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Understanding Perinatal Mortality Causes in Indramayu, Indonesia

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Abstract

Perinatal mortality is a useful indicator for assessing pregnancy and delivery care. Indramayu was the fourth-highest perinatal mortality in West Java province in 2015. The cause of death can be prevented from several factors including health workers, patients, referrals, and the availability of healthcare facilities. This study aimed to analyze the causes of perinatal mortality in Indramayu. The Study found 375 perinatal deaths but only 296 cases have documents according to the inclusion criteria. Statistical analysis showed there was an association between maternal disease and referral delays with preventable perinatal mortality ($p \leq 0.05$). Maternal disease in Indramayu cannot early be detected due to the lack of antenatal care services and behavioral factors on choosing a helper contributed to referral delays. It is necessary to improve the quality of antenatal care services by doing minimum standard of antenatal care for early detection of maternal disease and improving health promotion about danger sign of pregnancy and choosing birth attendants to reduce referral delays.

Introduction

Perinatal mortality is a useful indicator for assessing pregnancy and delivery care in a country, both in terms of the use of the services as well as the ability to ensure the birth of healthy babies (Bkkbn., BPS., & Kemenkes., 2012). Perinatal mortality is the number of stillbirth babies at 22 weeks' gestation to those who die within seven days of delivery (WHO, 2016b). World Health Organization (WHO) reports that 4.5 million infant deaths annually and 75% of infant deaths occur in the first week of life (early neonatal), and 25% -45% occur 24 hours after birth (WHO, 2016) Besides that, based on the report of the child watch organization "save the children fund" it is estimated that 1.3 million babies are stillborn each year. However, stillbirths have not become a serious concern because there is no target of reducing stillbirths on MDG's and SDG's (Wright S et al., 2014)

Perinatal mortality in the world ranges from 10/1000 births in high-income countries and reach 50/1000 births in low-income countries (Ezechi & David, 2012). Based on the Demographic Health Survey Indonesia (SDKI) in 2012, perinatal mortality in Indonesia is 26/1000 births. While the perinatal mortality in West Java province based on that report is 24/1000 births (BKKBN et al., 2012). Based on a preliminary study conducted at 27 districts in West Java there were 2,563 cases of perinatal death in 2014 with 1,055 stillbirths and 1.508 early neonatal deaths. In Indramayu perinatal mortality in the year 2014 is 370 cases and increased to 375 cases by the year 2015. Perinatal mortality results in the psychosocial and economic burden for families and the State. Parents with stillbirth babies can experience a variety of psychological symptoms for a long time after the death of her baby. An estimated 4.2 million women live with depression associated with a history of the death of her

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baby (Frøen et al., 2016).

Globally, the cause of stillbirth baby is an infection that occurs in pregnant women, obstetric complications in the maternal, the maternal health disorders (hypertension, diabetes, obesity), and congenital abnormalities (Frøen et al., 2016). Early neonatal causes of death were sepsis, prematurity, asphyxia, and congenital abnormalities (Viswanath et al., 2015). Most of the causes of perinatal mortality is a preventable condition except some of the congenital which cannot be prevented (BKKBN et al., 2012). Causes of preventable perinatal mortality can be grouped into four factors i.e. health workers as the giver of the pregnancy and delivery care; patient factors (age, parity, birth spacing, disease in the mother and antenatal care visit history); referral factors such as referral delay and availability of health care facilities like the availability of tools and medicines (Merali et al., 2014).

The referral in obstetric and neonatal emergencies needs to get special attention. Two-thirds of perinatal deaths are related to referral delays (Bapat et al., 2012). Referral Implementation is influenced by many factors i.e. geographical location, distance from health care facilities, travel time, the region of residence, the costs, administrative and transportation facilities (Luti et al., 2012; Upadhyay, Rai, & Krishnan, 2013). These factors can cause the existence of three delays that are delay in deciding to get help, delay in reaching health service after taking a late decision, and delay in getting the service after arriving in health care facilities.

Indramayu is the lowland and coastal areas with 66.26% the road condition are good and 1.7% heavily damaged. Based on the preliminary study on Health Office of Indramayu Regency, 375 cases of perinatal mortality are still found in 2015 which makes Indramayu became the five biggest perinatal mortality contributors in the West Java province. The causes of perinatal death need to be identified because it is predicted to reduce two-thirds of newborn and stillbirth deaths with appropriate prevention strategies through improved health systems (Frøen et al., 2016; Merali et al., 2014). This study aimed to understanding the causes of perinatal mortality in Indramayu District.

Method

An explanatory sequential mixed method was used, where the quantitative study in the first phase and followed by a qualitative study in the second phase. This method is carried out to gain a deep understanding of the causes of perinatal death. Quantitative is done to get the factors related to perinatal mortality and Qualitative is done to explore the problems that may happen behind Perinatal Mortality. Samples in the Quantitative study are mortality reports and verbal autopsy document that was available in Health Office of Indramayu Regency. There are 375 mortality reports and verbal autopsy documents of perinatal mortality from 1st January – 31st December 2015. Quantitative sampling is done by purposive sampling technique. The Autopsy documents that incomplete and do not write the chronological are excluded. Data Collected by the first author. Secondary data analysis is done on 296 perinatal verbal autopsies in 2015 that write chronological of perinatal death.

Qualitative data collection is done by In-depth interview and Focus Group Discussion. Samples on the qualitative study are perinatal death parents and health workers involved with perinatal death. Qualitative sampling is done by purposive sampling technique. The participants lived in the district with the highest and the lowest number of perinatal mortality cases in Indramayu District, based on the results of the mapping from quantitative data i.e. Juntinyuat District and Cantigi District. An in-depth interview was conducted by the first author on six perinatal parents and three Midwives that matches the Criteria. Focus Group Discussion (FGD) was conducted on three head of midwifes in primary health care that has perinatal mortality cases and two staff of maternal and child health section of Indramayu Health Office. This FGD led by the head of the maternal and child health section of Indramayu Health Office.

Quantitative data analysis through the process of entering data from perinatal verbal autopsy is to checklist form, re-checking, and coding the data. After that, data were analyzed using the chi-square test or Fisher's exact

test to know the factors related to perinatal mortality. Qualitative data were analyzed using a content analysis method by founding themes (Creswell, 2013). The audio-recorded interviews were transcribed verbatim to the Indonesian language, read line-by-line to check the accuracy, and marked meaningful sentences to makes coding development. All collected coding was grouped into several categories and developed into themes. Last, the authors interpret the themes (Creswell, 2013).

In the process of collecting qualitative data, researchers positioning themselves as research instruments, and used interview guidelines which consist of 10 open-ended questions to get the data from an informant. authors used the triangulation method as a strategy for the validation of qualitative research data. The first author examined and cross-checked the results of perinatal family's interviews with the results of health workers interviews and chronologically that were written on perinatal maternal audit documents. Then, the author does a debriefing with other authors who are the mentor and expert to improve the accuracy of the results. This study has been approved by the Medical and Health Research Ethics Committee, the Faculty of Medicine of Padjadjaran University Bandung Number: 943/UN6.C1.3.2/KEPK/ PN/ 2016, and the study permission was obtained from Office of National Unity and Politics of Indramayu District and Indramayu's Public Health Office.

Result and Discussion

Based on perinatal death report there are 375 cases of perinatal death in Indramayu District in 2015. However, from 375 cases only 310 cases have been documented in AMP form (OVP and or RMP/RMPP) and 14 of them are incomplete because it does not have a chronological death page. Therefore, known only 296 cases that can be included in the analysis. Frequency of causes of death, a period of death, place of death, a birth helper, and the number of case referrals can be seen in the following table:

Tabel 1.Distribution of Causes of Death, The Period of Death, Place of Death, Birth Helper and Referral Cases on Perinatal Mortality in the 2015 Year Indramayu District

Perinatal Death	n	%
The Cause of Death		
Not Be Prevented	34	11.5
Prevented	262	88.5
The Period of Death		
Stillbirth	148	50.0
Early Neonatal	148	50.0
Place of Death		
Non-Health Facilities	41	13.9
Health Facilities	255	86.1
Birth Helper		
Without A Helper	6	2.0
Traditional Birth Attendant	15	5.1
Midwife	133	44.3
Obstetricians	141	48.6
Case Citation		
Not A Referral cases	56	18.9
Referral cases	240	81.1

Based on table 1 knows that the majority of perinatal deaths in Indramayu can be prevented. The number of early neonatal death and stillbirth is almost the same. Most of the perinatal death happened in health facilities, there is labor not accompanied by health workers and some of them are referral cases as well. Causes of perinatal death in Indramayu District in 2015 that came from preventable causes were deaths due to such as low birth weight, hypoxia/asphyxia, infection, and aspirations. Most of these causes are complications from premature birth. These results are similar to a study done by Viswanath

in southern India that showed 40% of whom perinatal mortality is babies born prematurely (Viswanath et al., 2015). Premature birth in Indramayu District when viewed from history on verbal autopsy is largely due to maternal complications. Furthermore, the causes of stillbirths, especially IUFD, are not revealed much because of the limitations of examination that can be done, but from the interview are strongly suspected due to complications and maternal disease during pregnancy.

The number of deaths in health facilities especially in the hospital because the hospital is the referral center advanced when patients are not able to be handled in the first level health facilities with various causes both in terms of the giver of the Ministry as well as the availability of facilities such as the healthcare space, tools, and medicines. Although labor had been made at the health facility, perinatal death often is inevitable because the mother comes already late. This Result is similar to research in Mumbai, India (2012) where more deaths occurred in public health facilities because some were referral cases with delays (Bapat et al., 2012).

Table 2 shows the Relation of Perinatal mortality with the patient, health facilities, and referral factors in Indramayu District. Based on the table, there is no relation between mothers' age, parity, birth spacing, health facilities with perinatal mortality. Maternal disease factors and referral factors are related to perinatal death in Indramayu District ($p \leq 0.05$).

Table 2. Correlation between Patient Factors, Health Facility Factors, and Referral Factors with Preventable Perinatal Death in Indramayu District in 2015

	Perinatal Death				Total		*P value*
	Not Preventable		Preventable				
	N	%	n	%	n	%	
1. Patient Factors							
The age of mothers							
High risk (< and > 35tahun)	11	3,7	93	31,4	104	35,1	*0,718**
Low risk (20-35)	23	7,8	169	57,1	192	64,9	
Parity							
High risk (> 4)	2	0.7	16	5.4	18	6.1	*1,000***
Low risk (1-4)	32	10,8	246	83,1	278	93,9	
Birth Spacing							
High risk (< 2 years)	1	0.3	5	1.7	6	2.0	*0,526***
Low risk (first pregnancies and spacing ≥ 2 years)	25	8.5	194	65,5	219	74,0	
There Is No Data	8	2.7	63	21.3	71	24,0	
Maternal Disease							
With Maternal Disease	3	1.0	72	24,3	75	25,3	*0.019 **
Without Maternal Disease	31	10,5	190	64,2	221	74,7	
Antenatal Visit History							
< 4 times visit	3	1.4	49	16,6	52	17,6	
≥ 4 times visit	25	8.4	134	45,3	159	53,7	*0,066***
There Is No Data	6	2.0	79	26,7	85	28,7	
2. Factor In The Availability Of Health Facilities							
Available	34	11.5	259	87,5	293	99,0	*1,000***
Not available	0	0	3	1,0	3	1.0	
3. Referral Factors							
Delay	13	5,4	189	78,8	202	84,2	*0,000**
Not delay	15	6,3	23	9,6	38	15,8	

* Chi-square test, ** Fisher exact **test**

Perinatal deaths in Indramayu district occur mostly in mothers aged 20-35 years. That age is the reproductive period of a woman. A lot of women will get pregnant at this age; therefore the opportunity of the complications in the mother which can cause poor fetal output resulting in perinatal death will be increased. The same results were obtained from studies

conducted in 4 countries (Guatemala, Pakistan, Zambia and the Republic of Congo) that nearly 75% of perinatal deaths occurred in mothers aged 20-35 years old (Engmann et al., 2014).

Preventable perinatal mortality mostly originates from mothers with parity 1–4. These results are similar to the results of a study in Mumbai, India which showed that maternal parity had no risk of increasing infant mortality (Bapat et al., 2012). Although other studies reported that perinatal mortality was five times greater in women with parity ≥4 (Viswanath et al., 2015). In this study 40.9% of mothers were primipara. Hashim reported that primiparous mothers had a risk of obstetric complications in labor such as the first and second stages of prolongation and the risk of delivering low birth weight babies which would increase perinatal morbidity (Hasim N, et al., 2012). Perinatal morbidity would result in death if not handled properly

Perinatal mortality in this study was more prevalent at birth spacing ≥2 years and first birth. The results of the study in Ethiopia showed that birth space ≥2 years will have a double risk of infant mortality by birth order ≥5 (Elhassan et al., 2010). Based on the data, there were 64 cases with long birth spacing (>5 years) and the longest is 22 years. Conde-Agudelo reported in their study that birth spacing > 5 years was a significantly higher risk to have poor perinatal outcomes, such as prematurity and low birth weight. Mothers who become pregnant and delivery with over 5 years of birth spacing will be like mothers who deliver for the first time who have a risk of experiencing preeclampsia (Conde-Agudelo, et al., 2012). So, to prevent subsequent perinatal deaths should not only pay attention to mothers with birth spaces <2 years but also need to be considered by mothers with birth spacing > 5 years. Birth spacing can be planned with family planning services.

Maternal diseases had a relation with perinatal mortality in Indramayu District. This study found that anemia, hypertension in pregnancy, preeclampsia/eclampsia, diabetes mellitus, cardiac disease, infectious diseases consisting of sexually transmitted infections, HIV, tuberculosis, and TORCH are the disease that was owned by maternal. This was stated by the respondent in the following statement:

> "Ya banyak mereka yang di bawah 11 Hb nya"
> "Yes some of them (pregnant woman) have hemoglobin under 11 (mmHg)"(R1 FGD)

> "Ibu yang bayinya meninggal itu terkena eklampsia"

> "The mother whose baby died had eclampsia"(R1 FGD)

> "Tekanan darah ibu nya 180 waktu di cek di rumah sakit, makanya bayinya meninggal"

> "Mother blood pressure reaches 180 when checked in the hospital so the baby died" (R5-In-depth family)

Maternal Disease resulted in poor fetal outcomes due to the mechanism of the disease that interferes with pregnancy and the fetus in the womb. In line with this Research, Viera et al. (2017), found that maternal disease history was the most significant determinant of perinatal mortality, mothers with infection disease have 8 times larger than mothers who don't have a disease record to have perinatal mortality. Another previous study found that anemia in pregnant women had caused low birth weight babies (Elhassan et al., 2010). Hypertension in pregnancy including preeclampsia is also reported increasing the risk of perinatal mortality because it increases the incidence of preterm birth, fetal growth disorders, and neonatal respiratory disorders (Ananth & Basso, 2011; Mustafa, et al., 2012). In addition, fetal death also increases five times greater in pregnant women with diabetes mellitus (Mathiesen, Ringholm, & Damm, 2011).

According to the respondent of health workers, this maternal disease is related to the factors of consumption of the mother during pregnancy. The food intake is less well-balanced nutrition and does not meet the nutritional needs of a pregnant woman. A consumption factor is less well due to confidence in the myth about the abstinence of eating on a pregnant woman resulting in not the share owned by the nutrition of pregnant women. This was stated by the respondent in the following statement:

> "Ibu hamil nggak boleh makan telur, makan ikan. Waktu saya kasih tau biar makan telur, katanya suaminya belikan telur tapi terus

disembungikan sama neneknya. Jadi, gak dibolehin makan telur. Ya udah bayinya mati IUFD. Mereka bilang kalo ibu hamil makan telur nanti amis, dan kalau makan cumi-cumi nanti anaknya lahir kulitnya hitam"

"Pregnant woman should not be eating the egg, eating fish. when I give advice for eating the egg, her husband bought eggs but the eggs hidden by grandmother, so not allowed to eat eggs. So the baby ended up IUFD. They said If a pregnant woman eating egg it will be fishy and if eating squid, the son will be born with black skin"(R3-FGD)

Health workers also explained that some pregnant women only eat rice with crackers. Even though the husband works as a fisherman, all fish catches are sold or sometimes used as shrimp food in the pond. This is due to the economic factors of the family and also the trust factor about dietary restrictions. In abstinence, according to the information of health workers and the recognition of families of foods that are mainly challenged are food sources of protein such as eggs and seafood. People believe in myths, such as eating eggs, they will be fishy, if they eat shrimp, the baby will curl, if they eat squid, they will be born with blacks. Other problems were also conveyed related to consumption patterns, namely, pregnant women have been given free milk from the Public health center but did not want to drink milk for reasons of dislike and other reasons.

In the case of mothers with infections, 7 out of 11 of them have sexually transmitted infections. This is because of poor sexual behavior. Based on information from health workers in Indramayu there are 2 sub-districts with high cases of infection. In addition, the official health profile of Indramayu District was reported in 2015 that new cases of HIV were found in 279 women, and AIDS in 127 women in which 252 cases of HIV and 109 cases of AIDS were suffered by women aged 15-49 years old. This age is very possible for a woman to be pregnant. A previous Study reported that stillbirth increased 2 times higher and early neonatal increased 1,5 higher in mothers with HIV (Kennedy & Fawcus, 2014). McClure in their study say that it was difficult to determine the cause of fetal death due to infection suffered by pregnant women due to several reasons such as not detecting infection at routine examinations and the difficulty of the autopsy on the placenta and dead fetus to find out the infection (McClure, Dudley, Reddy, & Goldenberg, 2010). The maternal disease should be known early in antenatal care. Curative and preventive action to prevent perinatal death can be done with optimal antenatal care.

Perinatal Mortality still a lot happening on the mother who has already done the ANC ≥ 4 times in Indramayu District, it can be caused by inadequate services when the ANC. Based on information from several health workers in Indramayu District, the standard of ANC examination has been implemented at the Public health center, but for integrated service post and independent practice services, they have not been implemented at all due to limited tools, time, and health workers. Merali stated that the health worker's services that are not following standards contribute to the causes of death that can be prevented (Merali et al., 2014).

The history of ANC is an attempt to maintain the mother during pregnancy. Perinatal mortality is a benchmark in assessing the success of ANC services. The results showed that most mothers who had preventable perinatal deaths had performed ANC ≥ 4 times so that there was no relationship between the history of ANC visits with preventable perinatal deaths. These results are not in line with the results of other studies that state that ANC visits can prevent infant deaths, especially early neonatal deaths (Merali et al., 2014). Another study also found that the utilization of at least one ANC visit during pregnancy reduces the risk of neonatal mortality (Tekelab et al., 2019). This study found there are still many deaths among mothers who have performed four times of ANC in Indramayu District due to inadequate service during ANC. This is known based on the description of the respondents below:

"….Dua belas kali periksa"

"twelve times check" (R2-Indepth family)

"…..di bu K di puskesmas, sebulan dua kali"...

"with Mrs.K in the public health service, twice a month" (R5-Indepth family)

Thus, perinatal death in mothers who do routine ANCs indicates that the quality of ANC services is not yet good. Based on the results of interviews with health workers, it is known that in pregnant women who visit ANC at the Public health center, the minimum ANC service standard is "10T". However, for pregnant women who make ANC visits to the integrated service post, the services provided do not include 10 T. This is due to the unavailability of equipment to carry out checks at integrated service post so that for a complete examination must be done at the primary health care

> "Kami sudah melaksanakan10 T waktu ANC, kami juga kasih makanan tambahan (PMT) kaya susu. Ada petugas gizi misalnya ditemukan kasus KEK (Kurang Energi Kronis), kalo ada masalah kecil kami bilang segera dikonsultasikan. Petugas gizinya setiap hari standby di tempatnya".

> "We have already given 10T in ANCs, we also gave PMTs as well as milk. There is a nutritionist, for example, a KEK (Chronic lack of Energy) case is found, if there is a problem we will immediately consult to nutritionist. The nutritionist are standby every day" (R1-FGD)

However, participants from mothers who had perinatal deaths revealed that they had not received 10T services. Examinations that will be obtained by the mother only measure weight, measure height, measure blood pressure and palpation examination on the stomach. This is known based on the description of the respondents below:

> "Periksa periksa perut bae"

> "Just check the stomach" (R5-Indepth family)

> " Nggak pernah itu di tusuk tangan bu…"

> "Never punctured the hand" (check HB) ..." (R2-Indepth family)

To improve intranatal care services, the Indramayu District health office has a policy that every delivery that occurs at the primary health care service hours, delivery must be done there, not at the patient's home or in a private midwife. However, the application still depends on the policies of each primary health care. Merali et al., (2014) stated that non-standard service provided by health workers contributed to preventable causes of death. In accordance with the antenatal care policy issued by the Ministry of Health, that pregnant women had at least 4 times contact with health workers, once in the first trimester of pregnancy, once in the second trimester and twice in the third trimester. If a minimum of ANC visits has been fulfilled but there are still many cases of perinatal deaths, it is necessary to evaluate the quality of services provided during ANC visits. Elvira et al., (2019) found that one of the barriers of implementation adequate ANC service were excessive workload of the midwives.

Perinatal deaths in Indramayu District in 2015 were mostly referral cases. Delay in referral is the main factor that causes perinatal death. This result similar to Bapat study which found that two-thirds of perinatal deaths were associated with late referrals (Bapat et al., 2012).A large number of reference cases describes that the referral system of neonatal in Indramayu District has walked. However, the references are done when the condition of the mother and fetus already emergency caused the death in health facilities cannot be avoided. This is expressed by healthcare personnel below:

> "... kami merujuk banyak kasus. kalau ibu terdeteksi punya faktor risiko tinggi seperti persalinan prematur dan lain-lain, kami merujuknya ke rumah sakit. Jadi, ibu atau perinatal meninggal di rumah sakit"

> "we refer many cases. If maternal detected with high-risk factors like premature labor and others, we refer them to the hospital. So, maternal or perinatal died in hospital". (R2-FGD)

The delay that occurs in the reference is divided into three: late for deciding to seek appropriate medical help for an obstetric emergency; (2) late for reaching an appropriate obstetric facility; and (3) late for receiving adequate care when a facility is reached. Decision-making is influenced by confidence in non-health workers. The problem that was revealed to be the cause of perinatal mortality was a factor in people's behavior in the selection of the first helper. Communities who prefer

helpers from non-health worker in overcoming problems in pregnant women, and they will call health workers when they cannot be helped by non-health workers. This stated by the respondent in the following statement:

> "kalo manggil langsung tenaga kesehatan bisa diatasi"
>
> "if directly calling health workers, it can be overcome" ((R1-FGD)

The choice of non-health workers is due to family ignorance of emergencies in pregnancy and childbirth and trust in irrational matters. This is known based on the description of the respondents below:

> "Awalnya dia (pasien) jam 8 seperti kejang, ditolong. empat orang, yang nolong terlempar semua itu perutnya bunyi seperti air mendidih. Kata dukun yang nolong beliau tidak sanggup karena yang masuk badan dia ini bukan tandingannya. Trus saya minta tolong siapa saja datang kesini tolong menyembuhkan".
>
> "Firstly the patient convulsions at 8 pm, and then assisted by four people. The peoples who helped all thrown by her and her stomach sounded like boiling water. The shaman who helped her said that he could not help her because the body entered her was no match for him. Then I ask anyone who comes here to healing her" (R4-Indepth-family)
>
> ".... jadi dari keluarga percaya bahwa ada faktor mistik, jadi mereka memanggil Dukun, coba mereka memanggil bidan, saya yakin ibu dan bayinya selamat"
>
> ".... so the family believe that there is a mystical factors, so they call Dukun (non-formal midwife). If they call midwife, I believe the mother and baby will survive" (R1-FGD)

Perinatal deaths in Indramayu District were more than half due to the first delay. In this case, the first delay was mostly caused by pregnant women and families who did not know the danger signs in pregnancy and childbirth, besides the decision making, was too late because many families were invited to deliberations so that waiting often happened. This result is similar to Upadhyay et al. (2013) , research that first delay is caused by the inability of mothers to recognize danger signs and family beliefs that traditional medicine is more beneficial which results in delays in decision making (Upadhyay et al., 2013).

Perinatal death cases in Indramayu Regency are mostly caused by pregnant women and families not knowing the danger signs in pregnancy and childbirth, in addition to making decisions too late because many families are invited to deliberations so that waiting often occurs. This result is in line with the study of Upadhyay et al. (2013), first late is caused by the mother's inability to recognize danger signs and family belief that traditional treatment is more beneficial which results in late decision making.

Ignorance of the danger signs of pregnancy and childbirth is also due to a lack of information. Some respondents from the family claimed that during the pregnancy check-up, the health worker did not explain the danger signs, but he was told to read it himself in the Maternal and Child Health book. Health workers claimed not to explain the danger signs one by one because of the limited time and energy when doing services because of many patients. The first late is also caused by the family trust in irrational matters, so that when a danger signal is found, in this case, eclampsia, the family considers the seizure to be possessed or disturbed by unseen creatures so the family takes the patient to the shaman.

The second delay contributes the least to perinatal mortality in Indramayu District, which is as much as 6.4% of the total delay cases. Late for reaching health facilities occurs only at a little case of Indramayu District which is chronologically based on the OVP due to leaking car tire and traffic-jammed. In addition, road conditions have also influenced the delayed, because of not all the roads in the District of Indramayu in good condition. The transportation of reference used in Indramayu District is public transport, private transport, and ambulance village. There is no problem with the availability of transport. This is known based on the description of the respondents below:

> " Ya setengah jam dari rumah ibu ke rumah sakit, tapi ada jalan rusak jadi biasanya kita sampai i rumah sakit bisa satu jam"

> Yes half an hour from mothers home to the hospital, but there is an damage roads so usually we reaching the hospital in one hour (R3-Indepth-Midwife)
>
> "Oh untuk kendaraan kami nggak ada masalah karena sudah ada kerjasama dengan masyarakat"
>
> "Oh, for the transportation we don't have any problem because there is an collaboration with the community. " (R3-FGD)
>
> "Kami memakai transportasi umum, tapi nggak ada masalah"
>
> "We used public transport, but there is no problem or any obstacles" (R3-In-depth Family)

The third delay is late for receiving adequate care when a facility is reached. The third delay occurred around one-fifth of the delay referrals that caused perinatal mortality in Indramayu District. The third delay was influenced by the referral system and the availability of resources. In Indramayu this happened because the doctors were not there. This is known based on the description of the respondents below:

> "…kami cuma terus menunggu sampai malam sampai anak saya meninggal, perawat bilang nggak bisa berbuat apa-apa karena nggak ada dokter dan dokternya baru akan datang hari senin (2 hari kemudian)"
>
> ".... we Just waiting till the night, so my son died, the nurse says that they cannot do anything without doctors and the doctors will come on Monday (2 days left)" (R3-In-depth Family)
>
> " waktu kami datang tidak ada dokter dan bidannya bilang dokternya lagi ada operasi di tempat lain"
>
> "... when we were coming there are no doctors, and the midwife said that the doctors still have an operating procedure in another place" (R6-Indepth Family)

Indramayu has a referral system known as SI-IRMA-AYU (Indramayu's maternal and neonatal referral system). SI-IRMA-AYU is expected to prevent delay because it can facilitate two-way communication between hospitals and midwives so that there are no more refused patients after arriving at the hospital. The third delay in Indramayu District due to the availability of resources at the referral center. The results of this study are in line with research in the Indian village of Haryana which also found that among the factors that resulted in a third delay was the absence of doctors or other trained staffs and delays in the referral administration system (Upadhyay et al., 2013).

Several studies also found similar results that the three delays in referral are factors that are closely related to perinatal mortality. Salih and Eltyeb (2017), in their studies in Sudan found that the first delay is the highest in neonatal mortality compared to the second and third delay. The first delay was the highest delay in decision making and that was due to the inability of the mothers to recognize danger signs. Another study in Rwanda also found that delays for women in seeking obstetrical care are a critical factor associated with the main causes of neonatal death (Wilmot et al., 2017). From the discussion above, it is understood that referral delays have a strong relation to preventable perinatal mortality.

Conclusion

There was a significant relationship between maternal disease and referral delay with preventable perinatal mortality in Indramayu District. Maternal Diseases have not been detected early due to the lack of optimal antenatal care services. The referral delay factor was dominated by late decision-making in seeking help due to a lack of knowledge and information about danger signs in pregnancy and childbirth. The future researcher can investigate the quality of Antenatal care services to reduce the mortality rate.

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