International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Hoque LF et al. Int J Reprod Contracept Obstet Gynecol. 2025 Feb;14(2):400-404
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20250173

Original Research Article

Impact of adenomyosis on fertility and obstetric outcomes among women in tertiary care center

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Received: 13 December 2024
Accepted: 09 January 2025

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ABSTRACT

Background: Adenomyosis is a serious reproductive difficulty caused by aberrant endometrial tissue within the myometrium. It can induce infertility and predispose women to hypertensive problems, preeclampsia, and preterm birth. However, the influence of adenomyosis on fertility and obstetric outcomes has not been extensively explored, particularly in resource-limited settings. This study aimed to investigate the effect of adenomyosis on fertility and obstetric outcomes in women who visited a tertiary care hospital in Dhaka, Bangladesh.
Methods: A case control study was conducted in Shahabuddin Medical College Hospital and one IVF center from June 2023 to May 2024. The study included 100 women divided into two groups: A case group of 50 with adenomyosis and 50 in the control group without. Two groups were compared in terms of baseline characteristics, fertility outcomes, obstetric complications, and delivery outcomes. SPSS software statistical analysis was performed.
Results: Obstetric complications such as hypertensive disorders (32% versus 6%, p=0.001), preeclampsia (16% versus 2%, p=0.01) and preterm delivery (26% versus 8%, p=0.01) were more frequent in the adenomyosis group. The adenomyosis group also had a higher caesarean delivery rate (62% versus 34%), p<0.05. Outcomes in fertility, namely implantation rates and live birth rates were not different (p>0.05).
Conclusions: Early diagnosis and careful management of adenomyosis are important because adenomyosis is associated with increased obstetric complications and higher caesarean delivery.

Keywords: Adenomyosis, Fertility outcomes, Obstetric complications, Preeclampsia, Preterm delivery

INTRODUCTION

Adenomyosis, a chronic gynecological disease, is a condition that involves ectopic endometrial tissue within the myometrium, with resulting uterine enlargement, menorrhagia, dysmenorrhea and infertility.[1,2] It is majorly a disorder of the reproductive age women who lead to a very important clinical and psychological distress. Adenomyosis, although common, is underdiagnosed, as its symptoms are nonspecific and it frequently coexists with fibroids and endometriosis.[3]

There is complex pathophysiology of adenomyosis defined by myometrial inflammation, impaired uterine contractility, and altered endometrial receptivity that all have negative influence on fertility.[4,5] Such changes decrease implantation rates, recurrent pregnancy losses and ART cycle suboptimal outcomes.[6] Adenomyosis has also been associated with an increased risk for obstetrical complications including preeclampsia, hypertensive disorders, placentary abnormalities and preterm delivery.[7,8] However, the exact mechanism of these associations is not yet fully grasped, but it is thought that disruptions at the endometrial-myometrial junction, and abnormal placentation, are central.[9]

Particularly high resolution transvaginal ultrasound, and magnetic resonance imaging (MRI), the non-invasive diagnosis of adenomyosis has improved greatly.[10] However, diagnostic challenges remain in low resource settings where such technologies are not available. Consequently, women with adenomyosis frequently rely on clinical features, less sensitive imaging, and these delays frequently occur and ultimately compound the reproductive challenges they face.[11]

Several studies have been made regarding the reproductive and obstetric implication of adenomyosis, as a factor that can affect the odds of infertility, and of adverse pregnancy outcomes. In a meta-analysis by Nirgianakis et al it was shown that Adenomyosis is associated with lower pregnancy and live birth rates in women undergoing ART.[6] Data also suggest a relationship to an increased risk of miscarriage and hypertensive disorders of pregnancy.[7] However, these findings, along with the heterogeneity in diagnostic criteria and study designs, have led to inconsistent literature.[12]

In Bangladesh, adenomyosis is underdiagnosed due to lack of healthcare resources and awareness. It means delayed interventions and an incomplete perception of its real prevalence and effect. In this study, we attempted to fill this gap by evaluating the effect of adenomyosis on fertility and obstetric outcomes in a tertiary care set up in Dhaka. This study compared outcomes between women with adenomyosis versus a matched control group in order to give robust data for use in clinical practice and to direct future research. This study also highlighted the importance of early diagnosis and resource driven early management strategies in resource limited settings. Better understanding of reproductive and obstetric difficulties attributable to adenomyosis is important in improving maternal health outcomes and optimising fertility treatment for women with adenomyosis.

Objective

The objective of this study was to evaluate the impact of adenomyosis on fertility and obstetric outcomes among women.

METHODS

This retrospective case control study conducted at Shahabuddin Medical College Hospital and one IVF center, Dhaka, Bangladesh from June 2023 to May 2024. A total 100 patients included in this study where 50 patients diagnosed with adenomyosis considered as case and other 50 without adenomyosis are in control group.

Inclusion criteria

Women aged 18-45 years. Cases: by transvaginal ultrasound or MRI diagnosed as adenomyosis. Controls: matched for age and BMI with evidence of adenomyosis.

Exclusion criteria

Women with other uterine pathologies, e.g. fibroids or endometriosis. Pregnant women with a systemic chronic illness affecting fertility or pregnancy outcome. Incomplete medical records.

Data collection

Structured interviews and medical records reviews were performed to collect demographic, clinical and reproductive history data. Imaging studies were used to confirm the diagnosis of adenomyosis. Documentation was made of all participants and their fertility outcome, obstetric complication and delivery outcome.

Statistical analysis

The SPSS software was used to analyze data. The frequency and percentage were presented for categorical variables and mean±standard deviation for continuous variables. Groups were compared by independent t tests and chi square tests. Statistically significant ($p<0.05$) was considered with a p value <0.05.

RESULTS

Between the adenomyosis and control groups no significant differences in age (32.50±4.25; 31±4.75 years; p=0.094), BMI (26.57±4.10; 25.10±3.90; p=0.052), parity, or use of ART were observed. Nevertheless, dysmenorrhea ($p<0.001$) as well as dyspareunia ($p<0.002$) were significantly more prevalent in the adenomyosis group.

There were no differences in fertility outcomes (implantation rate: 56% versus 52%, p=0.68; cumulative live birth rate: 50% versus 46%, p=0.69) between groups. There were no significant differences in first trimester miscarriage (6 compared to 8, p=0.69), biochemical pregnancy (2 compared to 4, p=0.55) or second trimester loss (6 compared to 4, p=0.64).

A significant association of adenomyosis and lower obstetric complications was found; hypertensive disorders of pregnancy were significantly more frequent (32% versus 6%, p=0.001; preeclampsia 16% versus 2%, p=0.01). We also found the rates of preterm delivery were higher (26% versus 8%, p=0.01). Gestational hypertension, placental malposition, and fetal malpresentation were not significantly different between groups.

Delivery outcomes revealed that there was a significantly greater delivery by caesarean in the adenomyosis group (62% versus 34%, p less than 0.05). Frequency of non-reassuring fetal status was more in adenomyosis group (30% versus 14%, p=0.05). Adenomyosis patients were significantly more likely to have fetal malpresentation

(16% versus 2%, p=0.01). The rates of postpartum hemorrhage were identical among patients who delivered vaginally (42.1% versus 36%; p=0.54) but significantly higher in those who delivered by caesarean (35.5% versus 12%; p<0.05).

Table 1: Baseline characteristics of the patients (n=100).

Variables		Patients with adenomyosis (n=50) (%)	Control patients (n=50) (%)	P value
Age (in years)	Mean±SD	32.50±4.25	31±4.75	0.09
BMI		26.57±4.10	25.10±3.90	0.06
Parity	Nulliparous	42 (84)	39 (78)	0.44
	Multiparous	8 (16)	7 (14)	0.78
Assisted reproductive technology		24 (48)	22 (44)	0.68
Maternal complications	Hypertension	1 (2)	4 (8)	0.17
	Diabetes mellitus	2 (4)	4 (8)	0.4
	Dysmenorrhoea	28 (56)	9 (18)	<0.001
	Dyspareunia	11 (22)	0 (0)	<0.002

Table 2: Fertility outcome (n=100).

Variables	Patients with adenomyosis (n=50) (%)	Control patients (n=50) (%)	P value
Implantation rate (1st embryo transfer)	28 (56)	26 (52)	0.68
Cumulative Live birth rate (1st + 2nd embryo transfer)	25 (50)	23 (46)	0.69
First-trimester miscarriage	3 (6)	4 (8)	0.69
Biochemical pregnancy	1 (2)	2 (4)	0.55
Second-trimester loss	3 (6)	2 (4)	0.64

Table-3: Incidence of obstetric complications (n=100).

Variables	Patients with adenomyosis (n=50) (%)	Control patients (n=50) (%)	P value
Hypertensive disorders of pregnancy	16 (32)	3 (6)	0.001
Preeclampsia	8 (16)	1 (2)	0.01
Gestational hypertension	6 (12)	3 (6)	0.29
Placental malposition	7 (14)	2 (4)	0.08
Fetal malpresentation	8 (16)	5 (10)	0.37
Preterm delivery	13 (26)	4 (8)	0.01

Table 4: Delivery outcome (n=100).

Variables	Patients with adenomyosis (n=50)	Control patients (n=50)	P value
Cesarean delivery	31 (62)	17 (34)	<0.05
Non-reassuring fetal status	15 (30)	7 (14)	0.05
Fetal malpresentation	8 (16)	1 (2)	0.01
Hypertensive disorders of pregnancy	6 (12)	4 (8)	0.5
Postpartum hemorrhage			
Vaginal delivery	8 (42.10)	12 (36)	0.54
Cesarean delivery	11 (35.5)	4 (12)	<0.05

DISCUSSION

The objective of this study was to determine the effect of adenomyosis on fertility and obstetric outcome for women presented at Shahabuddin Medical College Hospital and one IVF center Dhaka, Bangladesh. Our results show that adenomyosis is associated with adverse reproductive outcomes, especially with obstetric complications and delivery related problems.

There were no significant effects in both age, BMI, and parity between the adenomyosis and control groups, consistent with previous research of baseline characteristics in women with adenomyosis.[1] Prevalence of dysmenorrhea and dyspareunia, however, was markedly different. As would be expected, women with adenomyosis did have much higher rates of dysmenorrhea, and dyspareunia than did the control group, and it is well known that adenomyosis is a major cause of pelvic pain.[13,14]

No differences in implantation rates or cumulative live birth rates were observed with respect to fertility outcomes for adenomyosis versus control groups. Consistent with Nirgianakis et al who showed that adenomyosis can be associated with infertility, but ART outcomes did not appear to be significantly different between women with and without adenomyosis.[6] Second trimester losses or miscarriages of other causes were used as controls rather than uncomplicated pregnancies, and, though the miscarriage rate and second trimester losses were slightly higher in the adenomyosis group, these differences were not statistically significant. Other studies have reported conflicting results, with some suggesting that adenomyosis may be responsible for elevated rates of pregnancy loss, and no difference in ART outcome.[15,16]

The principal finding of this study was that women with adenomyosis are at increased risk of obstetric complications. Consistent with the previous studies, notable higher hypertensive disorders of pregnancy, in particular preeclampsia, were also seen in the adenomyosis group.[8,17] Endothelial dysfunction and hypertension during pregnancy may be a pathophysiology of this association as a result of impaired placental function possibly secondary to the altered uterine environment of adenomyosis.[18] Moreover, the rate of preterm delivery was markedly higher in the adenomyosis group, as it has been described in the literature.[4] Uterine contractions and structural abnormalities associated with adenomyosis could also be contributing to preterm labor.

In terms of delivery outcomes, the caesarean rate was between 2 and 3 times higher when we compared the adenomyosis group to the control group (62% of the women experienced caesarean delivery versus 34% of the control group). There are studies by Donnez et al and Buggio et al which found higher caesarean rates in adenomyosis women, probably related to increased rates of fetal malpresentation and abnormal placentation.[5,9] Additionally, fetal malpresentation was significantly more common in the adenomyosis group, and this is likely secondary to the altered uterine shape and placement, attributable to the presence of adenomyosis. Previous animal studies have implicated adenomyosis in abnormal placentation or uterine atony, two causes of postpartum hemorrhage in caesarean deliveries observed in the adenomyosis group at a higher rate than the controls.[19]

This study provides valuable insights, but also limitations. Additionally, the results are limited to a single center. Since the sample size was small, the study could not provide long term follow-up data on fertility and obstetric outcome, which would be useful in providing complete spectrum of the complications of adenomyosis. Furthermore, ultrasound can be a weak tool for adenomyosis because it is still the primary means of diagnosis.[10]

Consequently, the impact of adenomyosis on fertility and obstetric outcomes in a tertiary care center in Dhaka, Bangladesh is emphasized in this study. Increased risks of hypertensive disorders, preeclampsia, preterm delivery and caesarean delivery also exist in women with adenomyosis. The significance of these findings to early diagnosis and careful management of adenomyosis should be taken for the optimization of both fertility and pregnancy outcomes.

Data was availed from a single center, thus, presented data on a small sample, depended completely on the interviewer's statement for the required information. These findings should be validated by future studies which will also obtain larger, multi-center samples that are more generalizable. Future studies are required to evaluate the full spectrum of fertility and obstetric outcomes in women with adenomyosis down through reproductive lifetime in long term follow up studies. In resource limited situations we recommend initiation of early screening and targeted management to optimize care of women with adenomyosis.

CONCLUSION

This study showed that adenomyosis is associated with increased obstetric complications, such as hypertensive disorders, preeclampsia, preterm delivery, and increased rate of caesarean delivery. But it failed to show any effect on fertility outcomes. Management of adenomyosis in affected women remains poor, primarily because early diagnosis and subsequent effective treatment frequently fail to be implemented.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Hoque LF, Begum F, Apsara S, Zinan AZ. Impact of adenomyosis on fertility and obstetric outcomes among women in tertiary care center. Int J Reprod Contracept Obstet Gynecol 2025;14:400-4.