

## Evaluation of the relationship between prior uterine surgery and the incidence of adenomyosis in the Shariati Hospital in Bandar-Abbas, Iran, from 2001 to 2011

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### Abstract

**Background:** Adenomyosis is a common benign disorder in pre-menopausal women that presents with uterine enlargement, pelvic pain, heavy menstrual bleeding, and dysmenorrhea. However, its risk factors have not been clearly determined. The aim of this study was to determine whether prior uterine surgery is a risk factor for adenomyosis.

**Methods:** In this cross-sectional study, we reviewed the medical records of all women who had hysterectomies for benign and a non-emergency, gynecological condition during 2001–2011 at Shariati Hospital in Bandar-Abbas, Iran. The variables in the study included age, gravidity, parity, abortion, prior uterine surgery, and the size of the uterus before hysterectomy. The data were analyzed by Microsoft Excel and SPSS version 16, by conducting descriptive statistics, by the t-test, and by Analysis of Variance (ANOVA).

**Results:** Of the 191 participants, 72 women (37.7%) had pathologically-confirmed adenomyosis. Women with adenomyosis reported a history of prior uterine surgery more frequently than women without adenomyosis ( $P = 0.01$ ), but age, menarche, gravidity, parity, and history of abortion were similar between the two groups ( $P > 0.05$ ).

**Conclusion:** History of prior uterine surgery is a risk factor for adenomyosis.

**Keywords:** uterine surgery, adenomyosis, myomectomy

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### 1. Introduction

Adenomyosis is one of the most common disorders in women, and it is defined as the presence of endometrial and stromal glands in tissue, which can be accompanied by hyperplasia and hypertrophy of the myometrium (1-10). While the etiology of adenomyosis is unknown, various factors have been found to influence it, such as previous caesarian section, dilation and curettage (D&C), dilation and evacuation (D&E), spontaneous abortion, endometrial hyperplasia, menarche age, parity, and gravidity (1, 3, 5, 6, 11).

Adenomyosis can be accompanied by pelvic pain, menorrhagia, dysmenorrhea, dyspareunia, painful menstrual cycles, and infertility. However, painful menstrual cycles and infertility are less common in these individuals, and about 35% of them are asymptomatic. Diagnosis of this disease is often done through pathology and histology after hysterectomy (1, 2, 4-6, 8, 10). This incidence of this disease has been reported in in the range of 8.8 to 61.5% of women who had hysterectomies (2). Several studies have indicated that various factors influence adenomyosis,

including previous caesarian section, dilation and curettage (D&C), dilation and evacuation (D&E), spontaneous abortion, endometrial hyperplasia, menarche age, and gravidity. However, the results obtained for the comparative effects of the various risk factors were different (1-4, 6).

In a study on the incidence and investigation of risk factors of adenomyosis in Denmark, researchers examined 549 patients and concluded that the incidence of adenomyosis varied from 10 to 18% according to different criteria and that there was no significant relationship between adenomyosis and uterine surgery, such as previous caesarian section, myomectomy, dilation and curettage (D&C), dilation and evacuation (D&E) (2). Another study (2004) investigated pathology species of 873 patients, and the results indicated that 41.7% of patients had adenomyosis. In this study, no significant relationship was found between adenomyosis and experiences of uterine surgery, such as previous caesarian section, myomectomy, dilation and curettage (D&C), and dilation and evacuation (D&E); however, experience of uterine surgery (caesarian section, myomectomy, D&C, and D&E) is one of the most common factors associated with the incidence of adenomyosis (2).

In most cases, adenomyosis is asymptomatic in patients and is only diagnosed after hysterectomy (12). Effective medical treatment has been not introduced for adenomyosis, and some treatments only partially reduce symptoms in patients (13). The reported prevalence of adenomyosis has varied significantly among the various studies (12, 14-16). Also, there is little agreement among the studies concerning the relationship between previous surgery and the incidence of adenomyosis. Some reports indicated that there was a strong relationship between previous caesarian section and the incidence of adenomyosis, but others reported no such relationship (1, 2, 11, and 14).

In Iran, where the prevalence of adenomyosis has been reported to be 31.3%, a study was conducted in which researchers examined 41 cases of adenomyosis, and they found that 97% of the patients in the study had undergone a previous caesarian section (17). Due to the different reports from many parts of the world and the controversy about the risk factors for adenomyosis, we focused our study on the potential relationship between prior uterine surgery and the subsequent incidence of adenomyosis.

## 2. Materials and Methods

In this retrospective, cross-sectional study, the data that were necessary for the investigation and analyses were obtained from files of patients who had been hospitalized in the Shariati Hospital in Bandar-Abbas, Iran, from 2001 through 2011. In this cross-sectional study, we reviewed the medical records of all women who underwent hysterectomies for benign and non-emergency gynecological conditions this time period. All patients who had a hysterectomy for benign uterine reasons and had positive specimens for pathology were investigated. Exclusion criteria of the study included women in whom endometriosis and uterine malignancies were reported in their pathology. The reason they were excluded was that the aim was to study adenomyosis; therefore, other uterine malignancies were omitted from the study.

In order to obtain information on the variables, such as age, gravidity, parity, spontaneous abortion, uterine size according to pelvic examination, experiences of prior hysterectomy, prior uterine surgery, caesarian section, myomectomy, and dilation and curettage (D&C), we referred to the patients' files at the Shariati Hospital in Bandar-Abbas. In addition, other data, including uterine weight, uterine leiomyoma, and pathologic reports also were obtained from the patients' files. This study was approved by Ethics Committee of Hormozgan University of Medical Sciences, and the confidentiality of the data in the patients' files was protected at all times. The data were analyzed by using SPSS version 16 (SPSS, Inc., Chicago, IL, United States), descriptive statistics, the Student's t-test, and Analysis of Variance (ANOVA).

## 3. Results

In this study, we investigated 201 women who had hysterectomies at the Shariati Hospital in Bandar-Abbas from 2001 through 2011. Ten patients were excluded from the study because of incomplete files, so we evaluated 191 patients. The average age of the patients was  $51.66 \pm 12.46$  (ranging from 23 to 85), and the average of the age of patients who had positive pathology was  $50.2 \pm 9.6$ , while it was  $52.52 \pm 13.8$  for those with negative pathology. The Student's t-test indicated that there was no statistically significant difference between the patients' mean ages and adenomyosis ( $P = 0.07$ ). Also, the findings of the study indicated that there was not a significant relationship between menarche age and adenomyosis prevalence ( $P = 0.75$ ). In addition, the relationship between gravidity and the prevalence of adenomyosis was not statistically significant ( $P = 0.7$ ) (Table 1). Also, no significant relationship was found between parity and adenomyosis prevalence ( $P = 0.78$ ). Furthermore, there was no significant

relationship between uterine size and increased risk of adenomyosis ( $P = 0.82$ ) (Table 1). In addition, the relationship between rate of abortion and adenomyosis was not statistically significant ( $P = 0.74$ ) (Table 1).

**Table 1:** Results of pathology according to age, gravidity, parity, menarche, uterine size, and abortion

Variable	Pathology report	Frequency	Mean	Standard deviation
Age (year)	Adenomyosis	72	50.25	9.6
	Normal	119	52.52	13.86
Gravidity	Adenomyosis	72	7.36	2.73
	Normal	119	7.06	2.61
Parity	Adenomyosis	72	6.69	2.64
	Normal	119	6.44	2.51
Menarche age	Adenomyosis	72	12.76	1.21
	Normal	119	12.61	1.1
Uterus size	Adenomyosis	72	2.57	1.74
	Normal	119	2.57	1.8

**Table 2:** Prevalence of hysterectomy causes

Cause of hysterectomy	Frequency	Percent
Pelvic relaxation	88	38.1
Abnormal uterine	79	34.2
Myoma	48	20.77
Chronic pelvic pain	4	1.7
Endometrial hyperplasia	4	1.7
Ovarian benign mass	3	1.3
Ovarian cyst	3	1.3
Uterine Abscess	1	0.4
Endometrial polyp	1	0.4
Total	231	100

**Table 3:** Results of pathology according to the type of previous surgery

Type of surgery	Pathology report				Total
	Adenomyosis		Normal		
	Frequency	Percent	Frequency	Percent	
C/S	12	66.66	6	33.33	18
D&C	24	42.1	33	57.89	57
APR	1	14.28	6	85.71	7
Polypectomy	2	100	0	0	2
Myomectomy	0	0	1	100	1
Salpingectomy	0	0	1	100	1

Among the 191 patients that we studied, 117 cases (61.3%) had not a history of previous uterine surgery. Of the 74 patients (38.7%) with a history of previous uterine surgery, 18 patients (9.2%) had experienced caesarian section (C/S), of which 5 patients (2.6%) had experienced both dilation and curettage (D&C) and C/S. With regard to adenomyosis, 72 patients (37.7%) were pathologically positive and 119 patients (62.3 percent) were pathologically negative. Seventy-nine cases (34.2%) had hysterectomy due to abnormal uterine bleeding (AUB). AUB was the only reason for hysterectomy in 74 of those who had hysterectomy due to AUB (Table 2). Among the patients that we studied, 117 had not experienced surgery, of which 37 (31.62%) were pathologically positive and 80 (62.3%) were pathologically negative in terms of adenomyosis. Eighteen cases (9.4%) had a history of previous C/S, of which 12 cases (66.66%) were pathologically positive and 6 cases (33.33%) were pathologically negative in terms of

adenomyosis. In addition, it was found that there was a significant relationship between a history of surgery and the positive results for adenomyosis, and cesarean surgery was the most prevalent type of surgery related to adenomyosis according to its higher statistics ( $P = 0.01$ ) (Table 3).

#### 4. Discussion

Adenomyosis is one of the most common diseases in women, and it can be accompanied by various symptoms, such as dysmenorrhea, menometrorrhagia, dyspareunia, and chronic pelvic pain. Since adenomyosis is prevalent, its complications can cause physical and mental problems in women, and it also can influence their fertility and childbearing ability. It seems that prevention is necessary, but the risk factors for adenomyosis must be identified in order to prevent it. It has been found in various studies that several factors can influence adenomyosis, including chronological age, menarche age, gravidity, parity, weight, uterine size, and previous uterine surgery (1-4). The average age of the patients we studied was  $50.25 \pm 9.66$ , which was very close to that of other studies (1-6, 11). The prevalence of adenomyosis was found to be 37.7% in our study, which was similar to the results of several other studies (1, 6, and 7). However, prevalence at this level was not found in other studies (2, 4). According to different studies, the prevalence of adenomyosis is variable and can result from differences in the populations that are studied, differences in the diagnostic criteria of adenomyosis, and incorrect diagnoses due to the lack of standard criteria for making such a diagnosis.

In our study, there was not a significant relationship between menarche age and adenomyosis. Our results were in agreement with those of Vercellini in which no significant relationship between menarche age and adenomyosis was found (6). The average number of parity in women who had adenomyosis was  $6.6 \pm 2.64$ , and it was  $6.4 \pm 2.51$  in women who did not have adenomyosis, thus, there was no a significant relationship between the number of parity and adenomyosis ( $P = 0.712$ ). However, different from our results, other studies have demonstrated a significant relationship between parity and increased risk of adenomyosis (1-6). The results of our study were in agreement with the results of Bergholt's study, which showed that there was not a significant relationship between parity and adenomyosis (2). In our study, there was not a significant relationship between adenomyosis and gravidity ( $P = 0.712$ ), but some studies reported different results and concluded that women with adenomyosis had significantly higher gravidity than the group without adenomyosis (1, 11).

We found a significant relationship between adenomyosis and prior uterine surgery ( $P = 0.03$ ). Panganamamul also reported a significant relationship between adenomyosis and prior uterine surgery (1). Vercellini concluded that prior uterine surgery increased the risk of adenomyosis (6). Our results were compatible with the results of these studies; however, there was not a significant relationship between adenomyosis and prior uterine surgery in some studies (2, 11). Our study did not show a significant relationship between uterine size and adenomyosis ( $P = 0.8$ ), but, in some studies it was indicated that the sizes of the uterus were larger when adenomyosis was present than when it was not (3, 4, 7); our results were not in agreement with this. It seems that uterine sizes of cases with adenomyosis were smaller than those without adenomyosis. According to these studies, there is general agreement that the uterine size is larger in cases with adenomyosis. The lack of such a hypothetically significant relationship could be due to the fact that our study was a retrospective study, and the bimanual pelvic examinations were performed by different people. Consequently, the results we reported were produced by different people. Hence, prospective studies should be conducted with one person as the examiner with uterine weight included in the pathology result.

In our study, there was not a significant relationship between adenomyosis and spontaneous abortion. Some studies reported that both spontaneous and induced abortions were risk factors for adenomyosis (1, 2, 6, 11). According to these studies, it could be concluded that the evidence favors the fact that, in general, abortion (spontaneous and induced) is a risk factor for adenomyosis. According to the results obtained in this study and their comparison with those of other studies in other parts of the world, it was found that adenomyosis is more prevalent in women of childbearing age, premenopausal women with high parity and gravidity, and women who have had prior surgeries or abortions. However, there were no results that implied that there was a relationship between adenomyosis and menarche age. The results of this study were different from those of related studies concerning the prevalence of adenomyosis. Adenomyosis is a prevalent disease in women of childbearing age and can cause menometrorrhagia, iron deficiency anemia, dysmenorrhea, decrease in quality of life, and obstetrical complications, such as placenta accreta, placenta increta, atonia, and uterine rupture. Therefore, it is important to be able to identify, treat, and prevent adenomyosis in order to decrease its possible complications.

**5. Conclusion**

This study indicated that prior uterine surgery is a risk factor for adenomyosis. The data showed that adenomyosis could be reduced if unnecessary uterine surgeries were reduced. In order to decrease the number of unnecessary uterine surgeries, women should be trained to avoid unnecessary caesarian sections, and physicians should emphasize the importance of avoiding unnecessary caesarian sections. Then advantages of vaginal delivery and the side effects of cesarean section should be explained to women. Such training could be given through mass media, health centers, and health organizations. Women should be reminded of the fact that abortion should not be induced when an unexpected pregnancy occurs; also women should seek the advice and guidance of a physician when they intend to conceive so that cases of adenomyosis and the side effects of emergency cesarean sections can be reduced to the greatest extent possible. Training should be provided for women of childbearing age to make them aware of the complications of multiple pregnancies.

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**Conflict of Interest:**

There is no conflict of interest to be declared.

**Authors' contributions:**

All of authors contributed to this project and article equally. All authors read and approved the final manuscript.

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