



Original Article

Home or Healthcare Facility: Influence of Antenatal Health Service on the Decision on the Place of Birth in Indonesia

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ABSTRACT

Background: Health facility is an ideal place for child birth to obtain favorable outcomes for maternal and neonatal health. Most of mothers in Indonesia have access to healthcare but 20% of them do not give birth in a healthcare facility. This study aimed to assess the association of the maternal health services and choosing a healthcare facility for birth.

Methods: This research utilized Indonesia's Survey of Health Indicators (SIRKESNAS) 2016 data and analyzed it using logistic regression model.

Results: Antenatal care (ANC) (OR = 3.696; P-value = 0.004), preparedness of birth budget (OR = 2.291; P-value = 0.007) and having maternal and child health (MCH) handbook (OR = 1.492; P-value = 0.103) were independently associated with the decision of healthcare facility birth. The ANC service particularly the availability of health professional provider as the first birth attendance (OR = 7.563; P-value = 0.00) and maternal examination as in the form of blood pressure test (OR = 5.009; P-value = 0.013) and ultrasonography (OR = 2.341; P-value = 0.001) substantially associated with the decision of the place of birth.

Conclusion: In order to encourage mothers to deliver in a healthcare facility, improving the quality of ANC services including utilization of MCH handbook and expanding the coverage of delivery insurance are the prominent concerns for healthcare policy.

Keywords: Antenatal care, Indonesia, Maternal health, Place of birth

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Introduction

Maternal mortality is one of the key health equity indicators that depict health status, gender equalities, and the functioning of the healthcare system in a country (1). The high maternal mortality rate (MMR) has become a huge concern at the global and national levels. Maternal mortality refers to maternal death due to complications in pregnancy, during delivery, or 42 days after childbirth (2). The Sustainable Development Goals (SDGs) as a global goal, set to reduce the rate to 70 per 100,000 live births in 2030 (3). However, the MMR of Indonesia remains high: 305 per 100,000 live births (4). Compared to other countries in South-East Asia, Indonesia has the second-highest after *Lao People's Democratic Republic* and it is four times higher than that of Vietnam (5). Achieving the MMR SDG's target

by 2030 is a huge challenge for Indonesia and it requires an ultimate strategy to accelerate reaching the target.

Understanding the time of maternal death is necessary for formulating effective approach and policy in order to reduce the MMR. Ahmed et al. (6) found that 40 – 45% of maternal and neonatal death occurs during labor (intrapartum) and up to 24 hours after delivery (immediate post-partum) period. The risk of maternal death during childbirth is quite high because emergency situations can occur any time and when it is not handled properly, it will endanger both the mother and baby. However, the major causes including maternal hemorrhages, infections, and hypertension in pregnancy are preventable and treatable (7, 8).

Although it is no risk-free method or place of delivery but the choice of place of birth is substantial because it affects

the handling management in emergency situations. Homebirth either assisted by a health worker or a non-healthcare worker entails higher risks of morbidity and mortality for the mother and infant than health-facility birth (9). Moreover, the American Congress of Obstetricians-Gynecologists (10) and the American Academy of Pediatrics (11) explained that health facilities with the availability of professional staff and medical devices therein are the best place to give birth. In line with this, Indonesia Ministry of Health Act of 2014 P.L No 97 (12) enacted that the standard for achieving optimum safety for mothers and infants has been expanded not only to achieve delivery by skilled birth assistance but also has to be carried out in a healthcare facility.

The National community-based participatory health research, Indonesia Basic Health Research (RISKESDAS) in 2018, showed that 96% of Indonesian mothers have access to maternal health care but still 20% of them did not give birth at a healthcare facility (13). The gap shows that even though they have access to a health professional or healthcare service, it is not certain that mothers choose a healthcare facility to give birth.

Previous studies mostly focused on the mothers' characteristic and the access to a healthcare facility to determine the decision of the place of birth (14-16). However, the service on maternal health care is another determining factor that can affect it (17); yet, few researchers have studied this issue.

This research aimed to identify the maternal health service factors affecting a mother's decision of whether to deliver at home or in a healthcare facility. Whilst, the primary focus of this study is on the impact of the maternal health program including antenatal care (ANC), antenatal classes, the Delivery Planning and Complication Prevention (DPCP) program, and the Mother and Child Health handbook (MCH handbook). Furthermore, it explores the ANC service and its influence on the probability of giving birth at a healthcare facility.

It is important to know the major determinants of maternal health care to formulate the most effective and efficient approach in healthcare services in order to reach the optimum health status of mothers and babies. With the focus on the healthcare programs, this paper proposes some possible policy recommendations to achieve better outcomes in maternal and neonatal health, particularly in the scope of pregnancy and delivery services.

Methods

This secondary study was performed on a subset of Indonesia's Survey of Health Indicators (SIRKESNAS) 2016 data. SIRKESNAS 2016 is a survey conducted by the Health Research and Development Agency of the Ministry of Health with coverage samples from all provinces (18). The data was composed of various health indicators including maternal healthcare service.

For the purpose of this study, the samples selected have to meet the inclusion criteria of a homemaker who has given birth during the period of 2014–2015. The variables to be analyzed were healthcare facility birth, as the dependent variable, and three categories of independent variables including the predisposing factors; mother's age, education,

occupation, and authority in making the decision, enabling factors; region of living, type of residence, ANC, ANC's provider, antenatal classes, an MCH handbook, delivery planning program, availability of skilled birth assistance (SBA) and health insurance, and need factors; the mothers health status of diagnosis, comorbid and other complications as the independent variables. There is a difference between antenatal class and ANC. Antenatal class sometimes called parenting class that provide education for pregnant woman and husband but there is no medical examination on it. But, antenatal care is dedicated to provide by health worker (doctors or midwives) with medical examination and give some diagnosis as the outcome

Data was analyzed with descriptive and logistic regression. The descriptive analysis firstly focused on the sample characteristics based on the place of childbirth. Secondly, it goes deeper on the respondents with ANC regarding to the services provided and the place of birth. Further analysis was conducted with multivariate logistic regression by connecting all independent variables to the dependent variable.

Two logistic regression models were used. The first logistic regression model identified the variables of sources of information in healthcare services, namely, ANC, MCH handbook, and birth planning, with the probability of a woman giving birth at a healthcare facility as dependent variable. Birth planning was described in two different variables: planned of health professional as the birth helper and preparedness of the financial needs of the childbirth process. The second model analyzed the service of ANC which supports the provision of health information for pregnant women. The included variables were pregnancy age at the first ANC visit, ANC provider, maternal healthcare education for delivery process preparation, maternal education for an emergency in pregnancy, blood pressure test, ultrasonography test, complication during pregnancy, and first birth attendance. The model goodness of fit was assessed using Omnibus test and the Hosmer and Lemeshow test. Data analysis was performed using SPSS, Version 22 (IBM Corp., Armonk, NY, USA).

Results

This study examined 708 women who gave birth in the period of 2014 to late 2015. The majority of the respondents belonged to the age range of 20–35 years (74.01%), had secondary school-level education (54.1%), and had no job (66.67%). The percentage of mothers who gave birth at a health facility was 76.98%.

As shown in table 1, there was a gap of the proportion of healthcare facility birth according to the region. In urban area, the percentage of mother who gave birth at a healthcare facility was 89.9%, which was 25% greater than in rural areas. The data also shows a gap among the islands where 38.1% of mothers in Papua and 56.3% in Maluku had given birth in a healthcare facility; meanwhile, in the other five islands, the proportion was above 70%. Moreover, based on educational category the data shows that lower education women were more likely to give birth at non-health facility than higher education.

Regarding health-seeking behavior, table 2 shows that majority of mothers received ANC service (95.5%), 77.7% had an MCH handbook, and 89.1% had a birth plan, but

Table 1. Baseline Characteristics of Respondents by Place of Delivery According to Predisposing Factors, Sirkesnas 2016 (N = 708)

Characteristics	N (%)	Place of delivery	
		Healthcare Facility	Home
Type of Residence			
Urban	540 (50.05)	89.91	9.79
Rural	539 (49.95)	65.23	34.50
Region			
Sumatera	194 (27.40)	76.29	23.71
Jawa	185 (26.13)	89.73	10.27
Bali and Nusa Tenggara	61 (8.62)	86.89	13.11
Kalimantan	81 (11.44)	71.60	28.40
Sulawesi	134 (18.93)	70.15	29.85
Maluku	32 (4.52)	56.25	43.75
Papua	21 (2.97)	38.10	61.90
Age Category			
< 20 years old	37 (5.23)	75.68	24.32
20-35 years old	524 (74.01)	77.29	22.71
> 35 years old	147 (20.76)	76.19	23.81
Education Level			
< = Elementary School	230 (32.49)	66.09	33.91
Secondary School	383 (54.10)	80.94	19.06
Tertiary School	95 (13.42)	87.37	12.63
Main Job			
No Job	472 (66.67)	75.00	25.00
Have a Job (worker)	236 (33.33)	80.93	19.07
Total	708	76.98	23.02

only a few of them (13.7%) participated in the antenatal classes. In the planning process for delivery, 75.1% of the mothers were involved in the decision-making process indicating that participation in the maternal health program was quite high. However, data analysis on the choice of place of delivery shows that more than 20% or one out of five mothers continued to deliver at home.

A deeper analysis of the planned financial source for the delivery showed that mothers with well financial preparedness were more likely to give birth at a health facility. People with delivery insurance had a higher probability to give birth at a healthcare facility than those who plan to pay with their own money. However, only 28.95% of mothers had health insurance. Mothers who did not have any budget plan for delivery, which was half of the total number of mothers in Indonesia, were more likely to give birth at home compared to those with a birth-financial plan.

Table 3 provides a deeper exploration of the 676 respondents who received ANC services according to the place of childbirth. From these restricted sample, 79.14% of women gave birth in a healthcare facility while the rest gave birth at home. Based on the characteristics of region and residence, there was a gap between islands in the utilization of a healthcare facility as the place of birth. Moreover, regarding the type of residence, 90.6% of urban mothers with ANC gave birth at a healthcare facility compared to 68% of mothers in rural area.

Another interesting finding is that 80.77% of mothers received ANC service in their first trimester of pregnancy. This showed that the awareness of people to do immediate check for pregnancy is quite good. Mothers in this group are more likely to give birth at a healthcare facility compared to those who first availed ANC service in the second and third trimesters of pregnancy.

Table 2. Baseline Characteristics of Respondents by Place of Delivery According to the Enabling Factors (Health-Seeking Behavior), Sirkesnas 2016 (N = 708)

Characteristics	N (%)	Place of Delivery	
		Healthcare Facility	Home
Antenatal Care (yes)	676 (95.48)	79.14	20.86
Antenatal Classes (yes)	97 (13.70)	78.35	21.65
MCH Handbook (yes)	550 (77.68)	79.45	20.55
Birth Plan (yes)	631 (89.12)	79.87	20.13
Planned Helper (yes)	598 (84.46)	79.26	20.74
Planned Resource of Budget (yes)	573 (80.93)	81.50	18.50
Birth-Plan Decision Maker			
Mother (involved)	532 (75.14)	79.70	20.30
Husband (involved)	542 (76.55)	80.26	19.74
Parents (involved)	179 (25.28)	78.21	21.79
Source of Budget			
Out of Pocket	368 (51.98)	76.63	23.37
Insurance	205 (28.95)	90.24	9.76
No Plan	135 (19.07)	57.78	42.22
Total	708	76.98	23.02

Table 3. Baseline Characteristics of Women with ANC by Place of Birth According to the Predisposing Factors (Sirkesnas, 2016) (N = 676)

Characteristics	N (%)	Place of Birth	
		Healthcare Facility	Home
Region			
Sumatera	185 (27.37)	77.84	22.16
Jawa	183 (27.07)	90.71	9.29
Bali Nusa Tenggara	59 (8.73)	86.44	13.56
Kalimantan	77 (11.39)	74.03	25.97
Sulawesi	128 (18.93)	71.88	28.13
Maluku	30 (4.44)	56.67	43.33
Papua	14 (2.07)	57.14	42.86
Type of Residence			
Urban	329 (48.67)	90.58	9.42
Rural	347 (51.33)	68.30	31.70
Job			
Unemployed	451 (66.72)	77.16	22.84
Employed	225 (33.28)	83.11	16.89
Education			
< = Elementary	211 (31.21)	71.09	28.91
Secondary	371 (54.88)	81.67	18.33
Tertiary	94 (13.91)	87.23	12.77
Pregnancy Age at First ANC			
First Trimester	546 (80.77)	82.6	17.4
> First Trimester	130 (19.23)	64.62	35.38
Total	676	79.14	20.86

Abbreviation: ANC, antenatal care

This can be related to earlier health information received and the number of visits since the earlier the mothers come the more chances of getting in contact with a healthcare worker.

The result of regression analysis as in table 4 shows some significant variables related to the choice of delivery place. Firstly, mothers who live in rural areas has a negative relationship with healthcare facility birth (OR = 0.3; 95% CI = 0.19 - 4.78; P-value = 0.001). This shows that mothers in rural areas are 30% less likely to give birth at a healthcare facility than urban mothers'. Second is about the level of education where mothers with a low level of education (elementary school or below it) are less likely to choose a healthcare facility for giving birth than those with a tertiary level of education (OR = 0.496; 95% CI = 0.226, 0.923; P-value = .042). Thirdly, this study found that ANC has a positive significant correlation with delivery at a healthcare facility with a probability of 3.69 times than mothers without ANC. Besides, the ownership of an MCH handbook has 1.5 times more probable to give birth at a healthcare facility than those who do not have an MCH handbook. Additionally, mothers with a financial plan also have a strong relationship with the choice of a healthcare facility as the place of birth (OR = 2.291; 95% CI = 1.257, 4.178; P-value = 0.007). In general, ANC has the biggest influence on the decision of a healthcare facility for birth.

Delves deeper to understand the influence of services provided during ANC to the decision on the place of birth, result of second logistic model (Table 4) showed that MCH ownership and birth planning (of childbirth helper and financial source) has a significant association with the decision of a healthcare facility birth. The other finding is that the odds ratio of receiving ANC in the first trimester of pregnancy was 1.902 with a P-value of 0.025. This means that mothers who came for ANC in the first trimester were more likely to give birth at a healthcare facility than those who did so in the second or third trimester. Moreover, mothers receiving ANC from a doctor were 2.3 times more

likely to give birth at a healthcare facility rather than by midwife or nurse (OR = 2.328; 95%CI = 0.96, 5.644; P-value = 0.061), indicating that a healthcare provider plays an important role in encouraging mothers to give birth at a healthcare facility.

Some other interesting findings are the impact of blood pressure tests and ultrasound examinations on the mother's decision of a healthcare facility birth. Mothers who have undergone a blood pressure examination are five times more likely to give birth at a healthcare facility (95% CI = 1.4, 17.8; P-value = 0.013) while those who have experienced USG maternal examination are 2.34 times more likely to deliver at a healthcare facility than those who have not (95% CI = 1.397, 3.922; P-value = 0.001). This empirical statistic shows that this important maternal examination could encourage mothers to utilize a healthcare facility for delivery.

Discussion

This study examined the association between maternal health services and the decision of where to give birth. More than 20% of the mothers were found to give birth somewhere other than a healthcare facility even though they had access to a medical professional through ANC. This shows maternal health behavior in the utilization of maternal health care especially in place of delivery still needs to be improved.

There are some activities that might provide information and education about pregnancy and child birth such as ANC, MCH handbooks, and guidance by healthcare workers in planning for delivery and prevention of complications. By frequently visit the healthcare provider in the form of ANC, they could facilitate preventive actions, early diagnosis, and prompt treatment of complications, and also provide a consultation session and imbed maternal health education such as the importance of nutrition, pregnancy health care, emergencies in pregnancy, delivery preparation, and the family planning program (19, 20).

Table 4. Result of Multivariate Regression Model

	Model 1. Woman choice of Health Facility Birth					Model 2. Woman choice of Health Facility Birth Restricted to Those with Antenatal Care service				
	B coefficient	P-value	OR	95.0% CI. for OR		B coefficient	P-value	OR	95.0% CI. for OR	
				Lower limit	Upper limit				Lower limit	Upper limit
Type of Residence										
Urban	Reference									
Rural	-1.205	0.001	0.3	0.188	0.478	-1.015	0.001	0.362	0.203	0.648
Region										
Papua	Reference									
Sumatera	1.303	0.026	3.679	1.165	11.617	1.096	0.126	2.992	0.736	12.162
Jawa	1.937	0.002	6.935	2.094	22.967	2.096	0.006	8.131	1.831	36.096
Bali Nusa Tenggara	2.121	0.002	8.337	2.149	32.337	2.657	0.002	14.259	2.602	78.132
Kalimantan	1.099	0.078	3.001	0.884	10.183	0.953	0.221	2.593	0.563	11.932
Sulawesi	1.213	0.043	3.363	1.037	10.903	1.414	0.055	4.114	0.971	17.437
Maluku	0.483	0.483	1.621	0.421	6.246	0.673	0.42	1.96	0.382	10.054
Educational Attainment										
Tertiary school	Reference									
< = Elementary school	-0.756	0.042	0.469	0.226	0.973	0.546	0.251	1.726	0.68	4.381
Secondary school	-0.273	0.447	0.761	0.377	1.538	0.389	0.373	1.475	0.627	3.467
Antenatal Care	1.307	0.004	3.696	1.51	9.047					
MCH Handbook ownership	0.4	0.103	1.492	0.922	2.413	0.521	0.086	1.684	0.929	3.053
Plan of the Childbirth attendance	-0.204	0.557	0.816	0.413	1.61	-0.766	0.101	0.465	0.186	1.161
Budget Plan for Delivery	0.829	0.007	2.291	1.257	4.178	0.623	0.105	1.865	0.878	3.959
Pregnancy Age at the first ANC										
Not in the first trimester	Reference									
First Trimester						0.643	0.025	1.902	1.085	3.335
ANC Provider										
Midwives or Nurse	Reference									
Doctor						0.845	0.061	2.328	0.96	5.644
Education about Preparedness for Delivery						-0.104	0.781	0.901	0.432	1.88
Education of Emergency in Pregnancy						0.059	0.869	1.061	0.526	2.137
Blood Pressure test						1.611	0.013	5.009	1.405	17.858
USG test						0.85	0.001	2.341	1.397	3.922
Complication						0.464	0.066	1.591	0.969	2.612
First Birth Attendance										
Family	Reference									
Health worker						2.023	0.001	7.563	3.402	16.814
Traditional skilled birth attendance						-1.154	0.025	0.315	0.115	0.868

Abbreviation: CI, confidence interval; OR, odds ratio; MCH, maternal and child health; ANC, antenatal care; USG, ultrasonography

This study shows that mothers with ANC are 3.69 times more likely to choose a healthcare facility for giving birth than those who did not. This finding is consistent with the previous research by Rai et al. (21), Gabrysch et al. (15), and Owili et al. (22) that ANC increases the likelihood of delivery by SBA or having an institutional delivery and continuing maternal health care in postnatal period.

Quality service may affect the utilization of complete maternal healthcare. In the case of ANC, the type of maternal examination, intensity of contact with healthcare workers, and availability of medical equipment are some measurements of quality services (23, 24). In the deeper investigation of ANC services, this study found that the treatment during prenatal-care services and the role of healthcare workers as antenatal providers had a significant association with the number of incidents of healthcare-facility birth. Ultrasound examinations that can provide health information about the baby's condition, and blood pressure tests that can detect early complications in pregnancy also increase the probability of the mother to give birth at a healthcare facility. At the same time, the data showed that not all ANC service in Indonesia provided

blood pressure tests and USG tests. Thus, this should be a special concern of the quality service of ANC. Indeed, these maternal examinations might increase the degree of trust and satisfaction in the healthcare service.

Another interesting finding in this study is that having a health insurance increase the probability of mother to do hospital birth. However, the number of people who have health insurance is only a few. There are only 28.95% mothers who have insurance. Having a financial plan for delivery, either from insurance or other sources, statistically increase the likelihood to give birth at a healthcare facility twice.

Conclusion

This study found that the decision of place of birth was associated with maternal health service. The most significant influences factor was found to be ANC. Some maternal examination found to be the leveraging factors in utilizing healthcare facility as the place of birth such as blood pressure examination and USG test. The availability of a healthcare worker at the time of delivery also one of variable that could encourage mother to give birth at healthcare facility. Another important factor is the

preparedness of financial budget for delivery which is about ownership of insurance. Therefore, improving the quality of the maternal healthcare system including the quality of healthcare workers, medical devices and supporting infrastructure, and also expanding the coverage of delivery insurance is very important in health strategize and prominent concerns for healthcare policy.

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Ethical consideration

This research was derived from the master's degree of public policy thesis. The study protocol has been approved by National Graduate Institute for Policy Studies in Tokyo, Japan.

Conflicts of interests

Authors declared no conflict of interest.

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