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Original Research

Determinants of Postpartum Hemorrhage Incidence in the Maospati Magetan Health Center Working Area in 2023, Indonesia

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ABSTRACT

Background: Postpartum hemorrhage (PPH) is a loss of blood of more than 500 ml that occurs after the birth of a child either before, during, or after the delivery of the placenta. In developing countries including Indonesia, PPH is the leading cause of maternal death, because of its rapid and unexpected occurrence. This study aims to determine the determinants of hemorrhagic postpartum incidence in Maospati Health Center in 2023. **Methods:** This type of research is using observational analytic with case control design. The sample in this study was a case sample with a total population of 9 birth mothers who experienced postpartum hemorrhage while the control sample with simple random sampling was randomly selected as many as 36 birth mothers who did not experience postpartum hemorrhage. Data collection techniques and instruments used secondary data from labor medical records in 2023. Data analysis used descriptive statistical methods with relative frequency distribution and proportion or percentage, analytical statistical methods with Chi-Square test, Logistic Regression Analysis and ODD Ratio. **Results:** Of the 10 determinants studied including that passed the candidate selection and Logistic Regression Analysis test were occupation p-value 0.253, parity p-value 0.137, anemia p-value 0.446, uterine subinvolution p-value 0.000. **Conclusion:** It can be concluded that occupation, parity, anemia have no influence on the incidence of postpartum hemorrhage while uterine subinvolution has a significant influence on the incidence of, which is 5 times more at risk of experiencing postpartum hemorrhage than mothers with no uterine subinvolution. Subinvolution uteri needs to be prioritized and should not be ignored in providing early treatment of postpartum hemorrhage with prevention efforts including fulfilling nutritional adequacy, conducting Early Breastfeeding Initiation, encouraging early and gradual mobilization, teaching uterine massage, teaching good attachment during breastfeeding, and postpartum exercises.

Keywords: Postpartum hemorrhage; laboring mother; uterine subinvolution

1. INTRODUCTION

Postpartum hemorrhage (PPH) is blood loss of more than 500 ml in vaginal delivery and 1000 ml in cesarean section delivery that can occur before, during, or after the placenta is removed.(1) Most cases of maternal death occur within 24 hours after giving birth due to PPH . The problem in some countries, especially in developing countries, is that PPH is still the leading cause of maternal death during labor. Heavy bleeding leads to hypovolemic shock,

inadequate perfusion of vital organs and death if not treated quickly.[2] PPH is the unexpected and fastest cause of maternal death worldwide. PPH occurs within four hours of delivery indicating that it is the third stage of labor. It is a major challenge in developing countries with a projected death rate of 140,000 per year or one death every four minutes.[3]

Data related to the problem of PPH according to the Indonesian Health Profile in 2022 is 20.7%.[4] Data according to the East Java Health Profile in 2022 shows that bleeding cases were found at (21.24%).[5] Data related to other PPH based on preliminary studies at the Magetan Regency Health Office in 2021 data is 50%, while data obtained based on preliminary studies at the Maospati Health Center in 2022 that bleeding was found to be 20.83%. According to Amelia's research, (2019) the impact caused during childbirth besides death is to cause uterine atony, placental retention, uterine rupture, uterine inversion, birth canal trauma and blood clotting system disorders to death, while in the postpartum period, namely infection in the uterus. Age, history of previous postpartum hemorrhage, history of prenatal examination, parity and prolonged parturition are also risk factors for PPH incidence.[6] Risk factors for PPH according to Ayunda's research, (2019) one of the main causes is anemia in childbirth which can cause serious complications in the form of myocardial ischemia, blood clotting system disorders to fatalities, namely death in the mother.[7] According to Hasna's research, (2021) nutritional status, namely chronic energy deficiency, affects the incidence of PPH in laboring mothers. However, the variable with the strongest relationship to the incidence of PPH is anemia status.[3] From a preliminary study at the Magetan Regency Health Office in 2022 anemia in adolescents was found to be the most prevalent at the Maospati Health Center at 64% as well as anemia in prospective brides at 32.29%. Other risk factors that affect PPH according to Mayasari (2023) are too close pregnancy distance, placental remnants, perineal tears, and uterine subinvolution.[8] Meanwhile, according to Bayuana (2023), other risk factors that also cause PPH are influenced by education and work.[9]

Prevention and treatment steps since before pregnancy and during pregnancy by routinely conducting pregnancy checks as an effort to treat and prevent early if there are several factors that cause PPH.[10] Integrated ANC program with anemia and SEZ screening in pregnant women, laboratory examination, and Fe supplementation can prevent anemia.[11] Screening Poedji Rochjati Score Card (KSPR) filling, early detection of bleeding screening and pre-eclampsia screening with Body Mass Index (BMI), Mean Arterial Pressure (MAP) examination as an effort to prevent complications of pregnancy, childbirth and postpartum.[12] According to the Magetan District Health Profile in 2023, programs to reduce Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR) include visiting and assisting pregnant women and postpartum women, Jek-Mil or pregnant motorcycle taxi, Mayangsari Childbirth Planning and Complication Prevention Program (P4K), Bankjo Lamp Innovation, namely safe delivery with abang, yellow, ijo card marking.[13] The handling of cases of bleeding during labor includes the installation of IVs to replace lost fluids, administration of oxygen, administration of drugs to stimulate contractions, internal and external bimanual compression measures in cases of bleeding caused by uterine atony, if bleeding is due to a birth canal tear then suturing will be done on the birth canal tear, so that from some of the treatments carried out can stop the occurrence of bleeding in laboring women.[14]

This study is important because the Maospati Health Center Working Area is the highest area with the most anemia in Magetan Regency in adolescents and brides-to-be in 2023. Anemia is the most important risk factor for PPH. And there are still many cases of PPH found during the preliminary study at the Maospati Health Center in 2029-2022. It aims to identify and further analyze the determinants of PPH incidence. The place of implementation with the highest area of anemia cases and there are still many cases of PPH, the year of implementation for 1 year, namely in 2023 and the variables studied as many as 10 variables, namely age, education, occupation, parity, nutritional status, anemia status, previous bleeding history, prolonged partus, uterine subinvolution and perineal tears are the significance of this study.

2. METHODS

2.1 Type of Research

This research method uses observational analytics. This research method is useful for finding relationships between variables, namely by conducting an analysis of the data collected. The research design used in this study is case control, a study that studies

risk factors using a retrospective approach and data collection with secondary data.[15]

2.2 Location and Time of Research

This research was conducted in the working area of the Maospati Health Center, Magetan Regency, from February to May 2024.

2.3 Research Population and Sample

The research sample for the case population is all laboring mothers who experience PPH by sampling in this study is a total population technique, namely a sampling technique where the number of samples is the same as the population. Total population is a sampling technique if all members of the population are used as samples. This is often done if the population is relatively small or small, which is less than 30 people, or research that wants to make generalizations with relatively small errors.[16] So the number of mothers who experienced PPH was 9 people. While the research sample for the control population is by probability sampling technique, namely simple random sampling, by paying attention to the limitations for the control sample, namely some of the birth mothers who are taken randomly, namely 36 people.

2.4 Data Collection Techniques and Instruments

Data collection technique is the process of approaching the subject and the process of collecting the characteristics needed in a study. Techniques and instruments for collecting data on age, education, occupation, parity, nutritional status, anemia status, previous bleeding history, prolonged partus, uterine subinvolution and perineal tears using documentation studies of secondary data obtained using instruments in the form of medical records of all mothers giving birth at the Maospati Health Center in 2023.

2.5 Data Analysis

The tabulated data were then analyzed using descriptive statistical methods and analytical statistical methods.

2.5.1 Data analysis using descriptive statistical methods

Data analysis at this stage is shown to describe the data from each variable. Because the type of data is categorical with a nominal scale, the method chosen is relative frequency distribution and proportion or percentage presented in the form of pie charts.[17]

2.5.2 Data analysis using analytical statistical methods

Data analysis at this stage is shown to test the hypothesis that the incidence of PPH is influenced by the ten determinants. The planned hypothesis testing steps are as follows:

1. Candidate selection

This stage is intended to select one determinant after another to be included in the multivariate analysis. The test used is Chi Square $(X)^2$, which tests the effect of each determinant on the incidence of PPH. Since there are 10 determinants, 10 tests were conducted. A determinant passed the candidate selection if the Chi Square $(X)^2$ obtained a p-value <0.25.[17]

2. Multivariate Analysis

This stage is intended to test the significance of the influence of all determinants (which have passed the candidate selection) together on the incidence of PPH using logistic regression analysis test. The effect of a determinant is said to be significant if a p-value <0.05 is obtained. Thus, multivariately, only determinants with a p-value <0.05 were concluded to be significant determinants of PPH incidence in the study area.[17]

3. Magnitude of Risk

Furthermore, from all determinants that are meaningful, it can also be determined the magnitude of the influence of each determinant on the incidence of PPH based on the p-value. To analyze the magnitude of the risk of each determinant that has been proven to be meaningful, the Odd Ratio formula is used.[17]

2.6 Research Ethics

In this study, researchers in carrying out research tasks or conducting research always uphold a scientific attitude and adhere to research ethics. This research emphasizes ethical issues including:

1. Informed Consent

In this study, respondents were given an informed consent sheet to seek approval to become research respondents.

2. Licensing

Obtain a research permit from the Magetan Campus Applied Midwifery Study Program addressed to Litbankesbangpol then conduct an ethical review through the Surabaya Poltekkes Kemenkes to be given a cover letter for research permission to the Maospati Puskesmas.

3. Anonymity

Names were not included on the data collection sheet, just the researcher's code number.

4. Confidentiality

In this study, the information is guaranteed by the researcher, the data can only be accessed by interested parties.

5. Description Ethically Appropriate

This research has passed the ethical test by the Health Research Ethics Commission (KEPK) of the Surabaya Ministry of Health Polytechnic No.EA/2188/KEPK-Poltekkes_Sby/V/2024.

3. RESULTS

3.1 Selection of Candidate Determinants of PPH Incidents

The results of candidate selection using Chi Square Test $(x)^2$ categories of age, education, occupation, parity, nutritional status, anemia status, previous bleeding history, prolonged partus, uterine subinvolution, perineal tear. Table 1 shows that determinants that have an influence on the incidence of PPH with a p-value <0.25 are determinants of

Table 1. Selection of Candidate Determinants of PPH Incidence

Category	PPH		No PPH		*P-Value*
	Frequency	Percentage %	Frequency	Percentage %	
Age					
<20 &> 35 years old	1	11.11	6	16.67	0.6808
20-35 Years	8	88.89	30	83.33	
Education					
≤12 years (low) >12	9	100	33	91.67	0.3700
years (high)	0	0	3	8.33	
Jobs					
Work	5	55.56	9	25	0.07657
Doesn't work	4	44.44	27	75	
Parity					
Grande-multiparous	1	11.11	0	0	0.04312
Primi-multiparous	8	88.89	36	100	
Anemia Status					
<11 gr/dl (Anemia) ≥11	8	88.89	25	69.45	0.2387
gr/dl (Normal)	1	11.11	11	30.55	
Nutrition status					
<23.5 (KEK)	0	0	4	11.11	0.2964
≥23.5 (Normal)	9	100	32	88.89	
RPS					
Once	0	0	0	0	-
Never	9	100	36	100	
Long Parturition					
Long	0	0	0	0	-
Normal	9	100	36	100	
Uterine Involution					
Mushy	9	100	7	19.44	0.000006314
Hard	0	0	29	80.56	
Torn Perineum					
Ripped	9	100	32	88.89	0.2964
Not torn	0	0	4	11.11	

employment, parity, anemia status and uterine subinvolution. Determinants of employment, parity, anemia status and uterine subinvolution were then subjected to multivariate analysis to test the significance of the influence of all determinants together on the determinants of PPH incidence using logistic regression analysis.

3.2 Multivariate Analysis and Risk Magnitude of Determinants of PPH Incidence

The results of the logistic regression analysis test based on Table 2 show that uterine subinvolution has a p-value of 0.000 (<0.05), indicating that the most significant determinant of PPH incidence is uterine subinvolution with an OR of 5.143 in Table 3, which means that mothers giving birth with uterine subinvolution are 5 times more likely to experience PPH than mothers who are not with uterine subinvolution. Although occupation, parity and anemia had an effect on the incidence of PPH, from the results of the logistic regression analysis test these determinants did not have a significant effect so that the odd ratio was not carried out.

Table 2. Multivariate Analysis of Determinants of PPH Incidence

No	Variable	Q	Sig
1.	Jobs	1.159	0.253
2.	Parity	1.516	0.137
3.	Anemia	0.769	0.446
4.	Uterine subinvolution	5.969	0.000
	Constant	5.421	0.000

Table 3. Risk Magnitude of Incidence Determinants of PPH

No	Variable	Exp-B	*Lower*	*Upper*
1	Uterine Subinvolution	5.143	2.645	9.999

4. DISCUSSION

Based on the results of research conducted in the Maospati Health Center area, in this chapter the researcher discusses in detail the results of research on the determinants of PPH incidence using secondary data obtained from medical records of childbirth at the Maospati Health Center in 2023, as follows:

Based on Table 1 regarding the age of mothers giving birth at the Maospati Health Center in 2023, it is known that the age categories are <20 years and >35 years (at risk) and 20-35 years of age (not at risk). The results showed that the determinants of PPH incidence in the age category at risk were most in the group of mothers who did not experience PPH, while the age category that was not at risk was most in the group of mothers who experienced PPH. So, it can be logically interpreted that age does not affect the incidence of PPH.

The relatively safe age for pregnancy, childbirth and postpartum is between the ages of 20-35 years because women at this age are in healthy reproduction. In women aged <20 years, the reproductive organs have not developed perfectly while at the age of >35 years the function of the reproductive organs has decreased a lot.[18] The efforts given are the provision of IEC through cooperative and collaborative communication approaches both to individuals, families, communities and health care providers can be an effort to prevent childbirth at an age that is too young and too old, in addition to conducting early detection and handling of danger signs through the MCH book and monitoring with comprehensive care for pregnant, delivery and postpartum women at risk.[19]

Based on Table 1 regarding the education of mothers giving birth at the Maospati Health Center in 2023, it is known that the education category at risk is ≤12 years (low education) and those not at risk are >12 years (higher education). The results showed that the determinants of PPH incidence in the education category in the group of mothers who experienced PPH all had risky education while the non-risky education category was in mothers who did not experience PPH. However, the number of age at-risk mothers is almost the same as the number of age at-risk mothers who experience PPH. So, it can be logically interpreted that education does not affect the incidence of PPH.

From the research journal according to Yuliyanti (2020) that high school and college education levels tend to have a good level of knowledge regarding pregnancy risks and childbirth preparation.[20] However, the level of education cannot determine how much knowledge is possessed because increased knowledge can be obtained from formal and non-formal education as well as education from parents, experience, environment, culture and their traditions.[21] Efforts must be made to be "digitally literate" following the times as now knowledge is easily obtained through social media. Besides being easier and more efficient, this can be obtained anywhere and anytime so that women with elementary, junior high, high school and college education can know more about the world of health.

Based on Table 1 regarding the work of mothers giving birth at the Maospati Health Center in 2023, it is known that the work category is working (at risk) and not working (not at risk). The results showed that the

determinants of the incidence of PPH in the category of risky work were most commonly found in the group of mothers who experienced PPH while in the group of mothers who did not experience PPH most were mothers who were not at risk of PPH incidents. So that logically work affects the incidence of PPH but is not meaningful or significant. Corroborated by the results of candidate selection in Table 1 and multivariate analysis in Table 2.

According to research by Sumiati (2023), excessive work can drain energy, causing his contractions and vaginal bleeding due to ruptured blood vessels in the cervical canal. Efforts must be made, especially for pregnant women who work, to increase knowledge so that pregnant women know the symptoms that indicate problems in their pregnancy so that complications do not occur during pregnancy, childbirth and postpartum. Compliance in ANC visits also needs to be done to monitor the condition of the mother and fetus and detect problems early and provide fast and appropriate interventions. Support from coworkers, superiors and family is also important to reduce stress. Organizing nutritional patterns and adequate rest needs to be done to avoid excessive workload and significant fatigue.

Based on Table 1 regarding the parity of mothers giving birth at the Maospati Health Center in 2023, it is known that the parity category is grande multipara (at risk) and primi-multipara (not at risk). The results showed that risky parity was found in the group of mothers with PPH, while in the group of mothers who did not experience PPH no risky parity was found. However, in both groups, non-risky parity was found with almost the same proportion. So logically parity has an effect on the incidence of PPH but is not meaningful or significant. Confirmed by the results of candidate selection in Table 1 and multivariate analysis in Table 2.

Parity 1-4 is the safest parity in terms of maternal mortality. Whereas parity 5 or more can cause myometrium and muscle tone conditions are no longer good, causing failure of blood vessel compression at the placenta implantation site, resulting in PPH.[22] Efforts to provide IEC regarding spacing pregnancies, the number of children, family planning (KB) with the existence of Safari KB, a program that provides easy and free access to family planning to the community with the aim of controlling population birth rates and preventing unwanted pregnancies.

Based on Table 1 regarding the nutritional status of mothers giving birth at the Maospati Health Center in 2023, it is known that the category of nutritional status at risk is <23.5 (SEZ) and not at risk ≥23.5 (normal). The results showed that the nutritional status at risk was found in the group of mothers who did not experience PPH, while the group of mothers who experienced PPH had normal nutritional status. So, it can be logically interpreted that nutritional status does not affect the incidence of PPH.

Labor requires good energy and stamina. Especially if the mother has a SEZ nutritional status, the energy and stamina needed must be extra. Nutritional intake is prioritized to fulfill the energy needed for uterine contractions and straining. Therefore, efforts must be made to provide IEC regarding the fulfillment of nutritional intake and electrolyte fluid balance. In the latent phase of the first stage, it is recommended to eat rice, vegetables, side dishes, fruit or bread and drink enough water with normal activities such as left side, sitting, standing, walking to accelerate opening. Entering the active phase of the first stage, the mother will begin to lose her appetite due to the pain of increasingly frequent contractions, therefore reducing activity and continuing to fulfill nutrition by eating and maintaining electrolyte fluids by continuing to drink.[3]

Based on Table 1 regarding the anemia status of pregnant women at Maospati Health Center in 2023, it is known that the category of anemia status at risk is <11 g/dl (anemia) and those not at risk are ≥11 g/dl (not anemia). The results showed that the risky anemia status was found in the group of mothers with PPH although it was not much different from the group of mothers who did not experience PPH. So that logically anemia status affects the incidence of PPH but is not meaningful or significant. Confirmed by the results of candidate selection in Table 1 and multivariate analysis in Table 2.

Anemia is a reduced number of effective red blood cells. This affects the amount of hemoglobin levels in the blood. Less hemoglobin leads to less oxygen being bound in the blood, thus reducing the amount of oxygen delivery to vital organs. Low hemoglobin levels can be prevented by feeding iron-rich foods such as red meat, chicken liver, green vegetables (spinach, broccoli, mustard greens) and kidney beans. Avoid consuming tea and coffee especially while taking blood supplement, calcium, vitamin c and folic acid tablets. Giving Fe tablets as

many as 90 tablets during pregnancy to prevent PPH. Checking Hb at least twice during pregnancy, namely during the 1st trimester and 3rd trimester to detect anemia.[18]

Based on Table 1 regarding the previous history of bleeding in pregnant women at the Maospati Health Center in 2023, it is known that the category of previous bleeding history is ever (at risk) and never (not at risk). The results showed that the history of previous bleeding at risk was not found in the group of mothers with PPH or who did not experience PPH. All mothers giving birth at the Maospati Health Center in 2023 did not have a history of previous bleeding. So, it can logically be interpreted that a history of previous bleeding has no effect on the incidence of PPH.

According to Indah's research (2023) a bad history in previous childbirth such as a history of previous bleeding is likely to be experienced again when giving birth because it gives bad trauma to the female reproductive organs. By conducting bleeding screening, it can detect early the history of bleeding in previous childbirth so that mothers and health workers can prepare to provide appropriate and good treatment.[23]

Based on Table 1 regarding the long partus of laboring women at Maospati Health Center in 2023, it is known that the category of long partus at risk is primipara >12 hours and multipara >8 hours (long) and those not at risk are primipara ≤12 hours and multipara ≤8 hours (normal). The results showed that long partuses at risk were not found in the group of mothers with PPH or who did not experience PPH. All mothers in the Maospati Health Center in 2023 had a normal length of labor, which ranged from primipara ≤12 hours and multipara ≤8 hours. So, it can be logically interpreted that prolonged parturition does not affect the incidence of PPH.

Prolonged partus during labor can be caused by inadequate hiss, especially when it occurs in the latent phase, namely opening <4. The first stage can last long enough to cause a prolonged partus, this condition is followed by placental retention which can cause uterine atony. The treatment given to overcome prolonged partus is oxytocin massage, nipple stimulation, oxytocin drip.[24]

Based on Table 1 regarding perineal tears of laboring women at the Maospati Health Center in 2023, it is known that the category of perineal tears at risk is the presence of tearing and those that are not at risk are the absence of tearing. The results showed that the determinants of PPH incidence in the at-risk category occurred in all laboring mothers in the group of mothers who experienced PPH. In the group of mothers who did not experience PPH, almost all laboring women experienced perineal tears but there were few laboring women who did not experience tears. So, it can be logically interpreted that perineal tears do not affect the incidence of PPH.

Birth canal tears can cause varying amounts of bleeding. The amount of blood loss during labor is always evaluated. Birth canal tears are caused by several factors including a rigid perineum, a large baby, the wrong way to push, the wrong birthing position. Handling done before labor is with Kegel exercises, perineal massage while during labor is stitched according to the degree of the tear.[23]

Based on Table 1 regarding the uterine involution of laboring women at the Maospati Health Center in 2023, it is known that the category of uterine involution at risk is flaccid (uterine subinvolution) and those not at risk are hard (no uterine subinvolution). The results showed that those who experienced uterine subinvolution were found in the group of mothers with PPH that all laboring women experienced PPH, while in the group of mothers who did not experience PPH only a few experienced uterine subinvolution, the two groups were quite far apart. Uterine subinvolution influenced the incidence of PPH and was the only determinant that was meaningful or significant. So logically, uterine involution has a significant effect on the incidence of PPH. This is corroborated by the results of candidate selection in Table 1, multivariate analysis in Table 2 and risk magnitude in Table 3.

Uterine subinvolution is a condition of the uterus after childbirth that has failed or delayed the process of returning the uterus to the same size as before pregnancy.[25] The process of uterine subinvolution occurs due to a lack of blood in the uterus so that the uterine muscles atrophy and cause uterine contractions to decrease so that wide blood vessels do not close completely. Uterine sub-involution occurs in the placenta implantation template, especially in the endometrium.[26] Symptoms of uterine sub involution are that the mother does not feel heartburn or bad contractions, the uterus feels soft, the lokea comes out continuously blackish red with a large amount, the height of the fundus uteri is not appropriate. Subinvolution of the uterus can be caused by

endometrial infection, residual placenta, blood clots, uterine myoma and retained placenta. Risk factors that can cause subinvolution are age, parity, nutrition, anemia and other causative factors.[25]

Treatment is carried out pharmacologically and non-pharmacologically, namely by giving antibiotics if caused by infection, uterine exploration, curettage, giving methylergometrine and oxytocin drugs according to the doctor's recommendation. As for non-pharmacology, it is done before and after labor. During pregnancy, namely providing IEC regarding the understanding of uterine subinvolution, the process of occurrence, causative factors and risk factors for subinvolution, signs and symptoms and handling both through leaflets, brochures, through social media such as youtube, tiktok, instagram, google and whatsapp groups. Providing IEC regarding the fulfillment of nutrition, especially for mothers with SEZ, teaching pregnant exercises and Kegel exercises. Handling during the postpartum period, namely performing IMD, encouraging early mobilization, teaching uterine massage, teaching good attachment during breastfeeding and postpartum exercises.[27]

5. CONCLUSION

In the group of mothers who experienced PPH and did not experience PPH, the proportion of age at risk was almost the same, the proportion of low education was almost the same, the proportion of working mothers was higher in the group of PPH mothers, the proportion of parity was almost the same, the proportion of nutritional status experiencing SEZ was almost the same low, the proportion of anemia status was different higher in the group of PPH mothers, the proportion of sub uterine involution was much different higher in PPH mothers, the proportion of previous bleeding history and long partus was the same low, the proportion of perineal tears was almost the same high.

Of the 10 determinants of PPH incidence studied in the Maospati Health Center working area in 2023, those that influence the incidence of PPH are determinants of employment, parity, anemia status and uterine subinvolution. However, only uterine subinvolution had a significant or meaningful effect on the incidence of PPH.

The most significant or meaningful determinant in this study was uterine subinvolution so that the risk of subinvolution was large. So, it was found that uterine subinvolution had a 5 times greater risk of experiencing PPH than laboring women who did not experience uterine subinvolution.

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Conflict of Interest

The authors declare no conflict of interest.

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