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ASSESSMENT OF PREGNANCY MANAGEMENT AND OUTCOMES AMONG PRIMIGRAVID WOMEN AT DONG NAI-2 HOSPITAL

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ABSTRACT

Objective: This study aimed to evaluate antenatal care practices, pregnancy abnormalities, and birth outcomes, and to identify associated factors among primigravid women.

Subjects and methods: A prospective longitudinal observational study was conducted to evaluate antenatal care, pregnancy abnormalities, birth outcomes, and associated factors among primigravid women managed at Dong Nai-2 Hospital from June 2025 to February 2026.

Results: Of 202 participants, 15 (7.4%) experienced miscarriage, leaving 187 women followed throughout pregnancy. All underwent prenatal screening, and 99.5% completed tetanus vaccination. Antenatal care was initiated early, with 50.5% at 8-12 weeks and 48.5% before 8 weeks, and a mean of 13.7 visits. Pregnancy abnormalities occurred in 44.6%, most commonly gestational diabetes mellitus (24.8%) and prelabor rupture of membranes (17.3%). Cesarean section was the predominant mode of delivery (57.8%), mainly due to cephalopelvic disproportion (30.5%) and arrest of labor (13.4%). Neonatal outcomes were generally favorable, including low birth weight (5.9%), preterm birth (3.7%), and respiratory distress (0.5%), with unfavorable outcomes in 21.9%. In multivariable analysis, maternal age 25-34 years and rural residence were associated with higher odds of pregnancy abnormalities, whereas a first antenatal visit before 8 weeks was associated with lower odds. A higher number of antenatal visits was associated with reduced odds of unfavorable outcomes (aOR = 0.84, 95% CI: 0.77-0.91), while pregnancy abnormalities increased this risk (aOR = 3.15, 95% CI: 1.53-6.49).

Conclusion: Despite generally adequate antenatal care, pregnancy abnormalities remained common and were the main determinant of adverse outcomes, underscoring the importance of early and continuous monitoring.

Keywords: Pregnancy outcome, pregnant women, primigravid, pregnancy management.

1. INTRODUCTION

First pregnancy represents a unique physiological stage that may also pose various risks to both the mother and the fetus. The World Health Organization (WHO) emphasizes that a model of at least eight antenatal visits helps reduce perinatal mortality and enhances early detection of pregnancy-related complications [1]. Adequate and guideline-based antenatal care plays a crucial role in improving maternal and neonatal outcomes. However, adequate antenatal care does not necessarily prevent all pregnancy-related abnormalities from occurring, rather, its main value lies in the early identification, close monitoring, and timely management of complications when they arise. This issue is particularly relevant in primigravid women, in whom several important obstetric disorders may develop later in pregnancy or remain difficult to predict at the first antenatal visit. Indicators reflecting the quality of pregnancy management include the timing of the first antenatal visit, the number of antenatal visits, the proportion of recommended tests and screening procedures performed, and the level of maternal compliance. Pregnancy outcomes are assessed through the mode of delivery, gestational age at birth, birth weight, neonatal health status, and maternal obstetric complications [2,3].

Globally, preterm birth accounts for approximately 10.6% of all births and remains a leading cause of neonatal mortality, highlighting the importance of effective antenatal care in improving perinatal outcomes [4]. Despite relatively clear recommendations on antenatal follow-up, evidence is still limited regarding how pregnancy abnormalities emerge during follow-up among primigravid women and how these abnormalities subsequently affect birth outcomes in real-world clinical settings. In Vietnam, several authors have reported data on antenatal care, However, studies specifically focusing on primigravid women and analyzing associated factors. In particular, longitudinal evidence that follows primigravid women from the first antenatal visit through the end of pregnancy to evaluate both antenatal care practices and incident pregnancy abnormalities in relation to pregnancy outcomes is still scarce. Therefore, this study was conducted to assess the status of pregnancy management and pregnancy outcomes and to analyze related factors among primigravid women at Dong Nai-2 Hospital.

2. SUBJECTS AND METHODS

2.1. Study design: A prospective longitudinal

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observational study .

2.2. Study setting and period of study: At Dong Nai-2 Hospital from 2025 to 2026.

2.3. Study participants

Primigravid women who attended their first antenatal visit during the first trimester at Dong Nai -2 Hospital in from June 2025 to February 2026.

- Inclusion criteria

Pregnant women aged 18 years or older with a gestational age of less than 13 weeks and 6 days (determined based on the last menstrual period if the menstrual cycle was regular with a 28-day cycle, or by ultrasound if the last menstrual period was unknown or cycles were irregular), primigravid women, women attending their first antenatal visit, and those who agreed to participate in the study.

- Exclusion criteria

Pregnant women with a history of severe medical conditions prior to pregnancy, such as advanced cardiovascular disease, end-stage chronic kidney disease, uncontrolled diabetes mellitus, severe progressive autoimmune diseases, or ongoing cancer treatment that may affect pregnancy outcomes. Women diagnosed with ectopic pregnancy or hydatidiform mole were excluded. Pregnant women with impaired consciousness or acute or chronic psychiatric disorders affecting their ability to cooperate were also excluded. In addition, women who could not be followed throughout the entire pregnancy and deliver at Dong Nai -2 Hospital were excluded from the study.

2.4. Sample size and sampling method

The sample size was calculated using the formula:

$$n = Z^2_{1-\alpha/2} \frac{p(1-p)}{d^2}$$

In this formula, n represents the minimum required sample size, Z is the standard normal distribution value, α is the probability of a type I error. With α = 0.05, the corresponding value is $Z_{0,975}$ = 1.96. The absolute precision (d) was set at 0.05, and p represents the cesarean section rate among primigravid women. According to the study by Vo Hoang Lam et al. (2024), the reported rate was 10.3% [4]. Based on this formula, the estimated sample size was 142 participants. In practice, a total of 202 primigravid women were recruited for the study.

2.5. Study variables

General characteristics: Age, living place, body mass index (BMI), highest education, and history of chronic diseases.

Assessment of pregnancy management among primigravid women: Antenatal care status was defined as the period before the onset of labor and delivery and included the number of antenatal visits, gestational age at the first visit, and pregnancy abnormalities, including polyhydramnios/oligohydramnios, threatened preterm labor, preeclampsia, gestational diabetes mellitus, premature rupture of membranes, prelabor rupture of membranes, intrauterine growth restriction, small for gestational age fetus, and placenta accreta.

Pregnancy outcomes among primigravid women: Birth outcomes among primigravid women were assessed in terms of maternal and neonatal outcomes. Maternal outcomes included mode of delivery, indications for cesarean section, and postpartum complications, whereas neonatal outcomes included low birth weight, preterm birth, and respiratory distress. In addition, unfavorable intrapartum events were also considered clinically relevant adverse outcomes. Accordingly, the composite outcome unfavorable pregnancy outcomes was defined as the occurrence of any poor maternal outcome, poor neonatal outcome, or unfavorable labor and delivery event, including assisted vaginal delivery or intrapartum cesarean section due to fetal distress or arrest of labor.

2.6. Data collection

Follow-up and antenatal care management: Pregnant women were followed according to the standard antenatal care protocol, with monthly visits until 28 weeks of gestation, biweekly visits from 28 to 36 weeks, and weekly visits thereafter until delivery. Assessments included maternal health evaluation, fundal height measurement, fetal growth ultrasound, fetal heart rate monitoring, and Doppler examination when indicated. Tetanus vaccination status, nutritional supplementation, and counseling on diet and lifestyle were routinely reviewed. Prenatal screening was performed according to gestational age, including the Double test (11-13 weeks), Triple test (15-20 weeks), and non-invasive prenatal testing from 10 weeks when indicated or requested. Pregnancy complications, including threatened miscarriage, fetal demise, polyhydramnios, oligohydramnios, preeclampsia, gestational diabetes mellitus, placental abruption, and placenta previa, were diagnosed based on current clinical and paraclinical criteria. Fetal status was assessed by ultrasound for intrauterine fetal demise, congenital anomalies, intrauterine growth restriction, and small for gestational age. Labor-related conditions such as preterm birth and membrane rupture were also recorded.

Follow-up of pregnancy outcomes: Pregnancy outcomes were assessed at delivery and during the postpartum period. Data included mode of delivery, indications for cesarean section, and maternal complications. Neonatal outcomes were evaluated based on birth weight, Apgar scores at 1 and 5 minutes, need for special care, and postnatal abnormalities.

2.7. Data analysis

The collected data were entered, checked, and cleaned before analysis using SPSS version 26.0. Categorical variables were presented as frequencies and percentages, whereas continuous variables were described as mean ± standard deviation (SD). Factors associated with pregnancy abnormalities and unfavorable pregnancy outcomes were first evaluated using univariable logistic regression to estimate odds ratio (OR) and their 95% confidence interval (95%CI). Variables with statistical significance or a p value < 0.20 in the univariable analysis were included in the multivariable logistic regression model. Statistical significance was set at $p < 0.05$.

2.8. Ethical considerations

This study was approved by the Biomedical Research Ethics Committee of Can Tho University of Medicine and Pharmacy (approval No. 25.385.HV/PCT-HĐĐĐ, dated June 30, 2025). All procedures were conducted in accordance with ethical principles for medical research.

3. RESULTS

During the study period from June 2025 to February 2026, a total of 202 primigravid women were managed and followed for pregnancy outcomes at Dong Nai 2 Hospital. All patients, except those with miscarriage (n = 187), underwent prenatal screening, including

non-invasive prenatal testing in 66.8% and the double test in 33.2%, and all screening results were normal. In addition, nearly all participants had completed tetanus vaccination, with 99.5% receiving all three recommended doses. Some general characteristics and antenatal care status of the study participants are presented in Table 1.

Table 1. General characteristics of the study participants and pregnancy abnormalities

Characteristics (n = 202)		n	%
Age group	18-24	95	47.0
	25-29	87	43.1
	30-34	20	9.9
BMI	Underweight	24	11.8
	Normal	168	83.2
	Overweight and obese	10	5.0
Living places	Rural area	128	63.4
	Urban area	74	36.6
Highest education	Primary school or below	14	6.9
	Secondary school	33	16.3
Highest education	High school	57	28.2
	Above high school	98	48.5
History of chronic diseases		7	3.5
Antenatal visits (times), mean (SD) [Min-Max]		13.7 (4.4) [2-22]	
Gestational age at the first visit	< 8 weeks	98	48.5
	8-12 weeks	102	50.5
	12-<14 weeks	2	1.0
Polyhydramnios		5	2.5
Oligohydramnios		11	5.4
Threatened preterm labor		6	3.0
Preeclampsia		3	1.5
Gestational diabetes mellitus		50	24.8
Preterm prelabor rupture of membranes		3	1.5
Prelabor rupture of membranes		35	17.3
Intrauterine growth restriction		6	3.0
Small for gestational age		8	4.0
Placenta accreta		1	0.5
Missed miscarriage		15	7.4
Fetal macrosomia		3	1.5
Abnormalities during pregnancy		90	44.6

Table 1 summarizes the baseline characteristics of 202 participants and the distribution of pregnancy abnormalities. Most women were aged 18-24 years (47.0%) or 25-29 years (43.1%), with 9.9% aged 30-34 years. The majority had normal BMI (83.2%), resided in rural areas (63.4%), and had education above high school (48.5%). A history of chronic disease was reported in 3.5%. The mean number of antenatal visits was 13.7 (range 2-22). First antenatal visits occurred mainly at 8-12 weeks (50.5%) or before 8 weeks (48.5%), while only 1.0% attended at 12-14 weeks. Overall, pregnancy abnormalities were identified in 44.6% of participants, including missed miscarriage in 7.4%. Gestational diabetes mellitus was the most common abnormality (24.8%), followed by prelabor rupture of membranes (17.3%) and oligohydramnios (5.4%). Other conditions were less frequent, including small for gestational age (4.0%), threatened preterm labor and intrauterine growth restriction (3.0% each), polyhydramnios (2.5%), preeclampsia and fetal macrosomia (1.5% each), and placenta accreta (0.5%).

Table 2. Univariable and multivariable logistic regression analysis of factors associated with adverse pregnancy outcomes

Characteristics	Abnormalities during pregnancy		Univariable		Multivariable	
	Yes (n = 90)	No (n = 112)	OR (95%CI)	p	OR (95%CI)	p
Age group 25-34 years, n (%)	60 (66.7)	47 (42.0)	2.76 (1.55-4.92)	< 0.001	2.78 (1.43-5.40)	0.003
BMI, mean (SD)	20.8 (2.6)	20.3 (1.8)	1.10 (0.97-1.25)	0.119	1.10 (0.96-1.26)	0.141
Rural area, n (%)	66 (73.3)	62 (55.4)	2.21 (1.22-4.03)	0.009	2.53 (1.32-4.84)	0.005
Above high school, n (%)	50 (55.6)	48 (42.9)	1.66 (0.95-2.91)	0.073	1.17 (0.60-2.25)	0.638
Chronic disease, n (%)	3 (3.3)	4 (3.6)	0.93 (0.20-4.27)	0.927	-	-
Antenatal visits, mean (SD)	13.5 (5.6)	13.9 (3.3)	0.97 (0.91-1.04)	0.475	-	-
Gestational age at first prenatal visit (< 8 wks), n (%)	54 (60.0)	44 (39.3)	0.43 (0.24-0.76)	0.004	0.43 (0.24-0.80)	0.007

The multivariable logistic regression analysis (in Table 2) showed that maternal age 25-34 years and rural residence were associated with a higher likelihood of pregnancy abnormalities, with adjusted odds ratios of 2.78 (95%CI: 1.43-5.40) and 2.53 (95%CI: 1.32-4.84), respectively. In contrast, having the first antenatal visit before 8 weeks

of gestation was associated with a lower likelihood of pregnancy abnormalities, with an adjusted odds ratio of 0.43 (95%CI: 0.24-0.80).

Table 3. Pregnancy outcomes of primigravid women

Characteristics		n	%
Maternal outcomes (n = 202)			
Termination of pregnancy with mifepristone + misoprostol		15	7.4
Mode of delivery (n = 187)	Vaginal delivery	78	41.7
	Assisted delivery	1	0.5
	Cesarean section	108	57.8
Indications for cesarean section (n = 108)	Fetal macrosomia	5	2.7
	Fetal distress	4	2.1
	Cephalopelvic disproportion	57	30.5
	Arrest of labor	25	13.4
	Others (placenta accreta, oligohydramnios, preeclampsia, etc.)	18	9.6
Postpartum complications		0	0.0
Neonatal outcomes (n = 187)			
Low birth weight		11	5.9
Preterm birth		7	3.7
Respiratory distress		1	0.5

In Table 3, All cases of missed miscarriage (n = 15) were terminated medically with mifepristone plus misoprostol. Regarding maternal outcomes, cesarean section was the most common mode of delivery, accounting for 57.8% of cases, while vaginal delivery was recorded in 41.7% and assisted delivery in 0.5%. Among women who underwent cesarean section, cephalopelvic disproportion was the most frequent indication (30.5%), followed by arrest of labor (13.4%), other indications including placenta accreta, oligohydramnios, and preeclampsia (9.6%), fetal macrosomia (2.7%), and fetal distress (2.1%). No postpartum complications were observed in the study population. Regarding neonatal outcomes, low birth weight was the most common adverse outcome, occurring in 5.9% of newborns, followed by preterm birth in 3.7%, whereas respiratory distress was rare, accounting for 0.5%.

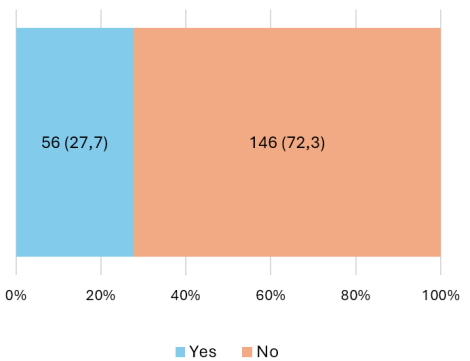


Figure 1. Unfavorable pregnancy outcomes among primigravid women

Unfavorable pregnancy outcomes were observed in 56 primigravid women, accounting for 27.7% of the study population, whereas 146 women (72.3%) did not experience unfavorable pregnancy outcomes (see Figure 1).

Table 4. Univariable and multivariable logistic regression analysis of factors associated with unfavorable pregnancy outcomes

Factors	Univariable		Multivariable	
	OR (95%CI)	p	OR (95%CI)	p
Age group 25-34 years	0.84 (0.45-1.57)	0.601		
BMI	1.04 (0.91-1.20)	0.505		
Rural	2.70 (1.32-5.54)	0.007	2.02 (0.92-4.43)	0.079
Above high school	0.80 (0.43-1.49)	0.496		
Chronic disease	0.42 (0.05-3.60)	0.432		
Antenatal visits	0.84 (0.78-0.91)	< 0.001	0.84 (0.77-0.91)	< 0.001
First prenatal visit < 8wks	0.55 (0.30-1.04)	0.068	1.71 (0.83-3.53)	0.145
Abnormalities during pregnancy	3.81 (1.98-7.34)	< 0.001	3.15 (1.53-6.49)	0.002

In Table 4, on multivariable logistic regression, a higher number of antenatal visits was independently associated with reduced odds of unfavorable pregnancy outcomes (OR = 0.84, 95%CI: 0.77-0.91), whereas abnormalities during pregnancy were independently associated with increased odds of unfavorable pregnancy outcomes (OR = 3.15, 95%CI: 1.53-6.49).

4. DISCUSSION

The study indicates that antenatal care among primigravid women at Dong Nai-2 Hospital was generally adequate, characterized by early initiation and regular follow-up. Nevertheless, pregnancy abnormalities remained relatively common, and the cesarean section rate was high. Abnormalities were more frequently observed in women aged 25-34 years and those living in rural areas, whereas a first antenatal visit before 8 weeks of gestation was associated with lower odds of abnormalities. Unfavorable pregnancy outcomes were less likely with a higher number of antenatal visits but were more likely among women who developed abnormalities during pregnancy. Overall, these findings underscore the importance of early and continuous antenatal care, particularly for higher-risk groups, to facilitate timely detection of complications and improve outcomes.

Regarding antenatal care practices, the number of antenatal visits in this study exceeded the WHO recommendation of at least eight visits [1]. As participants were enrolled from early pregnancy, the gestational age at the first recorded visit should be interpreted as a cohort characteristic rather than a population-level indicator of access. Overall, antenatal

care appeared relatively adequate, reflected by frequent follow-up, universal prenatal screening, and near-complete tetanus vaccination coverage. Compared with the study by Nguyen Thanh Hai (2020) in Hue, where the mean gestational age at first visit was 16.2 weeks, women in this cohort had earlier antenatal engagement[3]. Despite this, pregnancy abnormalities were identified in 44.6% of primigravid women. This should not be interpreted as a limitation of antenatal care, but is consistent with the WHO framework, in which antenatal care improves outcomes primarily through early detection, close monitoring, and timely management rather than complete prevention of complications. Maternal age 25-34 years and rural residence were independently associated with a higher likelihood of abnormalities, whereas a first antenatal visit before 8 weeks of gestation was associated with a lower risk. The age-related association is biologically plausible, as gestational diabetes mellitus was the most common abnormality, and its risk has been shown to increase linearly with maternal age in a large meta-analysis by Li et al. [5]. The higher risk observed in rural women is consistent with Vietnamese data reported by Tran et al., who demonstrated substantial urban-rural disparities in antenatal care utilization, including fewer visits, lower first-trimester attendance, and reduced coverage of essential services (4.4 vs. 7.7 visits, 69.1% vs. 97.2%, and 20.3% vs. 81.1%, respectively) [6]. Finally, the inverse association between early initiation of antenatal care and pregnancy abnormalities likely reflects the benefit of earlier access to counseling, risk assessment, and closer monitoring, rather than indicating a direct causal protective effect.

With regard to birth outcomes, the cesarean section rate in this study was 57.8%, markedly higher than the global average of 21.1% reported by Betran et al. In this cohort, cephalopelvic disproportion and arrest of labor were the main indications, accounting for 30.5% and 13.4%, respectively [7]. This pattern is clinically plausible in primigravid women. Zhang et al. showed that labor progression in nulliparous women is substantially slower than described by the classic Friedman curve, with a mean duration of approximately 5.5 hours from 4 to 10 cm cervical dilation compared with 2.5 hours under the Friedman model [8]. These findings suggest that early diagnosis of labor dystocia may contribute to a higher rate of intrapartum cesarean section. In contrast, neonatal outcomes were relatively favorable. The preterm birth rate was 3.7%, notably lower than the global estimate of 10.6% reported by Chawanpaiboon et al. [4], while the rate of low birth weight was 5.9%, also below the 14.7% global estimate for 2020 reported by Okwaraji et al. [9]. Taken together, these results suggest that although intervention during delivery remained frequent, antenatal surveillance and intrapartum management may have contributed to reducing more severe neonatal adverse outcomes.

An important finding of this study was that, in the multivariable model, a higher number of antenatal visits was independently associated with reduced odds of unfavorable pregnancy outcomes, whereas pregnancy abnormalities were associated with increased odds. This suggests that the link between antenatal care and adverse outcomes is driven less by baseline characteristics and more by complications arising during pregnancy. This interpretation is supported by the predominance of gestational diabetes mellitus in the cohort. A systematic review and meta-analysis by Ye et al. reported that gestational diabetes mellitus is independently associated with higher risks of cesarean delivery, preterm birth, macrosomia, large-for-gestational-age infants, respiratory distress syndrome, and neonatal intensive care unit admission [10]. Taken together, these findings indicate that the value of antenatal care in primigravid women lies primarily in early detection and timely management of emerging complications, rather than complete prevention. The observed protective association of a higher number of antenatal visits likely reflects closer surveillance and more appropriate clinical intervention during pregnancy.

Some limitations of this study should be acknowledged. First, it was conducted at a single provincial hospital with a relatively small sample, which may limit generalizability. Second, although participants were followed from early pregnancy to delivery, the analysis focused on overall antenatal care rather than the management of specific pregnancy abnormalities. Third, some outcomes were infrequent, particularly postpartum complications and rare abnormalities, potentially affecting the precision of estimates. Finally, the composite outcome of unfavorable pregnancy outcomes included heterogeneous components, which may not fully reflect the distinct mechanisms underlying individual adverse events.

5. CONCLUSION

Although primigravid women generally received adequate antenatal care and regular follow-up, pregnancy abnormalities still occurred at a considerable rate. Among the examined factors, abnormalities during pregnancy were the main determinant of unfavorable pregnancy outcomes. These findings highlight that in primigravid women, the value of antenatal care lies not only in adequate service coverage but also in the early detection and close monitoring of incident abnormalities throughout pregnancy.

REFERENCES

[1] World Health Organization. WHO recommendations on antenatal care for a positive pregnancy experienceGeneva: WHO. 2016.

[2] Mihretie GN, Habitamu A. Pregnancy outcomes among women who gave birth at health institutions: A cross-sectional study. Health Sci Rep. 2022;5(5):e843. https://doi.org/10.1002/hsr2.843.

[3] Nguyen Thanh Hai, Vo Thi Ngoc Anh, Tran Thi My Hanh, Le Thi Hong Hanh, et al. Adolescent pregnancies: Characteristics and obstetric outcomes. Viet J Obstet Gynecol. 2020;18(3):27-33. https://doi.org/10.46755/vjog.2020.3.1111.

[4] Chawanpaiboon S, Vogel JP, Moller AB, Lumbiganon P, et al. Global, regional, and national estimates of levels of preterm birth in 2014: a systematic review and modelling analysis. Lancet Glob Health. 2019;7(1):e37-e46. https://doi.org/10.1016/s2214-109x(18)30451-0.

[5] Li Y, Ren X, He L, Li J, et al. Maternal age and the risk of gestational diabetes mellitus: A systematic review and meta-analysis of over 120 million participants. Diabetes Res Clin Pract. 2020;162:108044. https://doi.org/10.1016/j.diabres.2020.108044.

[6] Tran Khanh Nga, Cao Ngoc Thanh, Pham Van Linh, Vo Thi Anh Trinh. Prevalence and associated fac-

tors of gestational diabetes mellitus: A multicenter, cross-sectional study in Mekong Delta region. J Med Res. 2024;177(14):83-90. https://doi.org/10.52852/tcncyh.v177i4E14.2347.

[7] Betran AP, Ye J, Moller AB, Souza JP, et al. Trends and projections of caesarean section rates: global and regional estimates. BMJ Glob Health. 2021;6(6). https://doi.org/10.1136/bmjgh-2021-005671.

[8] Zhang J, Troendle JF, Yancey MK. Reassessing the labor curve in nulliparous women. Am J Obstet Gynecol. 2002;187(4):824-8. https://doi.org/10.1067/mob.2002.127142.

[9] Okwaraji YB, Krasevec J, Bradley E, Conkle J, et al. National, regional, and global estimates of low birthweight in 2020, with trends from 2000: a systematic analysis. Lancet. 2024;403(10431):1071-80. https://doi.org/10.1016/s0140-6736(23)01198-4.

[10] Ye W, Luo C, Huang J, Li C, et al. Gestational diabetes mellitus and adverse pregnancy outcomes: systematic review and meta-analysis. BMJ. 2022;377:e067946. https://doi.org/10.1136/bmj-2021-067946