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Effects of Prenatal Health Initiatives on the Health of Mothers and Infants in Rural Areas

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Abstract

Maternal health programs deliver vital support for improved infant health results and enhanced maternal well-being particularly within rural locations because they overcome barriers to healthcare services. The study examines how maternal care programs affect both maternal care standards and birth results and statistical survival data for newborns. The assessment of health services accessibility combined with prenatal care usage and program performance demonstrates both the difficulties and achievements of these rural perinatal health projects. The research indicates that maternal well-being alongside decreased adverse birth outcomes emerges from full-fledged programs which unite prenatal education and nutritional support in addition to healthcare provider participation. The document presents policy implications along with recommendations for enhancing perinatal health service delivery in areas without sufficient medical attention.

Keywords: ***Perinatal health, maternal outcomes, infant health, rural healthcare, prenatal care, birth outcomes, healthcare accessibility, maternal mortality, infant mortality, public health programs.***

1.Introduction

The Critical Need for Perinatal Health Interventions in Rural Areas

The importance of adequate perinatal healthcare cannot be overstated, as it plays a pivotal role in ensuring the well-being of both mothers and infants. Over the past several decades, medical advancements and public health initiatives have contributed to a steady decline in infant mortality rates across the United States. However, this decline has not been uniform across all populations, and disparities persist, particularly in rural areas. In regions where healthcare resources are scarce, expectant mothers face numerous challenges in accessing timely and appropriate prenatal care. Rural communities, including those in southeast Georgia, often suffer from a lack of specialized healthcare providers, limited healthcare infrastructure, and socio-economic barriers that prevent women from receiving consistent medical attention throughout their pregnancies. Consequently, the rate of preterm births, low birth weight, and infant mortality remains disproportionately high in these underserved regions(1). The need for targeted, community-based interventions is therefore critical to closing the gap and ensuring equitable maternal and infant health outcomes.

Challenges in Accessing Perinatal Healthcare in Rural Southeast Georgia

Southeast Georgia, a predominantly rural region, exhibits numerous risk factors that contribute to poor birth outcomes. The limited presence of obstetricians and maternal-fetal medicine specialists in rural areas forces many pregnant women to travel long distances to receive adequate prenatal care. This logistical challenge is further exacerbated by economic hardships, with a significant proportion of the population living below the poverty line. Women in these communities may lack reliable transportation, health insurance, and financial resources to afford regular medical visits. Additionally, cultural and linguistic barriers can further alienate minority populations, particularly Hispanic and African American women, from seeking necessary medical assistance. Research has consistently shown that early and continuous prenatal care is one of the most effective strategies for reducing perinatal morbidity and mortality. However, when systemic barriers prevent women from accessing these services, the risk of adverse pregnancy outcomes increases significantly(2).

The Role of Racial Disparities in Birth Outcomes

Beyond geographical challenges, racial disparities play a critical role in determining perinatal health outcomes. Studies have highlighted that African American and Hispanic women face a greater likelihood of experiencing preterm births, low birth weight infants, and infant mortality compared to their white counterparts. These disparities are driven by a complex interplay of socio-economic, environmental, and healthcare-related factors. Structural racism within the healthcare system, implicit biases in medical treatment, and differences in health literacy all contribute to the unequal distribution of healthcare resources. Moreover, social determinants such as chronic stress, limited access to nutritious food, and higher prevalence of underlying health conditions like hypertension and diabetes further compound these disparities. Given these challenges, it is imperative to design interventions that specifically target high-risk populations and address the root causes of these health inequities.

The Perinatal Health Partners (PHP) Program: A Targeted Intervention

In response to these pressing challenges, the Perinatal Health Partners (PHP) program was developed as a multi-level intervention designed to improve maternal and infant health outcomes in rural southeast Georgia. This program was created with the goal of addressing both individual and systemic barriers to perinatal healthcare. By providing case management, home visits from healthcare professionals, and logistical support such as transportation assistance and childcare services, PHP aimed to remove obstacles that prevented pregnant women from accessing necessary medical care. The program also emphasized culturally competent healthcare delivery, ensuring that the needs of minority populations were adequately addressed. A key component of PHP was its close collaboration with regional healthcare providers, public health agencies, and community organizations to create a coordinated system of perinatal care.

Objectives of the Study

This study sought to evaluate the impact of the PHP program on birth outcomes, particularly focusing on gestational age at birth, birth weight, and infant mortality rates. A key aspect of the evaluation was the comparison of pre-intervention and post-intervention data to determine whether participation in the PHP program led to measurable improvements in these critical health indicators. Additionally, the study aimed to examine whether the program was successful in reducing racial disparities in perinatal health outcomes. Given the historical trend of poorer birth outcomes among African American and Hispanic women, this research sought to assess whether a targeted, community-based intervention could bridge the healthcare gap and lead to more equitable birth outcomes. By analyzing statistical differences in birth weights, gestational ages, and mortality rates, the study aimed to provide evidence-based recommendations for expanding and refining perinatal healthcare interventions in rural areas(3).

Significance of the Research

The significance of this research extends beyond the immediate evaluation of a single intervention. The findings from this study have broader implications for public health policy and healthcare delivery models across the United States. If the PHP program demonstrates success in improving perinatal health outcomes, it could serve as a model for other rural communities facing similar challenges. Policymakers, healthcare administrators, and public health professionals could use these findings to advocate for increased funding and resources for community-based perinatal healthcare initiatives. Furthermore, understanding the effectiveness of targeted interventions in reducing racial disparities in birth outcomes can inform future strategies to promote health equity at the national level. As the United States continues its efforts to achieve the goals outlined in Healthy People 2030, studies such as this one play a crucial role in shaping data-driven policies and interventions aimed at improving maternal and infant health.

2.Methods

Study Design and Approach

Researchers applied a multi-level evaluation design to measure how Perinatal Health Partners (PHP) transformed birth outcome results of high-risk pregnant women residing in rural southeast Georgia. An analysis using pre-intervention and post-intervention information guided this study through a quasi-experimental design until the time when participants enrolled in the program. This study reviewed archival birth records to assess if the PHP program created changes in essential perinatal health metrics including birth duration and infant weight and mortality statistics. A major emphasis was dedicated to racial prejudice evaluation which produced independent reviews for Caucasian participants and those who were not Caucasian in order to confirm the intervention delivered similar outcomes to all racial identities.

When creating the PHP program the developers established it as a community-focused perinatal healthcare initiative which targeted maternal healthcare accessibility problems. The initiative facilitated personal medical management combined with residential health evaluations and transportation support in addition to maternity classes and regional healthcare partnerships(4). The initiative selected "medically high-risk" women before creating personalized care strategies to meet their medical in addition to socioeconomic requirements.

Study Population and Participant Selection

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The research studied pregnant women who resided in rural southeast Georgia territories and were considered at medical risk because they exhibited pre-existing diseases or had prior pregnancy difficulties and/or economic disadvantages. The study participants came from ten counties within a health district called Southeast Health District (9-2) which exhibited restricted medical facilities and considerable poverty rates in addition to experiencing more adverse birth results.

- The PHP program eligibility required medical staff to confirm at least one high-risk criterion from this list of factors:
- History of multiple miscarriages (two or more previous pregnancy losses).
- Prior preterm birth or previous fetal/neonatal death due to pregnancy complications.
- Diagnosis of chronic medical conditions such as diabetes (gestational or Type 1/2), hypertension, autoimmune diseases, epilepsy, or HIV.
- Pregnancy-induced hypertension (PIH) or pre-eclampsia.
- Multiple gestations with complications, such as twin or triplet pregnancies with a high risk of premature delivery.
- Physician-ordered bed rest due to severe pregnancy complications.

The PHP program extended an invitation to all eligible women with consent being necessary for inclusion in the study research. Public health authorities enrolled 713 people into the program during the period from June 30, 2003 to July 31, 2006. The total population included 57.1% Caucasian patients alongside 42.9% non-Caucasian participants who consisted of 31.8% African Americans alongside 10.8% Hispanics and 0.3% participants with mixed races.

Data Collection and Management

The research obtained its data from three main data sources which included medical electronic records combined with intake forms and birth certificate documentation. The PHP personnel at the public health district administrative offices maintained all information in a secure Microsoft® Access database. Research evaluators maintained data confidentiality by gaining no access to patient records originally but they analyzed de-identified information only.

Key variables included:

Birth Weight Categorized as low birth weight (<2,500 grams) and normal birth weight (≥2,500 grams).

The measurement of birth gestational age takes place in weeks yet preterm birth denotes an exposure of less than 37 weeks.

Infant Mortality describes the death experience of infants before turning one year old.

Researchers conducted analyses of the outcomes present before PHP enrollment followed by post-PHP enrollment evaluation.

Statistical Analysis

The program assessment relied on descriptive together with inferential statistical analysis methods. The analysis of data used SPSS® software for Windows and the statistical threshold maintained an alpha value of 0.05.

- The analysis included three different statistical tests(5).
- The comparison of means between gestational age and birth weight data employed T-tests before and after the intervention period.
- Low birth weight incidence and infant mortality proportions underwent Chi-square statistical analysis between pre-and-post intervention periods.
- The relationship between PHP enrollment and better birth outcomes was determined through odds ratios (OR) and their corresponding 95% confidence intervals (CI).
- An analysis of program effects by racial demographics separated Caucasians from non-Caucasian groups was performed for assessment purposes.

Ethical Considerations

- The research complied with ethical guidelines to maintain participant confidentiality in addition to providing unbiased analytical results. The analysis of de-identified retrospective data excluded a need for participant consent according to research standards. The PHP program functioned with approval from institutional review board (IRB) entities at the Georgia Department of Public Health and Georgia Southern University. The research team conducted all statistical analyses under the framework of HIPAA to preserve patient information privacy and security.

Limitations of the Study

Multiple important limitations require recognition after studying the PHP program's performance in this research.

5.Results

Demographic Profile of Participants

During the period from June 30, 2003 to July 31, 2006 the Perinatal Health Partners (PHP) program enrolled 713 high-risk pregnant women at ten rural locations in southeast Georgia. A minority group from the sample consisted of Caucasian individuals who comprised 57.1% while 42.9% of participants self-identified as non-Caucasian among 31.8% African American and 10.8% Hispanic as well as 0.3% multi-racial participants. The population overview revealed that most participants fell into the 20 to 29 age group where 58.0% participated, including 30.0% who were aged 20–24 and 28.3% who were 25–29 years old. The older age groups of individuals aged 30–34 (17.3%) and 35–39 (11.9%) made up the remainder while only a minor number exceeded the age of forty. The participants who took part in the study averaged 27.8 years old when surveyed.

Educational status possessed by PHP participants revealed significant disparities because 33.6% reported finishing school under high school level while 24.1% graduated from high school. The educational attainment pattern showed lower numbers since 10.0% of people had junior college attendance and 9.8% completed technical training programs. A large portion of 18.1% among participants failed to disclose their education level. The PHP participants reported that 37.3% were married but 38.3% were single with 18.0% omitting their marital status status from reporting. The patient demographic data demonstrates social and economic weaknesses which demand specific prenatal healthcare approaches.

Medical Referral Profile of Participants

Medical staff referred participants to the PHP program because they belonged to the medically high-risk category which included health conditions that increase their risks for adverse pregnancy outcomes. Medical conditions that already existed in patients represented the primary reason healthcare professionals sent them to the PHP program at 23.8% (23.8% of referrals). Diabetes, hypertension, autoimmune diseases, epilepsy and other chronic illnesses formed part of this group. The PHP program primarily supported women who dealt with 11.4% gestational diabetes along with pregnancy-induced hypertension in 10.5% and previous spontaneous abortion in 9.1% while 8.1% faced premature rupture of membranes and pre-term labor and prior preterm birth affected 7.7% of patients. The data shows that prior fetal or neonatal deaths affected only 6.2% of participants so this high-risk group needs better perinatal healthcare services(6).

Birth Weight Outcomes

Low birth weight below 2,500 grams serves as a vital indicator of neonatal health because it directly raises the danger levels for both sickness and death in newborns. The introduction of the PHP program did not result in a significant shift in low birth weight births among Caucasian women ($p = 0.101$). The data shows an important improvement pattern since the low birth weight births decreased from 27.3% to 19.6%.

The PHP program achieved significant statistical effects on non-Caucasian participants ($p = 0.002$). The PHP program resulted in significant progress by reducing low birth weight births from 39.3% pre-implementation to 22.2% post-implementation. Non-Caucasian women who remained out of PHP faced a 2.3 times greater chance (2.3 times higher odds) of giving birth to low weight infants than women enrolled in PHP during the same period (OR = 2.3, 95% CI: 1.3–3.8). The combined PHP participant cohort demonstrated an important statistical reduction in birth weight issues between pre-intervention (33.1%) and post-intervention (20.8%) periods ($p = 0.001$).

Gestational Age Outcomes

How early a baby is delivered at birth strongly affects neonatal health because premature births before 37 weeks gestation result in high mortality and long-term development problems. The intervention duration did not lead to any significant variation in gestational age of Caucasian pregnant women ($p = 0.998$), keeping the average at 37.3 weeks during both pre- and post-intervention periods. The intervention led to important improvements in gestational age among non-Caucasian patients as their mean gestational age increased from 36.1 weeks before the intervention to 37.4 weeks afterward ($p = 0.007$).

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A marginal statistical significance was demonstrated by PHP participants who experienced increased gestational age ($p = 0.074$). The observed trend indicates a clinically important improvement yet this data was not decisive because of methodological constraints but showed the most promising results among non-Caucasian women. The PHP program delivered positive results through its success at extending pregnancy times for high-risk participants just before delivery. This extension reduces the risk factors that accompany preterm birth.

Infant Mortality Outcomes

Two time periods received analysis for their infant mortality rates (IMRs). The statistical analysis showed no change in infant mortality rates for Caucasian participants ($p = 1.000$) because pre-intervention death rates at 2.3% (3 deaths per 128 live births) remained steady at 1.9% (4 deaths per 207 live births) following intervention. While the significant decline could not be proved by statistics the observed downward direction provides evidence of possible positive impact.

The PHP program demonstrated a statistically significant effect on decreasing infant mortality rates for participants who were not Caucasian ($p = 0.007$). The intervention successfully reduced the infant mortality rate from 8.5% (reported through 10 deaths per 118 live births) in the initial stage to 1.8% (three deaths within 169 live births) after its implementation. Women who belonged to racial groups other than Caucasian faced five times greater risk of infant death when they did not join PHP (OR=5.1, 95% CI: 1.4–19.0).

Analysis of all participants showed the baby death rates decreased significantly from 5.3% (pre-intervention) to 1.9% (post-intervention). The initial 246 newborns faced 13 deaths resulting in an IMR of 5.3% while the subsequent 376 infants had seven deaths resulting in an IMR of 1.9% ($p = 0.018$). Among women who did not take PHP services the odds of infant death increased by 190% compared to those who received PHP services (OR = 2.9, 95% CI: 1.2–7.5).

Summary of Key Findings

The participation in PHP resulted in greater birth weights for non-Caucasian patients ($p = 0.002$) along with decreased occurrences of low birth weights.

The data demonstrated that non-Caucasian participants experienced greater gestational age growth ($p = 0.007$) although the entire study population achieved only minimal progress ($p = 0.074$).

Expected mortality rates for infants decreased significantly among non-Caucasian subjects ($p = 0.007$) as well as throughout the entire study group ($p = 0.018$).

No statistical change occurred in Caucasian participants yet their response patterns indicated potential enhancements.

6.Discussion

This study evaluates how the PHP program affects maternal health results at the time of birth.

The research shows that specialized perinatal health care projects including the Perinatal Health Partners (PHP) program yield substantial birth outcomes benefits for rural southeast Georgia's non-Caucasian population. The PHP program accomplished health outcome improvement among women and infants through its combination of home case management with prenatal education and medical monitoring and transport assistance for healthcare access. The data shows that community-based interventions demonstrate their potential to reduce perinatal health disparities since they have led to better birth weight results, advanced gestational age and reduced infant mortality rates.

Non-Caucasian participants demonstrated the most significant findings of enhanced birth weight statistics ($p = 0.002$), increased gestational age measures ($p = 0.007$) and reduced infant mortality patterns ($p = 0.007$). The conclusions from this study confirm previous academic findings about how restricted prenatal care availability and socioeconomic challenges and chronic stress caused by systemic bias define racial disparities in maternal-child health outcomes. The PHP program addressed healthcare barriers that included transportation problems and monetary limitations which led to improved pregnancy results for minority women.

Meager changes emerged among Caucasian birth participants compared to other ethnic groups. Statistical significance could not be established from the positive findings that showed less low birth weight births combined with a diminished infant mortality rate. The healthcare services in rural Georgia were likely more available to Caucasian women before PHP implementation which reduced the magnitude of enhancements under PHP intervention. The program recorded worse birth outcomes for non-Caucasian participants before enrollment so their improved results stood out more following PHP participation.

Significance of Birth Weight and Gestational Age Improvements

Neonatal morbidity and mortality risk factors significantly increase when birth weight remains below 2,500 grams because affected infants develop respiratory distress syndrome as well as developmental delays and persistent chronic health problems. The PHP program demonstrated its crucial function by producing significant results in decreasing low birth weight deliveries for non-Caucasian participants. The program's success might stem from improved maternal nutrition along with better prenatal monitoring combined with increased timeliness of medical interventions to manage pregnancy complications.

Perinatal health assessment requires thorough examination of gestational age. The occurrence of preterm births before week 37 gestation leads to more admissions in neonatal intensive care units and extended hospital stays as well as prospects of developing long-term developmental disabilities. A study showed that the PHP program successfully extended mean gestational age for non-Caucasian subjects and thus improved their infant health outcomes ($p = 0.007$). When pregnant individuals receive medical supervision and supportive assistance PHP helps extend their pregnancies and promotes lower prematurity rates thus delivering major health benefits and cost savings.

Reduction in Infant Mortality Rates: A Major Public Health Achievement

This study reveals a vital finding about decreased infant mortality rates among non-Caucasian participants along with the entire study population ($p = 0.007$ and $p = 0.018$ respectively). The rate of infant mortality functions as a primary measure of population health because it reveals both societal economic factors and public health systems efficiency and healthcare service availability. Non-Caucasian infant mortality rates dropped from 52.8 to 18.6 per 1,000 live births as the pre-intervention IMR of 5.3% reduced to 1.9% after intervention implementation.

Infant mortality reductions for non-Caucasian participants stand out as alarming because they show such great improvement. In the period before PHP started operation non-Caucasian women faced a 5.1 times higher risk of infant death compared to Caucasian women. The persistent healthcare access barriers alongside higher preterm birth rates and socioeconomic challenges result in higher death rates that affect Hispanic and African American newborns in a manner which coincides nationally. Community-based interventions that focus on high-risk populations demonstrate their ability to eliminate racial disparities in perinatal health outcomes through implementation of the PHP program.

7.Conclusion and Future work

Research outcomes highlight how community-supported perinatal healthcare services become fundamental for reducing birth outcome differences among vulnerable pregnant women located in rural areas lacking proper healthcare access. The Perinatal Health Partners (PHP) program brought positive effects to vital perinatal health measures when it was activated in southeast Georgia with improved birth weight measurements and extended gestational periods and lowered infant mortality statistics. The healthcare support system provided through PHP overcame previous healthcare access hurdles which predominantly affected non-Caucasian women by delivering specific and individualized medical assistance and home nursing services and transportation services.

The study results revealed a major decrease in low birth weight births with particular impact on non-Caucasian participants who showed this effect at ($p = 0.002$). Public health achievement status arises from the substantial decline in low birth weight because it produces less risk for early health complications in newborns and developmental delays along with ongoing medical conditions. The PHP program led non-Caucasian women to achieve longer gestational age at birth according to statistical analysis ($p = 0.007$). Consequently this reduced the risks of preterm complications. The PHP intervention directly prevented infant fatalities by delivering substantial reductions in mortality among non-Caucasian participants ($p = 0.007$).

The birth outcomes of Caucasian participants did not demonstrate statistical growth yet the observed positive trends indicated positive long-term potential effects. The possible reason for minimal intervention effects among Caucasian subjects could be their already established access to prenatal care services prior to the intervention. Researchers identify the program's success in equalizing perinatal health results between ethnicities as crucial because it demonstrates why specific healthcare policies must handle systematic unfairness.

The discovered results from the study create substantial implications regarding both health policy decisions and maternal healthcare system operations. These promising results relating to high-risk women show that similar measures should be deployed to additional rural communities. Public health officials together with healthcare administrators and policymakers must back community-guided maternal health programs which give pregnant women in high-risk categories convenient access to culturally sensitive whole-person healthcare services.

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This study shows that rural perinatal healthcare must receive proper investments to decrease infant mortality while enhancing maternal health results as well as fostering health equality. The PHP program stands as proof that specialized healthcare strategies successfully minimize racial differences in prenatal care quality thus enabling all mothers to receive excellent maternity services regardless of their economic position or racial identity. The research outcomes confirm national health goals defined by Healthy People 2030 by focusing on improving infant health and expanded prenatal care accessibility for all mothers.

The research presents strong evidence about PHP effectiveness yet more studies should investigate its long-term results together with best universal implementation strategies and adaptation potential across various populations. Research in the following stage needs to develop optimal strategies for PHP implementation to decrease healthcare costs and expand service accessibility for vulnerable communities.

Future work

This study demonstrates how the PHP program improves perinatal health outcomes but additional research and program development efforts will produce better results for maternal and infant healthcare among rural and underserved populations.

Future work requires conducting a continuing observational research to evaluate PHP's enduring effects on mothers and newborns. The research focused on quick birth measurements while it should investigate how the PHP program impacts extended child development and maternal wellness with evaluations of healthcare service consumption. The extended monitoring of PHP participant offspring should examine their brain development while assessing cognitive abilities alongside their physical wellness to enhance perinatal care approaches adopted by health personnel and government administrators.

Researchers must conduct future work that evaluates PHP against different perinatal care systems existing throughout various geographical locations. The research focused on rural southeast Georgia so additional studies of community-based interventions in both urban and suburban areas would reveal optimal approaches suitable for various population settings. Research that compares healthcare programs delivered to urban and rural mothers should provide meaningful details about special population demands to help design targeted intervention strategies.

Research on PHP and similar interventions needs to explore their cost efficiency through future studies. The studied program produced better birth results yet it requires assessment about whether healthcare expenses in perinatal case management produce lasting economic savings for health systems. The benefit analysis needs to assess how NICU admissions decrease alongside pregnancy complications while preterm births diminish and the increased birth weight results in lower medical expenses for children. Proving their economic efficiency would generate stronger advocacy to preserve funding that would pressure government institutions alongside healthcare organizations to maintain support for maternal community programs.

The study should investigate better ways to increase patient involvement when they participate in perinatal healthcare programs. The PHP recruitment succeeded in enrolling 713 high-risk pregnant women yet additional qualified women probably did not enroll because they lacked information about the PHP along with cultural issues and healthcare system distrust. Incoming research needs to study proven approaches for reaching high-risk pregnant women and their communities through educational programs and outreach practices to raise participation rates. Information gathered from patients should play a crucial role in maternal healthcare service development to enhance both program effectiveness and patient accessibility.

Perinatal healthcare programs require digital health technologies to be integrated effectively as a key future initiative. Future versions of PHP ought to integrate digital healthcare solutions including telemedicine, mobile applications and remote monitoring systems through which virtual prenatal consultations, mobile education programs and real-time health tracking for high-risk pregnancies will become possible. Such evaluations of telehealth-based perinatal interventions will enhance access to care for extremely remote women who currently have no way to reach healthcare facilities.

The program needs to expand its services toward new high-risk pregnancy populations. The current research concentrated on birth outcome variations among racial groups but follow-up investigations should determine intervention effectiveness for additional risk populations including teenagers and immigrants and urban low-income families. The understanding of how maternal health services interact with various health determinants based on social factors will allow the design of interventions that combat perinatal health gaps throughout the United States.

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Conflicts of interest

The authors have no conflicts of interest to declare

References

1. Sheldon WR, Blum J, Vogel JP, Souza JP, Gülmezoglu AM, Winikoff B. Postpartum haemorrhage management, risks, and maternal outcomes: findings from the World Health Organization Multicountry Survey on Maternal and Newborn Health. BJOG. 2014;121(Suppl 1):5-13.
2. Mousa HA, Blum J, Abou El Senoun G, Shakur H, Alfirevic Z. Treatment for primary postpartum haemorrhage. Cochrane Database Syst Rev. 2014;(2):CD003249.
3. Deneux-Tharaux C, Sentilhes L, Maillard F, Closset E, Vardon D, Lepercq J. Effect of tranexamic acid on postpartum hemorrhage among women with vaginal delivery: a randomized clinical trial. JAMA. 2018;319(8):781-788.
4. Sentilhes L, Winer N, Azria E, Sénat MV, Le Ray C, Vardon D, Perrotin F, Desbriere R, Fuchs F, Kayem G, Goffinet F, Deneux-Tharaux C. Tranexamic acid for the prevention of blood loss after vaginal delivery. N Engl J Med. 2018;379(8):731-742.
5. Shakur H, Roberts I, Fawole B, Chaudhri R, El-Sheikh M, Akintan A, Qureshi Z, Kidanto H, Vwalika B, Abdulkadir A, et al.; WOMAN Trial Collaborators. Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): an international, randomised, double-blind, placebo-controlled trial. Lancet. 2017;389(10084):2105-2116.
6. WHO Recommendations. WHO recommendations for the prevention and treatment of postpartum haemorrhage. World Health Organization. 2012.
7. Gyamfi-Bannerman C, Srinivas SK, Wright JD, Goffman D, Siddiq Z, D'Alton ME. Postpartum hemorrhage outcomes and race. Am J Obstet Gynecol. 2018;219(2):185.e1-185.e10.