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SPATIAL ANALYSIS OF HIGH RISK PREGNANT MOTHER IN 10 HEALTH CENTER IN BATANG DISTRICT, JANUARY - JULY 2017 PERIOD

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ABSTRACT

Introduction: Maternal mortality rate (MMR) in Batang District was recorded in 13 cases in 2015. In 2016 the total number of maternal mortality including pregnant maternal mortality, postpartum maternal mortality reached 127.61 per 1000 live births (16 cases), in detail the number of deaths of pregnant women was 4 cases, maternal mortality was 2 cases, post partum maternal mortality was 10 cases. One of the biggest causes is maternal pregnancy status. Therefore it is important to know the distribution of high-risk pregnant women to facilitate monitoring of the health of pregnant women for health workers. **Method:** This study was an observational study with a cross-sectional approach describing the factors of high-risk pregnant women 10 health centers in Batang District from January to July 2017 through the visualization of the ArcView 3.3 program. **Results:** Risk mapping results for pregnant women in 10 health centers in Batang District are risk factors for maternal age less than 20 years and more than 35 years, period of gestation, history of chronic diseases, status of pregnant women with Chronic Energy Deficiency (KEK), and history of complications at previous deliveries. Based on the map, not all factors are found in all Puskesmas. **Conclusion:** Through the ArcView 3.3 program can be used as a reference for monitoring the health of high-risk pregnant women through the postpartum period, facilitating the suppression of maternal mortality.

Keywords: *pregnant women, high risk, maps, maternal mortality rate*

Introduction

The degree of maternal and child health is a crucial indicator to assess the quality of development in the health sector in an area. The higher the degree of maternal and child health shows the higher quality and quality of health services in an area. Based on the 2012 Indonesian Demographic and Health Survey (IDHS), the maternal mortality rate in Indonesia is still high at 359 per 100,000 live births (Ministri of Health 2013). this figure is still far if compared with the achievement of the MDGs which is targeted to reduce maternal mortality to 102 per 100,000 live births (BAPPENAS, 2010) meaning that it cannot be achieved and requires genuine effort and hard work to achieve it.

The maternal mortality rate in Batang in 2015 reached 103.26 per 1000 live births (13 cases), this figure decreased when compared to 2014 at 179.09 per 1000 live births (23 cases), but this figure is still below the strategic plan target Health services in 2015 amounted to 142.98 per 1000 live births (18 cases), and the maternal mortality rate in Central Java in 2014 was 126.5 per 1,000 live births. In 2016 the total number of maternal deaths including death of pregnant women, partum maternal mortality, postpartum maternal mortality reached 127.61 per 1000 live births (16 cases), in detail the number of pregnant maternal deaths in 2016 amounted to 4 cases, partum maternal mortality 2 cases, postpartum maternal mortality was 10 cases. From the distribution of maternal deaths in 2016, the highest proportion was postpartum maternal mortality.

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Factors that contribute to maternal death can broadly be classified into direct causes and indirect causes. The direct causes of maternal death are factors related to complications of pregnancy, childbirth and puerperium such as bleeding, preeclampsia / eclampsia, infection, congestion and abortion. Indirect causes of maternal death are factors that aggravate the condition of pregnant women such as "Four Too" (too young 2.6%, too old 27%, giving birth too often 11.8% and too close to birth distance) (Kementerian Kesehatan RI, 2010).

In addition to the above causes "Late Three" is also the cause of maternal death, which is late knowing danger signs and making decisions, late reaching health facilities, and late in handling emergencies, can also worsen maternal health status and complicate the process of handling emergency pregnancy, childbirth and postpartum (Kementerian Kesehatan RI, 2010; Nieburg, 2012).

Status during pregnancy also greatly affects maternal health both during pregnancy, childbirth, and postpartum. Pregnant women who suffer from chronic energy deficiency and anemia have a greater risk of pain, especially in the third trimester of pregnancy compared to pregnant women with normal nutritional status. As a result they have a greater risk of having a baby with low birth weight, death during childbirth, bleeding, difficult postpartum because of weakness and susceptibility to health problems.

The computer programming model that can be operationalized by health workers at the primary level is currently very much needed considering that it is very helpful in detecting the risk of pregnancy and childbirth. Development of mapping and technology provides new opportunities in the planning, analysis, monitoring and management of health systems through the use of geographic information systems (GIS) (Kurniasari et al., 2012). GIS is a computer-based system that is used to collect, store, combine, organize, transform, manipulate and analyze geographic data. Early detection of high-risk pregnant women is an activity in maternal local area monitoring (PWS) that is important to find and prevent prevention of obstetric complications (Ardiyansah *et al.*, 2017). The purpose of this study was to use GIS to create a distribution map of high-risk pregnant women in 10 working areas of Puskesmas in Batang District from January to July 2017.

Method

This study uses descriptive cross-sectional design. The population in this study were high risk pregnant women in 10 working areas of Puskesmas in Batang Regency from January to July 2017 totaling 256 people. The sample in this study is the total population. The ten targeted Puskesmas are Batang I Health Center, Batang II Health Center, Batang III Health Center, Batang IV Health Center, Warungasem Health Center, Blado I Health Center, Blado II Health Center, Limpung Health Center, Gringsing I Health Center, and Gringsing II Health Center.

Primary data collected are points (coordinates of longitude and latitude) of high-risk pregnant women obtained from digitizing the position (location) using GPS instruments. Secondary data, namely Puskesmas administration map, were obtained from each Puskesmas, data on the address and risk status of pregnant women obtained from the register of maternity maternity visit Puskesmas. Furthermore, the data obtained were analyzed by ArcView 3.3 spatial analysis.

Results and Discussion

Distribution of High Risk Pregnant Women

The results of the 256 respondents, found the average number of high-risk pregnant women in 10 Puskesmas were 25 people with the lowest number of 14 people found in Batang III & IV health centers while the highest number of 48 people was found in Limpung health center. High-risk pregnant women are distributed as follows.

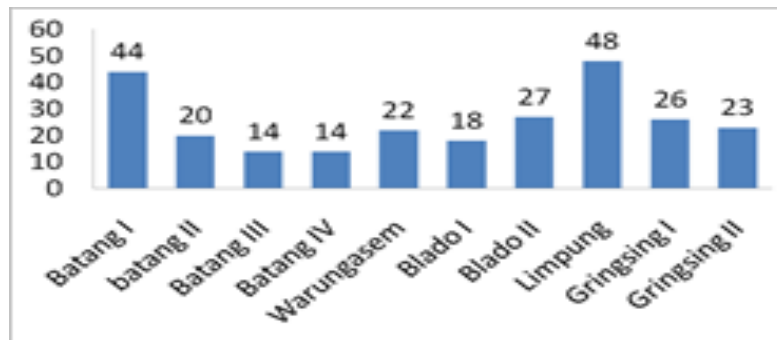


Figure 1. Distribution of the number of high-risk pregnant women in 10 Puskesmas in Batang District

Mapping high-risk pregnant women based on risk factors

Batang I Health Center

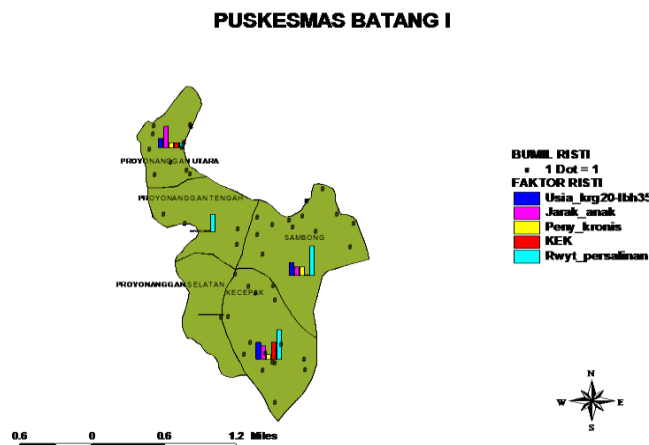


Figure 2. Map of high-risk pregnant women based on the risk factors of the Batang I Health Center work area

Map of high-risk pregnant women in the work area of Puskesmas Batang I above shows that out of 5 regions in the work area of Batang I Health Center which includes: North Proyonanggan, Middle Proyonanggan, Sambong, southern Proyonanggan, and Kecepak, are scattered according to the region with the number of pregnant women mapping Most high risk are as follows: Disappointment with the number of high risk pregnant women as many as 17 people, then Sambong with 13 high risk pregnant women, North Proyonanggan with 10 high

risk pregnant women, next with middle number of pregnant women with risk 4 people high. As for the southern Proyonanggan region, the presence of high-risk pregnant women was not detected. The kecepak, sambong and Proyonanggan Tengah regions with the highest risk factors are previous labor history that is complicated or complicated, while in the area of Proyonanggan, the tendency of risk factors is parity and period of gestation.

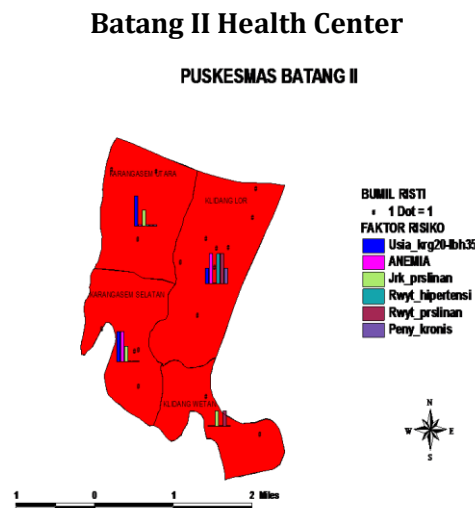


Figure 3. Map of high-risk pregnant women based on the risk factors of the Batang II Puskesmas work area

Map of high-risk pregnant women in the work area of the Batang II Public Health Center, which covers the northern Karangasem, southern Karangasem, Klidang Lor and Klidang Wetan, respectively, the highest number of high-risk pregnant women are as follows: Klidang Lor with 8 high-risk pregnant women, next Karangasem Selatan with 4 high-risk pregnant women, Karangasem Utara with the number of high-risk pregnant women as many as 3 people, and Batang II region which has the lowest number of high-risk pregnant women is Karangasem selatan which amounts to 2 people. The tendency of risk factors in the Batang II Puskesmas area is the age of pregnant women who are at risk of under 20 years and over 35 years, and anemia status in pregnant women.

Batang III Health Center
PUSKESMAS BATANG III

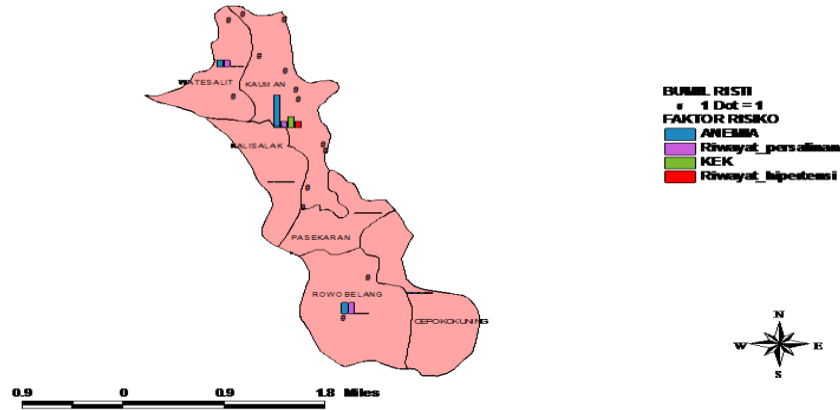


Figure 4. Map of high-risk pregnant women based on the risk factors of the Batang III Health Center work area

The working area of Batang III Public Health Center covers 6 Villages. The most risk factor found is anemia.

Batang IV Health Center
PUSKESMAS BATANG IV

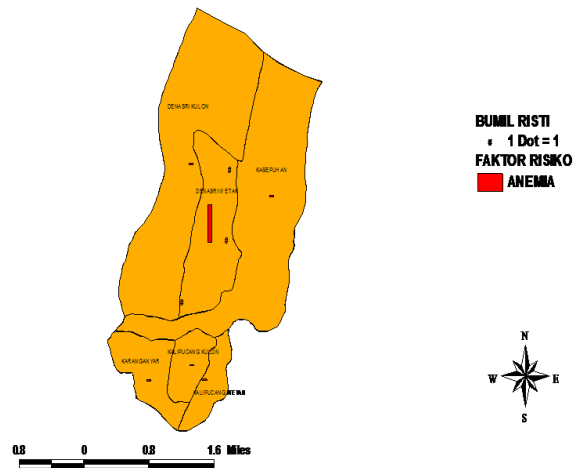


Figure 5. Map of high-risk pregnant women based on the risk factors of the Batang III Health Center work area

The working area of Batang IV Public Health Center covers 6 Villages. The most risk factor found is anemia

Warungasem Health Center

PUSKESMAS WARUNGASEM

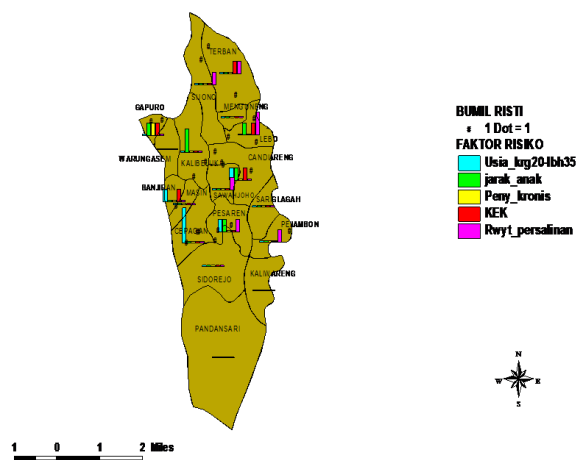


Figure 6. Map of high-risk pregnant women based on the risk factors of the Warungasem Health Center work area

1 The working area of Warungasem Health Center includes 18 villages, namely: Terban, Sijono, Menguneng, Lebo, Gapuro, Candiareng, Kalibeluk, Warungasem, Banjiran, Masin, Sawahjoho, Sariglagah, Pejambon, Pesaren, Cepagan, Sidorejo, Kaliwareng, and Pandansari. The distribution of high-risk pregnant women is as follows: the working area of Warungasem Health Center which is not found by risti pregnant women is 7 villages, as follows: Sijono, Sidorejo, Kaliwareng, Pandansari, Banjiran, Sawahjoho, Warungasem. As many as 1 region with high risk pregnant women is found in 5 villages, namely: Terban, Sijono, Menguneng, Pejambon and Masin. The area with 2 high-risk pregnant women is Cepagan, Kalibeluk and Gapuro. As many as 3 areas with high risk pregnant women are in Lebo, Candi and Pesaren Villages. The tendency of risk factors is evenly distributed starting from the maternal age in the risk category, the distance of pregnancy, the presence of chronic diseases, the status of chronic maternal energy deficiency, and the history of maternal disease.

Blado I Health Center

PUSKESMAS BLADO I

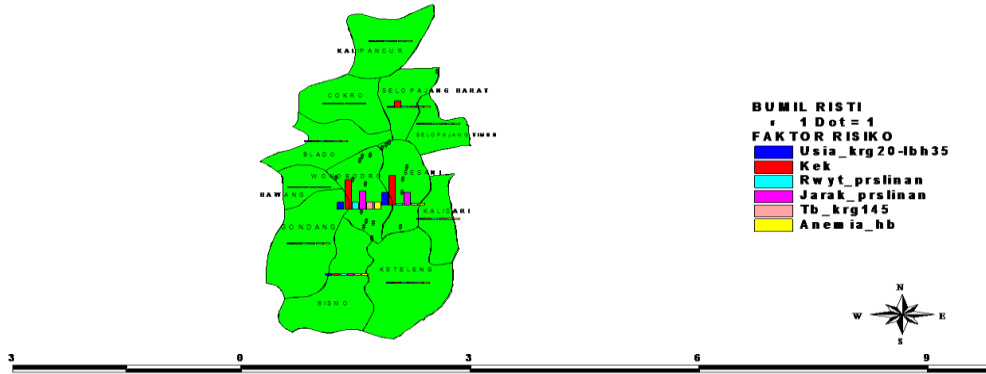


Figure 7. Map of high-risk pregnant women based on the risk factors of the Blado I Health Center work area

The working area of the Blado I Health Center includes: 12 villages, namely: Kalipancur, West Selopajang, Cokro, East Selopajang, Besani, Wonobodro, Blado, Bawang, Gondang, Bismo, Keteleng, Kalisari. The number of rhei pregnant women was found 1 person in the village of Selopajang Barat, Gondang and Bismo, in Wonobodro village found high risk pregnant women with the highest number of 12 people, and in Besani Village there were 6 people. With the tendency of risk factors is the Calorie Energy Deficiency status (KEK) and the birth distance that is too close.

Blado II Health Center

PUSKESMAS BLADO II

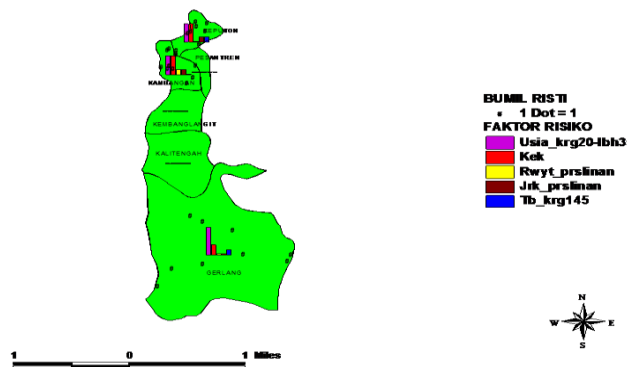


Figure 8. Map of high-risk pregnant women based on the risk factors of the Blado II Health Center work area

The working area of the Blado II Health Center consists of Keputon, Pesantren, Kambangan, Kembanglangit, Kalitengah, Gerlang. As for the region with the highest number of high-risk pregnant women in Kambangan Village, there were 11 people, followed by Gerlang Village with 9 people, and the next was Keputon with 7 people. With the tendency of risk factors are under 20 years and over 35 years of age and chronic energy deficiency status in pregnant women.

Limpung Health Center
PUSKESMAS LIMPUNG

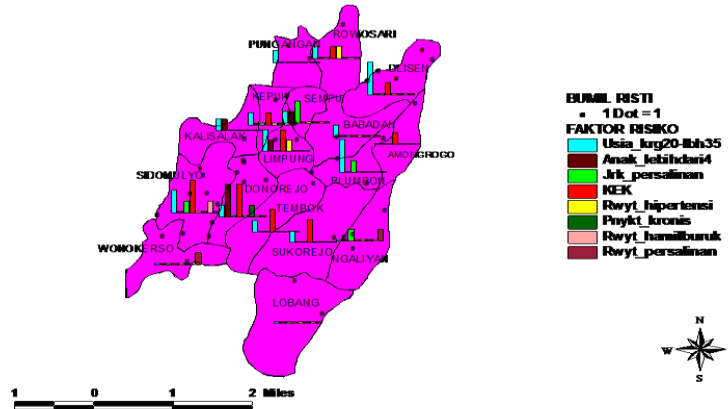


Figure 9. Map of high-risk pregnant women based on the risk factors of the Limpung Health Center work area

The working area of Limpung Health Center covers 18 villages, namely: Amongrogo, Babadan, Dlisen, Donorejo, Kalisalak, Kepuh, Limpung, Lobang, Naliyan, Plembon, Pugangan, Rowosari, Sempu, Sidomulyo, Sukorejo, Tembok, and Wonokerso. The number of rhei pregnant women during the period of January to July 2017 amounted to 48 people, spread almost throughout the working area of Limpung Health Center, with the tendency of risk factors is the age of pregnant women who have not met or even exceed 35 years, and KEK status in pregnant women. In 2016, the number of high-risk pregnant women reached 60 people, while in 2015 there were 47 people.

Gringsing I Health Center
PUSKESMAS GRINGSING I

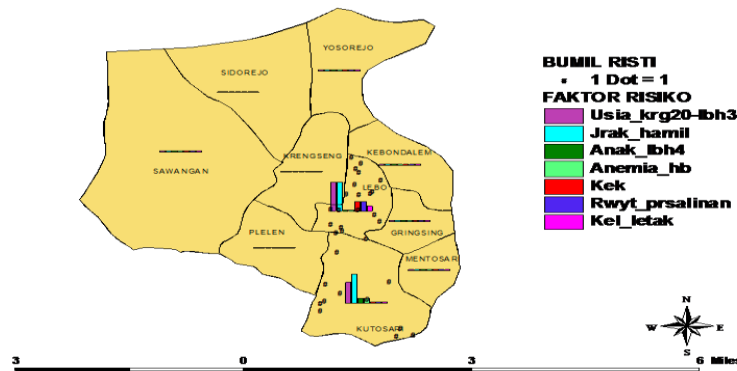


Figure 10. Map of high-risk pregnant women based on the risk factors of the Gringsing I Health Center work area

The working area of Puskesmas Gringsing I covers 10 villages, namely: Yosorejo, Sidorejo, Sawangan, Krengseng, Kebondalem, Plelen, Lebo, Gringsing, Mentosari, and Kutosari. The

distribution of high risk pregnant women in Lebo Village is 14 people, 12 people in Kutosari with age risk factors of pregnant women who are in the risk category and the pregnancy distance is too close.

Gringsing II Health Center

PUSKESMAS GRINGSING II

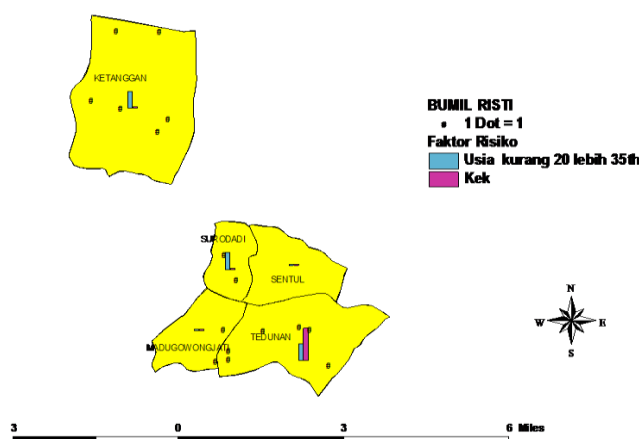


Figure 11. Map of high-risk pregnant women based on the risk factors of the Gringsing II Health Center work area

The working area of Puskesmas Gringsing II covers 5 villages, namely Ketanggan, Surodadi, Sentul, Tedunan and Madugowongjati. The number of risti pregnant women in 2017 was 16 people, spread in Surodadi Village as many as 2 people, Ketanggan Village as many as 6 people, Madugowongjati Village as many as 2 people, and Desa Tedunan as many as 6 people. The majority of risk factors are the age of pregnant women who have not fulfilled and the status of chronic energy deficiency in pregnant women.

The dominant high risk factor

The mapping results show that the determinants of high risk pregnant women are not the same in each puskesmas. Here are the dominant high risk factors found

Table 1. Dominant factors of high-risk pregnant women in 10 Health Center in Batang District

No	Health Center	Dominant factors
1	Batang I	history of complications at previous deliveries
2	batang II	maternal age
3	Batang III	Anemia
4	Batang IV	Anemia
5	Warungasem	history of complications at previous deliveries
6	Blado I	Chronic Energy Deficiency (KEK)
7	Blado II	Maternal Age
8	Limpung	Maternal Age
9	Gringsing I	Period of gestation
10	Gringsing II	Maternal age

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Factors of variable high-risk pregnant women in each health center are important factors to be considered to constantly monitor the health of pregnant women. Some programs need to be adjusted to the number of findings of high-risk pregnant women, and variations in the factors that accompany them. The accuracy of program implementation will minimize the manifestation of maternal deaths during childbirth and postpartum.

Distribution of High Risk Pregnant Women

A total of 256 respondents surveyed found the average number of high-risk pregnant women in 10 health centers were 25 people with the lowest number of 14 people found in Batang III & IV health centers while the highest number of 48 people was found in Limpung health center. Data on high-risk pregnant women are obtained from Puskesmas data for the period of January to July 2017. The risk factors that become indicators are maternal age (less than 20 or more than 35), number of children (more than 4), pregnancy distance (less than 2 years), Chronic energy deficiency (arm circumference less than 23.5 cm), anemia (Hb less than 11 g / dl)

Table 2. Indicators of high risk pregnant women

<i>Indicator</i>	<i>Measure</i>
Maternal age	less than 20 or more than 35
Number of children	more than 4
Period of gestation	less than 2 years
Chronic energy shortage	Lila is less than 23.5 cm
Anemia	Hb is less than 11 gr / dl
Height	Less than 145 cm
History of complications at previous deliveries	Bleeding, Complications, abortion, etc.
Chronic disease	TB, asthma, etc.

Pregnant women at high risk will increase the manifestation of maternal death if not monitored and cared for early. The greater the number of high-risk pregnant women in an area will increase the risk of maternal death.

Mapping high-risk pregnant women based on risk factors

Early detection of high-risk pregnant women (resti) is an activity in monitoring the local area regarding maternal health which is important to find and prevent the occurrence of obstetric complications. The map provides information on the distribution of pregnant women who are blessed on 10 working areas of Puskesmas in Batang Regency.

The type of map produced is dot density one-to-many maps to describe the density distribution of pregnant women by using a point as a symbol. This map is a map of point types location is a map that describes the geographic location of the actual case. This map is suitable for visualizing the distribution of cases of pregnant women to rest, see if there are geographical case groupings, decision making and further investigation.

Judging from the distribution of pregnant women as a whole, pregnant women resting from January to July 2017 were seen to spread in every working area of the puskesmas and did not show a certain grouping pattern. In Batang IV Public Health Center, pregnant women were found to rest in groups in Denasri Wetan village, although they were found in Karanganyar and Kalipucang. Factors that were found were only anemia. In contrast, the working area of the

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Limpung Health Center and Warungasem showed that the distribution of pregnant women was spread, and the resting factors found also varied.

The benefits of this map in the MCH program are to provide a more visual picture of the global distribution of the number of high-risk pregnant women in their working areas. With the visualization of pregnant women data being approved through digital maps, the presentation of data will be more easily understood and easily carried everywhere for the purpose of intervention and program evaluation with related sectors. This application can be considered to be used as an analysis and monitoring tool for maternal health problems related to the environment or region.

The dominant high risk factor

The factors of restoration found in 10 varied Puskesmas have their own characteristics. There were 5 dominant factors found, namely labor history, age, anemia, SEZ status, and pregnancy distance. Age is one indicator of blessing if pregnant women are less than 20 years old or more than 35 years old. If pregnant women are <20 years old, the risk that is feared is the unpreparedness of reproductive devices, while mothers with the age of > 35 years have the risk that their reproductive devices have begun to decline medically (khasanah, 2016).

Pregnancy distance of pregnant women is very influential on the health of the mother and fetus. If the mother with a pregnancy interval of <2 years then the health factor is not yet perfect return of uterine devices after the mother gave birth, with a distance that is so close it will have an impact on the health of the pregnant woman. Conversely, if a pregnant woman has a pregnancy distance of > 10 years, the risk factor is also high because the uterus will return to the first pregnancy, which requires a re-adjustment to the condition of the mother's body.

Hemoglobin levels in pregnant women will experience dilution due to increased estrogen and progesterone hormones, therefore the limit of Hb tolerance for pregnant women is 11 g / dl. The condition of anemia will affect maternal and fetal conditions such as increased risk of maternal bleeding, disability in children and so on.

Identification of the rest factor is needed to do the program appropriately. While the maps that have been created can provide a more visual picture of the global distribution of the number of high-risk pregnant women and the distribution of forms of blessing they have so that intervention and program evaluation can be carried out quickly and accurately.

Conclusion

Determinants of high-risk pregnant women: maternal age less than 20 years and more than 35 years, parity, history of chronic disease, maternal chronic energy deficiency status (KEK), and previous birth history. Each working area of Puskesmas has the characteristics of a typical high-risk pregnant woman or has a dominant factor that needs to be considered by health workers. Map of high-risk pregnant women can be used as a reference for monitoring the health of high-risk pregnant women through the postpartum period, facilitating the suppression of maternal mortality. The benefits of maps with GIS are maps that are much faster to produce, more informative, visual, varied and interesting and easy to understand to help the process of monitoring and evaluating the achievement of programs based on location or region.

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