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Inadequate Antenatal Care Visits and Risks of Infant Mortality in Rural District

Kunjungan Antenatal Care yang tidak Memadai dan Risiko Kematian Bayi di Daerah Pedesaan

Sukma Rahayu[1]*, Toha Muhaimin[2]

[1,2]Faculty of Public Health, Universitas Indonesia, Depok, West Java, Indonesia

**Korespondensi Penulis : sukmarahayu47@gmail.com*

Abstract

Introduction: *Infant Mortality Rate (IMR) in Indonesia has decreased over the last fifteen years, but still left behind from other South-East Asia countries. One of the efforts to reduce IMR is antenatal care. However, there are disparity of antenatal care coverage between rural and urban area.*

Objective: *This study aimed to determine the effect of antenatal care on infant mortality in rural district in Indonesia.*

Methods: *The quantitative study used cross-sectional secondary data from Indonesia Demographic Health Survey 2017 with a total sample of 7.551 most recent born infant in 2012-2017 from women with childbearing age who's live in rural district. Logistic regression multivariate analysis was used to determine the effect of antenatal care and infant mortality.*

Results: *The results show that antenatal care reduce risk of infant mortality. Infants whose mothers had 1-3 antenatal care visits (OR = 3; 95% CI = 1.6 – 5.3) and no antenatal care visits (OR = 3; 95% CI = 1.6 – 5.5) had higher odds compared to infants whose mother had 4 or more antenatal care visits after controlled by social-economic status, maternal occupation, parity, and tetanus immunization.*

Conclusions: *Empowering community empowerment with the help of community health workers and midwives is needed to target women with low social economic status. Studies and regulations for pregnant and lactating women at work also needed to reduce infant mortality. Further research involving quality of antenatal care and more covariates variables might be carried out.*

Keywords: *Antenatal Care; Infant Mortality; Rural*

Abstrak

Latar Belakang: Angka Kematian Bayi (AKB) di Indonesia sudah mengalami penurunan dalam lima belas tahun terakhir, namun masih tertinggal dibandingkan negara Asia Tenggara lainnya. Salah satu upaya penurunan AKB adalah pemeriksaan antenatal lengkap, namun keterbatasan sumber daya menyebabkan terjadinya kesenjangan cakupan pemeriksaan antenatal di daerah perkotaan dan perdesaan.

Tujuan: Studi ini bertujuan untuk mempelajari pengaruh pemeriksaan antenatal dengan kematian bayi pada daerah rural di Indonesia.

Metode: Studi kuantitatif ini memiliki desain penelitian potong lintang dengan menggunakan data sekunder dari Survei Demografi Kesehatan Indonesia (SDKI) tahun 2017 dengan total sampel sebesar 7.551 bayi lahir hidup yang dilahirkan oleh wanita usia produktif pada tahun 2012-2017 dan bertempat tinggal di daerah perdesaan. Peneliti menggunakan pemodelan multivariat dengan regresi logistik ganda untuk menentukan pengaruh pemeriksaan antenatal dengan kematian bayi di perdesaan.

Hasil: Hasil penelitian menunjukkan bahwa pemeriksaan antenatal menurunkan risiko kematian bayi. Bayi yang ibunya memiliki 1-3 kali kunjungan pemeriksaan antenagal (OR = 3.0; 95% CI = 1.6 – 5.3) dan tidak melakukan kunjungan pemeriksaan (OR = 3.0; 95% CI = 1.6 – 5.5) memiliki peluang lebih tinggi untuk mengalami kematian bayi dibandingkan dengan ibu yang melakukan kunjungan pemeriksaan antenatal minimal 4 kali setelah dikontrol oleh status social ekonomi, pekerjaan ibu, paritas dan imunisasi tetanus.

Kesimpulan: Pemberdayaan masyarakat dengan bantuan kader dan bidan desa diperlukan untuk menyasar ibu hamil khususnya pada status social ekonomi rendah. Kajian dan regulasi bagi ibu hamil dan menyusui di tempat kerja juga diperlukan untuk menurunkan angka kematian bayi. Penelitian lebih lanjut yang melibatkan kualitas pelayanan antenatal dengan faktor-faktor lainnya sebagai kovariat dapat dilakukan di kemudian hari.

Kata Kunci: Pemeriksaan Antenatal; Kematian Bayi; Perdesaan

INTRODUCTION

Infant Mortality Rate (IMR) has been one of public health indicator over a country because it affect the sustainability of the population. Over the past fifteen years, IMR in Indonesia had decreased from 32 per 1000 live births to 24 per 1000 live births, which means 1 from 42 child die before their first birthday (1). Despite of the decreased in IMR, Indonesia has not achieve government work plan 2019 and still left behind from other South-East Asia country (2). IMR contribute to the three-quarter part from under-five mortality which become one of the main goal in Sustainable Development Goals (SDGs) on 2030, whereas 63% of them die in the neonatal period (1).

Antenatal care is generally thought to be an effective way to decrease infant mortality (3,4). Through this service, health proffesional enables to identify the potential risk in pregnancy and delivery processes, therefore prevent adverse outcome. Previous studies show that antenatal care have a protective effect to neonatal deaths (5).

In Indonesia, at least four antenatal visits are recommended during pregnancy or once in first trimester, once in second trisemester and twice in last trisemester. Descriptive data from IDHS 2017 shows that 77,4% women had already received four antenatal care (6). While this proportion already meets the strategic goal of Indonesia Health Ministry, still there is disparity in antenatal care coverage between geographical area, urban (82%) and rural (72%) (1,7). The disparity also proved by the IMR in rural district. was twice higher than in urban district (1,7). It is caused by some factors such as lack of health facility, limitation to access and poverty.

This study therefore aimed to examine the effect of antenatal care on infant mortality in rural district in Indonesia. The results should provide recommendation to stakeholders and policy makers about public health strategies to increase coverage of antenatal care services and decrease infant mortality.

METHOD

The data used secondary data of Indonesia Demographic Health Survey (IDHS) 2017 which was conducted in 34 province. The population of this study was all recently born infant in the last five years from women aged 15-49 years in rural areas. This quantitative study used crossed-sectional design with total sample of 7.551 recently born infant in the last five years from women aged 15-49 years in rural areas selected in the sample of IDHS through complex sample design. The sample gathered was through two stage stratification from census blocks using probability proportional to size (PPS). Details of sampling design, sampling frame, list of questionnaire are reported publicly in report of IDHS 2017.

The outcome variable for this study was infant mortality defined as the death of an infant before his or her first birthday. The main independent variable was antenatal care defined as number of antenatal care visits during pregnancy consisting of no visit, 1-3, >4. The covariates variable were socio-economic status, maternal education, maternal occupation, parity, mother's age at birth, pregnancy complication, delivery complication, tetanus toxoid (TT) immunization, and skilled birth attendance (SBA). Socio-economic status used household wealth index variable and divided into two category, low (poor and poorest) and high (middle, rich, richest). Maternal education used highest maternal education level then divided into two category, low (no education and primary) and high (secondary and higher). Health proffesional defined as skill birth attendance were general practitioner, obstetrician, nurse, midwife, and village midwife whereas not SBA defined as non health proffesional assistance (traditional birth attendant, relative/friend, other person or no one) in delivery process.

Frequency tabulations were performed to describe the maternal characteristics in this study. Logistic regression was used to determine the association with the outcome. Bivariate and multivariable analyses was conducted to assess the crude Odds Ratio (OR) and adjusted Odds Ratio. Backward elimination method was conducted to examined the potential confounder. Statistical analyses performed in this study used the STATA/MP version 14.1. Survey commands were employed for logistic regression models to adjust for the sampling weights and stratified sampling design.

RESULT

The results of maternal characteristics who gave birth to the last child in rural district in Indonesia is shown in Table 1. The proportion of > 4 antenatal care visits was 88,4% (95% CI= 87,1 – 89,6) The proportion of infant deaths occured was approximately 1,4%. The infants who received no antenatal visit (5,9%) and 1-3 antenatal checks (3,6%) were more likely to die in the first year of life rather than the infants who received > 4 antenatal checks. Based on socio-economic status, women with lower socio-economic status had higher odds of infant mortality compared to women with higher socio-economic status. From maternal occupation, the infants whose mothers were employed were more likely to die compared to the infants whose mothers were unemployed.

Based on parity, women with parity > 2 had higher odds of infant mortality than ≤ 2. From complications, whether it is pregnancy complications or delivery complications, women who had not complications were more

likely experienced infant deaths. From tetanus toxoid immunization, the infants whose mothers were not received tetanus injection at least once had higher odds of infant mortality. In skilled birth attendance, the infants whose delivery were not attended by SBA had higher odds of infant mortality.

In the final model analysis multivariable, four variables shown to be confounder variables were socioeconomic status, maternal occupation, parity, and tetanus immunization (Table 2).

Table 1. Analysis of Association of Antenatal Care and Maternal Characteristic with Infant Mortality

Variable & Category	Infant Mortality				Total	OR	95% CI	p value
	Yes		No					
	n	%	n	%				
Antenatal care								
4	63	1,0	6.615	99,0	6.678	Ref		
1-3	22	3,6	588	96,4	610	3,8	2,1 – 7,2	0,001*
No antenatal care	15	5,9	248	94,1	263	6,5	3,6 – 11,8	0,001*
Socioeconomic status								
High	27	0,9	3.139	99,1	3.166	Ref		
Low	71	1,7	4.312	98,3	4.385	1,9	1,1 – 3,2	0,013*
Maternal education								
High	15	1,7	881	98,3	896	Ref		
Low	85	1,3	6570	98,7	6.655	0,8	0,4 – 1,3	0,310
Maternal occupation								
Unemployed	28	0,7	4.201	99,3	4.229	Ref		
Employed	72	2,2	3.250	97,8	3.322	3,3	2,0 – 5,3	0,001*
Maternal age at birth								
20-34	66	1,3	5.372	98,7	5.438	Ref		
<20 or ≥ 35	34	1,6	2.079	98,	2.113	1,3	0,8 – 2,0	0,2411
Parity								
≤ 2	44	0,9	5.050	99,1	5.094	Ref		
> 2	56	2,3	2.401	97,7	2.457	2,7	1,7 – 4,3	0,001*
Pregnancy complications								
No	53	1,7	3.058	98,3	3.111	Ref		
Yes	47	1,0	4.393	99,0	4.440	0,6	0,4 – 0,9	0,046*
Delivery complications								
No	50	1,7	2.872	98,3	2.922	Ref		
Yes	50	1,0	4.579	99,0	4.629	0,6	0,4 – 0,9	0,035*
Tetanus Immunization								
Yes	48	0,9	5.371	99,1	5.420	Ref		
No	52	2,5	2.080	97,5	2.132	2,8	1,7 – 4,5	0,001*
Skilled birth attendance								
SBA	59	1,1	5.249	98,9	5.308	Ref	1,0 – 2,7	0,035*
Not SBA	41	1,8	2.202	98,2	2.243	1,7		

Notes:
n = Number of sample, OR= Odds Ratio, CI= Confidence Interval

Table 2 shows that women with 1-3 antenatal care visits were 3 times higher (95% CI= 1,6 – 5,3) for infant mortality compared to women with > 4 antenatal care visits after controlled by socio-economic status, maternal occupation, parity and tetanus immunization. While women with no antenatal care visits were also 3 times higher (95% CI= 1,6 – 5,5) for infant mortality compared to women with > 4 antenatal care visits after controlled by socio-economic status, maternal occupation, parity and tetanus immunization.

Table 2. Final Model of the Effect of Antenatal Care with Infant Mortality

Variable	β	SE	OR	95% CI	p value
Antenatal care					
≥ 4			Ref		
1-3	1,0	2,9	3,0	1,6 – 5,3	0,001*
No antenatal care	1,0	3,1	3,0	1,5 – 5,5	0,001*

Socio-economic status					
High			Ref		
Low	0,4	0,3	1,5	0,8 – 2,5	0,131
Maternal occupation					
Unemployed			Ref		
Employed	1,1	0,2	3,0	1,9 – 4,9	0,001*
Parity					
≤ 2			Ref		
> 2	0,6	0,2	1,9	1,2 – 3,0	0,006*
Tetanus Immunization					
Yes			Ref		
No	0,6	0,2	1,9	1,2 – 3,0	0,007*

Notes:
SE = Standard Error, OR= Odds Ratio, CI= Confidence Interval

Four confounder variables influence the effect of antenatal care with infant mortality. Infants whose mothers in low socio-economic status were 1,5 times higher (95% CI= 0,8 – 2,5) for infant mortality compared to infants whose mothers in high socio-economic status after controlled by maternal ocuppation, parity and tetanus immunization. Based on maternal occuppation, infants whose mothers employed were 3,0 times higher (95% CI= 1,9 – 4,9) for infant mortality compared to infants whose mothers unemployed after controlled by socio-economic status, parity and tetanus immunization. Infants whose mothers with parity of > 2 was 1,9 times higher (95%CI= 1,2 – 3,0) for infant mortality compared to infants whose mothers with parity of ≤ 2 after controlled by socio-economic status, maternal occupation and tetanus immunization. Infants whose mother were not receive tetanus immunization at least once were 1,9 times higher (95% CI= 1,2 – 3,0) for infant mortality compared to infants whose mother received tetanus immunization after controlled by socio-economic status, maternal occupation, and parit.

DISCUSSION

The result of this study give an overall idea about how proper antenatal care can reduce infant mortality in Indonesia. Findings of this study shows higher odds of infant mortality on infants whose mother had 1-3 antenatal care visits and had not receive antenatal care after controlled by confounder variables. This results similar with previous studies where women who did not receive antenatal care were 16 times higher for neonatal mortality and 2 times higher for post-neonatal mortality (8,9).

Antenatal care play a role in identifying risk, prevention and treatment for pregnancy complication and delivery complication. Health proffesional in antenatal care also gave health promotion to prepare women for parenting. Based on Permenkes No. 43 Tahun 2016, minimum service standard for antenatal care is four times with ten components known as 10T (10).

Four variables identified as confounder, those were maternal socio-economic status, maternal occupation, parity, and tetanus immunization. These findings similar to previous studies where infants whose mothers work in informal sector had 2,6 times higher odds for infant mortality compared to infants whose mothers unemployed (11). Work environment and high workload affect maternal health during pregnancy and breastfeeding. Mothers with high workloads such as farmers or those who have long work shifts are at risk of causing fatigue and lack of energy. In addition, working mothers also tend not to be able to care for their children in the long term, including providing exclusive breastfeeding, so that the child is taken care by others (12–14).

Based on parity, infants whose mothers had > 2 parities had higher odds of infant mortality. This results are in line with previous studies that states infant born to mothers with parity > 2 children have 10 times higher odds of infant mortality compared to infant born to mothers with parity ≤ 2 (15,16). High parity causes loss of elasticity of uterine lining tissue due to previous pregnancy and childbirth, thereby increasing the risk of infant mortality (15,16).

Based on tetanus immunization, infant whose mothers had not receive tetanus immunization had higher odds of infant mortality compared to infant whose mothers receive tetanus immunization. Tetanus neonatorum is one of the main causes of infant mortality where neurotoxin released by *Clostridium tetanii* enters through unsterilized method of childbirth, abortion, or umbilical cord care. Having adequate antenatal care visits ensure pregnant women to be given minimum doses of tetanus toxoid immunization to protect the baby from the infection. Previous studies also showed that tetanus immunization had protective effect to neonatal mortality (17,18).

This study used secondary data from IDHS 2017 which obtained through recall on interviews with women

of childbearing age. The limitations of study are there is a possibility where the mother did not provide the accurate data and cause information bias.

CONCLUSION

Infant mortality occurs higher among infants whose mother had 1-3 and no antenatal care visits compared to women with > 4 antenatal care visits after controlled by socio-economic status, maternal occupation, parity and tetanus immunization. There are no interaction found in this model. Based on the results, empowering community health workers and midwives is needed to target women with low social economic status. Studies and regulations for pregnant and lactating women at work are also needed. Further research involving quality of antenatal care and more covariates variables might be carried out.

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