

The Relationship between Antenatal Care with Childbirth Complication in Indonesian's Mothers (Data Analysis of The Indonesia Demographic and Health Survey 2012)

Hubungan Antara Perawatan Antenatal dengan Komplikasi Persalinan pada Wanita Indonesia (Analisis data Survei Demografi dan Kesehatan Indonesia 2012)

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ABSTRAK

Komplikasi persalinan sering membawa kepada kematian ibu. Perawatan antenatal yang baik dapat menurunkan kematian ibu dan bayi. Penelitian ini bertujuan untuk menganalisis hubungan antara perawatan antenatal dengan komplikasi persalinan di antara para ibu di Indonesia. Data Survei Demografi dan Kesehatan Indonesia tahun 2012, dari 33 Provinsi digunakan dalam penelitian ini. Sampel terdiri dari 11.803 wanita berusia 15-49 tahun yang melahirkan bayi dalam 5 tahun terakhir sebelum survei. Rancangan potong lintang digunakan dalam penelitian ini. Variabel yang diteliti terdiri dari variabel komplikasi persalinan (variabel terikat), variabel perawatan antenatal (variabel tak terikat utama dan variabel tak terikat lain yang berpotensi sebagai perancu meliputi umur ibu saat persalinan terakhir, pendidikan ibu, jumlah paritas, jarak kehamilan sebelumnya, penolong persalinan, tempat melahirkan, riwayat komplikasi kehamilan, riwayat komplikasi persalinan sebelumnya, kehamilan kembar. Regresi logistik digunakan untuk menganalisis data. Hasil penelitian menunjukkan bahwa prevalensi komplikasi persalinan adalah 49,2% dan prevalensi perawatan antenatal yang buruk (yang tidak menggunakan kriteria yang direkomendasikan oleh Kementerian Kesehatan Republik Indonesia) adalah 91,2%. Setelah mengontrol semua variabel yang diduga sebagai perancu, penelitian ini menunjukkan bahwa para ibu dengan perawatan antenatal yang buruk berpeluang lebih tinggi 1,3 kali untuk mempunyai risiko komplikasi persalinan dibanding para ibu dengan perawatan antenatal yang baik (POR 1,3, 95% CI: 1,1 - 1,4).

Kata kunci: Perawatan antenatal, komplikasi persalinan, Indonesia

ABSTRACT

Labor complications often lead to maternal death. A good antenatal care can reduce maternal and infant mortality. The purpose of this study was to analyze the relationship between antenatal care and labor complication among Indonesian's mothers. Data of the Indonesia Demographic and Health Survey (IDHS) 2012 from 33 Provinces were used in this study. Samples consisted of 11.803 women aged 15-49 years who delivered baby at sometimes during the last 5 years before survey. A cross-sectional design was used. Variables in the study consisted of dependent variable (labor complication), main independent variable (antenatal care) and potential confounder variables including maternal age in the last labor, mother's education, number of parity, preceding birth interval, birth attendance, place of delivery, a history of pregnancy complications, history of previous labor complication and multiple pregnancies. A logistic regression was used for analyzing data. Results of this study showed that the prevalence of labor complications was 49.2% and the prevalence of poor antenatal cares (do not use a standard criteria recommended by Indonesian Health Ministry) was 91.2%. After controlling for all potential confounder variables, this study showed that, mothers with a poor antenatal care had a 1.3 times higher risk of labor complications than mothers with a good antenatal care (POR 1.3, 95% CI: 1.1 - 1.4).

Keywords: Antenatal Care, Labor Complication, Indonesia.

Introduction

In 2015 the maternal mortality ratio (MMR) in developing countries was 239/100.000 live births, while in developed countries, it was only 12/100.000 live births. It was quite high when compared to the MMR of neighboring countries in the ASEAN region. In 2007, when the Indonesian MMR reached 228 per 100.000 live births, the MMR of Singapore was only 6 per 100.000 live births, Brunei was 33/100.000 live births, Filipina was 112/100.000 live births, Malaysia and also Vietnam was similar 160/100.000 live births.¹ Indonesia's

MMR was far from the target of the Millenium Development Goals (MDGs) 2015 (102/100.000 live births).

All over the world, almost 75% of all maternal death was due to bleedings, pre-eclampsia/eclampsia, and unsaved abortion, the rest of 25% was due to HIV and malaria infection during pregnancy². The cause of maternal death is quite complex, and it can be categorized into reproduction factors (such as age,

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parity, and unwanted pregnancy); obstetrical complications (abortion bleeding, ectopic pregnancy, the 3rd trimester bleeding, postpartum bleeding, puerperium infection, aseptic abortion); and health services and socio-cultural factors (poverty, ignorance, culture of particular food eating taboo in pregnant women)³. The direct cause of maternal death in Indonesia was dominated by bleeding (30.3%), hypertension/eclampsia (27.1%), and infections (7.3%)⁴. The indirect causes of maternal death, that was what we called with "three delayed" (delayed in recognizing danger signs of labor, delayed in making a decision, and suspended in getting the health services by health professional in the health facility) and "four overly" (too young, too frequent, too old to give birth, and also short the birth space)⁵. The mother and child health program is one of the priority programs of the Republic of Indonesia Ministry of Health, and the success of this program becomes one of the significant indicators of the national long-term development plan (NLDP) 2005–2025. The high of maternal mortality rates (MMRs) in Indonesia encourages the Indonesian government, placing efforts to decrease the MMR as a priority in the health development program. According to the National Planning Development Agency (2010), the ANC and delivery by skilled health personal coverage were high enough, but some risk factors during pregnancy should be of concern. Efforts to improve maternal health were prioritized by the expansion of quality health services, comprehensive obstetric services, developing family planning services, and disseminating information and education to the public.

The burden of obstetric complication during labor was still high. Several types of serious complications can be early identified and prevented when the need for optimal health care during pregnancy and labor can be fulfilled. Increasing the monitoring and administering prompt interventions in high-risk groups of pregnant women during pregnancy was the key to reducing the occurrence of labor complications that lead to maternal morbidity and mortality.⁶ The ANC is a critical factor in preventing complications and death during labor, and also for the fetus growth and health. The risk of maternal morbidity and mortality can be reduced through reproduction health services such as antenatal care (ANC) and postnatal care (PNC), family planning, and the saved abortion. The safe motherhood program dramatically emphasizes on the availability and the affordability in the provision of skilled care at delivery to deal with the arising of emergency condition.⁷

The MMR can be reduced if mothers behaved healthily during pregnancy namely; taking care the pregnancy through well nutrient intake, taking iron tablets, doing pregnancy exercises, caring of the birth canal, avoiding smoke and visiting ANC at least 4 times

during pregnancy, and getting the information about what to be performed with their pregnancy and their labor⁸. The Indonesia Ministry of Health had recommended that pregnant women at least had four pregnancy examination visits, based on the "1-1-2" schedule during pregnancy namely: at least one visit in the 1st trimester, at least 1 visit in the 2nd trimester, at least two visits in the 3rd trimester. About 70.4% of pregnant women had fulfilled this schedule; it was higher when compared to the coverage of pregnancy care in 2007, which showed only 66%.^{9,10} According to the National Family Planning Coordination Agency, during the antenatal care visit, mothers should get some measurements and examinations namely: measurements of body height and weight; observations of blood pressure, uterine fundus, blood, and urine; administrations of iron tablets, and the TT vaccine; consultations for preparing the labor; explanations of signs of pregnancy and labor complications (The National Population and Family Planning Coordinating Agency, 2013). Through reasonable antenatal care (ANC), childbirth complications can be prevented by the early introduction to good pregnancy care, which complies with the BKKBN's standard. Reasonable antenatal care (ANC) can be determined by the frequency of ANC visit during pregnancy (the 1st visit and the 4th visit), and the type of examination to be done.

The morbidity and mortality of pregnant and delivery women are still important issues in developing countries, including Indonesia. It was shown by the high maternal mortality rates, and even recently, it was more increased than before. A complex condition may play a role in this high maternal mortality rate. Complications that arise during labor and puerperium were the direct cause of maternal death. The occurrence of bleeding (hemorrhage) (30.3%), hypertension or eclampsia (27.1%), infection (7.3%), and prolong labor were still high and may lead to maternal death. It was accounted only 70.4% of pregnant women who thoroughly followed the schedule of antenatal care (ANC 1-1-2), and this rate was far from the target (95%) of the maternal health program of Indonesia Ministry of Health. The low coverage of the ANC program might influence labor complications. This study was aimed at analyzing the association between the ANC and the labor complication in Indonesia.⁹

Method

Data were obtained from the Indonesia Demography and Health Survey (IDHS) 2012. IHDS was conducted in 33 provinces of Indonesia by the Indonesia Statistic Central Biro (ISCB/BPS) and in collaboration with the Indonesia National Population and Family Planning Agency (INPFPA/BKKBN), the Republic of Indonesia Ministry of Health and the United States Agency for International Development (USAID).

The major objectives of the IHDS 2012 were to provide detail information about population, family planning, and health, for policy makers and managers of the population and health program. A cross-sectional design was used in this study. The study population consisted of all women of childbearing age, age between 15-49 years old, lived in 33 provinces and had given birth in the last five years before the survey, and a member of the selected household of the IDHS 2012. The inclusion criteria: women age between 15-49 years old, who have given birth both live and stillborn. The exclusion criteria: women who did not have a pregnancy check-up on health worker, and women with missing data. Sample of this study consisted of 11.803 women of childbearing age who had given the last birth in 5 years period before the survey, age between 15-49 years who lived in one of the 33 provinces of Indonesia and had been selected as a sample in IDHS 2012. Variables included in this study were; labor complication (as an outcome variable), ANC (as a mean variable), and mother's age at the last birth, mother's education, parity, birth spacing, birth attendant, place of birth, history of pregnancy complication, history of birth complication, multiple pregnancies (as potential confounder variables). Data were analyzed by logistic regression.

Women with positive labor complication was defined as women who had one or more of the following events during or after labor, namely: regularly intense abdominal cramp more than one day, excessive bleeding (more than 3 napkins), high body temperature and/or smell vaginal discharge, seizures and unconscious, amniotic fluid discharge more than 6 hours before the baby is born, the presence of other difficulties and complications. Women with a standard ANC was defined as women who had ANC with an entirely visit pattern "1-1-2" of schedule, women who had been wholly measured of their body height, body weight, uterine fundus, blood pressure, women who had been received ultimately 90 iron tablets during pregnancy, consultation, the TT vaccines, blood and urine examination. Variables used as the potential confounder in this study were defined as follow (Table1). Multiple logistic regression was used to test the association between ANC and labor complication. The statistic software of SPSS 16 was used in this study.

Result

Descriptive results

Table 1 shows that from a total sample of 11.803 mothers who gave childbirth during 2007-2012 there were 5.803 who had labor complications (49.2%), and the rest or 6.000 mothers had no labor complication (50,8%).

Table 1. The distribution of labor complication of mothers in Indonesia (IHDS data 2012)

Labor Complication	Frequency	Percentage (%)
Yes	5803	49.2
No	6000	50.8
Total	11803	100.00

Table 1 presents among 5.803 mothers who had labor complications, the most frequent complication was prolonged labor (76%), followed by: amniotic fluid discharge more than 6 hours before labor (31,7%), high body temperature and smell vaginal discharge (16,5%), bleeding (16,3%) and the most rarely complication was seizure and / or unconscious (3.5%).

Table 2. The distribution of the type of labor complication of mothers in Indonesia

Type of Labor Complication	Frequency	Percentage (%)
Prolong labor	4405	76.0
Bleeding	947	16.3
High body temperature and smell vaginal discharge	957	16.5
Convulsion and unconscious	205	3.5
Amniotic fluid discharge more than 6 hours before labor	1841	31.7
Other difficulties or complications	583	10.0

* Note: mothers may had one or more symptoms

Table 3. The distribution of the type of ANC services of mothers in Indonesia (IHDS data 2012)

Indicators	Frequency	Percentage (%)
ANC visits		
1st Trimester	10,134	85.9
2nd Trimester	11,534	97.7
3rd Trimester	11,025	93.4
ANC visits based on standard		
< 4 times of visit	2443	20.7
= 4 times (1-1-2) of visit	9360	79.3
Types of ANC received by mothers		
Measurement of body weight	11,422	96.8
Measurement of body height	5,798	49.1
Measurement of blood pressure	11,515	97.6
Blood test	5,095	43.2
Urine test	5,891	49.9
Uterine fundus examination	11,646	98.7
Administration of iron tablets	9,484	80.3
Administration of TT	5,824	49.3
Consultation	10,183	86.3
Receiving ANC standard		
Not according to standard	10717	90.8
According to standard	1086	9.2

Tabel 4. Characteristics of Respondent Based on Other

Variables		
Variable Name	Frequency	Percentage (%)
Mother's age	Mean: 28.20 years; [95% CI (28.09-28.31)] Median: 28 years Min-Max: 13-49 years	
Mother's education		
Not going to school	94	0.8
Elementary school	3,469	29.4
Junior high school	3,021	25.6
High school	3,668	31.1
Diploma	600	5.1
Bachelor	951	8.1
Parity	Mean: 2.13; [95% CI (2.1 - 2.15)] Median: 2 Min-Max: 1-14	
Birth spacing (in month)	Mean: 70.97 months; [95% CI (70.02-71.91)] Median: 64 months Min-Max: 17-319 months	
Birth attendant		
General practice	118	1.0
Obstetrician	2,638	22.4
Nurse	1,670	14.2
Mid wife	6,491	55.0
Village mid-wife	2,386	20.2
Witch doctor	2,021	17.1
Friend or family	1,334	11.3
Others	95	0.8
Birth place		
Mother's house	3,102	26.3
House of others	303	2.6
Government Hospital	1,463	12.4
Primary health care	637	5.4
Village health station	30	0.3
Village polyclinic/ Other government clinic	154	1.3
Private Hospital	6	0.05
Maternity hospital		
Private clinic	943	8.0
General practitioner	801	6.8
Obstetrician	312	2.6
Midwife	12	0.1
Nurse	79	0.7
Village midwife	3,028	25.7
Others	15	0.1
	884	7.5
	34	0.3
History of previous labor complications		
Exist	607	5.1
Does not exist	11196	94.9
Types of previous labor complications		
Regularly strong abdominal cramp more than one day and night	471	77.6
Excessive bleeding (more than 3 napkins)	87	14.3
High body temperature and smell vaginal discharge	85	14.0
Convulsion and unconscious	18	3.0
Amniotic fluid discharge more than 6 hours before labor	203	33.4
Other difficulties and complications	47	7.7
n= 607 remark: respondent can experience more than one type complication		
Multiple pregnancies		
Yes	104	0.9
No	11699	99.1

Table 3 shows, from 11,803 mothers, 85.9% visited the first ANC in the 1st trimester. The highest visit (97.7%) was in the 2nd trimester, and in the 3rd trimester the ANC visit was 93.4%. Mothers who fulfilled the standard ANC visit schedule (the "1-1-2" visit) were only 79.3%. Based on the type of ANC services, only 9.2 % of mothers had received a standard ANC services. The uterine fundus examination was the highest (98.7%), followed by blood pressure (97.6%), and body weight (96.8%) measurement. The lowest ANC service that was received by mothers was blood test (43.2%). The administration of iron tablets, TT vaccines, urine test, and consultation was 80.3%, 49.3% and 86.3% respectively.

Table 4 shows the distribution of the characteristic of respondent based on covariate variables. Average respondent's age at delivery was 28 years, the youngest and the oldest was 13 years and 49 years respectively. Most respondent's education was high school. On average respondents had given birth to 2 children. Number of children ever born was at least 1 child and the most was 14 children. On average respondents had birth spacing between the last and the previous birth was 71 months. The shortest and the longest birth spacing were 7 months and 319 months. Labor was mostly helped by midwife (75.2%), and followed by obstetrician (22.4%). Labor was mostly taken place in the respondent's house (26.3%), and in the midwife's practice place (25.7%). Respondent who had a history of labor complication was (5.1%), while who have not (94.9%), The distribution of the type of the history of labor complications was also presented in this table. Respondents with multiple pregnancy was 0.9%

Analytic results

Table 5 presents the distribution of labor complications according to each independent variable and the association between each independent variable and labor complication in crude POR and adjusted POR. Crude POR represent of the association between each independent variable and outcome variable before adjusted. After conducting interaction test, we found that there was no interaction between ANC and each potential confounder variables in our statistical models. Adjusted POR represent the association between the mean exposure variable (ANC) and the outcome variable (labor complication) in this study after controlling for potential confounder variables (Mother's age, Parity, Birth assistant, Birth place, History of pregnancy complications, and History of previous labor complications). In this study there was statistically significant association between ANC and labor complications. Mothers who had no standard ANC were more likely to have labor complications than mothers who had standard ANC (POR 1.3; 95% CI 1.14-1.49).

Table5. The distribution of labor complications according to each independent variable and the association between each independent variable and labor complication in crude POR and adjusted OR (IHDS data 2012)

Variabel Name	Labor Complication		Crude POR	95% CI	P Value	Adjusted POR	95% CI	P Value
	Yes	No						
ANC Standard					0.002		1.14-1.49	<0.0001
Not Standard	5372 (92.6%)	5461 (91%)	1.23	1.08-1.41		1.30		
Standard	431(7.4%)	539 (9%)	1			1		
Mother's Age				0.81-0.96	0.005		0.76-0.94	0.001
At Risk (<20 and >35 years)	1141 (19.7%)	1305 (21.8%)	0,88			0.86		
Not at Risk (20-35 years)	4662 (80.3%)	4695 (78.2%)	1			1		
Mother's education				0,91-1,06	0.65	x	x	x
Low	3225 (55.6%)	3359 (56%)	0.98					
High	2578 (44.4%)	2641 (44%)	1					
Parity				1.28-1.48	0.001		1.42-1.66	<0.0001
At Risk (1/>4)	2808 (48.4%)	2429 (40.5%)	1.38			1.54		
Not at Risk (2-4)	2995 (51.6%)	3571 (59.5%)	1			1		
Birth space				0.78-1.09	0.356	x	x	x
<24 months	264 (8%)	339 (8.6%)	0.92					
=24 months	3019 (92%)	3583 (91.4%)	1					
Birth attendant				0.81-0.96	0.003		1.02-1.24	0.014
Non health professional	1435 (24.7%)	1626 (27.1%)	0.88			1.13		
Health professional	4368 (75.3%)	4374 (72.9%)	1			1		
Birth place				0.58-0.68			0.58-0.70	<0.0001
Non health facility	1400 (24.1%)	2018 (33.6%)	0.63		0.001	0.63		
Health facility	4403 (75.9%)	3981 (66.4%)	1			1		
History of pregnancy complications				2.15-2.70	0.001		2.11-2.66	<0.0001
Yes	1047 (18%)	502 (8.4%)	2.41			2.37		
No	4756 (82%)	5398 (91.6%)	1			1		
History of previous labor complications				2.63-3.81	0.001		2.94-4.31	<0,0001
Yes	451 (7.8%)	156 (2.6%)	3.16			3.57		
No	5352 (92.2%)	5844 (97.4%)	1			1		
Multiple pregnancies						x	x	x
Yes	49 (0.9%)	55 (0.9%)	0.93	0.63-1,37	0.724			
No	5754 (99.1%)	5945 (99.1%)	1					

Note: * not included in the last model

Discussion

Labor complications

It is already known that one of the direct causes of maternal death is complication during and/or after pregnancy and labor. It is estimated that 15-20% of pregnancy and labor may have complications. However most of these complications can be prevented or treated. Other complications may be happened before pregnancy, and may become worse during pregnancy, especially when they are not well managed.

Childbirth complications in this study were conditions that life-threatening mother due to disorders during the last childbirth that begin from the 1st stage until the 4th stage of labor which corresponds to the respondent's answer of IHDS questionnaire who experienced one or more of the following events: regularly strong abdominal cramp more than a night and day, high body temperature and/or smell vaginal discharge, seizures and unconscious conditions,

excessive bleeding (used more than 3 napkins), amniotic fluid discharge 6 hours before childbirth, and other difficulties /complications of childbirth. This study showed that 49.2% (5,803) of mothers experienced one or more of these complications. The types of complication were distributed as follows: prolong labor (76.0%), amniotic rupture more than 6 hours before child birth (31.7%), excessive (16.3%), fever/infection (16.5%), seizures and/or unconscious (3.5%), and other birth complication (10.0%). The incidence of the childbirth complication in this study was higher than the study results of Armagustini (2010) based on IHDS data 2007, which found that the childbirth complications was 43.7%, and the distribution of complications was as follows: prolonged labor (36.7%), excessive bleeding (8.9%), fever/infection (6.8%), convulsion and/or unconscious (2.0%) and other birth complication (4%).¹⁰ Based on the Indonesia Basic Health Research data 2010, the incidence of child birth complication was 47.8%.⁵ It suggested that since 2007 until 2012, there was an increased of the incidence of childbirth complications among Indonesian mothers.

This study showed that the most frequent of childbirth complications was prolonged labor (76.0%). Prolonged labor can be determined by labor stages and whether the cervix has thinned and opened appropriately during labor. If the baby is not born after approximately 20 hours of regular contractions, it is likely to be a prolonged labor. Some health experts may say it occurs after 18 to 24 hours. If multiple pregnancies prolonged labor is a labor that lasts more than 16 hours. Prolonged labor may result in high maternal and infant morbidity and mortality, and is still commonly found in developing countries. Impacts of prolonged labor are infection during labor, pathological retraction ring, fistulas, pelvic floor muscles injury, caput succedaneum in infants, fetal head molasses. Prolonged labor may happen if: the baby is very big and cannot move through the birth canal, the baby is in an abnormal position, the birth canal is too small for the baby to move through, and uterine contractions are very weak. Causes of this prolonged labor were related to 4P (Power, Passageway, Passenger and Psychological).¹¹ In order, to get ahead and take place on time of labor, the energy or power, including uterine contractions and attempt to push of mother in the 2nd stage of labor must be well coordinated and adequately strong to push out the baby from the birth canal. The fetus (passenger) must be appropriate in size and shape and able to perform necessary movements to get through many different dimensions of birth canal. The birth canal (passageway) must be great enough in size and has a normal configuration that may not cause unexpected obstacles on decreasing, rotating and expulsing the fetus. Maternal psychological conditions, such as anxiety, lack of preparation for child birth, and feel of fear, may interact with other factors, may prolong the labor.

The high proportion of prolonged labors (76.0%) in this study might be influenced by the presence of information biases. This bias might come from mothers' answer of the question of "do you have an experience of getting regularly strong abdominal cramp more than a night and day in the last childbirth? Mothers might forget or even not know whether they really had an experience what had been asked, or they actually just had an experience of abdominal cramps such as in normal labors as usual. The medical record of mothers' labor progression was needed to confirm the answer of mothers. But it will be very difficult and impossible to do in such a big survey.

This study showed that the measurement of body height in ANC visits was only 49.1%. The measurement of body height is important and it is one of indicators of standard ANC that must be perform to detect the possibility of the presence of narrow pelvic of mothers with body height of 145 cm. The presence of narrow pelvic was the risk for prolonged labor, mal-position and mal-presentation of the fetus.

Abdominal examination with the measurement of the high of uterine fundus in the late pregnancy and Leopold method can provide the possibility of the presence of big fetus, multiple pregnancy, mal-presentation and mal-position of fetus.⁵ A Partograph should be performed during labor to monitor the condition and progression of labor. In a prolonged labor, this instrument is very useful in making decision whether the birth attendant still waits for the normal birth process or begin to consider a specific action for vaginal delivery, or performs a C-section.¹² The competency of using partograph instruments in health provider especially mid-wife for monitoring the progression of labor is required to reduce prolonged labors.

This study showed that the occurrence of excessive bleeding was 16.3% of all labor complications. Excessive bleedings may due to an a-tonic uterine (weak tonus of uterine muscles), episiotomy, vaginal and cervical laceration, uterine rupture, retained conception product, placenta accreta, and/or coagulation defect. The occurrence of post-partum hemorrhage is 4% of all childbirth. In most of studies, bleeding is the most common cause of childbirth mortality. In all over the world, post-partum hemorrhage responsible for 35% of maternal death.¹³

Post-partum hemorrhage (PPH) has many potential causes, but the most common, by a wide-margin, is a-tonic uterine, ie, failure of the uterus to contract and retract following delivery of the baby. PPH in a previous pregnancy is a major risk factor and every effort should be made to determine its severity and cause. In a recent randomized trial in the United States, birth weight, labor induction and augmentation, chorioamnionitis, magnesium sulfate use, and previous PPH were all positively associated with increased risk of PPH.¹⁴

Significant risk factors of PPH including retained placenta, failure to progress during the second stage of labor placenta accreta, lacerations, instrumental delivery, large-for-gestational-age (LGA) newborn hypertensive disorders, induction of labor, and augmentation of labor with oxytocin¹⁵. The risk of atonic uterine hemorrhage rapidly increased with increasing BMI; in women with a BMI over 40, the risk was 5.2% with normal delivery and 13.6% with instrumental delivery.¹⁶ According to the Indonesia Health Ministry (2008), data from post-partum hemorrhage cases without previously known risk factor revealed that it was impossible to predict which mother who will develop hemorrhage after childbirth.¹⁷ A mother can die due to postpartum hemorrhage in less than 1 hour. The atonic uterine becomes a cause of more than 90% of post-partum hemorrhage, within 24 hours after labor.¹⁸

In addition to prolonged labor and hemorrhage, infection is one of leading causes of maternal death. In developing countries at least one of ten of maternal deaths is due to infection. Postpartum lesions/wounds are still the common cause of infection, and the rest is due to, mastitis, thrombophlebitis, and pelvic inflammation.¹⁹ This study showed that the proportion infection was 14.0 % of all complications. Postpartum fever is defined as a temperature greater than 38.0°C on any 2 of the first 10 days following delivery exclusive of the first 24 hours²⁰. The presence of postpartum fever is generally accepted among clinicians as a sign of infection that must be determined and well managed. Mostly postpartum infection cases were diagnosed after patient's discharge from the hospital.²¹

It should be aware that the risk of infection may come from unsterile environment exposures²². Infection during labor and puerperium may be due to amniotic rupture before labor begins. Germs from the outside entered through the canal birth may result in infections during labor. Vaginal examination may also increase the risk of infection. Universal precaution for infection control in normal or abnormal childbirth is often overlooked. A strict supervision in maternity room and instrument disinfection, and the use of hand gloves, must be done. It becomes more important with the presence of HIV epidemic.¹²

In addition to hemorrhage and infection, preeclampsia and eclampsia are also the cause of maternal death. The incidence of preeclampsia in USA, Canada, and West Europe was ranged between 2-5%. In developing countries, the incidence of preeclampsia was higher in some part of Africa ranged between 4% - 18%. In Latin America preeclampsia was as number one cause of maternal death. In developing countries, women have 7 times higher at risk for preeclampsia than women in developed countries. From preeclampsia cases, 15-20% will cause maternal death²³. Preeclampsia should be early detected and promptly managed before the onset of seizures (eclampsia) that may life-threatening mother. Prevention of seizures during labor is by regular blood pressure control during pregnancy and after baby is born. Magnesium sulfate is drug of choice for prevention and treatment of seizures due to eclampsia. This essential and cheap drug must be available in every maternity unit and delivery-set.¹²

As it is often happened, childbirth complications cannot be predicted and prevented during pregnancy, therefore, appropriate diagnosis and intervention during labor are very important. Early detection of labor complications and interventions including referral to the higher level of health services may reduce maternal and perinatal morbidity and mortality in some developing countries.⁶

This first prevention is also for other complication, including hemorrhage, infection, and prolonged labor. In the un-prevented cases, the objective of interventions is for preventing cases become more severe or life-threatening. Delays in dealing with the complication of labor have been proven to be one of main obstacles for reducing morbidity and mortality at time of labor.² The information about how to be health during pregnancy and get the services from trained health worker, immediately recognize the warning signs of pregnancy and labor complications, and also what women have to do when the sings of pregnancy and labor complications arise significantly, will increase women capacity, and the health of their spouse and family, to take appropriate measures to guarantee save labor and to seek skilled health worker in an emergency condition.²⁴

Pregnancy care

In the pregnancy cycle, the focus of services is directed to pregnant women health services and pregnancy care which is practiced from the beginning of pregnancy. Through a well pregnancy care, indeed the development of pregnant women health, every time can be monitored and early interventions may be performed in order to minimize various risk factors of labor complications and maternal death. Studies in developed countries have showed the positive impact in pregnancy and childbirth when women can control their pregnancy and labor processes, and make a birth plan in the desired health facility.²⁴

This study used the 8 standard cares of ANC (measurements of body weight, body height, examinations of blood pressure, abdomen, urine and blood, administrations of iron tablets, TT immunization and consultations) as a standard pregnancy care services received by pregnant women. While the standard pregnancy care services, recommended by Indonesia government is the 10 standard of cares (all of the 8 standard of cares plus the measurements of nutritional status and case management).

Results of this study showed that pregnancy care that accordance to the standard care services was only 8.2%, while the rest of 91.8% was not. A good pregnancy care was determined when pregnant women received all the 8 standard of cares plus at least 4 ANC visits with 1-1-2 pattern. The monitoring of ANC services is done in the 1st visit as representation of the accessibility of pregnant women to health facility and the 4th visit as representation of pregnant women health care quality. Pregnant women with the 4th visit status at least have received health services accordance to the standard of cares during minimally 4 visits (1-1-2). Thus the risk factors related to the complications can be prevented including referral services to the more complete health facility.¹⁷

This study showed that there was a discrepancy between the 1st visit and the 4th visit coverage, where the 1st visit coverage was (85.9%) and the 4th visit coverage was (79.3%). When the drop-out rates of the 1st visit and the 4th visit is more than 10%, it means that there is a problem in the pregnancy care services, and it needs further investigation and interventions. Although the drop-out rates in this study was not more 10%, it still to be considered the importance of the 4th visit as a quality indicator of pregnant women health services. Data from the Indonesia Health Profile 2014 suggested that there was an increased of the 1st and 4th visit coverage (94.9% and 86.7% respectively)¹. While the Indonesia Basic Health Research 2013 showed that the 1st and 4th visit coverage was 85.6% and 70.4% respectively.⁵

The high rate of drop-out of ANC visits may due to various factors. Factors associated with the incomplete of ANC visit including the mileage to health facility from home, traveling time to health facility, the availability of transportation, knowledge and attitude toward the examination of pregnancy.²⁵ A study in West Sulawesi showed that the low of the 4th visits was affected by cost factor. Pregnant women who said that the cost of A NC visits was cheap, was more likely to use regularly health care services than pregnant woman who said that the cost was expensive.²⁶

According to the description of Donabedian there was an association between the increased access to the health facility and the decreased of mileage, and traveling time. In other words, preventive health services were more related to geographical access rather than the use of curative health services.²⁷ Access to health facility was not included in this study due to the limitation of secondary data. Furthermore the high drop-out rate of ANC visits may due to some pregnant women moved to other place and checked their pregnancy to another health worker with various reason so that the 4th visits cannot be monitored.

This study showed that the ANC coverage based on types of care services such as measurements of body weight and blood pressure, examination of abdomen, administration of iron tablets and counseling was more than 80%. The abdominal examination, blood pressure and body weight measurements were the most frequent of the care services received by pregnant women. All of these three examinations should ideally be received by pregnant women in every ANC visits. There were low coverage of pregnancy care services including blood and urine tests, body weight measurement, and TT immunization. The mostly rare examination was blood test (43.2%), whereas blood test was important to find out whether a pregnant woman was anemic or not during her pregnancy. Pregnant women with anemia may result in hemorrhage at labor and affect the growth and

development process of fetus in the womb. Body height measurement was also rarely performed (49.1%), body height less than 145 cm was a risk factor for the presence of head-pelvic disproportion which cause prolonged labor.

Both of the coverage of TT immunization and urine test were also low (49.3%), and (49.9%) respectively. Tetanus neonatorum is one of the leading causes of neonatal death. Tetanus neonatorum can be prevented by appropriately administration of TT vaccine to pregnant women, and hygienic delivery services²⁸. The urine test is commonly performed in pregnant women to detect the presence of protein in urine, to establish the diagnosis of preeclampsia/eclampsia. The low coverage of urine and blood test could be due the unavailability of laboratory equipments and trained health workers. WHO declared that Indonesia has successfully eliminated the maternal and neonatal tetanus by increasing the TT immunization coverage, particularly in pregnant women.²⁸

The association between pregnancy care and childbirth complication

Results of this study showed that there was an association between ANC and childbirth complications. Pregnant women who received nonstandard ANC were 1.3 times more likely to have childbirth complication than pregnant women who received standard ANC (OR 1.3; 95% CI 1.14-1.49). This result was in accordance with the study of Misar et al., in North Gorontalo Indonesia (2012), which found that pregnant women who received poor health care services were 3.2 times more likely to have child birth complications than pregnant women who received good health care services (OR 3.2; 95% CI: 1.41-7.18), pregnant women who had ANC visit less than 4 times during pregnancy were more likely to have child birth complications (OR 2.6; 95% CI: 1.18 – 5.70) than pregnant women who had ANC visit e" 4 times during pregnancy. Wijono et al., (2008) also found that, pregnant women who never had pregnancy care were 1.82 times more likely to have child birth complication than pregnant women who had pregnancy care (OR 1.82; 95% CI, 1.31-2.5)2. According to Kusumawati (2006) pregnant women who had ANC visits < 4 times during pregnancy were 7.3 times more likely to have medical intervention during labor than pregnant women who had ANC visits e" 4 times during pregnancy (OR 7.3; 95% CI: 2.07- 25.99).

Some studies outside Indonesia: Women receiving late timings or low frequency of pregnancy care in the first trimester are at a higher degree of adverse maternal outcomes, studies by Coria-Soto et al.²⁹ found that an inadequate number of visits are associated with 63% higher risk of intra uterine growth retardation; Study by Orvos et al.³⁰ In Hungary indicated

that women who never attended prenatal care were more in preterm labors (OR 3.1, 95% CI 1.4-6.8), lower birth weight ($P < 0.001$) and more given up for adoption (OR 21.4, 95% CI 2.63-173.9); Abera Haftu et al.³¹ conducted a study to assess pregnant women adherence level to antenatal care visit and its effect on perinatal outcome among mothers in Tigray Public Health institutions. The study showed that the overall adherence level of the women towards to antenatal care visit was 49.9% and incidence of PPH, still birth, early neonatal death, late neonatal death and low birth weight complication was 4.3%, 2.3%, 2.7%, 1.9% and 7.5% respectively. PPH, preterm labor, early neonatal death and LBW complication was reduced by 81.2%, 52%, 61% and 46% respectively among women's with complete adherence to ANC visit.

Pregnancy care typically consists of several interventions including: 1) Health promotion: health workers have an opportunity to educate women about health, pregnancy and childbirth, to let them know the danger signs of pregnancy and labor, the benefit of good nutrient and exclusive breastfeeding, the harm of alcohol, tobacco and drugs, and other relevance issues; 2) Diseases prevention: TT immunization, prophylaxis against malaria, and protection against iron deficiency anemia, and some conditions that can be managed during ANC visits; 3) Early detection and/or treatment for diseases and complications: pregnant women can be screened for syphilis, HIV, and other sexual transmitted diseases. Pregnancy complication such as preeclampsia, eclampsia, vaginal infection and vaginal bleeding can be immediately treated; 4) Preparation of labor: counseling or consultation to choose the safe birth place in health facility and birth attendant. ANC visits may also include consultation for hospital transportation, costs for treatment and delivery provision; 5) Preparation in case of complication: pregnant women are driven to have emergency plans in case of complication, this plan should include money for potential medical care or extra surgery.³²

Pregnancy care could not overcome all the cause of maternal death, but it is positively related to the professional birth attendant, therefore may reduce labor complication³⁰. The utilization of pregnancy care services varies among countries. In developing countries the utilization of pregnancy care services is low. The utilization of pregnancy care services is also varied based on mother's age, mother's education, parity, mother's job, socio-economical status of family, residence, and access to health services.³¹

In addition to variable of pregnancy care, this study also showed that variables of mother's age, parity, birth attendant, birth place, history of pregnancy complication in the previous pregnancy, history of birth complication in the previous labor, were associated with child birth complication

Limitations of the study.

A cross-sectional study design was used in this study, although it could not explain a causal relationship between the exposure variable (ANC) and an outcome variable (labor complication), it can measure the prevalence of ANC and labor complications. This study could not completely rule out the event of bias. The occurrence of the selection bias might be due to lack of comparability of exposure variables distribution between groups being compared. Confounding bias is a bias in estimating the effect of an exposure on the outcome variable, due to lack of comparability between the characteristic in exposed group and unexposed group. Bias due to confounding in this study had been controlled in analytical phase of study by multivariate analysis. A number of questionnaires had been used as tools for measuring variables being studied. Interviewers collected data by using structured questionnaires. The possibility of recall biases arise when respondent should answer the question of events in the past (the experience of mother that related to pregnancy, delivery, and ANC events at a sometime during 5 years before survey). Although all interviewers had been trained, interviewer bias might still be happened due to the differences in the degree of perception and understanding of each questionnaire among interviewers, so that it might result in biases in the interpretation of questionnaire being asked. Samples of this study were drawn from a total samples of 45.607 women aged 15-49 years who were randomly sampled and interviewed by the 2012 IHDS team, 11.803 of these women fulfilled the inclusion and exclusion criteria of this study, so that the response rate of this study was only 25.88 %. The generalization of this study into the general population of women aged 15-49 years in Indonesia may not be fulfilled.

Conclusion

Labor complications were more common in pregnant women with nonstandard ANC.

Referensi

1. The Republic of Indonesia Ministry of Health. 2015. The Indonesia Health Profile 2014. Jakarta: Kemenkes RI. 2014
2. WHO. 2003. Pregnancy, Childbirth, Postpartum and Newborn Care: A Guide For Essential Practice. Geneva, World Health Organization, 2003. Available at <http://whqlibdoc.who.int/publications/>. Accessed 10 October 2015
3. Prawirohardjo, S. *Ilmu Kebidanan*. Jakarta: PT. Bina Pustaka Sarwono Prawirohardjo. 2008.
4. The Republic of Indonesia Ministry of Health 2014. The Situation of Mother Health. Jakarta: Pusat Data dan Informasi Kemenkes RI. 2014
5. The Republic of Indonesia Ministry of Health. 2010. The Indonesia Basic Health Research Reports. Jakarta: Badan Penelitian dan Pengembangan Kesehatan. 2010

6. Hoque M. Incidence of Obstetric and Foetal Complications during Labor and Delivery at a Community Health Centre, Midwives Obstetric Unit of Durban, South Africa. *ISRN Obstet Gynecol.* 2011;2011:259308.
7. Habte F, Demissie M. Magnitude and factors associated with institutional delivery service utilization among childbearing mothers in Cheha district, Gurage zone, SNNPR, Ethiopia: a community based cross sectional study. *BMC Pregnancy Childbirth.* 2015;15:299. Published 2015 Nov 17. doi:10.1186/s12884-015-0716-8
8. Gulardi, H. 2006. Maternity Nursing Teaching Book. Jakarta. EGCIBI, 2005
9. The Indonesia National Population and Family Planning Agency 2013. The Indonesia Demography and Health Survey (SDKI) 2012. Jakarta
10. Armagustini, Yetti. 2010. The determinant of the occurrence of labor complication in Indonesia (Analysis of The Indonesia Demography and Health Survey Data 2007). Depok: FKMUI. 2010
11. Sinclair, Constance. 2010. A Midwife's Handbook. Jakarta: EGC. 2010
12. Fauveau, V, de Bernis, L. 2006. Good Obstetrics Revisited: Too Many Evidence Based practices and Devices Are Not Used. *International Journal of Gynecology and Obstetrics* 94, p.179-184.
13. Countdown to 2015: Maternal, Newborn and Child Survival [Internet]. WHO and UNICEF, 2012. Available at: <http://www.countdown2015mnch.org/documents/2012Report/2012-Complete.pdf>. Last accessed 5 September 2017.
14. Jackson KW Jr, Allbert JR, Schemmer GK, Elliot M, Humphrey A, Taylor J. A randomized controlled trial comparing oxytocin administration before and after placental delivery in the prevention of postpartum hemorrhage. *Am J Obstet Gynecol.* 2001 Oct. 185(4):873-7.
15. Sheiner E, Sarid L, Levy A, Seidman DS, Hallak M. Obstetric risk factors and outcome of pregnancies complicated with early postpartum hemorrhage: a population-based study. *J Matern Fetal Neonatal Med.* 2005 Sep. 18(3):149-54.
16. Blomberg M. Maternal obesity and risk of postpartum hemorrhage. *Obstet Gynecol.* 2011 Sep. 118(3):561-8.
17. Indonesia Health Ministry 2008. The health map of Indonesia 2007. Jakarta: Kemenkes RI.2008
18. JNPK-KR. 2007. Normal child birth care. Jakarta: Depkes RI. 2008
19. Varney, H. 2006. Text book of midwifery care. Jakarta: EGC.2006
20. Adair FL. The American Committee of Maternal Welfare, Inc: The Chairman's Address. *Am J Obstet Gynecol.* 1935. 30:868.
21. Yokoe DS, Christiansen CL, Johnson R, Sandu KE, et al. Epidemiology of and Surveillance for Postpartum Infectious. *Emerg Infect Dis.* Sep-Oct 2001. 7(5):837-41.
22. Prasetyawati, A.E. 2012. Maternal and child health in the Millenium Development Goals (MDGs). Yogyakarta: Nuha Medika. 2012.
23. Preeclampsia Foundation. 2013. Preeclampsia and Maternal Mortality: a Global Burden. Available at <http://www.preeclampsia.org>. Accessed 10 October 2015
24. WHO. 2006. Birth and Emergency Preparedness in Antenatal Care Integrated Management of Pregnancy And Childbirth (IMPAC) Standards For Maternal and Neonatal Care. Geneva: the Department of Making Pregnancy Safer WHO. 2006
25. Adri. 2008. Factors that influenced the coverage of pregnancy care program (the 1st and 4th visits) in Puskesmas Runding, Subussalam City, Nangro Aceh Darussalam Indonesia. Medan: USU. 2008
26. Surniati. 2013. The analysis of factors that associated with the regularity of the utilization of ante natal care program (the 1st and 4th visits) in Puskesmas Mamasa, Makasar: FK Unhas. 2013
27. Notoatmodjo, S. 2005. The theory and application of health promotion Jakarta: PT Rineka Cipta. 2005
28. UNICEF. 2016. WHO declaration: The elimination of tetanus in mother and infant in Indonesia. Available at <http://www.unicef.org>. 5 October 2015
29. Coria-Soto IL, Bobadilla JL, Notzon F (1996) The effectiveness of antenatal care in preventing intrauterine growth retardation and low birth weight due to preterm delivery. *Int J Qual Health Care* 8: 13-20.
30. Orvos H, Hoffmann I, Frank I, Katona M, Pál A, Kovács L. The perinatal outcome of pregnancy without prenatal care. A retrospective study in Szeged, Hungary *Eur J Obstet Gynecol Reprod Biol.* 2002 Jan 10;100(2):171-3.
31. Abera Haftu, Hadgay Hagos, Mhired-AB Mehari, and Brhane G/her. Pregnant women adherence level to antenatal care visit and its effect on perinatal outcome among mothers in Tigray Public Health institutions, 2017: cohort study *BMC Res Notes.* 2018; 11: 872.
32. Kinzie B, Gomez P. 2004. Basic maternal and newborn care: a guide for skilled providers. (JHPIEGO/MNH Program: Baltimore, MD) 2004. Available at <http://www.jhpiego.org/> Accessed 5 Oktober 2015
33. Mbuagbaw LC, Gofin R. 2011. A new measurement for optimal antenatal care: determinants and outcomes in Cameroon. *Maternal and Child Health Journal* 2011;15(8):1427-34.
34. Tran, et al. 2011. Urban-Rural Disparities in Antenatal Care Utilization: A Study of Two Cohorts of Pregnant Women in Vietnam. *BMC Health Service Research*, No.11,Vol. 120.