



Socioeconomic Difference and Adequate Antenatal Care in Indonesia: Evidence from a Nationwide Household Survey

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Abstract

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BACKGROUND: Inadequate antenatal care (ANC) has been identified as a risk factor for poor pregnancy outcomes in low-income nations. The World Health Organization recommends adequate ANC for a minimum of eight visits. While universal health coverage has been implemented since 2014, Indonesia as fourth largest populous country encounters challenge on socioeconomic disparities.

AIM: This study aims to explore the socioeconomic difference of adequate ANC in Indonesia.

METHODS: Data from the Indonesia Demographic and Health Survey 2017 was used for the analysis and includes 15,313 mothers age 15–49 who had a last live birth in the 5 years preceding the survey. Multivariate logistic regression was employed to assess correlation between socioeconomic status and adequate ANC.

RESULTS: About 20.8% of mothers had adequate ANC and the proportion ranging between 11.4% in the poorest group and 34.5% in the richest group. Poorest (adjusted odds ratio [AOR]: 0.68; 95% CI: 0.54–0.86) and poorer (AOR 0.79; 95% CI: 0.64–0.97) mothers are less likely to have adequate ANC compared to the richest mothers. In addition, mothers who lived in Java-Bali region, had better knowledge on danger sign of pregnancy, exposed to internet every day, health insurance ownerships, and having ANC at health facilities were more likely to have adequate ANC.

CONCLUSION: Socioeconomic status was significantly associated with adequate ANC, where inequality was profound among poor mothers. Therefore, specific intervention to expand universal health coverage for poor mothers is essential to reduce socioeconomic disparities.

Introduction

The sustainable development goals (SDGs) aimed to reduce the global maternal mortality ratio to <70/100,000 live births in 2030 (SDG target 3.1.1) [1]. However, globally, there were around 295,000 maternal deaths in 2017 and approximately 86% of the death occur in Sub-Saharan Africa and Southern Asia [2]. Good access and quality of antenatal care (ANC) during pregnancy, delivered attended by health providers and good care for few weeks after delivery, can prevent maternal death. During ANC, pregnant mothers and their family had an opportunity to get information related to danger sign of pregnancy. In addition, routine ANC visit allows health provider to monitor the pregnancy and undertake prevention and prompt treatment for any complication during pregnancy [3], [4], [5].

In 2016, the World Health Organization recommends adequate ANC for at least eight visits for positive pregnancy experience and birth outcomes. In addition, the recommendation also

suggests timing of the visits, with the first visit in the first trimester, following with two visits during second trimester, and five visits during third trimester [6]. The 2017 Indonesian Demographic and Health Survey (IDHS) showed that nearly all pregnant women have minimum one visit of ANC (98%). However, only 77% of pregnant women have minimum four visits as previously recommended [7].

Indonesia is the largest archipelagic country in the world, with a spatially diverse population, location of economic activity, ecology and ethnicity which causes different variations in health conditions across the country [8]. Indonesia also has a very unique geography and diverse population residing on a large number of islands. This geography poses several challenges to the health system due to variations in local government, transportation challenges, and delivery and utilization of services [9].

The previous studies showed that previous study also highlights the importance of socioeconomic status for accessing adequate ANC [10], [11], [12]. In addition, geographical barriers, distance to health

facilities, place of residence, age of mothers, maternal education level, household wealth index, parity, health insurance ownership, financial constraints, and exposure to mass media were associated with four or more ANC visits [13], [14], [15], [16]. In 2014, the Government has launched its National Social Health Insurance Scheme (Jaminan Kesehatan Nasional, or JKN) to provide health coverage for all Indonesians. The main purpose was to increase equity in access to health services and improving outcomes [17]. The central government paid the insurance for poor resident to reduce socioeconomic disparities [17]. Therefore, our study aimed to measure association of socioeconomic status and adequate ANC after almost a decade of universal health coverage implementation in Indonesia.

Materials and Methods

Study design and population

We used a cross-sectional national household survey, the IDHS conducted in 2017 by Statistics Indonesia (Badan Pusat Statistik) in collaboration with the National Population and Family Planning Board (BKKBN) and the Ministry of Health (MOH) of Indonesia. The IDHS collects information about demographic and health indicators using standardized household and individual questionnaires. A multistage systematic random sampling method was used to select participants. The IDHS 2017 consisted of 1970 census blocks (CBs) distributed across all 34 provinces in Indonesia. In the first stage, the CBs were systematically selected stratified by urban and rural areas, and ordered by wealth index category. In the second stage, 25 households from the target population of each CB were selected with equal probability using the systematic random sampling method. Details on the methodology of data collection and sampling procedures are provided elsewhere [18]. In brief, the IDHS interviewed 49,627 mothers age 15–49 and 10,009 currently married men age 15–54. The analyses herein were restricted to 15,313 mothers age 15–49 who had a last live birth in the 5 years preceding the survey and have complete all variable in the analysis.

Variables

The primary outcome variable for this study was adequate ANC. The mothers consider to have adequate ANC if having at least eight visits with subsequent one visit in the first trimester, following with two visits during the second trimester, and five visits during the third trimester [6]. We also define a minimum of six visits as the dependent variable. The MOH Republic of Indonesia recommends ANC minimum six visits with subsequent at least one

visit in the first trimester, at least two visits in the second trimester, and at least three visits in the third trimester [19].

In this study, we used the wealth index constructed by the IDHS as an estimate of socioeconomic condition. The wealth index is calculated using principal component analysis from items related to household ownership of assets, housing materials, types of water access, and sanitary services [20]. The index was ranked into five categories (poorest, poorer, middle, richer, and richest).

We also determine other explanatory variables, including geographic factors, perceived barriers to assessing health services, and demographic-related factors. The grouped of islands in accordance with the region was used as geographic factors. The region was divided into seven groups, namely, Sumatera, Java-Bali, Nusa Tenggara, Kalimantan, Sulawesi, Maluku Islands, and Papua. While perceived barriers to access health services were classified as: (1) problem in distance to healthcare facility, (2) problem in getting money needed for treatment, and (3) problem in getting permission to access health care. Mothers who said “yes” to each question were considered to experience problems or difficulties preventing them from obtaining health services.

The respondents’ demographic characteristics included age groups (categorized as 15–24, 25–34, and 35–49 age groups), education (categorized as no education, primary, and secondary and higher), occupation (categorized as not working and working), and place of residence (categorized as urban and rural). We also included health insurance ownership, knowledge on danger sign of pregnancy, parity, ANC attendant, and place of ANC as controlling variables in this study.

Statistical analysis

Multivariable logistic regression was used to assess factors associated with ANC minimum of eight and six visits. Odds ratios and 95% confidence interval were reported in addition to the p-values. The analyses were performed using Stata 15 software (StataCorp LLC, College Station, TX, USA).

Ethics approval

The 2017 IDHS was granted ethical clearance by the Institutional Review Board of Inner-City Fund (ICF) International and ORC Macro (ICF IRB192 FWA00000845). Before the interview, all respondents to the 2017 IDHS were given information about the survey and agreed to participate by submitting written informed consent. The authors obtained approval to use the 2017 IDHS dataset from the DHS program.

Results

The characteristics of respondents are summarized in Table 1. Out of 15,313 mothers age 15–49 who had a last live birth in the 5 years preceding the survey, more than half were in the 25–34 age group (50.9%) and most of mothers had secondary level education (56.2%), being at poorest household wealth (26.6%), and living in Java-Bali region (31.7%).

Table 1: Antenatal care visit and basic characteristics of respondents

Characteristics	n	%
Age (years)		
15–24	2.828	18.5
25–34	7.787	50.9
35–49	4.698	30.7
Education		
No education	204	1.3
Primary	3.855	25.2
Secondary	8.609	56.2
Higher	2.645	17.3
Occupation		
Not working	7.102	46.4
Working	8.211	53.6
Household wealth		
Poorest	4.067	26.6
Poorer	3.026	19.8
Middle	2.887	18.9
Richer	2.752	18.0
Richest	2.581	16.9
Place of residence		
Urban	7.543	49.3
Rural	7.770	50.7
Region		
Java-Bali	4.855	31.7
Sumatera	4.006	26.2
Nusa Tenggara	1.287	8.4
Kalimantan	1.418	9.3
Sulawesi	2.289	14.9
Maluku and Papua	1.458	9.5

Despite only 20% of mothers having adequate ANC, Table 2 illustrates socioeconomic difference with lower coverage among the poorest mothers (11.4%) compared to the richest group (34.5%).

Table 2: Proportion of adequate ANC according to socioeconomic status and region

Characteristics	ANC ≥6 visits n (%)	Adequate ANC ≥8 visits n (%)
National average	9996 (65.3)	3181 (20.8)
Socioeconomic status		
Poorest	2066 (50.8)	462 (11.4)
Poorer	1879 (62.1)	480 (15.9)
Middle	1962 (68.0)	608 (21.1)
Richer	2044 (74.3)	741 (26.9)
Richest	2045 (79.2)	890 (34.5)
Region		
Java-Bali	3797 (78.2)	1777 (36.6)
Sumatera	2480 (61.9)	544 (13.6)
Nusa Tenggara	823 (63.9)	242 (18.8)
Kalimantan	919 (64.8)	219 (15.4)
Sulawesi	1251 (54.7)	284 (12.4)
Maluku and Papua	726 (49.8)	115 (7.9)

ANC: Antenatal care.

Table 3 presents the adjusted odds from the multivariable logistic regression analysis. Socioeconomic status is significantly associated with adequate ANC. In reference to the richest mothers, the poorest (adjusted odds ratio [AOR]: 0.68; 95% CI: 0.54–0.86) and poorer (AOR 0.79; 95% CI: 0.64–0.97) mothers are less likely to have adequate ANC. In addition, mothers lived in Maluku and Papua region less likely to have adequate ANC compared those who lived in Java-Bali region (AOR 0.23; 95% CI: 0.17–0.33).

Table 3: Logistic regression analysis: factors associated with ANC six and eight visit

Characteristics	ANC ≥6 visits	Adequate ANC ≥8 visits
	AOR (95% CI)	AOR (95% CI)
Household wealth		
Poorest	0.54 (0.44, 0.67)***	0.68 (0.54, 0.86)**
Poorer	0.62 (0.51, 0.75)***	0.79 (0.64, 0.97)*
Middle	0.69 (0.57, 0.82)***	0.92 (0.77, 1.09)
Richer	0.85 (0.72, 1.01)	0.96 (0.82, 1.13)
Richest	Reference	Reference
Region		
Java-Bali	Reference	Reference
Sumatera	0.57 (0.50–0.65)***	0.29 (0.24–0.34)***
Nusa Tenggara	0.84 (0.69–1.02)	0.58 (0.44–0.76)***
Kalimantan	0.66 (0.55–0.79)***	0.33 (0.27–0.41)***
Sulawesi	0.44 (0.37–0.51)***	0.32 (0.26–0.40)***
Maluku and Papua	0.48 (0.39–0.59)***	0.23 (0.17–0.33)***
Problems in distance to health facility		
No	Reference	Reference
Yes	0.80 (0.68–0.94)**	0.89 (0.73–1.09)
Problems in getting money		
No	Reference	Reference
Yes	0.83 (0.72–0.96)**	0.94 (0.79–1.11)
Problems in getting permission		
No	Reference	Reference
Yes	1.21 (0.97–1.52)	1.01 (0.75–1.36)
Knowledge on danger sign of pregnancy		
No	Reference	Reference
Yes	1.37 (1.24–1.51)***	1.19 (1.06–1.35)**
Health insurance ownership		
No	Reference	Reference
Yes	1.11 (1.01–1.22)*	1.13 (1.01–1.26)*
Place of ANC		
Health post/home/other	Reference	Reference
Primary health facilities	0.96 (0.80–1.16)	1.47 (1.13–1.92)**
Hospital	1.06 (0.84–1.35)	2.00 (1.46–2.73)***
Exposed to Internet		
Not at all		
Less than once a week	0.90 (0.71–1.13)	0.87 (0.64–1.20)
At least once a week	1.20 (1.02–1.40)*	1.12 (0.93–1.34)
Almost everyday	1.38 (1.20–1.58)***	1.26 (1.09–1.45)**
Parity		
1	Reference	Reference
2+	0.78 (0.69–0.87)***	0.89 (0.78–1.01)
Age (years)		
15–24	Reference	Reference
25–34	1.48 (1.29–1.69)***	1.35 (1.15–1.57)***
35–49	1.45 (1.24–1.70)***	1.25 (1.03–1.52)*
Education		
No education	Reference	Reference
Primary	1.42 (0.89–2.25)	0.85 (0.45–1.58)
Secondary	1.69 (1.05–2.70)*	1.19 (0.63–2.24)
Higher	1.65 (1.01–2.68)*	1.28 (0.67–2.44)
Occupation		
Not working	Reference	Reference
Working	1.06 (0.96–1.16)	1.14 (1.02–1.26)*
Place of residence		
Urban	Reference	Reference
Rural	0.99 (0.88–1.12)	0.93 (0.81–1.07)

*p < 0.05; **p < 0.01; ***p < 0.001. AOR: Adjusted odds ratio, ANC: Antenatal care.

Table 3 also indicates that mothers who had better knowledge on danger sign of pregnancy, exposed to internet every day, health insurance ownerships, and having ANC at health facilities were more likely to have adequate ANC.

We observe similar factors associated with at least eight and six ANC visits, including socioeconomic status, region, knowledge of danger sign of pregnancy, health insurance ownerships, internet exposure, and mothers age (Table 3). Problems in distance to health facility and getting money, parity, and mothers' education were associated with minimum of six ANC visits, but not significantly associated with minimum of eight ANC visits. While, place of ANC and mothers' occupation was associated with minimum of eight ANC visits, but not significantly associated with minimum of six ANC visits. Mothers who had problems at a distance to health facility were less likely to have at least six ANC visits compared to those who did not have any problem to access health facility (AOR: 0.80; 95% CI: 0.68–0.94).

Mothers who had problems in getting money had lower odds to have at least six ANC visits (AOR: 0.83; 95% CI: 0.72–0.96). In addition, multiparous mothers were less likely to have minimum six ANC visits compared to primiparous mothers (AOR: 0.78; 95% CI: 0.69–0.87).

Discussion

In this study, we found that socioeconomic status is significantly associated with adequate ANC, as also shown in other countries [10], [11], [21], [22], [23]. Socioeconomic difference significantly seen between poorest and richest group, despite there is no significant difference between poorest and poorer group. This indicates a need of action to increase access for adequate ANC for both poorest and poorer mothers. Socioeconomic status indicates ability to pay for health services, where mothers from wealthier economic status able to afford ANC services. Despite of our study did not show significant association between problems of getting money to adequate ANC, we found significant association to health insurance ownership. Health insurance ownerships associated to higher odds to have adequate ANC. The previous studies showed the impact of health insurance on access to maternal health services, including ANC [13], [23]. Indonesia has been implemented universal health coverage (JKN) since 2014, where 83.4% of total population covered by health insurance in 2021. In addition, Jampersal financial support program also been implemented to cover ANC, delivery, and postnatal care service cost for uninsured mothers. The implementation of JKN and Jampersal in Indonesia has significantly influence poor mothers to access health services [17], [24]. However, only four ANC services are presently covered by JKN and Jampersal programs. Thus, adjustment regulation to increase number of ANC services covered by JKN and Jampersal into eight ANC services are needed to improve adequate ANC, especially among poor pregnant mothers.

Our study found disparities of adequate ANC between regions. Disparities are clearly seen between the eastern and western regions, especially when Papua is compared to the Java-Bali region as the center of government. The results of this study are in line with the previous study in Indonesia [25]. Mothers in eastern Indonesia possess greater challenge of geographical conditions compared to the western regions [26]. In addition, eastern regions tend to have longer travel time to reach health facilities [27]. Therefore, cross-sectoral policy and health system strengthening is needed to improve adequate ANC in eastern region.

The analysis shows that there is no significant difference in adequate ANC between urban and rural areas in Indonesia. In contrast with previous studies in Nigeria, Ethiopia, and Ghana, adequate ANC were

significantly different between urban and rural areas [28], [29], [30]. Place of residence (rural/urban) may also affect the utilization of ANC services due to distance to healthcare facilities. In Indonesia, community-based health program, such as Posyandu dan Poskesdes, has been implemented to reduce the disparity of health services utilization between rural and urban areas. The community program was aimed to increase the coverage of health services and potential resources in the community through local empowerment [31].

Our study also showed that mother who had knowledge on danger sign of pregnancy, having internet access every-day, and higher level of education were more likely to have adequate ANC. This result was aligned with previous study from low-middle-income countries [21], [22], [23], [32], [33], [34], [35], [36]. Mother with higher education was having more empowerment and improved their decision-making in the family [37]. Mothers' education also associated to their economic opportunities and increases their ability to access ANC services. Moreover, better educational level among mothers may improve their knowledge and awareness concerning the importance of ANC to ensure health and well-being of both mother and the baby, as well as recognize the disadvantages of avoiding ANC visits to health personnel [37], [38]. Thus, health education programs are needed to raise awareness about the benefit of adequate ANC.

As for the place of ANC visit, our result showed that mothers who have ANC at the hospital or primary health facilities had higher odds to have adequate ANC compared to mothers who had ANC at home. Mothers with a high-risk pregnancy will refer to hospitals by primary health facilities to receive further assessment and intervention [39]. High-risk pregnancy needs to be frequently assessed to prevent further complications during delivery. Therefore, mothers who receive ANC in the hospital are more frequent ANC visits. To improve adequate ANC among mothers who have ANC at home, personal reminder is needed to ensure awareness of mothers. In addition, mothers must be encouraged to obtain ANC at health facility so that they could have better assessment during ANC.

Age of mothers significantly influenced adherence to meet a minimum of eight ANC visits. Older women are more likely to comply with ANC eight visits. Women in a fertile age group (25–34 years) are more likely have the potential to experience pregnancy and more awareness the importance of ANC visit [23]. On the other hand, the number of ANC visit among mothers at the age of 35–49 years is increased due to high-risk ages for pregnancy and need to be closely monitored [23]. Among younger mother, health promotion is needed to improve their knowledge and awareness on the important of adequate antenatal services to monitor health status of mothers and fetus development.

Several limitations existed despite the large sample size of the IDHS data used in this study. First,

this study was a cross-sectional study; therefore, causal correlations could not be properly inferred. Second, this study did not directly measure geographical barriers, such as distance to health facility and availability of transportation which may be a considerable reason for preventing access to ANC [9]. Third, we did not incorporate cultural beliefs and practices that notable influence mothers to access health-care services [40].

Conclusion

Our results show an association between the socioeconomic status of mothers and adequate ANC, with the poorest group had lower adequate ANC compared to the richest mothers. Thus, health system strengthening and expanding universal health coverage, especially for poor mothers is essential to reduce disparities between socioeconomic and region, as well as ensure mothers able to have adequate ANC and improve mothers and children health and well-being.

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Authors' Contributions

S designed the research and analyzed the data. S, EN, YU, YP, and SDL participated in the data interpretation. S, EN, and YU wrote the first draft of manuscript. TA, SM, O, NS, EN, YU, MAM, YP, SDL, MDPL, and LM provide input and comments on the manuscript. All authors have read and agreed to the published version of the manuscript.

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