancy had a 1.245 higher chance of completing antenatal care than mothers with multiple pregnancies. This aligns with the research of [Saptarini and Suparmi \(2016\)](#), who found a connection between pregnancy history and antenatal care visits. Mothers with three or more pregnancies were less likely to complete visits for antenatal care and pregnancy check-ups, as they felt they had adequate knowledge and experience. However, mothers with two pregnancies felt inexperienced and needed information and help. According to [Kusuma \(2018\)](#), 70% of mothers had multiple pregnancies. These multigravida mothers had some experience with visits to public health centers, hospitals, clinics, and others during their previous pregnancies.

Parity is the number of children who were born live to mothers. This study found that parity is related to the completion of antenatal care. Mothers with parity of two or less had a 1.712 times higher chance of completing antenatal care than mothers with parity greater than two. This is consistent with [Junga et al. \(2017\)](#), which revealed a connection between maternal parity and the regularity of antenatal care examinations. Mothers with a higher parity feel more experienced in pregnancy and childbirth, making them less concerned during subsequent pregnancies. In addition, pregnant women with fewer children tend to be more diligent in checking their pregnancy compared to mothers with more children ([Choirunissa & Syahputri, 2018](#)). [Sari \(2015\)](#) also found a correlation between parity and adherence to standard antenatal care visits, with lower parity resulting in more routine visits. This may be because high parity pregnancies are often unplanned. [Dengo and Mohamad \(2019\)](#) also found a substantial relationship between pregnancy parity and antenatal care visits.

This study found that desired pregnancy is related to the completion of antenatal care, with mothers who had desired pregnancies having a 1.844 times greater likelihood of completing antenatal care compared to mothers who had unwanted pregnancies. This finding is supported by research by [Dumilah \(2019\)](#), which found that desired pregnancies receive 5.1 times more regular check-ups compared to unwanted pregnancies. Conversely, [Dini et al. \(2016\)](#) found that mothers with unwanted pregnancies had a 1.79 times greater chance of not receiving standard prenatal care than those with desired pregnancies. Therefore, mothers with unwanted pregnancies should seek information about pregnancy health earlier to prevent late detection and treatment of pregnancy complications.

The study found that pregnancy complications are linked to the completion of antenatal care. Women who experience complications during pregnancy are more likely to complete antenatal care than those without. This is supported by research conducted by [Jusniyanti et al. \(2016\)](#), which found a

significant relationship between pregnancy complications and the utilization of antenatal care services. Women who experience complications are more likely to be aware of their health and seek antenatal care services. However, some women with mild complaints may not seek a pregnancy check-up. The level of knowledge and maternal awareness can be improved by participating in regular antenatal care during pregnancy, as complaints related to the disease are likely to result in the utilization of antenatal care services (Indrastuti & Mardiana, 2019).

### Limitations

This study, which employed a cross-sectional survey approach, was unable to establish causality between the factors due to its limitations. Furthermore, secondary data analysis revealed the exclusion of certain variables, such as geographical, economic, and social-cultural factors, owing to limitations in the available data.

### Implications of the Study for Nursing Practice

The results of this study found relationships between completion of antenatal care and various factors such as education level, occupation status, health insurance ownership, place of ANC services, travel time to health facilities, area of residence, pregnancy history, parity, desired pregnancy, and pregnancy complications, can serve as valuable information for nurses and other healthcare professionals in developing effective healthcare interventions. The role of nurses in promoting the use of antenatal care services is crucial. They play a significant part in educating and providing health information to pregnant women. Nurses should take steps to improve health education and raise community awareness to increase utilization of these services, which can lead to better health outcomes for expectant mothers.

### Conclusion

Several variables have been found to significantly influence the completion of antenatal care, including education level, health insurance ownership, location of antenatal care services within health facilities, travel time to health facilities, urban residency, desired pregnancy, and pregnancy complications. Education level is essential in shaping a mother's knowledge and attitudes toward using antenatal care services at health facilities. To enhance the utilization of these services, the Indonesian government should undertake increased socialization efforts to raise community awareness and knowledge of the importance of regular antenatal care. Healthcare workers, especially nurses and midwives, should also provide increased health education to pregnant women to help them access these services.

### Declaration of Conflicting Interest

None to declare.

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### Authors' Contributions

IS conceptualized the study design and acquired the raw data for analysis. HI conceptualized the article and prepared the original draft of the manuscript. All authors were accountable in each step of this current study and approved the final version of the manuscript to be published.

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### Data Availability

The Agency of Health Research and Development Indonesia gives access to data on Basic Health Research by applying to their website [<https://www.litbang.kemkes.go.id/layanan-permintaan-data-riset/>].

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