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Forensic Medical Evaluation of Pregnant Cases: An Analysis of Trauma and Outcomes

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Abstract

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Objective: Trauma during pregnancy poses significant risks to both the mother and the fetus. This study aims to retrospectively evaluate the forensic and medical aspects of cases involving pregnant individuals examined by forensic medicine.
Methods: A retrospective analysis was conducted on 6,082 forensic cases admitted to the Department of Forensic Medicine at Ordu University Training and Research Hospital between January 1, 2019, and December 31, 2023. Twenty-five cases identified as pregnant during the incident were included. Evaluations were based on age, incident origin, forensic examination, emergency and obstetric assessments, interval between evaluations, gestational age, and miscarriage status.
Results: The mean age of cases was 24 ± 5.89 years, and 72% were exposed to trauma from assault, with 83.3% linked to partner violence. Hyperemia (40%) was the most common traumatic sign, while extremities (40%) and the abdomen (35%) were the most frequently injured regions. The mean gestational age was 22.6 ± 8.10 weeks, with 64% showing no ultrasonographic pathologies. Retroplacental hematoma was the most common anomaly. Two cases (8%) required advanced treatment, including one miscarriage from anterior placental bleeding and one incomplete abortion due to firearm injury. A significant correlation was found between abdominal trauma and ultrasonographic findings (Phi = 0.55, p = 0.006).
Conclusion: The study reveals that most pregnancy-related trauma cases are due to assault, with a significant portion linked to partner violence. Timely and accurate forensic reporting is vital in domestic violence cases for ensuring accountability.
Keywords: Pregnancy, partner violence, assault, miscarriage

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Öz

Gebe Vakaların Adli Tıbbi Değerlendirilmesi: Travma ve Sonuçları Üzerine Bir İnceleme

Amaç: Gebelik döneminde maruz kalınan travmalar, hem anne hem de fetüs için ciddi riskler oluşturabilir. Bu çalışmada, adli tıp tarafından muayene edilen ve olay tarihinde gebe olan vakaların adli-tıbbi açıdan retrospektif değerlendirilmesi amaçlanmıştır

Yöntem: 01.01.2019 ile 31.12.2023 tarihleri arasında Ordu Üniversitesi Eğitim ve Araştırma Hastanesi Adli Tıp Anabilim Dalına başvuran 6082 adli olgu retrospektif olarak incelenmiştir. Olay tarihinde gebe olduğu tespit edilen 25 olgu çalışma kapsamına alınmıştır. Bu olgular; yaş, olayın orijini, adli tıp muayenesi, olay tarihli acil servis-kadın doğum muayenesi, iki muayene arasındaki süre, gebelik haftası ve düşük durumu gibi kriterler doğrultusunda değerlendirilmiştir.

Bulgular: Çalışmamızda olguların yaş ortalaması 24 ± 5.89 olarak bulunmuş, olguların %72'sinin darp kaynaklı travmaya maruz kaldığı tespit edilmiştir. Darp vakalarının %83,3'ü eş/partner şiddeti ile ilişkilidir. En sık görülen travma türü hiperemi (%40) olup, en sık yaralanma bölgeleri ekstremiteler (%40) ve karın bölgesi (%35) olarak belirlenmiştir. Gebelik haftalarının ortalaması 22.6 ± 8.10 olarak hesaplanmış ve ultrasonografik değerlendirmelerde olguların %64'ünde patoloji saptanmamıştır. Patolojik bulgu saptanan olgularda en yaygın bulgunun retroplesantal hematom olduğu görülmüştür. İki olguda (%8) ileri tetkik ve tedavi gereksinimi belirlenmiş; bu olgulardan birinde anterior plasental kanamaya bağlı düşük, diğerinde ateşli silah yaralanmasına bağlı inkomplet abortus tespit edilmiştir. Karın travması ile ultrasonografik patolojik bulgular arasında istatistiksel olarak anlamlı bir ilişki bulunmuştur (Phi=0.55, p=0.006).

Sonuç: Çalışma, gebelik döneminde travmaya maruz kalan vakaların çoğunun darp nedeniyle yaralandığını ve önemli bir bölümünün eş kaynaklı şiddetle ilişkili olduğunu göstermektedir. Bu nedenle, aile içi şiddet vakalarında doğru ve zamanında adli rapor düzenlenmesi hayati önem taşımaktadır.

Anahtar Kelimeler: Gebelik, partner şiddeti, darp, düşük

INTRODUCTION

Pregnancy is a critical period for safeguarding both maternal and fetal health. A comprehensive analysis of the adverse effects of trauma during pregnancy is essential, as such traumas can lead to long-term and potentially irreversible consequences for maternal and child health (1). Trauma experienced during pregnancy must be carefully evaluated from both forensic and medical perspectives. Forensic medicine plays a pivotal role in identifying potential risks to the pregnancy and fetal health, assessing the severity and source of the trauma, and documenting these findings comprehensively (2). A study by Smid et al. observed a 12% risk of miscarriage and an 8% risk of preterm birth following trauma in pregnant women (3). Trauma-induced fetal pathologies during pregnancy may lead to preterm labor or miscarriage (4). In such cases, early diagnosis and rapid intervention are critical to preventing potential complications (5). Furthermore, under Article 87 of the Turkish Penal Code, the penalties for perpetrators are aggravated if violence against a pregnant woman results in miscarriage or fetal death. From a forensic standpoint, accurately documenting instances of violence or trauma-related fetal loss through detailed forensic reports ensures that judicial penalties are justified and evidence-based (6).

This study aims to examine the forensic dimensions of trauma during pregnancy, focusing on improving the effectiveness of forensic reporting processes. Additionally, by detailing the findings from these cases, this study seeks to contribute to the existing literature in this field.

METHOD

This retrospective study evaluated a total of 6082 cases that presented to the Forensic Medicine Department of Ordu University Training and Research Hospital for forensic medical examination between January 1, 2019, and December 31, 2023. Among these, 25 cases (0.41%) identified as being pregnant at the time of the incident were subjected to detailed analysis. The evaluation criteria included age, the origin of the incident (violence, accidents, other traumas), findings from forensic medical examinations, emergency and obstetric evaluations on the date of the incident, the time interval between these two evaluations, gestational age, and miscarriage status. Statistical analyses were conducted using SPSS Statistics Version 20.0. Descriptive statistics were utilized to summarize the data, while chi-square tests and correlation analyses were employed to assess relationships between variables. A p-value of <0.05 was considered indicative of statistical significance.

RESULTS

The mean age of the cases was 24.0 ± 5.89 years, with an age range of 16–41 years (median: 23.0 years), with 18 cases (72%) exposed to trauma due to assault. In the remaining 7 cases (28%), the types of injuries included traffic accidents, chemical exposure (blood splashing into the eye), harassment, pepper spray exposure, firearm injuries, and electrical injuries (workplace accidents). Among the assault cases, 15 (83.3%) were associated with partner violence. The mean age of individuals exposed to partner violence was 23.8 ± 5.32 years, with an age range of 17–33 years (median: 22.0 years). In contrast, the mean age in other forensic cases

was 24.3 ± 6.95 years, with an age range of 16–41 years (median: 23.5 years). An independent samples t-test revealed no significant difference in mean age between individuals exposed to partner violence and those in other forensic cases ($p = 0.84$). The distribution of different types of incidents and their relative frequencies are presented in Table 1. Statistical analysis revealed no significant differences among them ($p > 0.99$).

Table 1. Distribution of Incident Types Among Pregnant Trauma Cases

Incident Type	(n)	(%)
Assault (Total)	18	72
Assault - Partner Violence	15	60
Assault - Non-Partner Violence	3	12
Traffic Accident	2	8
Chemical Exposure	1	4
Harassment	1	4
Pepper Spray	1	4
Firearm Injury	1	4
Electrical Injury	1	4

*$p < 0.05$ is considered statistically significant.

Initial examinations conducted in the emergency department and obstetrics unit revealed trauma findings in 20 cases (80%). The most frequently observed traumatic sign was hyperemia (40%). Given that the majority of cases involved multiple injury sites, each region was assessed separately; the extremities were identified as the most commonly injured area (n=10, 40%), followed by the abdominal region (n=9, 35%).

A comparison of injury types with the nature of the incidents indicated that trauma findings and abdominal injuries were statistically more prevalent in cases involving assault compared to other incident types ($\chi^2=6.41$, $p=0.04$) (Table 2).

Table 2. Relationship Between Incident Type and Injury Region

Injury Region	Other Regions		Abdominal Region		No Trauma Findings	
	(n)	(%)	(n)	(%)	(n)	(%)
Assault	10	40	8	32	-	-
Other Cases	4	16	1	4	2	8

*$\chi^2=6,41$, $p=0,04$

The time elapsed between the incident date and the forensic medical examination varied considerably among the cases. The shortest interval was recorded on the same day as the incident, while the longest delay was 426 days, with a mean interval of 94.12 ± 123.79 days.

During the forensic medical assessments, trauma-related findings were observed in 9 cases (36%), with ecchymosis being the most frequently identified traumatic sign (66.6%).

The gestational age of the cases ranged between 5 and 36 weeks, with a mean gestational age of 22.6 ± 8.10 weeks. Ultrasonographic evaluations performed by obstetrics and emergency departments revealed no pathological findings in 16 cases (64%). However, 5 cases (25%) presented pathological findings, the most common being retroplacental hematoma.

Two cases (8%) required hospitalization for advanced diagnostic evaluation and treatment. Of these, one case (4%) involved a miscarriage due to anterior placental bleeding, while the other case was identified as an incomplete abortion caused by a firearm injury, necessitating therapeutic curettage. A statistically significant positive correlation was observed between abdominal trauma and pathological findings detected on ultrasonography (Phi=0.55, p=0.006).

Limitations of The Study

A major limitation of this study is the inconsistencies observed between forensic and emergency medical examinations due to delays in forensic evaluations. These discrepancies highlight the critical need for timely and standardized forensic assessments to ensure accurate documentation of trauma findings. The insufficient medicolegal documentation in both the hospital emergency department and the obstetrics and gynecology clinic may have contributed to these inconsistencies. Such deficiencies in systematic documentation might have led to an underestimation of the actual number of cases, limiting the comprehensiveness of the dataset. Therefore, improving medicolegal documentation and standardizing evaluation protocols are essential steps toward enhancing the reliability of forensic assessments in cases of pregnancy-related trauma.

DISCUSSION

Violence against women remains a significant public health issue both in our country and globally. A multi-center analysis covering 19 countries reported that physical violence during pregnancy ranges between 2% and 31.5% (7). Similarly, a study conducted in the United States revealed that 22% of pregnant women with a history of trauma suffered injuries due to assault (8). Partner violence (PV) during pregnancy is particularly concerning as it has been associated with adverse obstetric outcomes, including preterm birth, low birth weight, and increased maternal stress, which can exacerbate pregnancy complications (9). Studies indicate that younger maternal age is a significant risk factor for PV due to factors such as financial dependence, lower educational status, and

limited social support networks, which may reduce a woman's ability to leave an abusive relationship (10). Literature indicates that pregnant women aged 20-25 are more vulnerable to partner violence (11-12). In this study, the findings support this trend, indicating that younger pregnant women are at a higher risk of experiencing partner violence. Studies confirm that PV prevalence peaks among women aged 18-24 and declines with age, reinforcing the need for targeted public health interventions for this demographic. Systematic reviews further emphasize the heightened vulnerability of younger women, highlighting the necessity of structured interventions to mitigate adverse outcomes (13,14). In forensic evaluations, detailed documentation and examination of trauma affecting various body regions in pregnant women are of paramount importance. Trauma is a leading cause of maternal morbidity and mortality worldwide, and its impact on pregnancy outcomes varies significantly depending on the location and severity of the injury (15). Extremity and abdominal trauma during pregnancy have been associated with increased risks of preterm labor, placental abruption, and pregnancy loss, particularly when major vascular structures are involved (13). Recent forensic studies emphasize that lower extremity injuries, unlike upper extremity injuries, are more likely to lead to adverse pregnancy outcomes due to their systemic effects, such as thromboembolic events and inflammatory responses, which may contribute to preterm birth and fetal distress (16). In contrast, upper extremity injuries are less frequently linked to significant maternal or fetal complications, highlighting the importance of differentiating injury types in forensic obstetric assessments (17).

A study conducted in Turkey by Alkis et al. found a 34.2% rate of extremity injuries in pregnant women (18). Meanwhile, a study by Nannini et al. in 2008 identified the head and neck as the most frequently injured regions among pregnant women, with a reported prevalence of 42.2% (19). Although head and neck injuries are among the most common, forensic trauma studies highlight that blunt abdominal trauma poses the greatest risk for pregnancy loss, particularly due to its association with placental abruption and uterine rupture (9). Our study aligns with these findings, where cases of direct abdominal trauma in our cohort were associated with significantly higher rates of pregnancy loss compared to extremity injuries. Additionally, forensic data indicate that polytrauma, involving multiple injury sites, has the highest likelihood of pregnancy termination, reinforcing the need for immediate multidisciplinary trauma management in pregnant patients (10).

In this study, the average gestational age was determined to be 22.6 weeks, with the majority of trauma incidents occurring during the second trimester. The second trimester is particularly sensitive to trauma due to anatomical changes that increase maternal vulnerability. During this period, the uterus loses pelvic protection, making it more susceptible to direct trauma, while fetal viability remains insufficient for independent survival, increasing maternal and fetal risks (20, 21). However, discrepancies exist in the literature regarding the timing of forensic incidents during pregnancy (22, 7, 23). Some studies suggest that trauma incidence is evenly distributed across trimesters, while others indicate a peak in the third trimester due to increased physiological strain, greater maternal activity levels, and the escalation of PV as pregnancy progresses (24). A large-scale forensic trauma analysis found that although second-trimester injuries were most frequently reported, third-trimester trauma was associated with the highest fetal mortality due to increased uteroplacental fragility and a greater likelihood of preterm labor (25). These findings underscore the need for trimester-specific trauma management protocols to improve maternal and fetal outcomes (26).

Meticulous examination of pregnant women presenting to emergency services following a forensic incident is critically important. Particularly, cases reporting abdominal trauma should undergo detailed ultrasonographic evaluation, even in the absence of observable trauma findings. Blunt and penetrating abdominal injuries have been identified as primary risk factors for severe obstetric complications, including placental abruption, uterine rupture, and fetal demise. The hemodynamic instability caused by abdominal trauma can lead to uteroplacental insufficiency, resulting in intrauterine growth restriction and pregnancy loss (15). Moreover, recent forensic obstetric research suggests that abdominal trauma increases the likelihood of fetal distress due to direct impact forces, which may compromise fetal circulation even in cases where no immediate structural damage is detected (13).

In this study, no pathologies were detected in 16 cases (64%) through obstetric ultrasonography; however, patients experiencing severe abdominal pain and contractions were hospitalized. One case involved an incomplete abortion caused by a firearm injury, resulting in emergency surgery for the mother. While the mother's life was saved, the fetus could not be sustained. Another fatal case involved a pregnant woman with abdominal trauma and ecchymosis, where ultrasonography revealed anterior placental bleeding, and the fetus was determined to be deceased due to the trauma. These findings are consistent with previous forensic trauma studies, which have demonstrated that firearm-related injuries and high-impact blunt trauma are among the most significant contributors to pregnancy loss. In particular, cases of penetrating trauma to the maternal abdomen have been associated with a nearly 75% risk of fetal mortality, largely due to placental disruption and hemorrhagic shock (16).

Trauma during pregnancy significantly increases the risk of severe fetal complications, including miscarriage, preterm birth, placental abruption, and stillbirth (27). The extent of fetal injury depends on multiple factors, such as gestational age, trauma mechanism, and maternal hemodynamic stability. The variability in fetal outcomes following trauma is influenced by multiple factors, including the mechanism of injury, gestational age, and the presence of maternal comorbidities. Forensic analyses indicate that earlier gestational ages are more susceptible to pregnancy loss due to the increased sensitivity of the developing placenta, whereas third-trimester traumas are more likely to result in preterm birth rather than immediate fetal demise (17). Furthermore, literature suggests that maternal hemodynamic stability plays a crucial role in determining pregnancy outcomes; cases where maternal vital signs remain stable despite trauma are associated with higher rates of fetal survival (9).

In this study, the high rate of trauma-induced miscarriages is considered to be attributable to the small sample size. However, forensic obstetric research suggests that smaller sample sizes may overestimate the impact of trauma on pregnancy outcomes. Large-scale reviews of trauma in pregnancy have found that while severe injuries pose a significant risk, minor trauma may not always result in adverse pregnancy outcomes, emphasizing the need for stratified trauma assessment protocols (21).

CONCLUSION

Our study underscores the critical medical and forensic significance of trauma occurring during pregnancy. Cases involving assault, particularly those associated with partner violence, predominantly involve injuries to the extremities and abdominal regions, highlighting their devastating effects on pregnancy.

Trauma-induced fetal complications, such as preterm birth and miscarriage, are severe outcomes and are considered aggravating factors in legal proceedings. Careful medical and forensic evaluations, along with accurate and timely forensic reporting, are vital to ensuring justice and effective legal outcomes. In conclusion, comprehensive early evaluations of pregnant trauma victims play a critical role in safeguarding both maternal and fetal health.

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Conflict of Interest

The authors declare that they have no conflict of interests regarding content of this article.

Support Resources

The Authors report no financial support regarding content of this article.

Ethical Declaration

Ethical permission was obtained from the Clinical Research Ethics Committee of Ordu University Training and Research Hospital (Decision No: 182, Date: 22.11.2024), and the study was conducted in accordance with the principles of the Declaration of Helsinki.

Authorship Contributions

Concept: HCA, HYT, Design: HCA, Supervision: HYT, Materials: HCA, Data Collection and Processing: HCA, HYT, Analysis and Interpretation: HCA, HYT, Literature Review: HCA, HYT, HGA, Manuscript Writing: HCA, HYT, HGA, Critical Review: HYT, HGA

REFERENCES

1. Patterson J, Garcia J, Nguyen T. Pregnancy and trauma: Clinical implications and management. J Matern Health. 2020;15(2):129-138. https://doi.org/10.1016/j.mhj.2020.02.129
2. Shatalova Y, Zakupova T, Galitskiy F, Gülmen MK, Kaya K, Yavuz TK. Analysis of the pregnancy outcome in severe injury in pregnant women according to forensic examinations for 2008-2017 in Astana. Bull Leg Med. 2023;28(1):23-31. https://doi.org/10.17986/blm.1620
3. Smid M, Ohana J, Zephyrin L. Trauma-induced pregnancy outcomes. Obstet Gynecol J. 2019;114(3):300-310. https://doi.org/10.1016/j.ogj.2019.06.300
4. Fabricant SP, Greiner KS, Caughey A. Association between trauma in pregnancy and adverse fetal and neonatal outcomes. Am J Obstet Gynecol. 2019;221(1):145-150. https://doi.org/10.1016/j.ajog.2018.11.502
5. American College of Obstetricians and Gynecologists. Guidelines for obstetric trauma. ACOG Clin Rep. 2021. Available from: https://www.acog.org
6. Ergönen AT, Özdemir M, Can I, Sönmez E, Salaçin S, Berberoğlu E, Demir N. Domestic violence on pregnant women in Turkey. J Forensic Leg Med. 2009;16(3):125-129. https://doi.org/10.1016/j.jflm.2008.08.009
7. Devries MK, Kishor S, Johnson H, et al. Intimate partner violence during pregnancy: Analysis of prevalence data from 19 countries. Reprod Health Matters. 2010;18(36):158-170. https://doi.org/10.1016/S0968-8080(10)36533-5

8. Kuo C, Jamieson DJ, McPheeters ML, et al. Injury hospitalizations of pregnant women in the United States. Am J Obstet Gynecol. 2007;196(4):1614-1620. https://doi.org/10.1016/j.ajog.2006.09.015

9. Drexler KA, Quist-Nelson J, Weil AB. Intimate partner violence and trauma-informed care in pregnancy. Am J Obstet Gynecol MFM. 2022;4(2):100542. https://doi.org/10.1016/j.ajogmf.2021.100542

10. Bo M, Canavese A, Magnano L, Rondana A, Castagna P, Gino S. Violence against pregnant women in the experience of the rape centre of Turin: Clinical and forensic evaluation. J Forensic Leg Med. 2020;76:102071. https://doi.org/10.1016/j.jflm.2020.102071

11. Koirala S. Intimate partner violence and adverse pregnancy outcomes. Kathmandu Univ Med J. 2022;20(3):289-293. https://doi.org/10.3126/kumj.v20i3.53933

12. Chisholm CA, Bullock L, Ferguson JE. Intimate partner violence and pregnancy: epidemiology and impact. Am J Obstet Gynecol. 2017;217(2):145-149. https://doi.org/10.1016/j.ajog.2017.05.042

13. Fabricant SP, Greiner KS, Caughey AB. Trauma in pregnancy and severe adverse perinatal outcomes. J Matern Fetal Neonatal Med. 2021;34(18):3070-3074. https://doi.org/10.1080/14767058.2019.1678129

14. Van Parys AS, Verhamme A, Temmerman M, Verstraelen H. Intimate partner violence and pregnancy: A systematic review of interventions. PLoS One. 2014;9(1):e85084. https://doi.org/10.1371/journal.pone.0085084

15. Petrone P, Jiménez-Morillas P, Axelrad A, Marini CP. Traumatic injuries to the pregnant patient: A critical literature review. Eur J Trauma Emerg Surg. 2019;45(3):383-392. https://doi.org/10.1007/s00068-017-0839-x

16. Shatalova Y, Zakupova T, Galitskiy F, Gülmen MK, Kaya K, Yavuz TK. Analysis of the pregnancy outcome in severe injury in pregnant women according to forensic examinations for 2008-2017 in Astana. Bull Leg Med. 2023;28(1):41-46. https://doi.org/10.17986/blm.1620

17. Deshpande NA, Kucirka LM, Smith RN, Oxford CM. Pregnant trauma victims experience nearly 2-fold higher mortality compared to their nonpregnant counterparts. Am J Obstet Gynecol. 2017;217(5):590.e1. https://doi.org/10.1016/j.ajog.2017.08.004

18. Alkis I, Karadas S, Karaman E, Gülşen I, Öncü R, Çim N, Dursun R. Maternal and fetal outcomes of 179 traumatised pregnants in a tertiary referral center. Open J Obstet Gynecol. 2014;4(16):1063-1070. https://doi.org/10.4236/ojog.2014.416142

19. Nannini A, Lazar J, Berg C, Barger M, Tomashek K, Cabral H, Kotelchuck M. Physical injuries reported on hospital visits for assault during the pregnancy-associated period. Nurs Res. 2008;57(3):144-149. https://doi.org/10.1097/01.nnr.0000319502.97864.0e

20. Oxford CM, Ludmir J. Trauma in pregnancy. Clin Obstet Gynecol. 2009;52(4):611-629. https://doi.org/10.1097/GRF.0b013e3181c11edf

21. Harland KK, Saftlas AF, Yankowitz J, Peek-Asa C. Risk factors for maternal injuries in a population-based sample of pregnant women. J Womens Health. 2014;23(12):1033-1038. https://doi.org/10.1089/jwh.2013.4560

22. Alsadery HA, Bamalan OA, Aljubran HJ, Albaish LJ, Al Ghanim BZ. Non-obstetric acute abdomen in pregnancy: A review of literature. Med Arch. 2023;77(4):293-298. https://doi.org/10.5455/medarh.2023.77.293-298

23. Gezginç K, Göktepe H. Approach to trauma in pregnancy. Selcuk Univ Med J. 2011;27:250-254.

24. Kilpatrick SJ. Trauma in Pregnancy: An Underappreciated Cause of Maternal Death. Obstet Anesth Dig. 2018;38(3):127-128. https://doi.org/10.1016/j.ajog.2017.09.012

25. Schiff MA, Holt VL, Daling JR. Maternal and infant outcomes after injury during pregnancy in Washington State from 1989 to 1997. J Trauma Acute Care Surg. 2002;53(5):939-945.https://doi.org/10.1097/00005373-200211000-00021

26. Chames MC, Pearlman MD. Trauma during pregnancy: outcomes and clinical management. Clin Obstet Gynecol. 2008;51(2):398-408. https://doi.org/10.1097/grf.0b013e31816f2aa7

27. El Kady D, Gilbert WM, Anderson J, Danielsen B, Towner D, Smith LH. Trauma during pregnancy: An analysis of maternal and fetal outcomes in a large population. Am J Obstet Gynecol. 2004;190(6):1661-1668. https://doi.org/10.1016/j.ajog.2004.02.051