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Pregnancy-related complications in relation with delivery complications in urban Public Health Center in 2019-2020: an analytic comparative study

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ABSTRACT

Introduction: With a huge gap of knowledge and understanding created by the current pandemic, especially regarding maternal health, this research aimed to compare and analyze the correlation between pregnancy-related complications and delivery complications in an urban public health center before and during the pandemic.

Methods: This is an analytic comparative study utilizing a retrospective cohort approach. Medical records of pregnant women during 2019-2020 were obtained from Pagesangan public health center with approved ethics from Mataram University and related government agencies. Collected data were then analyzed for each year and then compared between 2019 and 2020 to see if there were any significant differences between maternal health before and during the COVID-19 pandemic.

Results: Medical records of 653 pregnant women were collected in this study. Twenty-two of 311 and 27 of 342 pregnancy-related complications were recorded in 2019 and 2020, respectively. In contrast, 68 of 311 and 70 of 342 delivery complications were recorded in 2019 and 2020, respectively. Analysis was done to obtain each year's relative risk (RR), and then we compared the obtained RR of both years. In 2019, the RR of pregnancy-related complications to delivery complications was 0,398 (95% CI 0,104-1,518); in 2020, the obtained RR was 0,522 (95% CI 0,176-1,550).

Conclusion: Pregnancy-related complications were not the risk factor for delivery complications in both years. However, a significant correlation was found between maternal age and pregnancy-related complications in 2020, while in 2019, gravidity was also significantly related to delivery complications.

Keywords: COVID-19; Delivery Complications; Pregnancy-related Complications.
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INTRODUCTION

Coronavirus Disease 2019 (COVID-19) pandemic has negatively affected the entire earth's population and was magnified in the maternal population, considering they are vulnerable.[1] The current pandemic affected people's daily activities, including how healthcare facilities and their workers deliver the service.[2] There are already several studies regarding the effect of the COVID-19 pandemic and the delivery of antenatal care (ANC) in various countries.[3,4] Pregnant women are faced with a dilemma; on one side, they are craving adequate antenatal care, while on the other side, the possibility of being infected by COVID-19 in the healthcare facility cannot be underestimated. Further, this dilemma leads to delayed care, damaging maternal health. Several studies further aggravated this condition and reported that COVID-19 spreads more rapidly in an urban environment compared to a rural one.[5] Furthermore, with the higher population density, the risk of COVID-19 infection is potentially increased when receiving ANC.[5]

ANC plays a huge role in maintaining and improving maternal health in a population through various promotive and preventive efforts.[6-8] The outcome of these efforts is to decrease the incidence and prevalence of pregnancy or delivery complications, eventually decreasing maternal mortality.[6] Pregnancy-related complication is any disease or abnormalities that happen because of the physiological, psychological, and physical changes in pregnancy.[9-10] Pregnancy-related complication is the main predisposing factor for delivery complication and eventually increases the risk of maternal death.[11] Furthermore, delayed care has proven to be the main factor for undiagnosed pregnancy-related complications, increasing the risk of delivery complications.[12]

Considering the effect of the current pandemic on pregnant women as a vulnerable population directly (the risk of infection) or indirectly (disturbance of ANC) and the lack of published studies regarding this topic, especially in West Nusa Tenggara, we evaluate the relationship of pregnancy-related complication with delivery complications and its differences, if any, before and after the pandemic in urban population in order to further understand the state of maternal health in Mataram City in the working area of Pagesangan Public Health Center. Geographical location was the main consideration in choosing the location for this study. Pagesangan is located at the center of Mataram City, West

Nusa Tenggara; therefore, it should be able to represent the urban population for this study. Mataram was chosen as the location of our study, considering the condition of its maternal health. Based on the national health report released by the Indonesian Ministry of Health in 2018, maternal health efforts in West Nusa Tenggara, in particular, antenatal care (ANC) visit for pregnant women, mostly done through the "posyandu" program by as much as 48,6% of all ANC in West Nusa Tenggara, the second-highest percentage in Indonesia.[13] This data is concerning because during the COVID-19 pandemic, the "posyandu" program in West Nusa Tenggara was not functioning as intended but was utilized for vaccination purposes only.

Furthermore, the same report also mentioned that pregnancy complication was mostly detected in "*posyandu*" with the highest proportion in Indonesia (38,6%). These factors combined spark our concern about the effect of changes in healthcare during the COVID-19 pandemic on maternal health in West Nusa Tenggara, with a special focus on Mataram City. Therefore, this study aims to observe and compare the incidence of pregnancy-related and delivery complications in 2019 with 2020 and analyze the relationship between them.

METHODS

This study used a retrospective cohort method to analyze and compare the relationship between pregnancy-related complications and delivery complications in 2019 and 2020 with a population of pregnant women registered at Pagesangan Public Health Center, Mataram City, from January to December 2019 and 2020. Pagesangan public health center is located in Mataram City, West Nusa Tenggara, covering 1 subdistrict (Pagesangan) consisting of 5 villages with a total population of more than 50.000. This study uses a total sampling method with inclusion criteria of medical records as secondary data of pregnant women, which contain data regarding pregnancy or delivery complication, age, address, and gravidity status from January-December 2019 and 2020, along with exclusion criteria of the medical record which did not contain data regarding pregnancy or delivery complication, age, address, and gravidity status. The address of the participants will be classified as the inner skirt, middle skirt, and outer skirt based on the address' relative range to the Pagesangan Public Health Center. The inner skirt is villages directly adjacent to the geographic location of Pagesangan Public Health Center; the middle skirt is villages that range one village classified as an inner skirt. In contrast, the outer skirt is villages located near bordering villages in the outermost parameter of Pagesangan, which was the work area of Pagesangan Public Health Center. Based on these criteria, a total of 653 samples were included in this study.

In the data collection processes, the researchers coordinated with the person in charge of the village midwives, who is also in charge of the maternal health program at Pagesangan Public Health Center. This research has been approved by The Ethical Committee of the Medical Faculty of Mataram University with an approval letter with the number 118/UN18.F7/ETIK/2021. Obtained data were entered manually through Microsoft Excel ver. 2211 (Microsoft Corporation, Washington, United States) to be processed in SPSSver. 26 (IBM Corp, Armonk, NY). Data analysis was done using SPSS to obtain the relative risk (RR) of pregnancy-related complications with delivery complications as the main outcome of this study. Univariate analysis was also done to analyze the normality of each data variable and obtain the mean and range of said data. The difference between the 2019 and 2020 data in each variable was assessed for its significance with the Spearman correlation method.

RESULT

Table 1 shows that the mean and age range of the participant in both years were similar, while the gravidity variable slightly changed in 2020 compared to its 2019 counterparts. In terms of geographic location, in the perspective of Pagesangan public health center, there is a 10% decrease in the total of women from the outer skirt in 2020. A slight decrease was also observed in the incidence of pregnancy-related complications and delivery complications.

Table 2 showed a shift in risk factor of pregnancy-related complication in 2020 compared to 2019 in terms of age. In 2019, age was not a significant risk factor for pregnancy-related complications; in 2020, it had become a risk factor, especially at 18-28 years. On the other hand, Table 3 showed that there was a shift in the risk factor for delivery complications. Gravidity status was a risk factor for delivery complications in 2019, while in 2020, it was not a risk factor statistically.

This study also analyzed relative risk (RR) differences in 2019 and 2020. Table 4 showed that there was an increased RR in 2020 in comparison to 2019. Both years showed an RR of lower than 1, indicating a protective effect of pregnancy-related complications for delivery complications, though with different degrees of protection in both years.

DISCUSSION

The effect of the COVID-19 pandemic on maternal health is still vaguely observed and analyzed. In this study, from a total of 311 pregnant women in 2019 and 343 in 2020, the mean age of both years was similar (27,6 years old), which is in line with the national recommendation for maternal age and national data regarding mean maternal age.[13] Gravidity status also shows no significant difference in 2019 and 2020, which multigravidity women dominated in both years. The significant difference in the geographic location of 2019 and 2020, specifically in outer skirt category, could be explained by a previous qualitative study in Turkey in 2020 which reported that lifestyle changes caused by the COVID-19 pandemic is the main reason for hesitancy in seeking antenatal care. As mentioned in the study, the most influential changes were the lockdown or social distancing policy, hence the drop in the total of pregnant women in the outer skirt of our study.

Pregnancy-related complications were observed to be increased in 2020 in comparison to 2019, which was mainly caused by an increase in the incidence of gestational hypertension and gestational anemia. Disruption in the early detection process resulted from hesitancy in seeking antenatal care, which caused a decrease in healthcare

Table 1. Sample characteristics

Variable	Statistics	
	2019	2020
Age (years)		
Mean	27,6 (5,36)	27,6 (5,4)
Range	18-42	18-43
Age category (n)		
18-28 years	176	185
29-35 years	114	135
36-40 years	17	8
>40 years	4	8
Gravidity (n, %)		
Primigravida	109 (35%)	97 (28,4%)
Multigravida	202 (68,2%)	246 (71,6%)
Total	311 (100%)	343 (100%)
Geographic location (n, %)		
Inner skirt	144 (46,3%)	189 (55,3%)
Middle skirt	123 (39,5%)	139 (30,6%)
Outer skirt	44 (14,1%)	14 (4,1%)
Pregnancy-related complications (n, %)		
Gestational hypertension	6 (27,3%)	8 (29,6%)
Gestational anemia	13 (59,1%)	17 (63%)
Infectious diseases	2 (9,1%)	1 (3,7%)
Others	1 (4,5%)	1 (3,7%)
Total	**22 (100%)**	**27 (100%)**
Delivery complications (n, %)		
Infectious diseases	5 (7,3%)	6 (8,6%)
Preterm birth	13 (19,1%)	21 (30%)
Prolonged labour	14 (20,6%)	8 (11,4%)
Sectio caesaria	9 (13,2%)	12 (17,1%)
Intrapartum hemorrhage	6 (8,8%)	5 (7,1%)
Abnormal presentation	15 (22,1%)	14 (20%)
Others	6 (8,9%)	4 (5,8%)
Total	**68 (100%)**	**70 (100%)**

Table 2. Age as a risk factor for pregnancy-related complication

Age category	Pregnancy-related complication			
	2019	p-value	2020	p-value
18-28 years	12	0,074	14	**0,05**
29-35 years	9		9	
36-40 years	1		3	
>40 years	0		1	

Table 3. Gravidity status as a risk factor for delivery complication

Gravidity status	Delivery complications			
	2019	p-value	2020	p-value
Primigravida	26	**0.001**	19	0.623
Multigravida	42		51	

Table 4. Relative risk of pregnancy-related complication for delivery complication

Year	RR	95% CI	p-value
2019	0,398	0,104 – 1,518	0,177
2020	0,522	0,176 – 1,550	0,242

facility utilization.[14] This decrease could explain the increase in the incidence of pregnancy-related complications, especially gestational anemia, as the main prevention program for gestational anemia, iron supplementation relies on the antenatal care program, which was heavily affected by the pandemic directly and indirectly. Several factors were causing the disturbance, as mentioned in the study, which were minimizing the risk of infection, fear of healthcare facilities, government policies regarding social distancing, and a shift in priorities of healthcare facilities prioritizing more of their resources towards critical or urgent patients first.[14,15] Maternal anxiety was also reported to be an influential factor in increased pregnancy-related complications.[16,17] Problems caused by the pandemic, social distancing, financial disruption, and changes in the healthcare system are the main reasons for the anxiety.[17]

Interestingly, this study found that pregnancy-related complications were more prevalent in the 18-28 years old category, which contradicts various studies regarding an increased risk of pregnancy-related complications in pregnant women aged more than 35 years.[18,19] These contradictory findings could be explained by the policy implemented in Pagesangan public health center that categorizes pregnant women aged more than 35 years old as "high-risk". This policy caused the risk detection for this specific population to be more thorough and focused; therefore, treatment can be started earlier. This fact could also explain the difference in significance in 2020 compared to 2019 in terms of age category because the policy was not adequately implemented due to the pandemic.

Delivery complications were found to be increased in 2020 in comparison to 2019. This study found a shift in the significance of gravidity status, which was significant in 2019 while insignificant in 2020. This means that in 2019, delivery complications tend to happen in multigravida women, while in 2020 gravidity status does not significantly affect the risk of delivery complications. A shift in early detection and early intervention felt evenly in both groups (primigravida and multigravida),

while the underlying risk of delivery complications different could explain the shift in significance.

As the principal finding and a novelty in this research, we found a shift in the relative risk of pregnancy-related complications to delivery complications. In 2020, there was an increase in risk compared to 2019, with an RR of 0,398 in 2019 and 0,522 in 2020, a 12,4% increase. This increase in relative risk means that mothers with pregnancy-related complications have a higher risk of delivery complications in 2020 than in 2019. However, both RR were less than one meaning that in both years, the presence of pregnancy complications has a protective effect for the mother regarding the risk of delivery complications. However, between 2019 and 2020, the RR was increased by 0,124 or a 12,4% increase in the risk of delivery complications. This result means that the previously implemented policies and programs in the Pagesangan public health center adequately mitigate the risk of delivery complications in mothers with pregnancy-related complications, and the current pandemic disrupts these efforts.

Based on the results obtained in this study, the author has several recommendations regarding this topic. This study proves that a negative exposure, in this case pregnancy-related complications, does not always result in a negative outcome; this study showed otherwise. Moreover, this study also proves the importance of healthcare providers in preventing delivery complications. Therefore, we recommend a better commitment and effort from healthcare providers in increasing the awareness of pregnant women and their families regarding pregnancy-related complications to lower the risk of delivery complications further.

This study has several limitations. First, the medical records safekeeping method still uses paper-based storage and has no digital backup. Therefore, the medical records were highly vulnerable to damage from environmental exposure. Second, there was one midwife in charge of one of the villages recently being replaced by a new one and the data from the previous midwife could not be extracted.

CONCLUSION

This study showed that pregnancy-related complications were not a risk factor for delivery complications but a protective factor in 2019 and 2020. A significant correlation was found in maternal age with pregnancy-related complications in 2020; in 2019, gravidity status was found to be significant with the incidence of delivery complications. These results add to the growing body of evidence that the COVID-19 pandemic could affect maternal health. We recommend an improved effort to increase awareness of pregnancy-related complications for pregnant women and their families.

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CONFLICT OF INTEREST

There is no conflict of interest in this study.

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