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Exploring Multiparity's Influence on Uterine Fibroid Formation: A Cross-Sectional Study

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Abstract

Leiomyomas, commonly known as fibroids, are the most prevalent benign gynecological tumors among premenopausal women, with significant implications for women's health and healthcare costs. The study aimed to investigate the effect of parity on the development of uterine fibroids in women attending Al- Habibia General Hospital, Baghdad Medical City and multiple private clinics in Baghdad.

A cross-sectional observational study was conducted from May to July 2024, involving 103 women aged 20 and older.

Data were collected through structured interviews and medical record reviews, focusing on demographic and reproductive health characteristics, including parity and the presence of uterine fibroids, confirmed via ultrasound. Among the participants, 53.4% had 2 to 4 children, yet the association between parity and history of myomas was not statistically significant ($p \leq 0.078$). A significant correlation was found between pregnancy status and history of myomas ($p \leq 0.012$), with 89.1% of nonpregnant participants reporting a history of fibroids. No significant association was identified between the number of abortions and myomas ($p \leq 0.214$).

This study suggests that higher parity may not protect against the development of fibroids in this population. Additionally, pregnancy status appears to significantly influence the presence of myomas, aligning with existing literature that links fibroids to reduced fertility and adverse pregnancy outcomes. Further research is needed to explore the underlying mechanisms and broader implications of these findings.

Keywords: Multiparity, Leiomyomas, Uterine Fibroid

Introduction

Leiomyomas, commonly referred to as fibroids, are the most prevalent benign gynecological tumors in premenopausal women (1,2).

Their economic impact is substantial, affecting an estimated 11 million women (3), and incurring an annual cost of approximately 34 billion dollars in the United States alone (4). This article provides an overview of the general approach to the diagnosis, pathophysiology, histology, and treatment of leiomyomas.

Etiology

Leiomyomas arise from monoclonal cells originating in the myometrium (5). though research continues to explore their exact cause. Certain gene mutations have been implicated in the development of fibroids, with some linked to defects in cell transformation involving the RNA polymerase II transcriptional mediator subunit, MED12 (5).

Epidemiology

By age 50, nearly 70% of white women and over 80% of black women are diagnosed with leiomyomas, though clinical symptoms are twice as prevalent among black women compared to their white counterparts (2). Risk factors for developing fibroids include early menarche, oral contraceptive use before age 16, and increased body mass index, whereas the use of progestin-only contraceptives and higher parity tend to reduce this risk (2).

Pathophysiology

Leiomyomas are notably sensitive to steroid hormones, exhibiting increased expression of estrogen and progesterone receptors compared to normal myometrium (6). These ovarian steroids—estradiol and progesterone—stimulate fibroid growth, and it is well-documented that fibroids typically shrink after menopause due to decreased hormone levels (7).

Histopathology

Leiomyomas are benign, monoclonal tumors originating from the uterine smooth muscle (2,8). They primarily consist of extracellular matrix and cells with a low mitotic index (7,8), and are encapsulated by a pseudo capsule made of areolar tissue (8).

Clinical Presentation

Fibroids can present with a wide range of symptoms, from asymptomatic cases to those involving recurring and worsening symptoms that can significantly impact daily activities. Common symptoms include pain, pressure, and abnormal vaginal bleeding (7). The severity of symptoms is influenced by the fibroid's size, location, and number (1), and a physical examination usually reveals an enlarged, irregularly shaped uterus (2).

Diagnosis and Evaluation

Diagnosis is generally based on a detailed clinical history and physical examination. The most common finding is an enlarged uterus with an irregular shape, which can be confirmed with

ultrasonography, a cost-effective and rapid diagnostic tool. Further imaging, such as MRI, may be necessary to assess vascularization or degeneration and to define the relationship between fibroids and surrounding tissues (2).

Additionally, the FIGO (International Federation of Gynecology and Obstetrics) classification system helps evaluate the degree of fibroid invasion into the endometrial cavity, ranging from 0 to 8, with lower numbers indicating closer proximity to the endometrium (2,9). If excessive bleeding is a concern, further blood tests, including a complete blood count (CBC) and thyroid-stimulating hormone (TSH) levels, may be warranted to rule out other causes (2).

Treatment and Management

Managing fibroids effectively is essential to alleviate symptoms and reduce the economic burden on healthcare (2). Treatment options depend on the patient's age and reproductive goals, with medical and surgical interventions available.

Key treatment objectives include symptom relief, fibroid size reduction, and the preservation or improvement of fertility if desired. Medical treatments often involve hormonal therapy, Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), or modulation of the hypothalamic-pituitary axis.

While medical management can relieve symptoms, it is often short-term, as fibroid growth typically resumes after treatment ends.

Hormonal therapies, such as oral contraceptives, progesterone suppression, or Gonadotropin-Releasing Hormone (GnRH) agonists, help control bleeding but do not significantly reduce fibroid size or enhance fertility (1). Surgical options, including endometrial ablation, uterine artery embolization, myomectomy, or hysterectomy, offer more definitive treatments, with hysterectomy being the only option that completely resolves fibroids (2).

The study aimed to investigate the effect of parity on the development of uterine fibroids in women attending Al- Habibia General Hospital, Baghdad Medical City and multiple private clinics in Baghdad.

Subjects and methods:

Study design and Setting

This study was a cross-sectional, observational study conducted to investigate the effect of having multiple children (parity) on the development of uterine fibroids (myomas). The research was conducted at Al- Habibia General Hospital, Baghdad Medical City, and multiple private clinics in Baghdad Governorate, Iraq, over a 3-month period from May to July 2024. The hospital's gynecology and obstetrics

department provided access to patients who met the study's inclusion criteria.

Study Population

The study population consisted of 103 women aged 20 years and older, attending the hospital for gynecological consultation or routine reproductive health check-ups. Participants were selected using a convenience sampling method.

Data Collection

Data were collected through structured interviews and review of medical records. The primary investigator administered the interviews to gather relevant reproductive history and demographic data. Information of parity, number of normal vaginal deliveries (NVDs), C-sections, abortions, and menopausal status was collected. The presence or absence of uterine fibroids was confirmed via ultrasound reports or previous surgical records.

Data collection tools included:

Structured Interview Form:

This form captured demographic data (age, marital status) and reproductive history (parity, type of delivery, number of abortions).

Variables and Measures

The following variables were included in the analysis:

Independent Variables:

- Parity: Number of children (categorized as 0, 1, 2-4, or ≥5).
- Number of Normal Vaginal Deliveries (NVDs): Recorded as 0, 1, 2, or >2.
- Number of C-Sections: Recorded as 0, 1, or
- Pregnancy Status: Currently pregnant (yes/no).
- Menopausal Status: Menopausal (yes/no).
- Number of Abortions: Recorded as 0, 1, 2, or >2.
- Family History of Uterine Fibroids: (yes/no).

Dependent Variable:

- Presence of Uterine Fibroids: Confirmed diagnosis of uterine fibroids (yes/no).

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 25. Descriptive statistics were used to summarize demographic characteristics, reproductive history, and the prevalence of uterine fibroids in the study population. Categorical variables were reported as frequencies and percentages.

Associations between parity, reproductive health characteristics, and the presence of uterine fibroids were analyzed using the Chi-square test for categorical variables. A p-value of less than 0.05 was considered statistically significant. The study also explored potential

confounders, such as age and family history of uterine fibroids.

Ethical Considerations

Informed consent was obtained from all participants before data collection. Participants were informed of their right to withdraw from the study at any point. All personal information was anonymized to ensure confidentiality. Authorized by the Baghdad College of Medicine.

Results

Demographic Distribution:

The study included a total of 103 participants. Table 1 presents the distribution of participants by age group. The largest proportion of participants (34.0%) were aged 31-40 years, followed by 32.0% in the 41-50 age group. Only 1.9% were ≤ 20 years old, while 9.7% were > 50 years old.

Parity, Delivery, and Reproductive Health Characteristics

Table 2 shows the distribution of parity, number of normal vaginal deliveries (NVD), number of C-sections, pregnancy status, abortions, and menopausal status. The majority of participants (53.4%) had 2 to 4 children, while 19.4% had no children. Regarding delivery type, 33.0% of participants had no history of Normal Vaginal Delivery (NVD), while 66.0% had never undergone a C-section. Additionally, 22.3% of participants were currently pregnant, and 10.7% were menopausal.

History and Family History of Myomas

The history and family history of myomas are shown in Figure 1. Among the participants, 44.7% had a personal history of myomas, and the same percentage (44.7%) had a family history of myomas.

Association Between Reproductive and Demographic Factors with History of Myomas

Table 3 presents the association between various reproductive and demographic factors and the history of myomas. Although some differences were observed, no statistically significant association was found between the age groups and the history of myomas ($p \leq 0.086$). The highest percentage of participants with a history of myomas were in the 31-40 age group (37.0%).

Regarding parity, although the distribution of participants with 2 to 4 children was higher among those with a history of myomas (67.4%), the association was not statistically significant ($p = 0.078$).

The analysis of the number of NVD and C-sections also did not show significant associations with the history of myomas (p = 0.777 and p = =0.184, respectively). However, a significant association was found between pregnancy status and the history of myomas (p = 0.012), with 89.1% of non-pregnant participants having a history of myomas. The number of abortions was not significantly associated with the history of myomas (p = 0.214). Similarly, no significant association was observed between a family history of myomas and participants' personal history of myomas (p =0.311).

Table 1: Age Groups Distribution

Age Group	Frequency	Percent
≤ 20 years old	2	1.9%
20-30 years old	23	22.3%
31-40 years old	35	34.0%
41-50 years old	33	32.0%
> 50 years old	10	9.7%
Total	103	100.0%

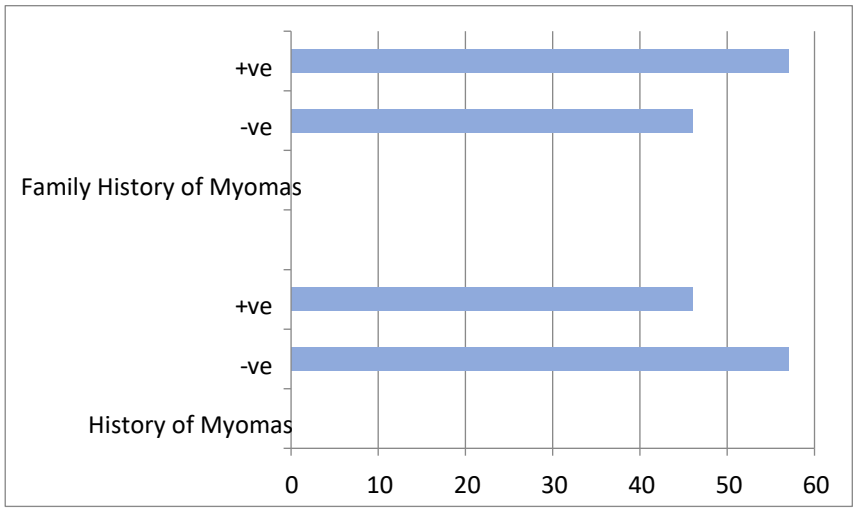

Figure 1: History and Family History of Myomas Distribution

Table 2: Parity, Delivery, and Reproductive Health Distribution

Reproductive issue	Category	P Frequency
Parity		
≥ 5	6	5.8%
0	20	19.4%
1	22	21.4%
2-4	55	53.4 %
Number of NVD		
> 2	19	18.4%
0	34	33.0%
1	29	28.2%
2	21	20.4 %
Number of C-Sections		
0	68	66.0%
1	25	24.3%
2	10	9.7 %
Currently Pregnant		
-ve	80	77.7%
+ve	23	22.3 %
Number of Abortions		
> 2	8	7.8%
0	63	61.2%
1	21	20.4%
2	11	10.7 %
Menopausal		
-ve	92	89.3%
+ve	11	10.7%
Total	**103**	**100.0%**

Table 3: Association Between Reproductive and Demographic Factors with the History of Myomas

Factors	History of Myomas (-ve)	History of Myomas (+ve)	Total	P value
Age Groups				0.086
20-30 years old	15 (26.3%)	8 (17.4%)	23 (22.3%)	
31-40 years old	18 (31.6%)	17 (37.0%)	35 (34.0%)	
41-50 years old	20 (35.1%)	13 (28.3%)	33 (32.0%)	
≤ 20 years old	2 (3.5%)	0 (0.0%)	2 (1.9%)	
> 50 years old	2 (3.5%)	8 (17.4%)	10 (9.7%)	
Parity				0.078
≥ 5	4 (7.0%)	2 (4.3%)	6 (5.8%)	
0	13 (22.8%)	7 (15.2%)	20 (19.4%)	
1	16 (28.1%)	6 (13.0%)	22 (21.4%)	
2 to 4	24 (42.1%)	31 (67.4%)	55 (53.4%)	
Number of NVD				0.777
> 2	10 (17.5%)	9 (19.6%)	19 (18.4%)	
0	19 (33.3%)	15 (32.6%)	34 (33.0%)	
1	18 (31.6%)	11 (23.9%)	29 (28.2%)	
2	10 (17.5%)	11 (23.9%)	21 (20.4%)	
Number of C-Sections				0.184
0	42 (73.7%)	26 (56.5%)	68 (66.0%)	
1	11 (19.3%)	14 (30.4%)	25 (24.3%)	
2	4 (7.0%)	6 (13.0%)	10 (9.7%)	
Currently Pregnant				**0.012**
-ve	39 (68.4%)	41 (89.1%)	80 (77.7%)	
+ve	18 (31.6%)	5 (10.9%)	23 (22.3%)	
Number of Abortions				**0.214**
> 2	3 (5.3%)	5 (10.9%)	8 (7.8%)	
0	40 (70.2%)	23 (50.0%)	63 (61.2%)	
1	9 (15.8%)	12 (26.1%)	21 (20.4%)	
2	5 (8.8%)	6 (13.0%)	11 (10.7%)	
Family History of Myomas				**0.311**
-ve	28 (49.1%)	18 (39.1%)	46 (44.7%)	
+ve	29 (50.9%)	28 (60.9%)	57 (55.3%)	

Discussion

In this study, a majority of participants (53.4%) had 2 to 4 children, with 19.4% having no children. Interestingly, while the highest percentage of participants with a history of myomas also fell within this group (67.4%), the association between parity and myomas was not statistically significant ($p \leq 0.078$). This finding contradicts some literature, which often suggests a protective effect of high parity against the development of fibroids. For example, Wise et al. (2023) indicated that women with higher parity have a reduced risk of developing fibroids (10). However, this discrepancy might be due to differences in study populations or cultural factors influencing reproductive patterns.

In this study, 66.0% of participants had no history of C-sections, and no significant association was found between the number of C-sections or normal vaginal deliveries (NVD) and the history of myomas ($p = 0.184$ and $p = 0.777$, respectively). This contrasts with the findings of Tugba Kinay et al., where a history of cesarean section was significantly associated with abnormal uterine bleeding in patients with uterine leiomyomas ($p \leq 0.001$), identifying it as an independent risk factor with an odds ratio of 2.1 (95% CI: 1.4-3.3) (11). The difference may be due to variations in study design, population, and focus, as their study involved a larger sample size and evaluated risk factors for abnormal uterine bleeding, including submucosal leiomyomas and adenomyosis, which were not assessed in this research.

One of the key findings of this current study was the statistically significant association between pregnancy status and the history of myomas ($p \leq 0.012$). We found that 89.1% of non-pregnant participants had a history of myomas, compared to only 10.9% of pregnant women. This is supported by research indicating that the presence of fibroids can reduce fertility and increase the likelihood of miscarriage, thereby reducing the chance of being pregnant (12,13). Research by Pritts et al. (2009) similarly found that fibroids, particularly submucosal types, can have a detrimental effect on conception and pregnancy outcomes, further supporting our findings (14).

In this study, 61.2% of participants had never experienced an abortion, and we found no statistically significant association between the number of abortions and the history of myomas ($p = 0.214$). This aligns with the findings from the systematic review and meta-analysis by Sundermann et al., which assessed the risk of spontaneous abortion among pregnant women with and without uterine leiomyomas. Their

analysis, which included over 21,000 pregnancies, revealed no increased risk of spontaneous abortion for women with leiomyomas (11.5% compared to 8.0%; Risk Ratio [RR]: 1.16, 95% CI: 0.80 to 1.52) (15-16). Both studies suggest that the presence of myomas may not significantly impact abortion rates, countering the common belief that they pose a risk factor.

Conclusions:

Parity and Myomas:

The study found that while a majority of participants (53.4%) had 2 to 4 children, the association between parity and the history of myomas was not statistically significant (p =0.078). This suggests that, contrary to some literature, higher parity may not necessarily confer protection against the development of fibroids in this population.

Pregnancy Status Impact:

A significant association was observed between pregnancy status and the history of myomas (p ≤ 0.012), with 89.1% of non-pregnant participants reporting a history of myomas. This aligns with existing research indicating that fibroids can negatively affect fertility and pregnancy outcomes.

Impact of Abortions:

The analysis indicated no statistically significant relationship between the number of abortions and the history of myomas (p =0.214), supporting findings from broader studies suggesting that myomas may not significantly influence abortion rates.

Recommendations:

Further Research:

Future studies should involve larger and more diverse populations to better understand the relationship between reproductive factors and the development of myomas. Additionally, examining the impact of specific types of myomas on fertility and pregnancy outcomes could provide more nuanced insights.

Awareness Programs:

Healthcare providers should implement awareness programs about the potential impacts of myomas on reproductive health, particularly focusing on fertility concerns for women diagnosed with myomas.

Consideration of Cultural Factors:

Researchers should consider cultural and socioeconomic factors influencing reproductive health when designing studies on myomas, as these factors may significantly affect reproductive patterns and health outcomes.

Conflict of Interest: None

Funding: Nil

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