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Strengthening the first antenatal visit to improve maternal health: results from a cross-sectional study in Bantul, Indonesia

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Abstract

Background Antenatal care (ANC) is an evidence-based intervention aimed to improve mothers' and newborns' health, but its effectiveness depends on service quality at each visit. This study aims to assess the quality of integrated ANC and associated factors in public health centers (PHCs) in Bantul, Indonesia.

Methods A facility-based cross-sectional study was conducted from February to April 2024. A total of 444 study participants out of 17 PHCs were selected using a cluster random sampling technique. We collected data on service quality structures, processes, and output. We analyzed visit time, visit initiation, waiting time, consultation duration, and satisfaction with the quality of integrated ANC. Data were collected through observation and interviews with pre-tested structured questionnaires. Bivariate and multivariable logistic regressions were used to analyze the relationship between the outcome and predictor factors.

Results A total of 293 (66%) of pregnant women received a good integrated ANC. The majority of respondents were between the ages of 20-35 (86.71%), had a low level of education (67.34%), and had insurance (88.74%). Based on input variable observations, five PHCs (29.41%) did not offer psychological services due to a lack of psychologists. ANC visits (aOR 2.57; 95% CI 1.67-3.95), insurance ownership (aOR 2.47; 95% CI 1.31-4,68), and education (aOR 0.50; 95% CI 0.31-0.80) were significant predictors of ANC quality.

Conclusion Two-thirds of pregnant women received high-quality integrated ANC in Bantul. The initial visit is a good predictor of ANC quality. Educational promotion, partnerships with local leaders, PHC capacity building with appropriate resources, and insurance coverage are crucial for improving the initial ANC visit.

Keywords Antenatal care, Health facilities, Health care, Personal satisfaction

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Introduction

Maternal mortality is still one of the most significant global public health concerns. According to the World Bank, severe maternal morbidity is increasing globally and is more prevalent in low- and middle-income countries compared to high-income countries [1]. The increase in maternal death would fail to meet the broad public health goals of improving women's health, as well as contributing to poor pregnancy outcomes and infant health [1]. In 2017, the maternal mortality ratio (MMR) in low-income countries was 462 per 100,000 live births, whereas in high-income countries it was 11 per 100,000 live births [2]. In Indonesia, MMR has decreased from 346 deaths per 100,000 live births in 2010 to 305 deaths per 100,000 live births in 2015, with a target of 183 deaths per 100,000 live births by 2024 [3].

The Indonesian Ministry of Health is escalating cross-sectoral collaboration, professional coordination, national health insurance optimization, and standby village activation to reduce maternal mortality [4], including improving the quality of integrated antenatal care (ANC). ANC is offered to ensure that all mothers have access to adequate maternal health services, as per the Indonesian Ministry of Health Regulation No. 97 of 2014. This is an effective method for early detection and treatment of maternal health issues, which can reduce maternal and infant morbidity and mortality [5].

ANC is essential to primary health care, but only one-third of all pregnant women in developing countries receive at least four antenatal visits. The quality of ANC can be evaluated by the number and frequency of ANC visits, the services received, the types of information provided during visits, the levels of satisfaction, and the qualifications of providers [6]. ANC services for pregnant women are standardized based on both quantity and quality, with six visits during pregnancy (one in the first trimester, two in the second, and three in the third). These services meet quality standards by completing all the components and providing ultrasonography services [7]. Providing high-quality ANC can encourage women to seek skilled care at birth and prepare for access to it [8].

Indonesia has already implemented integrated antenatal services. Antenatal services are a series of activities provided to all pregnant women beginning with conception and ending before the start of the comprehensive and quality delivery process [9]. High-quality ANC includes providing services and ensuring a positive service experience [10]. These services include maternity and child health (MCH) assessments, dental assessments, nutritional advice, psychological evaluations, and laboratory tests [9].

Previously, few studies were conducted to evaluate the quality of ANC services in Indonesia. Another study in Indonesia found that the quality of integrated antenatal services was 69.6% in Aceh Besar Regency [11] and 68.8% in Boyolali Regency [12]. The public health facilities where the integrated ANC services were offered are the focus of this study, which differs from others. It was also conducted using the Donabedian quality-of-care framework, which included the three dimensions of health service quality assessment: structure, process, and outcome [13]. Client satisfaction was added to recommend patient-centered care, a pioneering step in improving health care quality.

The current WHO progress report on maternal and newborn health shows that maternal mortality has stagnated or increased globally. The report highlights the importance of respectful, high-quality maternal and newborn care to reduce maternal mortality [14]. Another review that aligns with the WHO findings, as maternal mortality in Indonesia remained high despite the majority of women attending the required number of ANC visits and giving birth with a qualified birth attendant [15]. Interventions based on robust scientific research are needed to improve services. In Indonesia, quality studies have evaluated antenatal visits or components. Several studies [9, 10] on ANC quality have been completed in various regions of Indonesia, but no studies on integrated ANC have been published. This study aims to evaluate the quality of integrated ANC and identify relevant factors in public health centers in Bantul, Indonesia. Addressing the evidence gap will set the foundation for improving integrated ANC.

Method

Study setting, population, and sample

The study was carried out in Bantul, the second most populated district in Yogyakarta. A facility-based cross-sectional study was performed at public health centers from February 2024 to April 2024. All pregnant women receiving ANC services at Bantul's health centers served as the source populations. The required sample was calculated using OpenEpi. A sample size of 444 was calculated using a single population proportion formula (n = [DEFF*Np(1-p)]/[(d2/Z21-α/2*(N-1) + p*(1-p)] [16], considering the 95% confidence interval, the 5% marginal error, the 30% prevalence of ANC service quality in Bele Gasgar District, Ethiopia [17], the design effect of 1.3, and a 10% non-response rate. A cluster random sampling technique was used. The sample size was distributed equally among selected health centers, with approximately 26–27 respondents in each PHC.

Eligibility criteria

The study included all pregnant women who attended integrated ANC services in the selected public health centers during the data collection period, while pregnant

women who refused to participate and those who were critically ill and unable to respond were excluded.

Study variables

Dependent variable. Quality of antenatal care

Good quality of integrated ANC services. If a health care facility provides 75% of the required focus ANC components of services, such as physical examination, basic diagnostic laboratory services, therapeutic drugs, information on danger signs, birth preparation, and advice [18]. Meanwhile, poor quality of ANC services is if the health facility provides less than 75% of the necessary focus ANC components of services.

Independent variables

Socio-demographic characteristics Maternal age (< 20 years old, 20–35 years old, > 35 years old), religion (Moslem, catholic, protestant), residence (Bantul regency/outside Bantul regency), education (low education (≤ 12 years)/high education (> 12 years), employment (unemployed/employed), insurance ownership (not having insurance/having insurance), number of pregnancies (primigravida/multigravida), and comorbidities (no/yes).

Structures Waiting room and seating arrangements, washrooms with water, closed rooms for examinations, availability of basic health equipment, the competence of health service providers (all labeled in Available/Not Available).

Processes Number of visits (not first visit/first visit), initiation of visit (> 12 weeks/≤ 12 weeks), waiting time (> 60 min at one of the clinics/≤ 60 min on all clinics), consultation duration (< 15 min at one of the clinics/≥ 15 min on all clinics).

Output. Personal satisfaction

This satisfaction is measured using self-completed surveys filled out by each respondent. They completed questionnaires to assess waiting time, consultation duration, physical and supporting examinations, and the provision of information. Satisfaction was evaluated on a 4-point Likert scale (very dissatisfied, dissatisfied, satisfied, very satisfied).

Data collection tools

Data were collected by administering a standardized interview form that was adapted from various sources [7, 14]. To verify interview data, the patient's medical records and MCH books were reviewed. The questionnaires were written in English, translated into Indonesian, and returned to English for consistency. It is divided into four sections: part one is about socio-demographic and obstetric information, part two is about process information, part three is about satisfaction with integrated ANC, and part four is about the structural aspects of services.

The questionnaire was pre-tested on 30 mothers receiving integrated ANC services at non-study health centers and was organized sequentially using straightforward, understandable, concise, and acceptable language to guarantee the quality of the data. Content validity is employed to ascertain tool validity. Cronbach's alpha was calculated, yielding a coefficient scale exceeding 0.6. All values are greater than 0.6, showing high dependability of the scale. The internal consistency of each dimension was acceptable, suggesting that the scale had good internal consistency [19]. Based on these findings, no modifications were made to the questionnaire.

Data collection procedures

The data was collected by ten midwives with diploma-level qualifications. The data collectors received one day of training. During the data collection period, data collectors arrived early in the morning to record patients from the registry book for that day, note their time at the health center when they received ANC services, and conduct interviews. Throughout the data collection process, the principal investigator reviewed and verified the questionnaire responses' completeness, consistency, and validity, and data collectors received daily feedback. The principal investigator then classified and encoded the collected data.

Data processing and analysis

The collected data was verified for completeness and consistency. The data was then cleaned and coded in Microsoft Excel before being exported into STATA version 17 for analysis. Descriptive statistics such as frequencies and percentages were calculated. The results were presented as tables, graphs, and text. All structure variables were explained descriptively. Each variable was first analyzed using bivariate logistic regression, after which all independent variables were entered into the multivariable logistic regression.

Multivariable logistic regressions were used to identify the most important predictor variables associated with integrated ANC service quality while controlling for confounding variables. Multiple logistic regression calculates the adjusted odds ratio (aOR) with a 95% confidence interval. The adjusted odds ratio (aOR) was used to evaluate the relationship between predictor factors and treatment outcomes. A multicollinearity assumption test between independent variables was performed before conducting multivariable analysis using the collin command in STATA 17. The calculation results showed that there was no collinearity between the independent

variables. Multicollinearity can be identified using the Variance Inflation Factor (VIF). A significant multicollinearity issue is indicated by a VIF number larger than 10 [20].

Ethical clearance

This study was conducted following the principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the Research Ethics Committee of the Faculty of Medicine, Public Health, and Nursing at Universitas Gadjah Mada (KE/FK/0079/EC/2024). Permission from the DHO was obtained before the beginning of the study. All participants provided verbal and written informed consent and were informed that their participation was entirely voluntary. All procedures involving human participants were carried out in compliance with appropriate national and international ethical guidelines.

Result

Quality of integrated antenatal care

A total of 444 pregnant women participated in the study, making a response rate of 100%. Out of 444 respondents, 293 (66%) had a good integrated ANC.

Sociodemographic and obstetric history of the respondents

The majority of respondents were between the ages of 20 and 35 (86.71%), were Moslem (99.32%), lived in Bantul Regency (97.75%), had a low level of education (67.34%), were employed (53.15%), and had insurance (88.74%). The characteristics of respondents are illustrated in Table 1. According to obstetric data, the majority of respondents (61.94%) were multigravida and had no comorbidities (91.67%). The comorbidities experienced by study participants, with chronic hypertension (24.39%), pre-eclampsia (21.95%), and asthma (21.95%) being the most prevalent.

Table 1 Sociodemographic characteristics of respondents

Sociodemographic Variable		Total (*N* = 444)	Percentage (%)
Age	< 20	7	1.58
	20–35	385	86.71
	> 35	52	11.71
Religion	Moslem	441	99.32
	Catholic	2	0.45
	Protestant	1	0.23
Residence	Bantul Regency	434	97.75
	Outside Bantul Regency	10	2.25
Education Status	Low education (≤ 12 years)	299	67.34
	High education (> 12 years)	145	32.66
Occupation	Unemployed	208	46.85
	Employed	236	53.15
Insurance	Not having insurance	50	11.26
	Having insurance	394	88.74
Number of pregnancies	Primigravida	169	38.06
	Multigravida	275	61.94
Comorbidities	No	407	91.67
	Yes	37	8.33

Structure attributes

The structure's results showed that all health centers had waiting spaces and seating arrangements, washrooms with water, private rooms for examinations, basic health equipment, and health service providers who were competent. However, the only requirements that have not been fulfilled are the availability of a psychology outpatient clinic (70.59%) and the competence of a psychologist (70.59%). Five health centers—Banguntapan, Dlingo, Imogiri, Jetis, and Pandak—lack psychology outpatient clinics. As a result, patients who receive integrated ANC services do not have mental examinations performed.

Process attribute

Based on process variables, it was found that 225 respondents (50.68%) made a visit to get integrated antenatal services during the first visit to the health center, and 312 respondents (70.27%) performed integrated antenatal services when the gestational age was ≤ 12 weeks. During integrated antenatal services, the majority of respondents (86.49%) had a waiting time of less than 60 min in all clinics, and the consultation duration was less than 15 min in one clinic (98.87%). Table 2 provides a detailed display of process variables.

The satisfaction scale of respondents with physical and supporting examinations, consultation duration, waiting time, and respect for the provision of education is illustrated in Table 3. The results of this study's satisfaction scale were dominated by satisfied and very satisfied respondents in each category. The total satisfied and very satisfied percentages in each category ranged from 99.20 to 99.55%.

Bivariate analysis

The results of the bivariate analysis presented in Table 4 revealed that educational status, insurance ownership, and number of visits all had a significant ($p < 0.05$) positive relationship with the quality of good integrated ANC. Overall, the more outpatient clinic respondents visited with a waiting time of less than or equal to 60 min and a consultation duration of more than or equal to 15 min, the higher the quality of integrated ANC received. This is consistent with respondents' higher levels of satisfaction with waiting time, consultation duration, physical and supporting examinations, and providing education, indicating better quality integrated ANC.

Table 2 Characteristics of structural variables

Structure Variable		Total (*N* = 17)	Percentage (%)
Waiting area and seating layout	Available	17	100
Bathroom equipped with a functioning water supply	Available	17	100
Covered room for examination	Available	17	100
Weight and height scales	Available	17	100
Stethoscope	Available	17	100
Sphygmomanometer	Available	17	100
Metlin	Available	17	100
Doppler	Available	17	100
USG	Available	17	100
EKG	Available	17	100
Nutrition Clinic	Available	17	100
Dental Clinic	Available	17	100
Psychology Clinic	Available	12	70.59
Laboratory	Available	17	100
Competence of MCH Providers	Competent	17	100
Competence of Nutrition Providers	Competent	17	100
Competence of Dental Providers	Competent	17	100
Competence Psychology Providers	Competent	12	70.59
Competence of Laboratory Providers	Competent	17	100

Table 3 Characteristics of process variables

Process Variable		Total (*N* = 444)	Percentage (%)
Number of Visit	Not first visit	219	49.32
	First visit	225	50.68
Initiation of Visit	> 12 weeks	132	29.73
	≤ 12 weeks	312	70.27
Waiting Time	> 60 min at one of the clinics	60	13.51
	≤ 60 min on all clinics	384	86.49
Consultation Duration	< 15 min at one of the clinics	439	98.87
	≥ 15 min on all clinics	5	1.13

Table 4 Distribution of respondent satisfaction Levels

Variable	Very Dissatisfied *n* (%)	Dissatisfied *n* (%)	Satisfied *n* (%)	Very Satisfied *n* (%)
Waiting Time	1 (0.23)	3 (0.68)	270 (60.81)	170 (38,0.39)
Consultation Duration	1 (0.23)	2 (0.45)	244 (54.95)	197 (44.37)
Physical and Supporting Examination	1 (0.23)	1 (0.23)	285 (64.19)	157 (35.36)
Providing Information	1 (0.23)	2 (0.45)	258 (58.11)	184 (41.22)

Multicollinearity assumption test

There was no multicollinearity in this study. This is supported by a tolerance value greater than 0.1, a variance inflation factor (VIF) of less than 10, and a correlation coefficient of less than 0.8.

Multivariable analysis

Table 5 shows the results of the multivariable analysis, which revealed significant results ($p < 0.05$) for the variables visit time, education, and insurance ownership. This demonstrates that, after controlling for other variables, respondents who received integrated ANC at the first visit had a 2.57 times higher probability (95% CI 1.67–3.95) of receiving good quality integrated ANC than respondents who did not receive integrated ANC on the first visit.

Higher-educated women had a 50% lower likelihood (95% CI: 0.31–0.80) of receiving high-quality integrated ANC than those with less education, suggesting service delivery or expectation differences. In contrast, individuals with health insurance were 2.47 times more likely (95% CI: 1.31–4.68) to receive high-quality ANC than those without insurance, indicating the positive influence of insurance ownership on access to good maternal health services. All variables were included in a multivariable analysis to determine the effect of all independent and external variables on the dependent variable.

Discussion

The study found that 66% of pregnant women received more than 75% of the required focus ANC components, including physical examination, basic diagnostic laboratory service, therapeutic drugs, danger sign information, birth preparation, and advice. These findings show that many pregnant women receive good ANC. The key characteristics that significantly influence the quality of good ANC are ANC visits, having insurance, and the level of education.

This study finding is significantly higher than the 11.16% found in other East African studies [21], in India by 30.4% [22], and in Ethiopia by 33,3% [23]. However, these findings were lower than those of similar studies conducted in Mexico, which were 71.4% [24]. Another study in Indonesia found that the quality of integrated ANC was 69.6% in Aceh Besar District [11] and antenatal services at 68.8% in Boyolali Regency [12]. These differences could be attributed to a variety of factors, including differences in the mandatory integrated ANC examination variables, differences in the number of samples in the study, and differences in the cut-offs utilized for identifying between good and poor quality integrated ANC.

Health insurance ownership was associated with the quality of ANC in this study. A study found that insured women are 1.394 times more likely to receive complete

Table 5 Bivariate and multivariable analysis result

Variable		ANC Quality		OR (95% CI)	aOR (95% CI)
		Poor (%)	Good (%)		
Age	< 20	2 (28.57)	5 (71.43)	1	1
	20-35	127 (32.99)	258 (67.01)	0.81 (0.15-4.24)	1.54 (0.23-10.05)
	> 35	22 (42.31)	30 (57.69)	0.54 (0.09-3.07)	1.25 (0.17-9.27)
Residence	Bantul regency	145 (33.41)	289 (66.59)	1	1
	Outside Bantul regency	6 (60.00)	4 (40.00)	0.33 (0.09-1.20)	0.27 (0.06-1.18)
Education Status	Low education (≤ 12 years)	89 (29.77)	210 (70.23)	1	1
	High education (> 12 years)	62 (42.76)	83 (57.24)	0.56 (0.37-0.85)[a]	0.50 (0.31-0.80)[a]
Occupation	Unemployed	65 (31.25)	143 (68.75)	1	1
	Employed	86 (36.44)	150 (63.56)	0.79 (0.53-1.17)	0.77 (0.49-1.21)
Insurance Ownership	Not having insurance	27 (54.00)	23 (46.00)	1	1
	Having insurance	124 (31.47)	270 (68.53)	2.55 (1.40-4.63)[a]	2.47 (1.31-4.68)[a]
Number of Pregnancies	Primigravida	50 (29.59)	119 (70.41)	1	1
	Multigravida	101 (36.73)	174 (63.27)	0.72 (0.47-1.09)	0.64 (0.39-1.04)
Comorbidity	No	141 (34.64)	266 (65.36)	1	1
	Yes	10 (27.03)	27 (72.97)	1.43 (0.67-3.04)	1.88 (0.81-4.32)
Number of Visit	Not first visit	98 (44.75)	121 (55.25)	1	1
	First visit	53 (23.56)	172 (76.44)	2.62 (1.74-3.94)[b]	2.57 (1.67-3.95)[b]
Initiation of Visit	> 12 weeks	38 (28.78)	94 (71.22)	1	1
	≤ 12 weeks	113 (36.21)	199 (63.79)	1.21 (0.79-1.85)	1.28 (0.81-2.03)
Waiting Time	> 60 minutes at one of the clinics	27 (45.00%)	33 (55.00%)	1	1
	≤ 60 minutes on all clinics	124 (32.29%)	260 (67.71%)	1.71 (0.98-2.97)	1.81 (0.97-3.39)
Consultation Duration	< 15 minutes at one of the clinics	149 (33.94%)	290 (66.06%)	1	1
	≥ 15 minutes on all clinics	2 (40.00%)	3 (60.00%)	0.77 (0.12-4.66)	1.12 (0.15-8.38)
Patients' Satisfaction Levels on Waiting Time	Very Dissatisfied	1 (100)	0 (0)	1.21 (0.82-1.79)	0.95 (0.52-1.71)
	Dissatisfied	0 (0)	3 (100)		
	Satisfied	97 (35.93)	173 (64.07)		
	Very Satisfied	53 (31.18)	117 (68.82)		
Patients' Satisfaction Levels on Consultation Duration	Very Dissatisfied	1 (100)	0 (0)	1.18 (0.81-1.73)	0.88 (0.47-1.65)
	Dissatisfied	1 (50.00)	1 (50.00)		
	Satisfied	85 (34.84)	159 (65.16)		
	Very Satisfied	64 (32.49)	133 (67.51)		
Patients' Satisfaction Levels on Physical and Supporting Examination	Very Dissatisfied	1 (100)	0 (0)	1.35 (0.90-2.03)	1.84 (0.93-3.64)
	Dissatisfied	0 (0)	1 (100)		
	Satisfied	103 (36.14)	182 (63.86)		
	Very Satisfied	47 (29.94)	110 (70.06)		
Patients' Satisfaction Levels on Providing Informartion	Very Dissatisfied	1 (100)	0 (0)	1.20 (0.82-1.76)	0.96 (0.53-1.74)
	Dissatisfied	1 (50.00)	1 (50.00)		
	Satisfied	90 (34.88)	168 (65.12)		
	Very Satisfied	59 (32.24)	124 (67.76)		

Significance levels

[a] $p < 0.01$

[b] $p < 0.001$ using simple logistic regression

ANC than uninsured women, emphasizing the importance of insurance in promoting access to critical healthcare services [25]. Health insurance coverage is vital for eliminating out-of-pocket expenditures and considerably reducing the financial difficulties that frequently prevent women from attending ANC [26]. In 2014, the Indonesian government implemented universal health insurance under the National Social Security System (JKN) to improve overall healthcare. A further study assessed maternal health service (MHS) utilization before (2012) and after (2017) the adoption of JKN, revealing a significant favorable effect. JKN's national health insurance program undoubtedly lowered financial obstacles, increasing maternal health service use, especially among marginalized communities [27].

The findings of this study revealed that pregnant women who received integrated ANC at their first visit were more likely to receive high-quality care. This is

following Ministry of Health regulations, which require pregnant women to receive fully integrated ANC beginning with their first visit. Full screening, including obstetric risk assessment and ultrasonography, counseling, and adherence to all integrated ANC care components, should be part of the first trimester's ANC visit [28]. According to the 2016 WHO ANC guideline, the first ANC visit should occur during the first trimester, or at 12 weeks of gestation. This early visit is essential because it allows for the treatment and prevention of current and future causes of morbidity and mortality in both mothers and newborns [29].

The initial visit in early pregnancy can also provide earlier micronutrient supplements, particularly iron and folic acid. Folate deficiency in early pregnancy can result in birth defects such as neurological disorders and DNA damage [30]. Another study found a positive correlation between first-time ANC and average antenatal examination. Pregnant women who began their first ANC visit in the first trimester had an average of 6.2 examinations [31]. During the first antenatal visit, clinicians should ask their pregnant patients oral health screening questions and check their mouths for issues [32]. Effective antenatal-dental collaboration is essential for promoting good pregnancy outcomes and a future generation of oral disease-free children [33]. This shows that the first ANC visit allows for earlier and more thorough examinations and the identification and treatment of potential health issues that may affect the mother and fetus.

Raising awareness of the value of an early ANC checkup will increase the likelihood that women will receive the standard of treatment that the WHO recommends. Consequently, government initiatives must promote attendance at ANC for the most vulnerable women—those with poor education and high parity—immediately upon becoming pregnant [34]. By emphasizing the need for an early first ANC visit, programs are more likely to succeed in ensuring that pregnant women obtain the recommended care.

The World Health Organization advises pregnant women to start their first ANC visit during the first trimester of pregnancy because timing is crucial for ensuring the best possible health outcomes for both mother and child [35]. Pregnant women who received integrated ANC before 12 weeks of gestation were more likely to receive high-quality integrated ANC in this study. Other studies have found that early initiation of ANC and the number of visits to care are significantly associated with an increase in the number of ANC examinations received during pregnancy [31].

Early pregnancy ANC allows for the most useful tests and examinations, such as accurate gestational age assessment for preterm labor management, screening for genetic and congenital abnormalities, folic acid supplementation to reduce preterm pregnancy and neural tube defects, and screening and treatment for iron deficiency anemia and STDs [36]. Furthermore, early visits can detect noncommunicable diseases like diabetes and provide guidance on lifestyle risks like smoking, alcohol, drug abuse, obesity, malnutrition, and occupational exposure [37].

As a result, visits before 12 weeks of gestation are essential for receiving high-quality integrated ANC. Several strategies for increasing first ANC visits in this context include providing health education to women about the necessity of early ANC booking through mass media such as radio and television, as well as health discussions during community health worker (CHW) outreach visits. It is critical to train CHWs to identify pregnant women in the community and counsel them on the need to schedule an ANC appointment and receive care from doctors and nurses upon delivery. Because CHWs live in the community, they have a better awareness of local customs and beliefs, which may influence a woman's knowledge about and attitude toward ANC [29]. This study's findings were not significant, which could be attributed to the small sample size.

The waiting time and duration of consultation in this study have a positive impact on the quality of integrated ANC. This study discovered that the more polyclinics visited by respondents with a waiting time of less than 60 min, the higher the quality of integrated ANC obtained by 81%. A study in Ethiopia found that pregnant women who waited more than an hour were 40% less likely to receive quality antenatal care [23]. The length of the waiting time is a determining factor in patient satisfaction and the quality of health-care services. An excessively long wait time between arrival and visit completion will negatively affect the degree of satisfaction [38]. Furthermore, if the number of pregnant women waiting for ANC increases, the waiting time will be longer, potentially affecting access to quality integrated ANC [23]. In Indonesia, the Ministry of Health established waiting times based on outpatient service minimum standards. The waiting time indicator for outpatient services is 60 min, which is measured from the time the patient registers to when they are served by a doctor [39].

Indeed, waiting time can be viewed as a cost to the patient for being seen by a health professional, and the longer this investment of time, the poorer the patient's satisfaction with the health service. Another study shows that the highest levels of dissatisfaction are associated not only with a long waiting time but also with a short duration of the consultation [40, 41].

A consultation lasting more than 15 min at all clinics increased the likelihood of receiving high-quality integrated ANC by 12%. Longer consultation times have been linked to better health outcomes, such as improved

hypertension control, fewer prescriptions, and better recognition of long-term and psychosocial problems [42]. The Royal College of General Practitioners recommends that a consultation with a doctor last at least 15 min, including time for examination [43]. This study's waiting time and consultation duration variables yielded insignificant results, which could be attributed to imprecise calculations of waiting time and consultation duration during data collection and a small sample size.

Patient satisfaction is increasingly used to evaluate the quality of care [44].

Although not statistically significant, this study discovered a positive correlation between the quality of integrated ANC and satisfaction with physical examination and supporting services. According to other studies, patient satisfaction with consultations is a key factor in determining the quality of ANC. Patient satisfaction with ANC affects pregnancy outcomes like safe delivery, access to health services, and family planning [45]. All of these factors can contribute to lower maternal mortality rates [46]. Health service satisfaction also affects future health service utilization. Satisfied patients are more likely to participate in decision-making and complete services [47]. Consequently, it was discovered that high levels of satisfaction can help ensure that high-quality integrated ANC is provided.

To the best of our knowledge, this is the first study that evaluates the quality of integrated ANC services in Indonesia. We could not discover any similar research published in the public domain before data submission. Our study will provide more information on the quality of integrated ANC services and the factors that influence them. However, this study has several limitations. First, inadequate sample size may have contributed to the study's lack of significance. Second, this study only used quantitative approaches; triangulation in qualitative methods could provide more convincing proof of the quality of integrated ANC. Furthermore, the data collection team estimated waiting time and consultation duration by direct observation rather than using precise tools like a stopwatch or timer, which would have impacted the measurements' precision. Future studies should address these limitations to increase data accuracy and generalizability.

Conclusion

Two-thirds of pregnant women received high-quality integrated ANC in Bantul. Pregnant women who visit integrated antenatal services for the first time and have insurance are more likely to receive high-quality services. Meanwhile, pregnant women with higher education receive poor-quality integrated antenatal services. Lower waiting times and longer consultation durations had an influence on the quality of integrated ANC, although not statistically significant.

Improving public health education, collaborating with local leaders, building PHC capacity to offer high-quality care, and expanding national health insurance coverage are all critical for ensuring equitable access for all pregnant women and encouraging early ANC visits at PHCs. These attempts aim to align service delivery with national recommendations and improve maternal health outcomes. Lastly, more research on ANC quality may include qualitative studies to explore previously unidentified characteristics at individual, community, and facility levels, while expanding the geographical scope of research sites to achieve more diverse outcomes.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12884-025-08038-5.

Supplementary Material 1

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Authors' contributions
SII, SA, SP, and BSW conceptualized the study. Analysis was performed by SII, supervised by SP and BSW. SII wrote the first draft manuscript under the direct supervision of SP and BSW. SII, SA, SP, and BSW reviewed and critically evaluated the following and final draft. All authors are responsible for the reported data and approve the final version of the manuscript.

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Data availability
Data supporting the findings of the study can be requested from the corresponding author.

Declarations

Ethics approval and consent to participate
This study was approved by the Research Ethics Committee of the Faculty of Medicine, Public Health, and Nursing at Universitas Gadjah Mada (KE/FK/0079/EC/2024). Permission from the DHO was obtained before the beginning of the study. Participants completing the questionnaire are being administered written informed consent in the local language.

Competing interests
The authors declare no competing interests.

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