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FACTORS INFLUENCING PREGNANT WOMEN'S COMPLIANCE WITH STANDARD PREGNANCY EXAMINATIONS

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ABSTRACT
Antenatal care (ANC) refers to the care provided to mothers and their unborn babies during pregnancy. ANC visits are essential, as they allow for the early provision of important information and education regarding pregnancy and childbirth preparation. Objective to identify the factors influencing pregnant women's compliance with the minimum standard pregnancy examinations in the Deli Serdang District Health Office, North Sumatra. This study used a quantitative and cross-sectional approach, involving 138 pregnant using puposive sampling women from four community health centers under the Deli Serdang District Health Office, North Sumatra, Indonesia. Data were collected using questionnaires and analyzed using the McNemar, Chi-square, and multiple logistic regression tests The results of the study showed that factors influencing compliance with the minimum standard pregnancy examinations included the mother's last education level, gestational age, transportation, travel time, ANC visit frequency, media exposure, knowledge, and attitude, with a p-value of 0.000 < 0.05. The most dominant factor affecting compliance with ANC visits was the type of transportation used (p-value = 0.039). Education level, gestational age, transportation, travel time, ANC visit frequency, media exposure, knowledge, and attitude all influence compliance with ANC. Pregnant women should improve their attitude and motivation to seek information about healthy pregnancy using easier access, such as e-books or web links that can be read anytime and anywhere. In today's digital era, this can help increase awareness and knowledge about the importance of ANC, ultimately improving ANC coverage (K1-K4) and reducing maternal mortality rates.

Keywords: antenatal care; compliance; pregnant women; standard pregnancy examinations

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INTRODUCTION

Antenatal Care (ANC) is the care provided to mothers and their unborn babies during pregnancy. ANC visits are crucial, as they allow mothers to receive important information and education about pregnancy and childbirth preparation as early as possible (Gamberini et al., 2022). The Indonesian Ministry of Health requires a minimum number of ANC visits during pregnancy: at least one visit in the first trimester (0-12 weeks), one in the second trimester (12-24 weeks), and two in the third trimester (24 weeks until birth). Early pregnancy check-ups are crucial in preventing maternal illness and death. One key strategy is ensuring that every pregnant woman completes at least six ANC visits throughout her pregnancy (Nurhaida, 2022).Studies show that ANC utilization remains low, including in Indonesia. Lack of pregnancy knowledge is often due to infrequent ANC visits. Besides access and facility availability, low ANC use is also influenced by pregnant women's knowledge, attitudes, and perceptions. A lack of awareness about ANC's importance can lead to low K1 and K4

coverage. Every pregnant woman should have at least four ANC visits during pregnancy (Ariescha et al., 2024; Laksono et al., 2020).

The implementation of ANC can be assessed through K1 and K4 coverage rates. The ANC access coverage (K1) is 96.1%, while K4 coverage is only 74.1%. In North Sumatra Province, K4 service coverage for pregnant women has fluctuated over the past five years. K1 coverage declined to 98.58% in 2019, compared to 99.11% in 2018, falling short of the 100% target for both K1 and K4. Similarly, K4 coverage decreased from 96.23% in 2018 to 93.04% in 2019. This gap occurs because some pregnant women complete K1 visits but do not continue to K4 as per the standard (Irania et al., 2022).The decline in K1 and K4 coverage in 2019 was due to low maternal participation in ANC, incomplete data collection caused by high community mobility, and the suboptimal competency of village midwives in providing ANC according to standards. These issues should be considered significant public health challenges, especially since the number of pregnant women in Indonesia has exceeded 52 million per year over the past three years. Maternal knowledge has a significant impact on compliance with ANC, which in turn increases awareness of its importance (Suebu et al., 2022)Therefore, the aim of this study is to analyze the factors influencing pregnant women's compliance with the minimum standard pregnancy examinations and to identify the most dominant factor affecting compliance

METHOD

This study used a cross-sectional method, which involved observing or measuring variables at a specific point in time to determine the prevalence of an event and its related factors. The research was conducted in Deli Serdang Regency, specifically in the districts of Hamparan Perak, Tanjung Morawa, Pantai Labu, and Batang Kuis. The sampling technique used was purposive sampling, with a total of 138 pregnant women in their first to third trimesters as respondents. The research instrument was a questionnaire used for respondent interviews. Data analysis was conducted using the McNemar and Chi-square tests to assess the significance of factors influencing pregnant women's compliance with the minimum standard pregnancy examinations. Additionally, multiple logistic regression analysis was used to determine the most dominant factor affecting compliance. This study passed ethical review by the Research Ethics Committee of the Faculty of Medicine, Universitas Andalas, with approval number 107/UN.16.2/KEP-FK/2023.

RESULT

Most pregnant women were low-risk (87%), unemployed (88.4%), and had secondary education (84.1%). Javanese (36%) were the largest ethnic group. Most were in their second trimester (58%) and used motorcycles or ojek (81.2%) to reach healthcare, often taking over an hour (60.9%). ANC visits were low across trimesters. Poor media access (47.1%), limited knowledge (61.6%), and negative attitudes (59.4%) likely contributed to low ANC compliance (68.1%).

Table 1.
Respondent characteristics (n=138)

Respondent characteristics	f	%
Age		
Not at Risk	120	87.0
At Risk	18	12.9
Parity		
Nullipara	73	52.9
Multipara	65	46.8
Occupation		
Unemployed (Housewife)	122	88.4
Laborer/Employee	15	10.8
Civil Servant/Private Employee	1	0.7

Respondent characteristics	f	%
Ethnicity		
Malay	31	22.3
Karo	3	2.2
Javanese	50	36.0
Simalungun	1	0.7
Padang	26	18.7
Batak Toba	16	11.5
Others	11	8.0
Education Level		
Secondary Education (SMA/SMK/MA)	116	84.1
Higher Education (D3/S1/S2)	22	15.9
Gestational Age		
First Trimester	17	12.3
Second Trimester	80	58.0
Third Trimester	41	29.7
Transportation Used		
Walking	112	81.2
Motorcycle/Ojek	26	18.8
Travel Time		
Less than 30 minutes	19	13.8
31 – 60 minutes	35	25.4
More than 1 hour	84	60.9
ANC Visit Frequency		
TM 1 = 1 time	7	5.2
No ANC in TM 1	10	7.2
TM 2 = 2 times	31	22.4
TM 2 = 1 time	49	35.5
TM 3 = 3 times	6	4.4
TM 3 = 1-2 times	35	25.3
Media Exposure		
Never	65	47.1
Sometimes	43	31.2
Often	30	21.7
Knowledge		
Poor	85	61.6
Fair	35	25.4
Good	18	13.0
Attitude		
Negative	82	59.4
Positive	56	40.6
Compliance with Pregnancy Check-ups		
Non-compliant	94	68.1
Compliant	44	31.9

Table 2. reveals several factors influencing compliance with antenatal care (ANC) visits. Maternal age and parity do not show a significant association with ANC compliance ($p = 0.340$ and $p = 0.777$, respectively). Similarly, occupation does not significantly affect compliance, although unemployed women tend to have higher adherence to ANC visits ($p = 0.206$). However, education level plays a significant role, where women with only secondary education show higher compliance compared to those with higher education ($p = 0.025$, OR = 3.15, 95% CI = 1.239–8.006). Gestational age also influences compliance, with the highest adherence observed in the first and second trimesters, while the third trimester shows significantly lower compliance ($p = 0.018$). Transportation and travel time are also crucial factors; women who walk to healthcare facilities have better compliance compared to those using motorcycles or ojek ($p = 0.025$, OR = 4.427, 95% CI = 1.252–15.656). Additionally, longer travel times, especially those exceeding one hour, significantly reduce ANC compliance ($p = 0.027$). Another important factor is ANC visit frequency, where more frequent visits are strongly associated with higher compliance ($p = 0.000$). Media exposure surprisingly shows an inverse relationship, with women who are frequently exposed to media

having significantly lower compliance (p = 0.000). Knowledge also plays a significant role, with poor knowledge being linked to the lowest ANC compliance (p = 0.008). Lastly, attitude shows a significant association, where women with a negative attitude toward ANC exhibit higher compliance compared to those with a positive attitude (p = 0.036, OR = 2.325, 95% CI = 1.119–4.829).In conclusion, education level, gestational age, transportation, travel time, ANC visit frequency, media exposure, knowledge, and attitude significantly influence ANC compliance. In contrast, maternal age, parity, and occupation do not show a significant association with compliance.

Table 2.
Bivariate Analysis

Variable	Compliance with ANC				Total		p-value	OR	CI 95%
	Compliant		Non-compliant						
	f	%	f	%	f	%			
Age									
Not at Risk	36	30.0	84	70.0	120	100.0	0.340*	0.536	0.195 – 1.468
At Risk	8	44.4	10	55.6	18	100.0			
Parity									
Nullipara	22	30.1	51	69.9	73	100.0	0.777*	0.777	0.412 – 1.727
Multipara	22	33.8	43	66.2	65	100.0			
Occupation									
Unemployed (Housewife)	40	32.8	82	67.2	122	100.0	0.206**		
Laborer/Employee	3	20.0	12	80.0	15	100.0			
Civil Servant/Private Employee	1	100.0	0	0.0	1	100.0			
Education Level									
Secondary Education (SMA/SMK/MA)	12	54.5	10	45.5	22	100.0	0.025*	3.15	1.239 – 8.006
Higher Education (D3/S1/S2)	32	27.6	84	72.4	116	100.0			
Gestational Age									
First Trimester	7	41.2	10	58.8	17	100.0	0.018**		
Second Trimester	31	38.8	49	61.3	80	100.0			
Third Trimester	6	14.6	35	85.4	41	100.0			
Transportation Used									
Walking	41	36.6	71	63.4	112	100.0	0.025*	4.427	1.252 – 15.656
Motorcycle/Ojek	3	11.5	23	88.5	26	100.0			
Travel Time									
Less than 30 minutes	30	35.7	54	64.3	84	100.0	0.027**		
31 – 60 minutes	13	37.1	22	62.9	35	100.0			
More than 1 hour	1	5.3	18	94.7	19	100.0			
ANC Visit Frequency									
TM 1 = 1 time	7	41.2	10	58.8	17	100.0	0.000**		
TM 2 = 2 times	31	38.8	49	61.3	80	100.0			
TM 3 = 3 times	6	14.6	35	85.4	41	100.0			
Media Exposure									
Never	31	47.7	34	52.3	65	100.0	0.000**		
Sometimes	11	25.6	32	74.4	43	100.0			
Often	2	6.7	28	93.3	30	100.0			
Knowledge									
Poor	0	0.0	18	100.0	18	100.0	0.008**		
Fair	13	37.1	22	62.9	35	100.0			
Good	31	36.5	54	63.5	85	100.0			
Attitude									
Negative	24	42.9	32	57.1	56	100.0	0.036*	2.325	1.119-4.829
Positive	20	24.4	62	75.6	82	100.0			
Total	44	31.9	94	68.1	138	100.0			

Chi-square; McNamer***

The final logistic regression analysis results indicate that six independent variables have a p-value <0.05, namely gestational age, transportation used, ANC visit frequency, media exposure, knowledge, and attitude. However, based on the Exp(B) value, the most influential factor affecting ANC compliance is transportation used (p-value = 0.025), as indicated by Exp(B) = 4.427, which falls within the 95% confidence interval of 1.252–15.656**.** This is

followed by attitude (p-value = 0.036), with Exp(B) = 2.325**,** within the 95% confidence interval of 1.119–4.829.

DISCUSSION

High-risk maternal age does not show a significantly different tendency in ANC compliance compared to non-risk mothers. These results are consistent with previous studies, which indicate that age is not the only factor influencing compliance with ANC. Another study suggests that other factors, such as education level, family support, healthcare accessibility, and maternal knowledge about the benefits of ANC, play a more significant role in determining pregnant women's compliance with ANC (Eliufoo et al., 2024). Additionally, some studies indicate that older or high-risk mothers tend to be more aware of the importance of ANC compared to younger mothers; however, this awareness does not always correlate with higher compliance (Nizum et al., 2023).There is no significant influence of parity on compliance with ANC. Parity is not a key factor influencing pregnant women's compliance with ANC. The study shows that other factors, such as education level, healthcare access, maternal knowledge about the benefits of ANC, and family support, play a more significant role in determining pregnant women's compliance with ANC (Konlan et al., 2020)There is no significant influence of maternal occupation on compliance with ANC. Although working mothers may have limited time to access healthcare services, factors such as family support, education level, and access to healthcare facilities play a more significant role in determining ANC compliance. The study found that mothers with strong support from their husbands and families tend to remain compliant with ANC, despite having busy work schedules (Indah, 2022).

There is a significant relationship between maternal education level and compliance with ANC. An odds ratio (OR) of 3.150 with a 95% confidence interval (1.239 – 8.006) indicates that mothers with higher education are 3.15 times more likely to comply with antenatal care (ANC) compared to those with secondary education. This aligns with previous studies stating that education level is closely related to ANC compliance. Mothers with higher education tend to be more aware of the importance of regular antenatal check-ups and have better access to available healthcare services (Essa et al., 2024; Fegita et al., 2022).There is a significant relationship between gestational age and compliance with ANC. ANC compliance tends to be higher in the first and second trimesters compared to the third trimester. This study suggests that the decline in compliance during the third trimester may be due to maternal fatigue, increased physical discomfort, or a lack of understanding about the importance of antenatal check-ups closer to delivery (Saaka & Sulley, 2023). Previous studies show that pregnant women are more active in seeking ANC during early pregnancy, but some tend to neglect follow-up check-ups, especially in the third trimester (Mwenebanda et al., 2024).

There is a significant relationship between transportation and compliance with ANC. An odds ratio (OR) of 4.427 with a 95% confidence interval (1.252-15.656) indicates that pregnant women who walk are 4.4 times more likely to comply with ANC compared to those who use motorized vehicles, such as motorcycles or ride-hailing services. Healthcare accessibility is one of the key determinants in utilizing healthcare services. Studies emphasize that environmental factors, such as availability of transportation and distance to healthcare facilities, significantly influence healthcare-seeking behavior, including ANC utilization (Kalam & Islam, 2025). Pregnant women who face transportation barriers are more likely to delay or even neglect antenatal check-ups (Abdiwali et al., 2024). Previous studies state that mothers with easy access to healthcare facilities are more compliant with ANC compared to those who must travel long distances or rely on public transportation (Alhassan et al., 2024). There is a significant relationship between travel time to healthcare facilities and pregnant women's compliance with antenatal care ANC. This indicates that while longer travel time

can be a barrier, mothers who live farther from healthcare facilities tend to be more committed to attending antenatal check-ups (Adongo et al., 2024). Healthcare accessibility is influenced not only by distance and travel time but also by an individual's perception of the need for healthcare services. Psychosocial factors, such as health awareness and past experiences, can impact a person's decision to seek healthcare services, including ANC (Hijazi et al., 2018). Previous studies have found that pregnant women living farther from healthcare facilities have higher ANC compliance compared to those living closer. This study suggests that mothers with limited access tend to plan their visits more carefully, as they are aware of their access constraints (Hariani et al., 2024).

There is a significant relationship between the frequency of ANC visits and pregnant women's compliance with antenatal check-ups. Optimal ANC check-ups should be conducted at least 8 times during pregnancy, consisting of 1 visit in the first trimester, 2 visits in the second trimester, and 5 visits in the third trimester. This frequency is crucial for early detection of pregnancy complications and for providing necessary interventions to reduce the risk of maternal and infant morbidity and mortality (Chilot et al., 2023). Pregnant women who begin ANC in the first trimester tend to be more compliant with subsequent antenatal check-ups compared to those who start ANC in the second or third trimester (Amponsah-Tabi et al., 2022). Mothers who only start ANC in the third trimester face delayed detection of complications like preeclampsia and fetal growth issues, increasing the risk of preterm birth and neonatal complications (Arsenault et al., 2024).There is a significant relationship between media exposure and pregnant women's compliance with ANC. Previous studies found that mass media, such as TV and the Internet, often provide superficial or non-standard medical information. This can influence pregnant women's perception of ANC and reduce their motivation for regular check-ups (Fatema & Lariscy, 2020). There is a significant relationship between pregnant women's knowledge level and compliance with ANC. Pregnant women with good knowledge but limited access or financial barriers tend to be less compliant than those with moderate knowledge but better access. Economic, social, and cultural factors also influence ANC compliance, explaining why knowledge alone doesn't guarantee adherence (Noviyanti et al., 2022). There is a significant relationship between pregnant women's attitudes and compliance with ANC. Mothers with a positive attitude had a higher ANC compliance rate (42.9%) than those with a negative attitude (24.4%). An OR of 2.325 (CI: 1.119–4.829) indicates that mothers with a positive attitude are 2.3 times more likely to comply with ANC. Previous studies show that mothers with a positive attitude toward ANC are more likely to attend regular check-ups. Negative attitudes are often influenced by culture, personal experience, or lack of family support (Amungulu et al., 2023). Negative attitudes toward ANC often stem from past discomfort, fear of medical procedures, or the belief that ANC is only needed for complications. As a result, these mothers are more likely to delay or avoid check-ups (Drigo et al., 2020).

CONCLUSION

The analysis found that several factors significantly influence pregnant women's compliance with antenatal care (ANC), including education level, gestational age, transportation, travel time, ANC visit frequency, media exposure, knowledge, and attitude. Women with higher education, a positive attitude, and better access to healthcare tend to be more compliant with ANC. However, women with high knowledge but a lack of awareness of ANC urgency show lower compliance. In contrast, parity and occupation do not have a significant impact on ANC compliance. These findings highlight the need for better health education and promotion strategies to increase awareness of the importance of regular ANC visits. Improving healthcare access, targeted counseling, and attitude-based interventions can help enhance ANC compliance. A holistic approach will ensure that pregnant women understand the importance of ANC for the well-being of both mother and baby.

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