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The Association of Age, Parity, and History of Cesarean Section with the Occurrence of Placenta Accreta Spectrum (Pas) at H. Adam Malik Hospital in Medan 2020-2022

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ABSTRACT

Background: Maternal mortality rate (MMR) is an indicator of the quality of midwifery services in a country. Postpartum hemorrhage is a serious life-threatening complication and the main cause of maternal death especially that caused by placenta accreta spectrum (PAS). This study aims to determine the relationship between age, parity, and history of cesarean section on the incidence of PAS at H. Adam Malik Hospital Medan in 2020-2022.

Method: This study was an analytic-observational study with a cross-sectional design. The data used came from the medical records, including information about the population of mothers who gave birth, maternal age at delivery, parity, and previous history of cesarean section. Statistical analysis used univariate and bivariate chi-square tests.

Result: The study subjects were 84 people selected by simple random sampling method. The results of the univariate analysis showed the highest frequency of age >32 years, parity 3-4 times, and a history of cesarean section ≥ 2. The results of bivariate analysis showed a significant relationship between age and the incidence of PAS (p=0.016), parity and the incidence of PAS (p<0.001), and a history of cesarean section and the incidence of PAS (p=0.004).

Conclusion: There is a relationship between age, parity, and history of cesarean section with the incidence of PAS at H. Adam Malik Hospital Medan in 2020-2022.

Keywords: Maternal Mortality Rate, PAS, Age, Parity, Cesarean Section Record.

ABSTRAK

Latar Belakang: Angka kematian ibu (AKI) merupakan indikator kualitas pelayanan kebidanan di suatu negara. Perdarahan postpartum adalah komplikasi serius yang mengancam jiwa, dan penyebab utama kematian ibu terutama yang disebabkan oleh spektrum plasenta akreta (PAS). Penelitian ini bertujuan untuk mengetahui hubungan antara usia, paritas, dan riwayat operasi caesar terhadap kejadian PAS di RSUP H. Adam Malik Medan tahun 2020-2022.

Metode: Penelitian ini merupakan penelitian analitik-observasional dengan desain cross sectional. Data yang digunakan berasal dari rekam medis, meliputi informasi tentang populasi ibu yang melahirkan, usia ibu saat melahirkan, paritas, dan riwayat operasi caesar sebelumnya. Analisis statistik menggunakan uji chi-square univariat dan bivariat

Hasil: Subjek penelitian berjumlah 84 orang yang dipilih dengan metode simple random sampling. Hasil analisis univariat menunjukkan frekuensi tertinggi usia >32 tahun, paritas 3-4 kali, dan riwayat operasi caesar ≥ 2. Hasil analisis bivariat menunjukkan hubungan yang signifikan antara usia dan kejadian PAS (p = 0,016), paritas dan kejadian PAS (p < 0,001), dan riwayat operasi caesar dan kejadian PAS (p = 0,004).
Kesimpulan: Terdapat hubungan usia, paritas, dan riwayat operasi caesar dengan kejadian PAS di RSUP H. Adam Malik Medan tahun 2020-2022.
Kata kunci: Angka Kematian Ibu, PAS, Umur, Paritas, Catatan Operasi Caesar

1. Introduction

The maternal mortality rate (MMR) is the standard for assessing the quality of maternity care in a country [1]. MMR, regardless of the length of pregnancy or the location of delivery, is defined by the WHO as the number of maternal fatalities per 100,000 live births in a specific period. Within 42 days following the pregnancy's end, it covers all maternal deaths brought on by the condition of the pregnancy or its management. Over a predetermined length of time, MMR is expressed as one per 100,000 live births. Irrespective of the length of the pregnancy, a live birth is the extraction of a fetus that results from fertilization. Regardless of the condition of the placenta or umbilicus, the fetus exhibits indications of life during this period, such as breathing, heart rate, umbilical pulse, and voluntary muscle movement [2].

According to the results of the SP2020 Long Form covering the period from 2015 to 2020, Indonesia has a maternal mortality rate (MMR) of 189 per 100,000 live births. With 48 live births per 100,000, DKI Jakarta has the lowest MMR, whereas Papua has the highest MMR (565 per 100,000 live births) [3]. In North Sumatra, the MMR reached 195 deaths. This represents a relatively high maternal mortality rate compared to the national average in Indonesia [4]. Hemorrhage as a direct cause of maternal death, estimated by WHO as the largest proportion, consists of antepartum hemorrhage and postpartum hemorrhage [5]. Placenta accreta spectrum is one of the factors that contribute to postpartum hemorrhage (PAS). PAS-related hemorrhage is a dangerous complication that can be fatal, frequently necessitates blood transfusions, and requires appropriate surgical care. There is a correlation between this problem and a rise in cesarean deliveries [6]. PAS cases are quite numerous in the world and are increasing year by year. PAS occurs in about 0.2% of all pregnancies. Women with multiple risk factors are more likely to develop the condition [7]. Over the past 40 years, there has likely been a rise in risk factors for PAS, most notably a rise in the frequency of cesarean deliveries [8]. PAS is also increasing in other cities in Indonesia, including Medan. Research in 2022 using medical record data from H. Adam Malik Hospital in Medan from January 2016-July 2019 showed an increasing trend, with 1 case in 2016, 9 cases in 2017, 26 cases in 2018, and 23 cases in 2019, a total of 59 cases over 4 years. This increase is due to the increase in the number of cesarean sections each year, which is a major risk factor for PAS according to the study [9]. Risk groups that included younger (<20 years) and older (>35 years) age at first pregnancy, higher gravida, lower education level, and presence of anemia in pregnant women had a higher risk of PAS [10]. A new report by the WHO indicates that the number of cesarean sections performed worldwide is rising to over one in five deliveries, or 21 percent. Although a cesarean section is necessary in certain situations, there are dangers associated with it, such as bleeding or infection, a delayed recovery period, a delay in nursing, and problems in future pregnancies [11]. Data from the 2017 Indonesian Demographic and Health Survey (IDHS) noted that Sectio Caesarean (SC) deliveries accounted for 17% of total facility births, indicating an increase in SC deliveries in Indonesia [12]. Another hypothesis states that decidual abnormalities, excessive trophoblast invasion, or a combination of both may cause decidual malformation [13]. Because of the potential for morbidity and mortality in both mothers and fetuses, there is a need to increase understanding of this disease. Understanding risk factors can help with the early treatment of potentially fatal consequences like postpartum hemorrhage. The mother is most affected by an increased risk of problems and hemorrhage, while the fetus is primarily affected by iatrogenic preterm. The research aimed to assess the association between age, parity, and history of cesarean section with the incidence of PAS at H. Adam Malik Hospital Medan during 2020-2022.

2. Method

This study was an analytic-observational study with a cross-sectional design. Variable data were collected simultaneously during a certain period to achieve the objectives of this study. The sample of this study using simple random sampling technique consists of subpopulations that can be used as research subjects, namely mothers who give birth at the Department of Obstetrics and Gynecology of H. Adam Malik Hospital recorded in medical records from 2020 to 2022 who meet the inclusion and exclusion criteria, namely: mothers with a

diagnosis of PAS who give birth at H. Adam Malik Hospital, with complete medical record data containing age, parity, history of cesarean section, and placenta accreta score as inclusion criteria and mothers who have other risk factors such as a history of curettage or other uterine invasive actions as exclusion criteria.

The study was conducted after obtaining approval from the Research Ethics Committee of Universitas Sumatra Utara. The Slovin formula was used to calculate the sample size in this study. The minimum number of subjects was 66 patients. The statistical analysis used in this study was the univariate and bivariate chi-square tests. Data analysis was processed using the SPSS 27.0 program. The significance level is obtained if p-value <0.05.

3. Result

Table 1 shows the characteristics of the subjects. Most patients were diagnosed with PAS (69%), while those whose diagnosis was not PAS amounted to 31%. The distribution of each study variable was mostly age >32 years (63.1%), parity ≤ 2 (57.1%), history of cesarean section ≥ 2 times (56%), and placenta accrete score 2 (32.1%).

Table 1. Subject characteristics

| | Incidence | |
Characteristics	PAS Positif n = 58 (%)	PAS Negatif n = 26 (%)
Age (year):		
• >32	42 (50)	11 (13.1)
• ≤32	16 (19)	15 (17.9)
Parity :		
• 3-5	35 (41.7)	1 (1.2)
• ≤ 2	23 (27.4)	25 (29.8)
History of cesarean section:		
• ≥ 2 times	39 (46.4)	8 (9.5)
• < 2 times	19 (22.6)	18 (21.4)
a Accreta Score :		
• 0	6 (7.1)	
• 1	19 (22.6)	
• 2	27 (32.1)	
• 3	6 (7.1)	

The relationship between age, parity, and history of cesarean section with the incidence of PAS. There is an association between the age of the mother who gave birth and the incidence of PAS at H. Adam Malik Hospital in 2020-2022 (Table 2).

Table 2. The relationship between age, parity, and history of cesarean section of research subjects with the incidence of PAS at H. Adam Malik Hospital Medan in 2020-2022

Variable	p-value
Maternal age	0.016
Maternal parity	0.001
Cesarean section history	0.004

4. Discussion

This study found that the highest frequency of research subjects diagnosed with Placenta Accreta Spectrum (PAS) was in late adulthood (>32 years old), covering 50% of the total subjects [14]. This finding is in line with previous research at H. Adam Malik Hospital and shows an increase in the age of mothers giving birth since 2012 [15]. Age, according to previous studies, is a significant risk factor in the occurrence of PAS [16]. Placenta previa, high parity, history of prior cesarean section, and older mother age were all found to be independent risk factors for PAS in a 2017 study. Consequently, it was determined that late adulthood, which dominated this study, was a risk factor for PAS. On the other hand, moms between the ages of 20 and 32 also had PAS. Other risk factors include uterine curettage history, placenta previa associated with PAS, or history of prior cesarean delivery could have an impact [17]. This study highlights the significant role of maternal age

in obstetrics, including an increased risk of pregnancy interventions such as cesarean section. The results of research at the H. Adam Malik Hospital in 2020-2022 showed a relationship between maternal age and the incidence of PAS, with a p-value of 0.016 which means the hypothesis (H1) is accepted [15]. The results of this study are supported by similar findings in other studies. At H. Adam Malik Hospital Medan, most mothers who gave birth were >32 years old. This age is known to be at risk for PAS [18]. Along with women's aspirations for greater education and financial independence, other factors that may have an impact on the rise in cesarean sections in Indonesia include socioeconomics, location, and the health system [19]. Another study confirmed the association of late maternal age (≥35 years) with the risk of PAS, although differences in the age of marriage and childbirth in developed countries such as Minia and Indonesia affected the results of the study. Risk factors in late maternal age may be related to hormonal changes and the fetal implantation environment. The most common parity group diagnosed with PAS in this study was multiparous with parity 3-4, accounting for 41.7% of the total study subjects [20]. This finding is in line with research at Dr. Pirngadi Medan Hospital in 2011-2012 [21]. Another study at Anutapura Palu Hospital showed that mothers with parity ≥ 3 times had a 4.526-fold higher risk of postpartum hemorrhage compared to mothers who gave birth < 3 times [22]. The negative impacts of high parity include damage to blood vessels in the uterine wall, decreased tissue elasticity during pregnancy, and potential disruption of placental and fetal growth.

The results showed that multiparity (parity ≥3) was at risk of causing PAS, covering 41.7% of the total study subjects. The relationship between maternal parity and the incidence of PAS at the Obgyn Poly of H. Adam Malik Hospital Medan in 2020-2022 was highly significant (p-value <0.001). The results of this analysis confirm the acceptance of the hypothesis (H1) [15], [23]. This finding is consistent with previous studies by El Gelany et al. (2019) and Fitzpatrick et al. (2017) which showed that multiparity is a risk factor for PAS [16]. Another study in 2017 also identified parity ≥ 3 as an independent risk factor for PAS [24]. According to Moroz and D'Alton (2022), in addition to a previous history of cesarean section, multiparity may also be associated with PAS, as multiparous mothers undergo cesarean section more frequently [25]. Similar findings in Lagos, Nigeria, showed parity to be a strong predictor for cesarean section which in turn increases the risk of PAS.

The results of this study showed an increase in the frequency of study subjects with a history of cesarean section (≥2). This is related to the increasing frequency of cesarean section in maternity mothers in general [10]. WHO standards state that the cesarean section rate in a country should range from 5-15% per birth in the world, but previous studies in Indonesia recorded an increase from 2% in 1991 to 16% in 2012, exceeding WHO recommendations [18]. Women with higher economic and educational levels tend to undergo cesarean section more often, with a rate of 11.2% in 1991 and 20% in 2012. Hospital data in 2005 showed that the main reasons for cesarean sections in Indonesia were malpresentation (5.5% of total cesarean sections) and maternal requests without medical indication (2.2% of total cesarean sections).

A history of cesarean section ≥2 times was significantly associated with the incidence of PAS, with a p-value of 0.004. This value confirms that the hypothesis (H1) of the association is accepted. More than half of the respondents (56%) had a history of cesarean section ≥2 times, while 44% had a history of cesarean section <2 times. Although cesarean section is important to save lives in pregnancy complications, it still has short and long-term risks [26]. This study is consistent with the findings of Calagna et al, (2021). who showed an association between the history of cesarean section and the incidence of PAS histologically, especially related to the scar on the hysterotomy scar. The scar can result in pathological pregnancy as in Caesarean Scar Pregnancy (CSP) [27]. This study is also in line with the results of Pegu et al. (2021) who confirmed the association between an increased history of cesarean section and the incidence of PAS [18]. The growth of cesarean section rates in Indonesia is related to socioeconomic status and health system factors, where studies show an increase in cesarean section in women with high economic status and education. The use of the National Health Insurance (JKN) since 2014 has also contributed to the increase in cesarean sections in Indonesia, equally distributed across rural and urban areas. The results showed that the most common placenta accrete index (PAI) in subjects with a diagnosis of PAS was a score of 2, accounting for 32.1% of the total subjects [28]. PAI is used to identify the risk of placental invasion, and its assessment involves grading placental lacunae based on the Feinberg and Williams classification.

The strength of this research is that it was the first to be conducted at H. Adam Malik Hospital, while the weakness of the research is that the research is retrospective, so the data needed is incomplete.

5. Conclusion

In this study, it was found that age, parity, and history of cesarean section were significantly correlated with the incidence of PAS in mothers who delivered at H. Adam Malik Hospital Medan in 2020-2022. The most

common PAI in subjects with a diagnosis of PAS was a score of 2. Therefore, age; parity; and history of cesarean section are factors that cause the incidence of PAS.

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