

A Title Page

**FACTORS ASSOCIATED WITH CHOICE OF DELIVERY PLACE: CROSS-SECTIONAL
STUDY IN RURAL INDONESIA**

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Conflict of Interests

The author declares that no conflicts of interest

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We would like to thank you for RAND give us for accessing the raw data of IFLS

Authors Contributions

Conceptualized the study design, acquired the raw data for analysis, conceptualized for the article then prepared the original draft of the manuscript: Haerawati Idris

Data availability statement

This study used data from Indonesia Family Life Survey. The data are available to general public by request at <https://www.rand.org/well-being/social-and-behavioral-policy/data/FLS/IFLS/access.html>

Ethical Approval & Consent to Participate

The Indonesia Family Life Survey (IFLS) are available by request to general public from RAND with website <https://www.rand.org/well-being/social-and-behavioral-policy/data/FLS/IFLS/access.html>.

RAND has remove all information that could be used to identify the respondents. Therefore, no ethical approval was needed for this study because it was based on secondary analysis.

Payment

We will pay APC if their article is editorially accepted

FACTORS ASSOCIATED WITH CHOICE OF DELIVERY PLACE: CROSS-SECTIONAL STUDY IN RURAL INDONESIA

Abstract

Maternal mortality is still a concern in various developing countries, including Indonesia. Utilization of delivery place in health facilities in rural is still limited explored. This study aimed to analyze the determinants of the choice of delivery place in rural Indonesia. This study is a quantitative study with a cross-sectional study design. We used secondary data from the 2014 Indonesian Family Life Survey (IFLS). The study sample was 2,389 mothers who were aged 15-49 years & were in rural areas. Data were analyzed using chi-square and logistic regression. The study showed that mothers who gave birth in health facilities 67%. The analysis showed that tertiary and secondary education (p -value <0.001), lived in Java Bali region (p -value <0.001), economic status (p -value <0.001), insurance ownership (p -value <0.001), job status (p -value <0.05), complete antenatal care history (p -value <0.001) have a significant relationship with the choice of delivery place in health facilities. Tertiary education is the most dominant variable related to the choice of delivery place in health facilities (p -value <0.001 ; PR 4,55; 95% CI: 3,751-5,542) after being controlled by other variables. Education is the dominant factor influential in the choice of delivery place. The government can provide education through direct communication, information, and education through media.

Keywords: Choice; Health Facilities; Rural; Delivery place

Introduction

The World Health Organization reports that the world's mortality rates reach up to 289,000 people, consisting of several countries, among others the United States 9,300 inhabitants, Africa North 79,000 inhabitants, and Southeast Asia 16,000 inhabitants. While on the numbers, the mortality rate in the

developing country reached 230 per 100,000 live births. Based on the data, developing countries thrive contribute up to 99% of the mother's death globally; mother death became one of the several problems of health that need to be given attention specifically (WHO 2014), including in Indonesia.

Studies related to factors that determine the choice of place of delivery have been explored. A cross-sectional study in the city of Jimma, one of the largest in Ethiopia, states that there is a significant relationship between age groups, education levels, religion, antenatal history, and parity in maternal choice birthplaces (Yegezu and Kitila 2015). Research conducted in Nigeria shows a relationship between age groups, education, marital status, occupation, and income to choose delivery places in health facilities (Envuladu et al. 2013). A study conducted by Dickson et al. reports that economic status, maternal education, ecological zones, ethnicity, parity, and distance to the facility as determinants of maternity site selection (Dickson et al. 2016). Research by Abdumageed *et al.* shows age, area of residence, number of children, education, financial income, distance to health facilities, and source of decisions for the place of birth of women are significant determinants of women in determining the place of birth (Abdumageed and Elnimeiri 2018).

In a study in six African countries, maternal and infant mortality and morbidity be lower when delivering in health facilities with skilled medical personnel or proven to have a positive relationship. In addition to getting skilled health workers, health facilities also have advantages in medical equipment; officers keep equipment always sterile so that it is safe and ready to use. Also, health facilities have a comfortable place to give birth because they are explicitly provided for maternity (Stephenson et al. 2006). To improve maternal health requires an increase in women giving birth in health facilities assisted by skilled personnel, which is the primary goal of mothers' safe survival (Kesterton et al. 2010).

Research on the determinants of the choice of delivery place in Indonesian is important, especially in rural Indonesia. The proportion of the gap in the availability of health facilities in Indonesia is still high in urban and rural areas. Utilization of delivery place in health facilities in rural Indonesia is

still limited explored. This study aims to analyze the determinants of the choice of delivery place in rural Indonesia.

Method

The study design used a *cross-sectional* approach. This study analyzes the secondary data of the IFLS-5 Indonesia Life Family Survey in 2014. Sampling in IFLS was done in stages (*multistage random sampling*), where 13 provinces were selected as many as 321 random enumeration areas. Thirteen provinces selected based on cost efficiency are four provinces in Sumatera (North Sumatera, West Sumatera, South Sumatera, and Lampung), five provinces of Java (DKI Jakarta, West Java, Central Java, DI Yogyakarta, and East Java), and four provinces including major island groups (Bali, West Nusa Tenggara, South Kalimantan, and South Sulawesi) (Strauss et al. 2016).

The sample in this study were respondents who met the criteria of women who had given birth, were aged 15-49 years and were in rural areas. The number of samples obtained was 2,389. Research instruments can be obtained free of charge on the *website* <http://www.rand.org/labor/FLS/IFLS/download.html>. Data processing using SPSS Statistics software application. The univariate and bivariate analyses conducted (frequencies and cross-tabulations). Statistical tests used chi-square and logistic regression statistical tests.

Dependent variable

The delivery place's utilization is the place where mothers seek and get services and assistance when giving birth. The choice delivery place is divided into two: health facilities (including hospitals, puskesmas (primary health care), polindes (the village maternity post), clinics, midwife practices) and non-health facilities (including one's own home, family home, and traditional birth attendant).

Independent variables

The education variable is the last level of education followed/completed by the mother, divided into three: primary (elementary school and below), secondary (junior high school, high school), tertiary

(diploma, college). *The region* is the province of the respondent's residence, divided into three islands: Sumatera, Java/Bali, and the eastern region. Economic status is proxy by the total household expenditure for food consumption (consumption of staple foods) and non-food costs (health, taxes, clothing, etc.). Furthermore, after we enumerated it, then divided it into five groups, namely the lowest 20 percent (very poor)=Q1, 21-40 percent (poor)=Q2, 41-60 percent (middle)=Q3, 61-80 percent (rich)=Q4, up to the top 20 percent (wealthy)=Q5. Insurance ownership is insurance ownership by respondents to use health services. Ownership is divided into two, no health insurance and have health insurance. The mother's job status consists of work and not work. History Antenatal care (ANC) is visited at least four times during trimester I-III. The group is divided into two, complete (≥ 4) and incomplete (≤ 3)

Results

Descriptive analysis

Based on table 1, respondents who chose a delivery place in health facilities were 67%. The majority of respondents had secondary education 53.1 %, were in the Java/Bali region 64.1%, 35% were in an impoverished economic group, had health insurance of 55.9 %, 54 % did not have a job, had a complete antenatal care visit 63 %.

Table 1

Characteristic of Respondents

Variable	n=2389	(%)
Utilization of the place of delivery		
Health Facilities	1600	67,0
Non-Health Facilities	789	33,0
Education		
Tertiary	227	9,5
Secondary	1268	53,1
Primary	894	37,4
Region		
Sumatera	551	23,1
Jawa/Bali	1532	64,1
East Region	306	12,8

Economic Status		
Very rich	209	8,7
Rich	285	11,9
Middle	462	19,3
Poor	598	25,0
Very poor	835	35,0
Insurance ownership		
Yes	1336	55,9
No	1053	44,1
Job-status		
Work	1098	46,0
No work	1291	54,0
History of antenatal care		
complete	1505	63,0
incomplete	883	37,0

Based on table 2, most respondents who give birth at a health facility are the respondents who have a higher education, 82,2 %. Located in Bali, Java, 74.6 %, has wealthy 72 %, does not have health insurance 68.4 %, not have a job 69.3 %, and has a complete antenatal care visit of 71%. Based on the chi-square test results, educational variables, region, economic status, ownership of insurance, employment status, and antenatal care visit obtained p-value <0,05. There is a significant relationship between these variables with the choice of delivery place in health facilities.

Table 2 Relationship of Independent Variables with Choice of Delivery Place

	Choice of delivery place				Total	p-value	PR 95% CI
	Health Facilities		Non-Health Facilities				
	n	%	n	%			
Education							
Tertiary	187	82,2	40	17,8	227	100	<0,001 1,486 (1,418-1,557)
Secondary	918	72,4	350	27,6	1268	100	<0,001 1,309

								(1,231-1,391)
Primary	495	55,3	399	44,7	894	100	<i>Ref</i>	
Region								
Sumatera	308	55,9	243	44,1	551	100	0,056	1,145 (1,007-1,303)
Jawa/Bali	1143	74,6	389	25,4	1532	100	<0,001	1,529 (1,471-1,590)
East region	149	48,8	157	51,2	306	100	<i>Ref</i>	
Economic status								
Very rich	150	72,0	59	28,0	209	100	<0,001	1,146 (1,099-1,195)
Rich	188	65,9	97	34,1	285	100	0,024	1,049 (1,008-1,092)
Middle	320	69,4	142	30,6	462	100	<0,001	1,104 (1,064-1,145)
Poor	416	69,6	182	30,4	598	100	<0,001	1,108 (1,069-1,148)
Very poor	525	62,8	310	37,2	835	100	<i>Ref</i>	
Insurance ownership								
Yes	879	65,8	457	34,2	1336	100	0,048	0,961 (0,924-1,001)
No	721	68,4	332	31,6	1053	100		
Job-status								
work	705	64,2	393	35,8	1098	100	<0,001	0,926 (0,889-0,965)
No work	895	69,3	396	30,7	1291	100		
Antenatal care visit								
Complete	1068	71,0	436	29,0	1505	100	<0,001	1,181 (1,131-1,232)
Incomplete	531	60,1	352	39,9	883	100		

Logostic regression

Based on table 3, the statistical analysis results show that the most influential variable is seen from the highest *Adjusted Prevalence Ratio* value, namely the education variable with a PR value of 4.559 (95% CI 3.751-5.542). Higher education has a 4,5 times greater effect in choosing delivery in a health facility than lower education after controlling other variables.

Table 3. Final Model of Multivariate Analysis

Variable	p-value	Prevalence Ratio (CI 95%)
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Education		
Tertiary	0,000	4,559 (3,751-5,542)
Secondary	0,000	2,312 (1,958-2,729)
Primary	Ref	
<i>Region</i>		
Sumatera	0,054	1,322 (0,995-1,758)
Jawa/Bali	0,000	3,400 (2,994-3,862)
East Region	Ref	
Economic status		
Very rich	0,037	1,220 (1,012-1,1470)
Rich	0,549	0,951 (0,806-1,123)
Middle	0,053	1,191 (0,998-1,421)
Poor	0,001	1,308 (1,129-1,516)
Very poor	Ref	
Insurance ownership	0,001	0,785 (0,698-0,882)
Job status	0,001	1,272 (1,145-1,413)

Discussion

The purpose of this study is to analyze the determinants of the choice of delivery place in Indonesia. The results of the analysis showed that respondents who used childbirth at a health facility were 67%. This study reported the highest proportion of use of health facilities was respondents who have a higher education. It is consistent with others' studies that proved that most women who deliver at health facilities are located on respondents with a secondary education level to the top (Ganle et al. 2014).

Women's education status was the most significant factor influencing the choice of delivery place in a health facility. Women with secondary or higher education are more likely to use and use childbirth services in health facilities. Studies conducted in six African countries that conducted the study concluded that women's secondary or higher education led to greater awareness about the need for childbirth in health facilities. Women's education level can indicate an understanding of the importance of maternity in a safe and comfortable setting. The higher the education level, the woman will be more confident to utilize services in health facility services (Stephenson et al. 2006). Based on other studies, it also states that educational variables have a significant relationship with the utilization of health facilities when

giving birth (Rahman et al. 2008) (Envuladu et al. 2013) (Abdulmageed and Elnimeiri 2018; Kitui et al. 2013) (Dickson et al. 2016).

Respondents in Java and Bali had the highest priority in selecting health facilities when giving birth. The availability of infrastructure and infrastructure in Java and Bali is more adequate than in other regions. It is in line with research conducted in Tanzania. There are regional variations in the use of health services. The analysis results prove there is a relationship between the *region* and the use of the place of delivery. Experts urge these differences to be taken into account when making policies and designing programs to increase labor rates in health facilities. The differences indicate variations that occur, such as labor and facility density, quality of care, and availability of important commodities in the facility (Bishanga et al. 2018).

Economic status has a relationship with the choice of health facilities when giving birth. The mother who has a high economy-level would choose health facilities than non-health facilities. Economic status is a supporting and reinforcing factor in accessing health services in terms of costs for using health services. Household or mother's detriment when the poor will have the ability to charge small is difficult to use, especially in maternity health facilities. Maternity at home is an alternative for mothers to meet childbirth needs, which has limited costs. The services of traditional birth attendants who are known to be cheaper in terms of cost are also the reasons mothers with lower economic status will deliver in non-health facilities. Wealth index useful for determining the ranking of socioeconomic status in a household. Research by Kitui et al. shows a significant relationship between access to the economy with maternity choice. This proves that the impact of poverty reduces the ability to pay for services. So delivery at home is cheaper and is an option, especially for rural women (Kitui et al. 2013). Other research also shows that the higher the wealth index or economic status, the more likely it is to deliver in a health facility (Stephenson et al. 2006; Nketiah-Amponsah and Sagoe-Moses 2009) (Envuladu et al. 2013).

Health insurance ownership has a relationship with the selection of respondents in childbirth in a health facility. In line with a study conducted by Kitui et al. stated that respondents who do not give insurance tend to have the opportunity to give birth at home or no health facilities (Kitui et al. 2013). it means that there is a significant relationship between the choice of birthplace and insurance ownership. Research conducted by Rahman *et al.* that insurance has a significant relationship with the utilization of health services (Rahman et al. 2008). In this case, it can be said that mothers who have insurance have the opportunity to more easily access the place of delivery in health facilities than those who do not have insurance (Kitui et al. 2013) (Hwang et al. 2017; Gouda et al. 2016).

Employment has a relationship with the choice of health facilities during delivery. This research is in line with Envuladu *et al.*'s research that carries out work activities tend to be accustomed to accessing the outside world and tend to be better at making decisions. The employment status of the mother is related to the choice of place of delivery. Mothers who do not work tend to deliver at home compared to health facilities (Envuladu et al. 2013).

Job in pregnant women is other socioeconomic factors that have been proven significant in affecting women's changes in health care utilization. Employment is an economic resource that empowers women to take responsibility for their health and facilitates easy access to quality care. In this study, significant job variables have a relationship (Ugbor et al. 2017). Another study explains that women's position in working households is another factor that can influence decisions in using health services, deciding whether or not to use services. More independent women are more likely to use health services than those dependent on their husbands or other family members (Ewa et al. 2012). Meanwhile, research conducted in Kenya on female respondents who gave birth. Respondents who are not working or homemakers are six times more likely to give birth at home than mothers who have work activities (Ogolla 2015).

Mothers who do not work can give birth at a health facility because homemakers tend to depend on the decision of a companion/partner and encouragement from influential people around, such as parents or in-laws. The closest person will give a good recommendation for giving birth because they already have experience. Homemakers who do not work will follow the recommendations or advice from the closest people in deciding where to deliver. So that housewives who do not work can give birth at a health facility, not only working mothers. Previous studies indicate that work is not a statistically significant predictor of health service utilization among hypertensive patients in Korea. The reason is that the study participants were only divided into groups of workers and not workers and were *cross-sectional*. Besides, there is a lack of empirical evidence regarding the use of hospitals in Korea by different occupational groups, obtained through longitudinal analysis (Ham and Lee 2007).

The history of *antenatal care* visit is another factor associated with delivery in a health facility. A study among pregnant women in Ghana showed that women with at least four antenatal care visits were more likely to give birth at a health facility (Nketiah-Amponsah and Sagoe-Moses 2009). It is in line with the previous study that antenatal care is related to the use of health facilities (Kitui et al. 2013; Yegezu and Kitila 2015). The greater the number of antenatal care visits, the higher the chance to strengthen the health message that can result in better understanding and compliance for mothers (Egharevba et al. 2017)

Limitation

This study used secondary data to examine some variables related to the choice of maternity facilities such as education, economic status, marital status, employment, ANC visits, insurance ownership, regional location, and *region*. There are still variables not included in this study, such as maternal parity, distance to health care facilities. We did not use these variables is due to data limitations.

Conclusion

This study aimed to analyze the determinants of the choice of maternity places in rural areas in Indonesia. This study's results indicate that mothers who have a higher education greater effect in giving

birth in health facilities than mothers who have low education after being controlled by other variables. The government should provide educational facilities through direct communication, information, and education through media.

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[BNJ] Submission Acknowledgement

1 pesan

Dr. Joko Gunawan <editorbnj@gmail.com>

15 Maret 2022 12.20

Kepada: Haerawati Idris <haera@fkm.unsri.ac.id>

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2 pesan

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[BNJ] Editor Decision (Revisions Required)

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Kepada: "Assoc. Prof. Yupin Aunguroch, PhD, RN" <chiefeditorbnj@belitungraya.org>

Dear editor

We have revised our manuscript based on the suggestion. We have uploaded the revision on the website

Thank you

Sincerely,

Haerawati idris

[Kutipan teks disembunyikan]



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2022-04-18 07:47 AM

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Our decision is: Revisions Required

Due for resubmission: 5 June 2022

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For abstract, please follow the guideline.

Background

It is unclear how many studies in Indonesia that have been published on this topic. Gap of literature is still unclear therefore I cannot understand why we need to conduct this study.

The background is missing the Indonesian context. Not all readers understand Indonesia, where is rural Indonesia? Indonesian healthcare system needs to be addressed as well.

In addition, conceptual framework to understand each independent variable used in this study needs an explanation.

Method

Please use subheadings according to the guideline.

Are 13 provinces including Jakarta considered rural Indonesia?

Results

English matter. Percentage should be 67.0, NOT 67,0. Please change all. Similar to p-value and CI.

I suggest to remove the results of Chi-Square. Just directly use Logistic regression. But please note that the use of regression in this study is only to determine associated factors, not to describe cause effect model.

Discussion

Lack of nursing novelty. The authors haven't addressed nurses' roles or midwife roles in this study from abstract to conclusion. Nursing significance and implications of this study for nursing practice should be fully described.

The article is short to be considered original research. It needs to be minimum 5,000 words according to the guideline.

Many mistakes in reference formats.

English needs an improvement.

Recommendation: Revisions Required

Reviewer B:

The article is good..

The papaer is written under author guidelines

Paper title reflects the content and aim of study

Structure of manuscripts consist of abstract, introduction method, resulst, discussion, limitation and coclusion.

In statistical analysis not found potential bias and counfounding for control.

In artichel still minimum of contribution pratice of indonesia..

Measurement method of the sample is not clearly.

Recommendation: Accept Submission

BNJ Editorial Office

Factors associated with the choice of delivery place: A cross-sectional study in rural areas of Indonesia

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Abstract

Background: Developing countries, including Indonesia, commonly face maternal mortality as a public health concern, which needs special attention. Using maternal delivery services in health facilities may reduce maternal mortality. However, little is known about the general use of delivery services in health facilities in rural areas, Indonesia.

Objective: This study aimed to analyze determinants in choosing delivery places in rural areas of Indonesia.

Methods: A cross-sectional quantitative design with secondary data from the 2014 Indonesian Family Life Survey (IFLS) was used in this study. There were 2,389 mothers aged 15-49 years in rural areas were included. Data were analyzed using a logistic regression test.

Results: It was found that 67% of mothers gave birth in health facilities. Tertiary and secondary education levels, residence in Java and Bali regions, economic status, insurance ownership, and job status were significantly related to the choice of delivery place in health facilities. Tertiary education was the most dominant factor correlated with the use of delivery services in health facilities ($p < 0.001$; $PR = 4.55$; $95\% CI = 3.751-5.542$).

Conclusion: Education is the key factor associated with the choice of delivery place. Therefore, it is suggested that the government and healthcare workers, especially nurses and midwives, improve mothers' education and provide strategies to increase knowledge in choosing delivery services to enhance their health outcomes.

Keywords

sustainable development goals; maternal mortality; mothers; delivery place; nursing; midwifery; Indonesia

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Background

In the Sustainable Development Goals (SDGs), maternal mortality rates need to be reduced to 70 per 100,000 live births by 2030. The World Health Organization (WHO) reports that the global mortality rate reached 289,000 deaths. There were 9,300 inhabitants in the United States, 79,000 in Africa North, and 16,000 in Southeast Asia (WHO, 2014). The mortality rates in developing countries reached 230 deaths per 100,000 live births. They contribute up to 99% of maternal deaths globally. Hence, these health problems need special attention in all countries, including Indonesia (WHO, 2014).

Developing countries face maternal mortality due to pregnancy matters such as direct obstetric complications, including bleeding, sepsis, gestational hypertension, obstruction and prolonged labor, and unsafe abortion. Other indirect causes of the conditions involve malaria, HIV/AIDS, and heart disease. In addition, hemorrhage and hypertension are the leading causes of the highest maternal deaths in South Asia and Sub-Saharan Africa. Meanwhile, some direct causes of maternal mortality in developed countries are complications

of anesthesia and cesarean section. Thus, this discrepancy reflects a global disparity in access to obstetric care (Donnay, 2008).

Using maternal delivery in health facilities may reduce maternal mortality in Indonesia. Delivery carried out in a health facility can ensure the mother's safety. Health facilities have better standard operating procedures and health workers with guaranteed expertise. Meanwhile, in non-health facilities, there is no guarantee of skilled health workers; otherwise, only traditional birth attendants without licenses handle the delivery process (Ministry of Health, 2017). Andersen's theory groups some determinants in the utilization of health services into three main categories, namely: 1) predisposing characteristics (demography, gender, age, marital status, social structure, education, occupation, hobby, race, religion, and health belief), 2) enabling characteristics (family resources and community resources), and 3) needs characteristics (individual and clinical assessment) (Andersen & Newman, 1973).

Previous studies have explored factors influencing the choice of delivery place. For example, a cross-sectional survey in Jimma city, one of the largest in Ethiopia, has found age

groups, education levels, religion, antenatal history, and parity are significantly related to the choice of birthplaces (Yegezu & Kitila, 2015). Research conducted in Nigeria shows a relationship between age groups, occupation, education, income, and marital status in choosing delivery places in health facilities (Envuladu et al., 2013). In addition, a study conducted by Dickson et al. (2016) reports that economic status, ethnicity, maternal education, ecological zones, parity, and distance to the facility become determinants of maternity site selection. Research by Abdulmageed and Elnimeiri (2018) shows age, area of residence, number of children, financial income, education, distance to health facilities, and source of decisions on birthplace are significant determinants for women to determine birthplace. However, a study in six African countries revealed that maternal and infant mortality and morbidity could be lower when mothers choose health facilities as a delivery place with the assistance of skilled medical personnel. The use of health facilities has been proven to have a positive relationship with a strong community level. In addition to having skilled health workers, health facilities also have advanced medical equipment; officers always keep equipment sterile so that it is safe and ready to use. Also, they have a comfortable place to give birth purposefully established for maternity (Stephenson et al., 2006). Skilled personnel in health facilities also may improve the primary goal of delivery safety (Kesterton et al., 2010).

As a middle-income country, Indonesia has 262 million residents from 300 ethnic groups with 730 languages spoken across 17,774 islands (Agustina et al., 2019). It has a large rural population in ASEAN (Khor, 2008). The older population occupies rural areas more than urban areas (Utomo et al., 2019). Improving the health care quality in rural areas is a formidable task affecting residents' access to emergency care. Access to healthcare services may be hampered by the shortage of available resources, the lack of public transport, and distances to primary healthcare centers in rural areas. The absence of health science libraries and tertiary care facilities poses a challenge for providers to upgrade officers' knowledge. It also threatens health status and the accessibility of quality health care in all communities (Merwin et al., 2006). Many factors inhibit access to health services in rural areas. Some may include geographic isolation, transportation, economic instability, shortage of providers, discontinuation or fragmentation of care, stigma, funding losses, poor education concerning preventive measures, limited resources, and ethical challenges (Brems et al., 2006).

Research on the determinants of delivery place in Indonesia is essential, especially in rural areas. The gap in the availability of health facilities in urban and rural areas is high, but little research on this topic is still yet to be explored. Understanding the prevalence and predictors for the choice of delivery place will affect policy formulation and intervention strategies. Therefore, this study aimed to analyze determinants of the choice of delivery place in rural Indonesia.

Methods

Study Design

A cross-sectional quantitative study was conducted by analyzing the secondary data from the IFLS-5 Indonesia Family Life Survey in 2014.

Samples/Participants

IFLS was selected through multistage random sampling, where 321 random enumeration areas from 13 provinces were chosen. The provinces selected based on cost efficiency include four Sumatera provinces (North Sumatera, West Sumatera, Lampung, and South Sumatera), five Java provinces (DKI Jakarta, Central Java, West Java, East Java, and DI Yogyakarta), and four provinces including major island groups (South Sulawesi, Bali, South Kalimantan, and West Nusa Tenggara) (Strauss et al., 2016). The participants included in this study were 2,389 female respondents who had given birth in rural areas and were aged 15-49 years.

Instruments

This study employed a questionnaire from the IFLS-5 Indonesia Family Life Survey, which can be accessed free on the website: <http://www.rand.org/labor/FLS/IFLS/download.html>. The dependent variable in this study was the delivery place, which is the place where mothers seek and get maternity and delivery services and assistance. The choice of delivery place is divided into two: health facilities (including hospitals and primary health care centers), village maternity posts, clinics, midwife practices, and non-health facilities (including one's own home, family home, and traditional birthplace).

While the independent variables include: 1) Education variable, the latest education level followed/completed by the respondents. It is divided into three: primary (elementary school and below), secondary (junior high school, high school), tertiary (diploma, college); 2) Region, the province where the respondents reside, and it is divided into three islands: Sumatera, Java/Bali, and the eastern region; 3) Economic status, proxy by the total household expenditure for staple food consumption and non-food costs (health, taxes, clothing, etc.). After enumerated, it is then categorized into five groups: 20% (very poor/Q1), 21-40% (poor/Q2), 41-60% (middle/Q3), 61-80% (rich/Q4), above 80% (wealthy/Q5); 4) Insurance ownership, insurance owned by the respondents for using health services. It is categorized into no health insurance and having health insurance; 5) Mother's job status, consisting of work and not-work categories; 6) History of Antenatal Care (ANC), minimally counts for four times during trimester I-III. The variable is grouped into two: complete ($> = 4$) and incomplete ($< = 3$).

Data Analysis

This study used SPSS version 23 to conduct univariate and bivariate analyses (frequencies and cross-tabulations). In addition, logistic regression statistical tests were used to analyze factors associated with the choice of delivery place in rural Indonesia.

Ethical Consideration

The data from the IFLS-5 survey have been approved by Ethics Review Board at Gadjah Mada University, Indonesia.

Results

As shown in Table 1, 67% of the respondents delivered in health facilities. In addition, the majority of respondents had secondary education (53.1%), lived in Java/Bali regions

(64.1%), had health insurance (55.9%), and had a complete antenatal care visit (63%). However, half were unemployed (54%), and some were from impoverished economic groups (35%).

Table 1 Respondents' characteristics (N = 2,389)

Variables	n	%
Place of delivery		
Health facilities	1,600	67.0
Non-health facilities	789	33.0
Education		
Tertiary	227	9.5
Secondary	1,268	53.1
Primary	894	37.4
Region		
Sumatera	551	23.1
Java/Bali	1,532	64.1
East region	306	12.8
Economic status		
Very rich	209	8.7
Rich	285	11.9
Middle	462	19.3
Poor	598	25.0
Very poor	835	35.0
Insurance ownership		
Yes	1,336	55.9
No	1,053	44.1
Job-status		
Work	1,098	46.0
No work	1,291	54.0
History of antenatal care		
Complete	1,505	63.0
Incomplete	883	37.0

Table 2 shows that the most influential variable seen from the highest adjusted prevalence ratio value was education ($PR = 4.559$; $95\% CI = 3.751-5.542$). Higher education had a 4.5 times greater effect on people getting delivered in health facilities after controlling other variables.

Table 2 Final model of factors associated with the choice of delivery place in rural Indonesia

Variables	p-values	Prevalence Ratio (PR) (95% CI)
Education		
Tertiary	0.000	4.559 (3.751-5.542)
Secondary	0.000	2.312 (1.958-2.729)
Primary	Ref	
Region		
Sumatera	0.054	1.322 (0.995-1.758)
Java/Bali	0.000	3.400 (2.994-3.862)
East Region	Ref	
Economic status		
Very rich	0.037	1.220 (1.012-1.1470)
Rich	0.549	0.951 (0.806-1.123)
Middle	0.053	1.191 (0.998-1.421)
Poor	0.001	1.308 (1.129-1.516)
Very poor	Ref	
Insurance ownership		
Yes	0.001	0.785 (0.698-0.882)
No	Ref	
Job status		
Work	0.001	1.272 (1.145-1.413)
Not work	Ref	

Discussion

The purpose of this study was to analyze determinants of the choice of delivery place in Indonesia. The analysis showed that most respondents gave birth in a health care facility in rural areas. In addition, this study reported the respondents with a higher education performed delivery in health facilities the most. It is consistent with a previous study that proved that most women who deliver in health facilities have a secondary education level and higher (Ganle et al., 2014).

Women's education status, therefore, was the most significant factor influencing the choice of delivery place. Women with secondary or higher education are more likely to use childbirth services in health facilities. Studies conducted in six African countries conclude that secondary or higher education leads to greater awareness of women choosing health facilities as a place of delivery. Women's education level can indicate an understanding of the importance of a safe and comfortable setting for maternal and child health. The higher the education level, the more confident to utilize health facility services (Stephenson et al., 2006). Previous studies also believe educational variables have a significant relationship with the utilization of health facilities for delivery (Abdulmageed & Elnimeiri, 2018; Dickson et al., 2016; Enzuladu et al., 2013; Kitui et al., 2013; Rahman et al., 2008)

The study respondents in Java and Bali had the highest priority in selecting health facilities as delivery places. It can be assumed that the availability of infrastructure in Java and Bali is more adequate than in other regions. It is in line with research conducted in Tanzania, where the use of health services varies across areas (Bishanga et al., 2018). The analysis showed a relationship between the region and the use of delivery places. Stakeholders must consider the differences when formulating policies and designing programs to increase health facilities' labor rates. The differences may include quality of care, labor and facility density, and availability of essential commodities in health facilities (Bishanga et al., 2018).

In addition, economic status had a relationship with the choice of delivery place. Mothers with a high-economy level were more likely to choose health facilities compared to non-health facilities. Economic status is a supporting and reinforcing factor in access to health services, i.e., costs for health services. Those from lower economic families will have less ability to use maternity health facilities. Maternity at home is an alternative for mothers to meet childbirth needs within limited costs. Traditional birth attendants provide cheaper services; thus, mothers with lower economic status prefer non-health facilities for delivery. The wealth index is useful for determining socioeconomic status in a household. Research by Kitui et al. (2013) shows a significant relationship between economic status and maternity service choice. Poverty reduces affordability to bear services, and thus women in rural areas tend to choose cheaper home delivery services. Other research also shows that the higher the wealth index or economic status drives someone to select a health facility (Enzuladu et al., 2013; Stephenson et al., 2006)

Another variable is health insurance ownership, which was related to the use of a health facility. This aligns with Kitui et al. (2013) showed that respondents who do not give insurance tend to have the opportunity to give birth at home or in non-

health facilities. In other words, insurance has a significant relationship with the utilization of health services (Rahman et al., 2008). In this case, it can be said that mothers who have insurance have the opportunity to more easily access the place of delivery in health facilities than those who do not have insurance (Gouda et al., 2016; Hwang et al., 2017; Kitui et al., 2013).

Furthermore, employment was related to the choice of health facilities for delivery. Work allows ones to access the outside world. Therefore, one will make better decisions once they are employed. Conversely, mothers who do not work do not deliver in health facilities but at home (Envuladu et al., 2013). Employment is another socioeconomic factor significantly affecting health care utilization. Employment is an economic resource that empowers women to take responsibility for their health and facilitates easy access to quality care. Previous research also found a similar finding (Kalu & Martha, 2017). Another study explains that women's position in households is another factor that can influence decisions on whether or not to use delivery services in health facilities. Independent women are more likely to use health services than those who rely on family members or husbands (Ewa et al., 2012). Meanwhile, research conducted in Kenya finds that respondents who were not working or were homemakers were six times more likely to give birth at home than those employed (Ogolla, 2015).

Unemployed mothers may choose to give birth in a health facility because they tend to depend on the decision of a companion/partner and encouragement from influential people, such as parents or in-laws. The closest person may recommend what they need to experience. Health service utilization was not a significant predictor among hypertensive patients in Korea. Besides, empirical evidence was lacking on whether different occupational groups use hospitals (Ham & Lee, 2007).

The history of antenatal care visits is another factor associated with delivery in a health facility. A study among pregnant women in Ghana shows that women with at least four antenatal care visits tend to deliver in health facilities (Nketiah-Amponsah & Sagoe-Moses, 2009) because antenatal care determines the use of health facilities (Kitui et al., 2013; Yegezu & Kitila, 2015). In addition, the more frequent antenatal care visits, the higher health promotion is needed (Egharevba et al., 2017).

Health services work only if professional health workers are present in Indonesian areas in rural and remote areas. Expansion of services also requires the role of nurses. In isolated and remote regions, nurses tend to take on extended practice roles to fill the gaps caused by the shortage of medical professionals. However, this expanded role is not always legitimized, and the need for continuing education is greater (Greiner et al., 2008). While some studies suggest that redistribution of duties to nurses is appropriate, this is not based solely on personnel availability or cost considerations (Crossan & Ferguson, 2005).

Limitations

This study is less able to track the causality between factors as it uses a cross-sectional survey design. However, from the secondary data analysis, some variables were related to the choice of delivery place, including education, economic status,

marital status, employment, ANC visits, insurance ownership, regional location, and region. Due to data limitations, there were still variables not included in this study, such as maternal parity and distance to health care facilities. Thus, further studies to cover all factors will be beneficial in determining the choice of delivery place.

Implications

Mothers who gave birth in health facilities in rural were at 67%. The Government of Indonesia is suggested to increase this number to improve the maternal and infant health outcomes by strengthening the provision of health infrastructure, especially in rural areas. It is due to geographical constraints being considered a barrier to access to health facilities. In addition, healthcare workers should be expanded or distributed to remote and rural areas to provide maternal services. However, equitable health development is a supporting factor for better maternal health services. Also, the government is recommended to pay attention to economic status, insurance ownership, and job status among the mothers in rural areas. In addition, this study serves as an input for the healthcare professionals, especially nurses and midwives, to continually improve mothers' education regarding the delivery choices.

Conclusion

This study aimed to analyze determinants of the choice of delivery place in rural Indonesia. Mothers with higher education had a greater tendency to give birth in health facilities than mothers with low education. Therefore, the government and healthcare professionals, particularly nurses and midwives, should improve mothers' education and provide educational facilities through direct communication, information, and media education. In addition, the other factors, such as region, economic status, insurance ownership, and job status, should be considered to improve strategies to increase maternal health outcomes in Indonesia.

Declaration of Conflicting Interest

The author declares that there are no conflicts of interest in this study.

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The acknowledgment to RAND for giving access to the raw data of IFLS.

Author's Contribution

HI contributed to all study analyses and manuscript writing as well as approved the final version of the article to be published.

Author's Biography

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Data Availability

This study used data from Indonesia Family Life Survey. The data are available for the public at request at <https://www.rand.org/well-being/social-and-behavioral-policy/data/FLS/IFLS/access.html>.

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