ORIGINAL ARTICLE

CONTENTS

Adverse pregnancy outcomes associated with endometriosis in Ukraine: results a multicenter study

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ABSTRACT

Aim: To estimate pregnancy outcomes associated with endometriosis in Ukraine.

Materials and Methods: We performed the multicentre prospective cohort study during the period from January 1st, 2019 to December 31st, 2021. The study included pregnant women aged ≥18 years hospitalized in 17 hospitals from 15 regions of Ukraine. Logistic regression analysis provided odds ratios (OR) with 95% confidence intervals (CI).

Results: Of the 27,558 women, 990 (3,6%) reported a diagnosis of endometriosis before pregnancy. In 990 deliveries, women with endometriosis had a higher risk of hypertension in pregnancy (OR 1.2, 95% CI 1.0-1.3), preeclampsia (OR 1.4, 95% CI 1.3-1.5), severe preeclampsia (OR 1.7, 95% CI 1.5-2.3), hemorrhage in pregnancy (OR 2.3, 95% CI 2.0-2.5), placental abruption (OR 2.0, 95% CI 1.7-2.3), placenta previa (OR 3.9, 95% CI 3.5-4.3), premature rupture of membranes (OR 1.7, 95% CI 1.5-1.8), and retained placenta (OR 3.1, 95% CI 1.4-6.6). The neonates had increased risks of preterm birth before 28 weeks (OR 3.1, 95% CI 2.7-3.6), birth before 34 weeks (OR 3.2, 95% CI 2.8-3.6), being small for gestational age (OR 1.5, 95% CI 1.4-1.6), being diagnosed with congenital malformations (OR 1.3, 95% CI 1.3-1.4), and neonatal death (OR 1.8, 95% CI 1.4-2.1).

Conclusions: Pregnant women with endometriosis are at elevated risk for serious and important adverse maternal, fetal and neonatal outcomes. The magnitude of these complications calls for more intensive antenatal care of pregnant women with endometriosis.

KEY WORDS: endometriosis, adverse outcomes, pregnancy complications, obstetrical complications, neonatal complications, reproductive health, Ukraine

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INTRODUCTION

One of the important diseases in pregnant women is endometriosis. The most common localizations of pelvic endometriosis are the ovaries, the ligaments of the uterus, the Douglas pouch, and the fallopian tubes. Overall, the incidence of endometriosis is still unknown as there are no published cohort studies representative of the general population. According to the literature, approximately 10% of women of reproductive age have some degree of endometriosis. Characteristics robustly associated with a greater risk for endometriosis include early age at menarche, short menstrual cycle length, and lean body size, whereas greater parity has been associated with a lower risk [1]. Endometriosis has significant social, public health and economic implications.

Currently, endometriosis remains one of the most enigmatic disorders regarding its effects on pregnancy. Endometriosis adversely affects both natural and assisted conception. Furthermore, ruptured ovarian endometrioma, appendicitis, intestinal perforation, and hemoperitoneum have been described in pregnancy. Obstetricians are largely unfamiliar with these complications, as they have not been thoroughly investigated. Therefore, there is a rising need for a comprehensive study of the potential

negative consequences of this condition on pregnancy outcomes, including the postpartum period, as more women with a medical history of endometriosis become pregnant. Obstetrical complications are statistically elevated in women with endometriosis. [2, 3].

In recent years, endometriosis has been linked to a spectrum of major pregnancy complications, which originate either in the ectopic implants or in the uterus. According to the literature, women with endometriosis had a significantly higher risk of several complications, such as preeclampsia and placental complications in pregnancy and at delivery. The newborns had increased risk of being delivered preterm, having congenital malformations, and having a higher neonatal death rate [4]. Therefore, the development and pathogenesis of endometriosis is an important field of study and has not yet been fully elucidated. Finding these mechanisms is crucial for the development of new and more effective strategies to treat this condition.

In Ukraine, endometriosis in pregnant women has known significant social, medical and economic impact. Despite the high prevalence of endometriosis among women of reproductive age, no additional monitoring is recommended for pregnancies with a history of endometriosis. There has been no study to explore the association between endometriosis and adverse pregnancy outcomes in women with and without endometriosis in Ukraine. Previous studies have focused on prevalence and risk factors for infertility in Ukraine [5].

AIM

The aim this study to estimate pregnancy outcomes associated with endometriosis in Ukraine.

MATERIALS AND METHODS

STUDY DESIGN, SETTING AND PATIENTS

We performed the multicentre prospective cohort study during the period from January 1st, 2019 to December 31st, 2021. The study included pregnant women aged ≥18 years who were routinely examined and hospitalized in 17 maternal health hospitals from 15 regions of Ukraine. The inclusion criteria for this study were as follows: age ≥18 years and singleton pregnancy. The exclusion criteria were unconsciousness or severe illness; learning difficulties or serious mental illness; major fetal abnormalities identified at the time of screening; endocrine, autoimmune, or systemic diseases, such as hypertension or diabetes; or other uterine disorders that could affect pregnancy development, such as uterine malformation.

DEFINITION

Pregnancy-induced hypertension (PIH) is defined as systolic blood pressure (SBP) above 140 mmHg and diastolic blood pressure above (DBP) above 90 mmHg. Hypertensive disorders of pregnancy were classified as gestational hypertension, chronic hypertension, chronic hypertension with preeclampsia, pre-eclampsia, or eclampsia. Preeclampsia was defined as persistently raised blood pressure ≥140/90 mmHg, occurring after >20 weeks of pregnancy in an otherwise normotensive woman, including gestational hypertension (preeclampsia without proteinuria), and gestational proteinuria (preeclampsia with proteinuria of ≥300 mg protein in 24 h). The definition of gestational diabetes mellitus (GDM) is any degree of glucose intolerance with onset or first recognition during pregnancy. Gestational Cholestasis (GC) is a pregnancy-specific liver disease which manifests as maternal pruritus with deranged liver transaminases and/or elevated serum bile acids. Premature rupture of membranes (pPROM) is the rupture of membranes before 37 weeks of gestation. PROM is defined as the time from membrane rupture to onset of delivery was more than 18 hours. A diagnosis of PROM was confirmed with well-established clinical and/or biological diagnostic procedures: the visualization of amniotic fluid passing from the cervical canal and pooling in the vagina; a basic pH test of the vaginal fluid; or arborization of the dried vaginal fluid, identified with microscopy. Miscarriage was defined as spontaneous abortion before 28 weeks of gestation. Antepartum hemorrhage (APH) is defined as bleeding from the canal birth of 15 mL or more, after 20 weeks of gestation, before the baby's birth. Postpartum hemorrhage (PPH) is defined as bleeding more than 500 mL within 24 h of vaginal delivery and greater than 750 mL after Caesarean section. Placental Abruption (PA) was defined as bleeding at the meconium-placenta interface results in partial or complete detachment of the placenta before delivery. Placental abruption (PA), also called abruptio placentae, occurs due to compromise of the vascular structures that support the placenta and represents the early separation of the placenta from the lining of the uterus before completion of the second stage of labor. The diagnosis of PA was based on clinical findings of abdominal pain, vaginal bleeding, uterine contractions, fetal distress, and abnormal vital signs. Placenta previa (PP) was defined as a placenta completely or partially covering the internal cervical os, based on transvaginal ultrasonography performed during the third trimester when the patient had an empty bladder. Spontaneous preterm birth (PTB) is defined as spontaneous labor before 37 completed weeks of gestation followed by live birth. Prematurity are liveborn infants delivered before

Table 1. Baseline maternal characteristics according to endometriosis status for women delivering singleton births during 2019–2021 in Ukraine

Characteristics	All patients N=27,558	Endometriosis				p value
		Yes N=990		No N=26,568		
		n	%	n	%	
Maternal age, years						
< 20	769	3	0.3	766	2.9	<0.01
20–24	2,083	27	2.7	2,056	7.7	
25–29	5,970	156	15.8	5,814	21.9	
30–34	8,508	330	33.3	8,178	30.8	
35–39	5,269	285	28.8	4,984	18.8	
40-44	3,142	144	14.6	2,998	11.3	
≥ 45	1,817	45	4.5	1,772	6.6	
Smoking status						
Never	3,066	131	13.2	2,935	11.0	0.78
Former	6,168	236	23.8	5,932	22.3	
Current	18,324	623	62.9	17,701	66.6	
Alcohol drinking						
Non-	9,092	300	30.3	8,792	33.1	0.53
Ex-	16,565	624	63.0	15,941	60.0	
Current	1,069	35	3.6	1,034	3.9	
Missing	832	31	3.1	801	3,0	
Gestational age						
weeks, median [range]			39.0 [15.0–42.1]		39.3 [7.4–42.3]	
< 22	255	15	1.5	240	0.9	<0.01
22–37	1,619	102	10.3	1,517	5.7	
37–42	25,541	867	87.6	24,674	92.9	
≥ 42	59	3	0.3	56	0.2	
Missing	84	3	0.3	81	0.3	
Parity						
0	10,002	423	42.7	9,579	36.1	<0.01
1	10,446	345	34.8	10,101	38.0	
2	4,434	123	12.4	4,311	16.2	
> 3	1,268	36	3.6	1,232	4.6	
Missing	1,408	63	6.4	1,345	5.1	
Mode of delivery						
Vaginal delivery	22,339	732	73.9	21,607	81.3	<0.01
Cesarean section	5,219	258	26.1	4,961	18.7	
History of infertility	14,199	171	17.3	14,028	52.8	<0.01
History of oral contractive use	24,716	838	84.6	23,878	89.9	0.49
Age at menarche (years)						
11 or younger	7,656	230	23.2	7,426	28.0	0.78
12–13	15,798	580	58.6	15,218	57.3	
14 or older	4,094	180	18.2	3,914	14.7	

37 weeks of pregnancy (based on the Ballard score or from first day of the last menstrual period). Low birth weight (LBW) neonate is neonate whose birth weight is less than 2,500 grams. Small for gestational age (SGA) is defined as the weight of the baby at birth that is less than 10th percentile for GA.

Table 2. Pregnancy and neonatal outcomes in women with and without endometriosis in Ukraine, 2019-2021

Outcome	Total n	Endometriosis				Adjusted OR (95% CI)
		Yes		No		
		n	%	n	%	
All women						
Number of births	27,558	990		26,568		
Complications in pregnancy						
Hypertension in pregnancy	492	22	2.2	470	1.8	1.2 (1.0–1.3)
Preeclampsia	603	31	3.1	572	2.2	1.4 (1.3–1.5)
Severe preeclampsia	239	13	1.3	226	0.9	1.7 (1.5–2.3)
Placental abruption	183	11	1.1	172	0.6	2.0 (1.7–2.3)
Premature rupture of membranes	386	24	2.4	362	1.4	1.7 (1.5–1.8)
Placenta previa	168	23	2.3	145	0.5	3.9 (3.5–4.3)
Antepartum hemorrhage	200	16	1.6	184	0.7	2.3 (2.0–2.5)
Neonatal complications						
Birth before 28 weeks	102	10	1.0	92	0.3	3.1 (2.7–3.6)
Birth before 34 weeks	1,657	51	5.1	1,606	6.0	3.2 (2.8–3.6)
SGA	1,353	73	7.3	1,280	4,8	1.5 (1.4–1.6)
Apgar score (<7 after 5 min)	223	12	1.2	211	0.8	1.4 (1.2–1.6)
Congenital malformations	1,514	71	7.1	1,443	5.4	1.3 (1.3–1.4)
Stillborn	151	6	0.6	145	0.5	1.2 (1.0–1.5)

*OR, odds ratio; CI, confidence interval.

DATA COLLECTION

In this study, each woman completed a questionnaire regarding her past history of endometriosis, reporting whether she had been diagnosed with endometriosis during the past year, ever had endometriosis, and ever received infertility treatment. This study did not take into account the period between diagnosis of endometriosis and the occurrence of pregnancy. On the baseline questionnaire, participants reported a number of characteristics, including smoking history; alcohol drinking; age at menarche; menstrual cycle length; oral contraceptive use; parity (number of pregnancies lasting 6 months or longer); history of infertility (more than 12 months trying to conceive without success) and menopausal status. Trained research coordinators collected data concerning obstetrical complications and neonatal outcomes from medical records in the obstetrics institutions. Our main outcomes of interest for this analysis were pregnancy outcomes and maternal complications, including PIH, hypertensive disorders of pregnancy (preeclampsia or gestational hypertension), GDM, GC, PROM, APH, PPH, PA, PP, PTB, LBW, SGA, and APGAR scores at 1 min and 5 min.

ETHICS

The Ethics Committee of Shupyk National Healthcare University of Ukraine approved the study. All methods were performed according to the Declaration of Helsinki. All study participants signed a general consent form for using their clinical data for scientific purposes.

STATISTICAL ANALYSIS

All data were analyzed using Stata version 15.1 (StataCorp., College Station, TX, USA). Dichotomous data are presented as percentages and were compared between the two groups with the $\chi 2$ test or a nonparametric test (Fisher's exact test). Continuous data are presented as the mean±standard deviation (SD) and were analyzed with an independent-samples t-test or a nonparametric test. In the outcome analysis, relative risks and differences in absolute risk were calculated for dichotomous outcomes, together with their 95% confidence intervals (95% CI), using Fisher's exact test. All outcomes were analyzed by multivariate logistic regression to calculate odds ratios (OR) with 95% confidence intervals (CI). Significance was set at $p<0.05$.

RESULTS

A total of 27,558 pregnant women were enrolled whose pregnancy terminated between January 1st, 2019 to December 31st, 2021. Of the 27,558 participants, 990 (3,6%) reported a diagnosis of endometriosis before pregnancy. All women con-

Table 3. Birth complications in women with and without endometriosis in Ukraine, 2019-2021

Outcome	Total n	Endometriosis				Adjusted OR (95% CI)
		Yes		No		
		n	%	n	%	
All women						
Number of births	27,558	990		26,568		
Complications in labor						
Perineal laceration grade 3 and 4	877	36	3.6	841	3.2	1.0 (0.9–1.1)
Rupture of the uterus (before and during labor)	41	3	0.3	38	0.1	2.7 (2.0–3.6)
Postpartum hemorrhage (all deliveries first week)	2,770	96	9.7	2,674	10.1	0.9 (0.9–1.0)
Postpartum hemorrhage after cesarean	2,913	28	2.8	2,885	10.9	1.1 (1.0–1.2)
Postpartum hemorrhage after vaginal delivery	2,699	68	6.9	2,631	9.9	1.0 (0.9–1.0)
Retained placenta (placenta accreta/percreta)	0	0	0.0	0	0.0	3.1 (1.4–6.6)
Procedures in labor						
Vacuum extraction	2,420	79	8.0	2,341	8.8	1.2 (1.1–1.3)
Evacuation of the uterus	67	2	0.2	65	0.2	1.5 (1.1–2.2)
Intrauterine palpation	277	9	0.9	268	1.0	1.2 (1.0–1.4)
Manual removal of the placenta (vaginal delivery)	439	17	1.7	422	1.6	1.3 (1.2–1.5)
Cesarean section – emergency before labor	613	45	4.5	568	2.1	2.1 (2.0–2.3)
Cesarean section – planned	1,960	116	11.7	1,844	6.9	1.7 (1.7–1.8)
Cesarean section – emergency in labor	1,731	89	9.0	1,642	6.2	1.8 (1.7–1.9)

*OR, odds ratio; CI, confidence interval.

ceived naturally. The study participants' characteristics, age, smoking, and alcohol drinking were similar between women with and without endometriosis. Baseline maternal characteristics (socio-demographic and gynecological) according to endometriosis status for women delivering singleton births during 2019–2021 in Ukraine are presented in Table 1.

A total 7,271 (26.4%) of the 27, 558 participants were diagnosed with complications in pregnancy. The most all pregnancy complications occurred more frequently in women with endometriosis than in women without endometriosis. As shown in Table II, the OR of preeclampsia was 1.4 (95% CI 1.3–1.5) and for severe preeclampsia, eclampsia 1.7 (95% CI 1.5–2.0). In this study the OR of placenta previa was 3.9 (95% CI 3.5–4.3) and of placental abruption 2.0 (95% CI 1.7–2.3). Premature rupture of membranes and hemorrhage after 22 gestational weeks in women were both significantly increased in women with endometriosis. Pregnancy and neonatal outcomes in women with and without endometriosis in Ukraine are presented in Table 2.

In this study women with endometriosis had an OR of uterine rupture of 2.7 (95% CI 2.0–3.6), and of retained placenta (placenta accreta/percreta) of 3.1 (95% CI 1.4–6.6). For retained placenta with manual removal the OR was 1.3 (95% CI 1.2–1.5) and for evacuation of the uterus after delivery 1.5 (95% CI 1.1–2.2). Interestingly the OR for postpartum hemorrhage was slightly lower in women with endometriosis than in unexposed women. When stratified by mode of delivery, women with endometriosis who delivered by cesarean section had an OR of bleeding of 1.1 (95% CI 1.0–1.2). In this study women with endometriosis had more neonatal complications: stillbirth, neonatal death, preterm birth before 28 weeks, and preterm birth before 34 weeks. Among neonates of women with endometriosis, the OR of small-for-gestational age was 1.5 (95% CI 1.4–1.6), of low Apgar score 1.4 (95% CI 1.2–1.6) and of malformations diagnosed within the first year 1.3 (95% CI 1.3–1.4). Birth complications in women with and without endometriosis in Ukraine are presented in Table 3.

The incidence of adverse pregnancy outcomes associated with endometriosis varied widely within Ukraine, from 7% in three regions (Poltava, Sumy, and Cherkasy) to ≥38% in eight, mostly in southern (Odesa, Dnipro, Zaporizhzhia, Kropyvnytskyi, Kherson), eastern (Kharkiv), and central (Kyiv, Zhytomyr) Ukraine. The incidence of adverse pregnancy outcomes associated with endometriosis in Lviv, Rivne, and Chernivtsi varied from 18% to 33%.

DISCUSSION

The present study is the first in Ukraine to show a significant impact of endometriosis on the incidence

of adverse pregnancy outcomes. Our study is so far the largest and most detailed study of obstetrical and neonatal complications in women with endometriosis in Ukraine. In this study, we addressed the association between endometriosis and adverse pregnancy outcome, including gestational hypertension, pre-eclampsia, low birth weight, and small for gestational age, preterm birth, placenta previa, placental abruption, cesarean section, stillbirth, postpartum hemorrhage, and spontaneous hemoperitoneum in pregnancy in female in Ukraine. This study showed that endometriosis significantly increased the incidence of adverse pregnancy outcomes. Women with endometriosis had a higher risk of several adverse outcomes in pregnancy and at delivery. Also, the neonates had an increased risk of being delivered preterm, having congenital malformations, and neonatal death. Overall, our findings indicate an association between endometriosis and gestational hypertension, preeclampsia, preterm birth, placenta previa, placental abruption, cesarean section, and stillbirth. In general, our findings confirm the results of other sizable studies, whereas smaller studies have shown varying results, likely due to small sample size, and other methods or study design.

In literature, the incidence rate and prevalence of endometriosis has been debated. It is estimated that approximately 10% of women of reproductive age have some degree of endometriosis [1] In our study, the past history of endometriosis was determined by questionnaire, and a pregnant woman reported whether she had been diagnosed with endometriosis during her lifetime. Therefore, the diagnostic accuracy of endometriosis was reflected in a self-reported questionnaire. Endometriosis can be associated with a wide variety of symptoms, or it may be asymptomatic and incidentally observed at laparoscopy or exploratory surgery. Laparoscopic surgery and histological examination are strictly required for a precise diagnosis of endometriosis. In contrast, Ukrainian gynecologists routinely examine the patient's uterus and ovaries in the first examination using transvaginal ultrasonography.

According to the literature, adverse impact of pelvic endometriosis on uterine function before conception may also interfere with subsequent deep placentation, including preterm birth and antepartum hemorrhage. Brosens et al. considered the pathological pathway, including the altered junctional zone myometrium that causes the clinical consequences of uterine dysfunction associated with pelvic endometriosis [6]. Thus, both the coexistence of endometriosis and pregnancy and endometriosis before pregnancy may affect obstetrical complications.

In a Danish study in 19 331 deliveries, women with endometriosis had a higher risk of severe preeclampsia, hemorrhage in pregnancy, placental abruption, placenta previa, premature rupture of membranes, and retained placenta. The neonates had increased risks of preterm birth before 28 weeks, being small for gestational age, being diagnosed with congenital malformations, and neonatal death [4]. In an Australian study of 6730 singleton births of women, endometriosis was found to be a risk factor of placenta previa [7], a finding supported in a recent study of late pregnancy complications in 4232 women with endometriosis [8]. A large Swedish study showed an increased risk of antepartum hemorrhage/placental complications in women with endometriosis, but it was not possible to distinguish between the clinically different entities of antepartum bleeding, placental abruption and placenta previa [9]. In our study women with endometriosis had a higher risk of extremely preterm birth regardless of parity and plurality, which is in accordance with most other studies [8-11]. Another factor is the higher rate of iatrogenic preterm delivery because of the higher incidence of placenta previa, premature rupture of membranes and preeclampsia. Preterm delivery likely explains the higher risk of neonatal death, as sub-analysis on neonates born at term removed this increased risk.

According to the literature, in women pregnancies the implantation of the blastocyst into a receptive endometrium, successful placentation, and remodeling of the uterine vasculature require the integration of a number of critical stages. Dysfunction may occur in several stages of the process, and pregnancy complications are thought to depend on the dysregulation of such events [12]. In women affected by endometriosis, several adverse events may occur in the peri-implantation period as well as throughout the pregnancy, including endometrial resistance to selective actions of progesterone, inflammatory processes at the endometrial and systemic levels, inadequate uterine contractility, and endometrial excessive activation of free radical metabolism [13-17]. All these alterations of the local endometrial environment have been described in women with endometriosis as well as in women at risk of preterm labor, fetal growth restriction, and placental disorders [18].

The association between endometriosis and adverse pregnancy outcomes has drawn more attention in recent years with fairly consistent evidence of increased risks for caesarean section, preterm birth, and stillbirth [19, 20]. However, the link with gestational diabetes, preeclampsia, or intrauterine growth restriction remains less clear due to heterogeneity in study designs and methodologies used in previous studies [9, 21-25]. In epidemiology, it remains challenging to study the direct impact of endometriosis on pregnancy outcomes, and underlying mechanisms are not well understood.

STRENGTH AND LIMITATIONS

This is the first Ukrainian multicenter cohort study to estimate the association between endometriosis and adverse pregnancy outcomes. This work may be considered the first of more-detailed epidemiological studies of endometriosis in Ukraine in order to estimate the association between endometriosis and adverse pregnancy outcomes in Ukraine. In this study, the data of obstetrical complications and neonatal outcomes were collected prospectively by trained research coordinators for all puerperal patients from the medical records. Therefore, we expect the self-reported questionnaire and the outcome of delivery to be accurate.

Our study has some limitations. One of the weak points of this study is that the diagnostic accuracy of endometriosis is just referred by the self-reported questionnaire. Another limitation was that we did not have information on histological confirmation of the diagnosis of endometriosis. Little information is available concerning with the medical records of the participants for endometriosis. It is unclear how many out of 990 women had active endometriosis during their pregnancies. This study did not take into account whether the affected women were treated for endometriosis before pregnancy and what kind of treatment was given. Furthermore, it is unclear whether obstetrical complications are affected by pre-pregnancy treatment or the coexistence of endometriosis during pregnancy. In this study, we did not conduct a stratified analysis of the types of endometriotic lesions or the presence or absence of adenomyosis. Moreover, the variability in the existing diagnostic criteria for endometriosis, the heterogeneity and the potential confounding factors that were not accounted for (such as the type of endometriotic lesions, the presence or absence of adenomyosis, the use of assisted reproductive techniques, etc.) weaken the validity of our research results. Similarly designed studies have reported different results, so the pathogenesis of endometriosis requires further research to confirm our findings.

CONCLUSIONS

Endometriosis is a common benign gynecological disorder; however, delivery outcomes concerning pregnancies with endometriosis remain understudied. Our study showed that women with endometriosis are at elevated risk for serious and important adverse maternal, fetal and neonatal outcomes. Endometriosis increases the risk of pregnancy complications and neonatal morbidity. Women with endometriosis had a higher risk of hypertension in pregnancy, pre-eclampsia, severe preeclampsia, hemorrhage in pregnancy, placental abruption, placenta previa, premature rupture of membranes, and retained placenta. The neonates had increased risks of preterm birth before 28 weeks, birth before 34 weeks, being small for gestational age, being diagnosed with congenital malformations, and neonatal death. A more comprehensive understanding of this disease may allow timely prevention and treatment of the related complications and ultimately improve maternal and neonatal outcomes. The magnitude of these complications calls for more intensive antenatal care of pregnant women with endometriosis. Clinicians should consider the possibility of endometriosis in pregnant women. Since a diagnosis of endometriosis during pregnancy is challenging, a medical consultation would be helpful to determine whether endometriosis is present or whether there has been any past surgical history of endometriosis prior to pregnancy. This information might be helpful for women and their providers when managing these pregnancies. Further studies are required to assess whether any modification is needed to conventional pregnancy monitoring for patients with endometriosis.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

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