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THE CORRELATION BETWEEN LIPID PROFILE AND UTERINE FIBROID

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Abstract

Summary: Uterine fibroids are benign tumors of the uterus and are the most common type. Many women of childbearing age experience them for unknown causes. The primary purpose of our study was to assess the lipid profile of uterine fibroid patients and to compare the lipid profile of healthy women. **Methods:** This is a case-control study that included 100 women who attended the outpatient clinic and gynecological wards of the Department of Obstetrics and Gynecology at Al-Basra hospital from 1st of January 2020 to 1st of April 2020. The age, parity, and body mass index (BMI) of each participant were noted. For patients with uterine fibroids, we recorded the size, number, and location of the fibroids. Also, a lipid profile was measured. The results were analyzed using SPSS version 23. **Results:** indicated that the main complaint was abnormal menstrual bleeding. Most of the patients were older than 40 years. Cholesterol levels were significantly higher in the case group. Both groups had similar outcomes in terms of various lipid profiles. The lipid profile was not correlated with the largest diameter of the uterine fibroid ($p > 0.05$). **Conclusion:** the data showed that the lipid profile of women with uterine fibroids was different from that of women without these tumors. **Objective of study:**

- To investigate the lipid profile in patients with uterine fibroids.
- To compare the lipid profile in patients with uterine fibroids and normal women.
- To analyze the possible associations between dyslipidemia with uterine fibroids.

Keywords: Benign tumors, lipid profile, abnormal menstrual bleeding, uterine fibroid, women.

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Introduction

Overview on Uterine fibroids: Fibroids, sometimes called leiomyomas or myomas, are the most common benign uterine tumors (1-3). These tumors arise in the myometrium and are composed of a large amount of extracellular matrix containing proteoglycans, collagen, and fibronectin. They are monoclonal tumors of the smooth musculature of the uterus. Leiomyomas are found in 50-60% of women, and this percentage increases to 70% by the age of 50 (6). In 30% of these patients, irregular uterine hemorrhage and pelvic pressure can lead to morbidity, including urinary symptoms, constipation, and tenesmus (7, 8). Uterine fibroids (UFs), or leiomyomas, are the most common tumors of the female reproductive system (9). They probably evolved from single-celled creatures, and their rate of growth is affected by estrogen, growth hormone, and progesterone. Uterine fibroids commonly appear throughout a woman's reproductive years, grow larger during pregnancy, and then diminish after menopause. But there has been little research, and the exact mechanism is not yet known. Women who utilize estrogen agonists have a higher incidence of fibroid tumors. Growth hormone and estradiol appear to synergistically impact the production of fibroid tumors. Progesterone, however, seems to impede their development (10). Because many fibroids go undiagnosed, ultrasound screening can provide a more accurate estimate of fibroid prevalence. Several studies have reported that the incidence of uterine fibroid tumors is higher in Black women (11-13). White women have been reported to have smaller, less symptomatic tumors than Black women undergoing therapy (14).

Recent evidence suggests that women with hypertension have a higher risk of fibroid tumors, possibly through smooth muscle injury or cytokine release(13). Fibroids are likely to be less common among these pregnant women than among the general population because fibroids can interfere with fertility(12).

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Risk factors associated with the development of fibroid tumors were shown in table 1-1.

Table 1-1 Factors That Affect the Risk of Uterine Fibroid Tumors (11)

Decreased risk
More than five pregnancies
Postmenopausal status
Prolonged use of oral contraceptives
Smoking
Early age of menarche
Use of depot medroxyprogesterone acetate (Depo-Provera)
Increased risk
40 years or older
Black race
Family history of uterine fibroid tumors
Nulliparity
Obesity

Classifications of Uterine Fibroids

More recently, the International Federation of Gynecology and Obstetrics (FIGO) classification was published (16), describing eight types of fibroids as well as a hybrid class (association of two types of myomas) (Figure 1-1). As different types

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of fibroids are often present at the same time (depending on the site), this classification offers a more representative 'map' of fibroid distribution, figure 1-1.

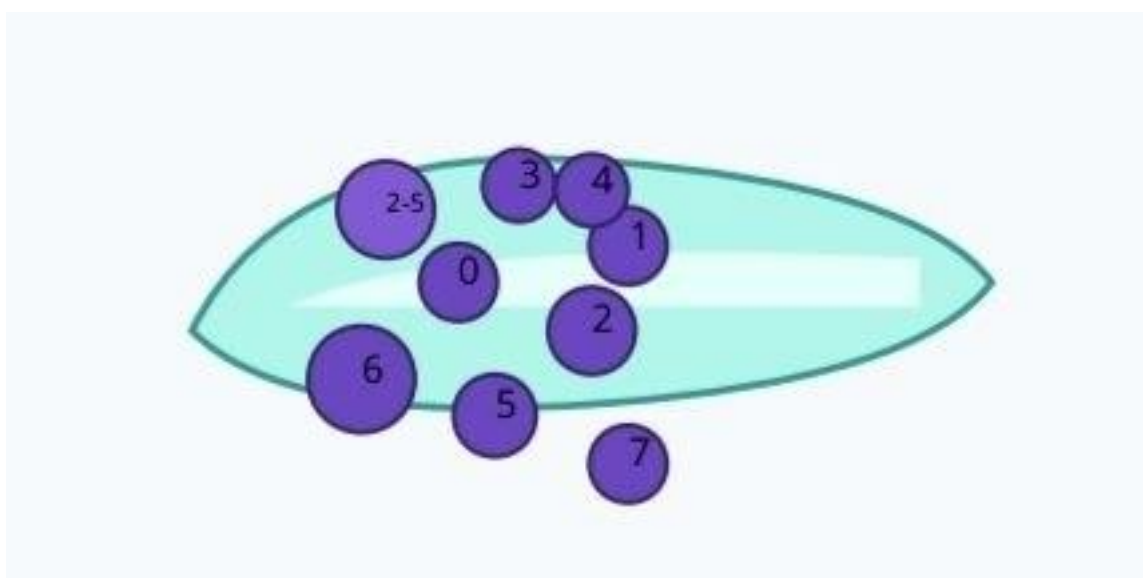


Figure 1-1 FIGO classification of uterine fibroids (14).

Fibroid types range from 0 to 8. **0** = Pedunculated, intracavitary; **1** = Submucosal, <50% intramural; **2** = Submucosal, ≥50% intramural; **3** = Contact with endometrium, 100% intramural;

4 = Intramural; **5** = Subserosal, ≥50% intramural; **6** = Subserosal, <50% intramural; **7** =

Subserosal, pedunculated; **8** = Other (e.g. cervical, parasitic). Where two numbers are given (e.g.

2-5), the first number refers to the relationship with the endometrium, while the second number

refers to the relationship with the serosa; e.g. **2-5** = Submucosal and subserosal, each with less

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than half the diameter in the endometrial and peritoneal cavities respectively.

Clinical Features of Uterine Fibroid

Because uterine fibroid tumors are so common and many are asymptomatic, it is difficult to attribute symptoms solely to them. Women with menorrhagia, pelvic pain, obstructive symptoms, infertility, or miscarriage are at increased risk to acquire uterine fibroids (17). Irregular periods, often called menorrhagia, are the most common signs of uterine fibroid tumors. Many individuals think submucosal tumors cause menorrhagia, but a study has found no difference in the endometrium overlying these tumors compared to other areas of the uterus. Fibroid tumors can produce vascular abnormalities leading to menorrhagia due to dysregulation of local growth hormones, irrespective of their location in the uterus (18, 19). Uterine fibroids less commonly cause pelvic pain and pressure. Some case reports have described enormous tumors causing constipation, urinary symptoms, pelvic pain, and respiratory failure (20, 21). A number of symptoms can occur with large fibroid tumors and an enlarged uterus in pregnancy, including a blocked urinary tract, abdominal pain (due to tumor degeneration), and, occasionally, an increased risk of placental abruption (especially if the tumor is retroplacentally located) (22). The contribution of fibroid tumors to infertility is debated. Some of the ways fibroids can impair a woman's fertility include: Changes in endometrial function after changes in local architecture, namely the uterine cavity (20).

- ✓ Functional changes including higher uterine contractility and decreased blood supply to the endometrium and myometrium (8)
- ✓ Fibroids may induce paracrine molecular changes and alterations of the local hormonal milieu that may delay the migration of the gametes and perhaps limit blastocyst implantation (24, 25).

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Fibroids can interfere with pregnancy and occur in up to 10.7% of pregnant women. The estimated cumulative risk for random miscarriage is 20.4% when an ultrasound diagnosis of intramural fibroids is made in the first trimester. Uterine fibroids are not prevalent in recurrent pregnancy loss and are expected to be present in only 4.08% (26). Fibroids can negatively impact pregnancy outcomes. The pregnancy outcome may be influenced by Inflammatory pathways, whether linked to other reproductive disorders or not (27). by inflammatory pathways, either associated with or not associated with other reproductive disorders (27). Fibroids have been highly associated with preterm delivery (before 37 weeks), primary cesarean section, breech presentation, and lower birthweight neonates (28-31) [28-31]. Most recently, studies have demonstrated that pregnant women with fibroids are more likely to have a short cervix (31).

Diagnosis of Uterine Fibroid

1. Pelvic examination. In examining your pelvis, you may notice a swollen uterus or you may notice a swollen uterus or a mass. If a woman has excessive menstrual flow and there is suspicion of fibroids, then...

2. Ultrasound Usage. Ultrasound is considered the most dependable way to identify uterine fibroids. Ultrasound is widely available, making confirmation typically straightforward and inexpensive. Ultrasonography can also detect intramural myomas next to the endometrial cavity and submucous myomas after saline infusion in the uterine cavity (33). Since the introduction of 3D imaging technology, the ability of 3D ultrasound to reconstruct the uterine coronal plane has been a crucial tool for the investigation of myometrial pathology (34, 5).

3. Hysteroscopy. Hysteroscopy may help in the differential diagnosis of large endometrial polyps and intracavitary myomas (30, 36). Hysteroscopy is usually performed as an outpatient procedure and does not require anesthesia. If hysteroscopic myomectomy is needed, diagnostic hysteroscopy and ultrasonography with saline infusion are more like complementary examinations.

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Hysteroscopy can be used with endometrial biopsy in cases of abnormal bleeding or in women at risk for endometrial hyperplasia (obesity, prolonged anovulation) (36).

Imaging using Magnetic Resonance

MRI can provide information on fibroids, such as size, vascularization, and relationship. The objective is to find any possible association between the uterine cavity and serosal surface and interaction with the normal myometrium. However, it should be pointed out that magnetic resonance imaging (MRI) or ultrasonography do not allow a completely confident diagnosis of malignancy (37, 38). Right now there is no preoperational test that can definitely exclude sarcoma; however, MRI findings may be suggestive of a diagnosis (39). Though sarcoma is still a relatively rare pathology (1/1500 in women under 40 years, 1/1100 in women 40-44 years), future imaging methods may improve detection (40).

Management Uterine Fibroid

Surgical intervention and pharmacological therapy may be necessary for symptomatic uterine fibroids, contingent upon factors such as the patient's age, level of infertility, intention to preserve the uterus, and FIGO classification (37). The available techniques are mostly surgical, such as hysterectomy, hysteroscopic myomectomy, and laparoscopic or laparotomic myomectomy. While hysterectomy is the gold standard of fibroid therapy, it is not always the best solution. Your gynecologist can tell you which of the less invasive procedures might be the best fit for you depending on their knowledge, the kind of fibroids you have, how many there are, and where they are located. Some procedures are uterine-sparing, such as myomectomy. Other rare surgical treatments include laparoscopic cryomyolysis, thermocoagulation, and uterine artery occlusion. Additionally, we offer non-invasive techniques such as uterine

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artery embolization (UAE) and high-frequency magnetic resonance-guided focused ultrasound surgery (MRgFUS). However, the desire to have a family in the future is a relative contraindication to these techniques (32).

Medical treatment, however, is still necessary. If fertility preservation is the goal, alternatives to surgical intervention are immediately required, so novel treatments must be developed to supply these. GnRH agonists have been promising in lowering the size of fibroids and improving hemoglobin levels in symptomatic women, yet side effects restrict their use to the short term. However, current studies with selective progesterone receptor modulators (SPRMs) are hinting at the critical involvement of progesterone in the aetiology of uterine fibroids (32). The results of extensive clinical trials with the SPRM compound ulipristal acetate UPA and with its long-term intermittent administration are positive and open new possibilities for treatment. More than one 3-month course is advised to achieve the best benefits from UPA in controlling bleeding and reducing fibroid volume. Therefore, SPRMs should be considered as an alternative to surgical treatment or as an extra tool for surgery, depending on the patient's age and symptoms (bleeding, infertility) (32).

Relationship of Uterine Fibroids with Lipid Profile

The growth rate of uterine fibroids: Estrogen, growth hormone, and progesterone influence the growth rate of uterine fibroids. by estrogen, growth hormone, and progesterone. There is evidence of a synergistic relationship between growth hormone and estradiol in the formation of fibroid tumors and an increased incidence of these tumors with the use of estrogen agonists. In contrast, progesterone appears to impede their development (10).

The development of uterine fibroids is steroid hormone-dependent, and tumors and tumor-derived cell lines are more sensitive to estrogen (41). Fibroids also differ from normal myometrium in a number of respects, such as estrogen content, estrogen binding, estrogen receptor density, and the rate of conversion

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of estradiol to estrone. It has been suggested that estrogen synthesized in situ in leiomyomas may stimulate leiomyoma growth in an autocrine/paracrine fashion. Several publications have demonstrated that leiomyomas overexpress aromatase P450, an estrogen synthetase that converts androgens to estrogens.

There have been several studies showing the effect of estrogen on lipoproteins. For example, before menopause women had lower plasma levels of low-density lipoprotein (LDL) and higher levels of high-density lipoprotein (HDL) than males of the same age. After menopause, levels of low-density lipoprotein (LDL) cholesterol often rise, often above those of age-matched males, while levels of high-density lipoprotein (HDL) cholesterol fall (44-46). Oestrogen is particularly beneficial in triglyceride metabolism. Oestrogen accelerates the breakdown or turnover of cholesterol. Women during menopause had increased blood triglyceride levels due to loss of estrogen (45). Oestrogen enhances the use of lipids as fuel by boosting lipid oxidation and reducing blood triglyceride levels. Postmenopausal women have reduced levels of estrogen and greater serum triglyceride levels (47).

Liver lipase activity is inhibited by endogenous estrogen; hence, decreasing lipase activity would result in increased HDL cholesterol levels and a slight decrease in solid LDL particle levels. "The fall in LDL cholesterol levels is probably due to the liver converting cholesterol to bile acids faster and cells expressing more LDL receptors, which enhances the removal of LDL from the blood." The increase in HDL levels is explained by a reduction of hepatic lipase activity and an increase in apolipoprotein A-I production. These alterations raise the amounts of HDL, the subparticle most active in reverse cholesterol transfer. Increased production of apolipoprotein B and triglycerides results in increased amounts of VLDL; however, the atherogenic potential of these particles is unknown. Lipoprotein(a) is a lipoprotein that is thought to be proatherogenic and antithrombotic. It is structurally related to LDL and plasminogen. Oestrogen medication has been shown to diminish levels of this lipoprotein (48). The positive effects of estrogen

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on lipoproteins measured by secondary-prevention cholesterol may delay the onset of atherosclerosis or its immediate repercussions. Furthermore, estrogen was implicated in the regulation of lipoprotein lipase, which hydrolyzes triglycerides to VLDL and chylomicrons (49). Research has shown that there is a negative association between estrogen and cholesterol levels (50).

Fibroids are estrogen-driven tumors; hence, it is reasonable to assume that hyperlipidemia will diminish the chances of growth of fibroids. Several research projects have investigated the effect of lipid profile factors on UF, and the results indicated that the case group has higher cholesterol and LDL levels (51–54). For example, Sersam et al. observed that patients with UFs had lower total and LDL cholesterol levels and higher HDL values (52). Further studies by Huda et al. and Sadlonova et al. have reported that individuals with UFs had greater levels of HDL (54, 55). The researchers Huda et al. and Sadlonova et al. hypothesized that elevated HDL levels may have been caused by the important involvement of estrogen in the development of UF. They reasoned that elevated estrogen levels would inevitably lead to a protective lipid profile characterized by high HDL and low LDL. But others are not convinced of this theory yet.

However, some investigators reported higher triglyceride and cholesterol levels in the case group; for instance, Vignini et al. (53) and Akinlua et al. (56). No substantial conclusions regarding UFs and lipid profiles were reported by Parazian et al. and Ratch et al. (57, 58).

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Methodology

Study design: Statistical considerations in a case-control study.

Study setting: Data collection was carried out on women of reproductive age who attended the gynecological wards and outpatient clinic of the Department of Obstetrics and Gynecology at Al-Basra hospital, central Al-Basra, Iraq, from 1 January 2020 to 1 April 2020.

Sampling technique and sample size: We employed a consecutive sampling technique for this data set that comprised women of childbearing age. Fifty women with uterine fibroids and fifty healthy women equivalent to the case group regarding age, body mass index, and parity were included over the time frame.

Inclusion Criteria

All women with fibroids who:

- At the beginning of the research, research subjects must be between 18 and 45 years of age.

For example, if you have ever suffered from dysmenorrhea, pelvic pain, irregular monthly periods, or infertility, it is vital to contact a doctor.

- Ultrasound findings compatible with UFs.

Exclusion Criteria

Do not include any women that

This is what menopause is.

During pregnancy.

People with a history of high blood pressure, diabetes, or thyroid problems and women receiving hormone replacement treatment Patients with a prior history of cancer or those without any prior history of cancer were considered. It is preferable to have a positive family history of cardiovascular, autoimmune, or endocrine diseases (e.g., delayed menstrual periods).

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Patients taking lipid-lowering drugs during the study or with a family history of familial hyperlipidemia syndromes were excluded. Sonographically, adenomyosis was observed.

Data collection tools (appendix 1):

1 Questionnaire:

Data was collected by means of a self-administered questionnaire, in which participants provided information on various variables. The data were collected via face-to-face interviews with the participants. The questionnaire contained demographic, obstetric, and gynecological data such as age (in years), parities, and symptoms suggestive of UF (e.g., bleeding, stomach, or pelvic pain).

2 .Anthropometric measurements:

Researchers measured anthropometric characteristics of the subjects. The patients' weights were recorded in kilograms using a calibrated beam-balance scale and their heights in meters. Patients were requested to stand without shoes and in light clothing. In addition, the calculation for body mass index (BMI) was $BMI = \text{weight}/\text{height squared (kg/m}^2\text{)}$. The body mass index (BMI) is described with different categories: underweight ($< 18.5 \text{ kg/m}^2$), normal (≥ 18.5 and $< 25 \text{ kg/m}^2$), overweight (≥ 25.0 and $< 30 \text{ kg/m}^2$), and obese ($\geq 30.0 \text{ kg/m}^2$).

3. Ultrasound examination:

The patient was in the supine position. A baseline ultrasound examination was performed by a specialized ultrasonographer on all subjects using the ultrasound instrument (TAS or TVS probe). Fibroids were defined as solid hypoechogenic masses on ultrasonography. The number of UFs and their anatomic subtypes (submucosal, subserosal, and intramural) were recorded, and the greatest diameter of each identified fibroid was calculated in perpendicular planes.

4. Laboratory tests:

All laboratory measurements were performed in the laboratory of Al-Basra hospital in the morning between 8:00 and 9:00, after an overnight fast, using normal methods. Blood samples were collected, and fasting blood sugar, total

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cholesterol, triglycerides, high-density lipoprotein, and low-density lipoprotein levels were assessed in milligrams per deciliter (mg/dL). The process was to take 5 cc of blood from veins through venipuncture and put it in a flat tube without anticoagulant. After spinning for 10 minutes, serum was created and evaluated.

7. Ethical consideration:

The study was approved by the ethical committees of the Department of Gynecology and Obstetrics, Basra Medical College, Al-Basra Health Directorate, and the hospital. Participants were provided with information about the study's purpose to obtain verbal consent.

2-8 Statistical Analysis:

Data was analyzed using the statistical package for the Social Sciences (SPSS) version 23. Descriptive statistics were presented in terms of frequency tables. Continuous variables were expressed as mean $\pm$ standard deviation and categorical data as numbers and percentages. Analytical tests such as the Student t-test and the analysis of variance (ANOVA) may be used to explore the relationship between continuous and categorical variables as well as between two categories of variables. Statistical significance was assessed using a P-value of 0.05 or less.

Research limitations:

1. Small samples.
- 2- The study was conducted in a hospital setting, and hence the results may not be generalizable to the general community.

Results

A total of 100 women enrolled in this study, 50 case of UF and 50 control women. The mean ($\pm$ SD) of age in cases was 39.8 ± 5.2 years and the mean ($\pm$ SD) of control women was 38 ± 5.7 years. The mean $\pm$ SD of BMI in cases was 29.3 ± 4.6 and the mean $\pm$ SD of control was 31.2 ± 5.4 . The two sample were homogenous in age, BMI and parity ($p = 0.107, 0.065$ and 0.34 respectively), table 3-1.

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Table 3-1 Characteristics of studied groups.

Characteristics	Participants		Total	P value
	Cases No (%)	Control No (%)		
Age	<30 years	1(2%)	2(4%)	0.107*
	30-39 years	16(32%)	22(44%)	
	≥40 years	33(66%)	26(52%)	
	Mean ±SD	39.8± 5.2	38± 5.7	
BMI	Normal	8(16%)	2(4%)	0.065*
	Overweight	20(40%)	18(36%)	
	Obese	22(44%)	30(60%)	
	Mean ±SD	29.3± 4.6	31.2 ±5.4	
Parity	Nil	11(22%)	6(12%)	0.34**
	1-3	10(20%)	14(28%)	
	≥4	29(58%)	30(60%)	

*Student T test, ** chi-square test, significant ≤0.05.

The type of uterine fibroid for case in our sample were 46%(23) of cases had posterior intramural type, 22%(11) of cases had two site or more, 16%(8) of cases had anterior intramural, 8%(4) of cases had subserosal and 4%(2) had pedunculated and submucosal, figure 3-1.

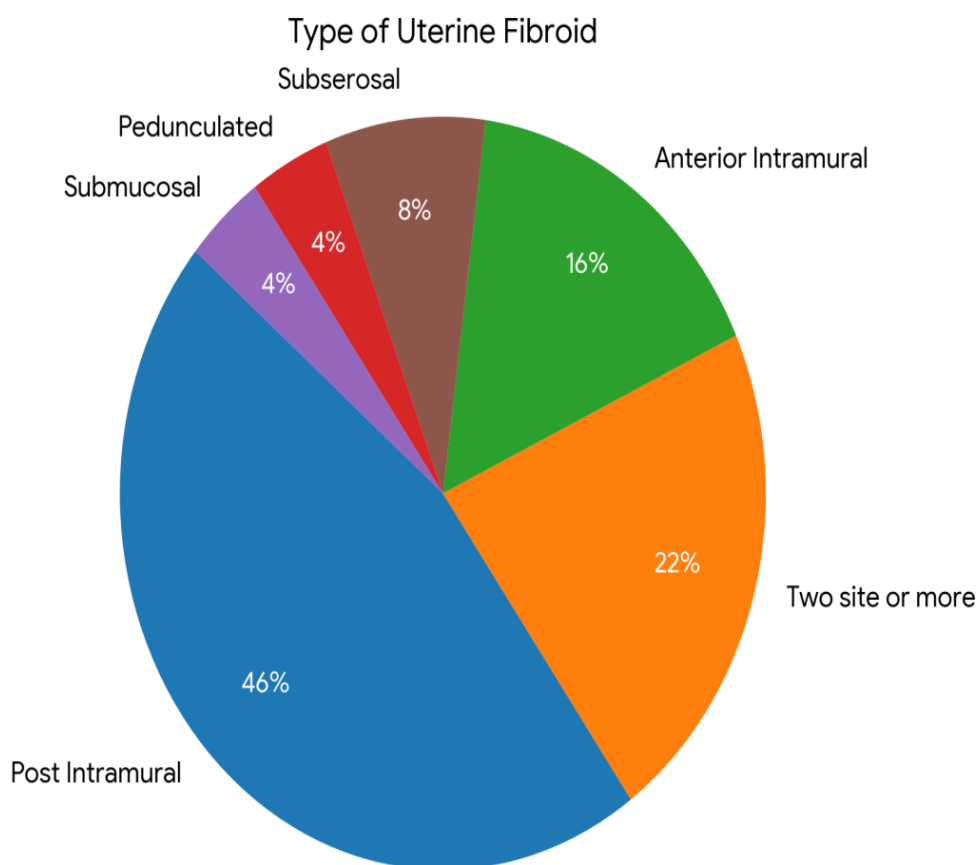
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The mean $\pm$ SD largest diameter for uterine fibroid by ultrasound was 4.9 ± 2.2 cm, ranging between 1.3 to 8.5 cm. The symptoms that cause by fibroid were bleeding in 52%(26) of cases, pain in 10%(5) of cases, infertility in 16%(8) of cases, urinary symptoms in 2%(1) of cases and two and more symptoms in 20%(10) of cases, figure 3-2.

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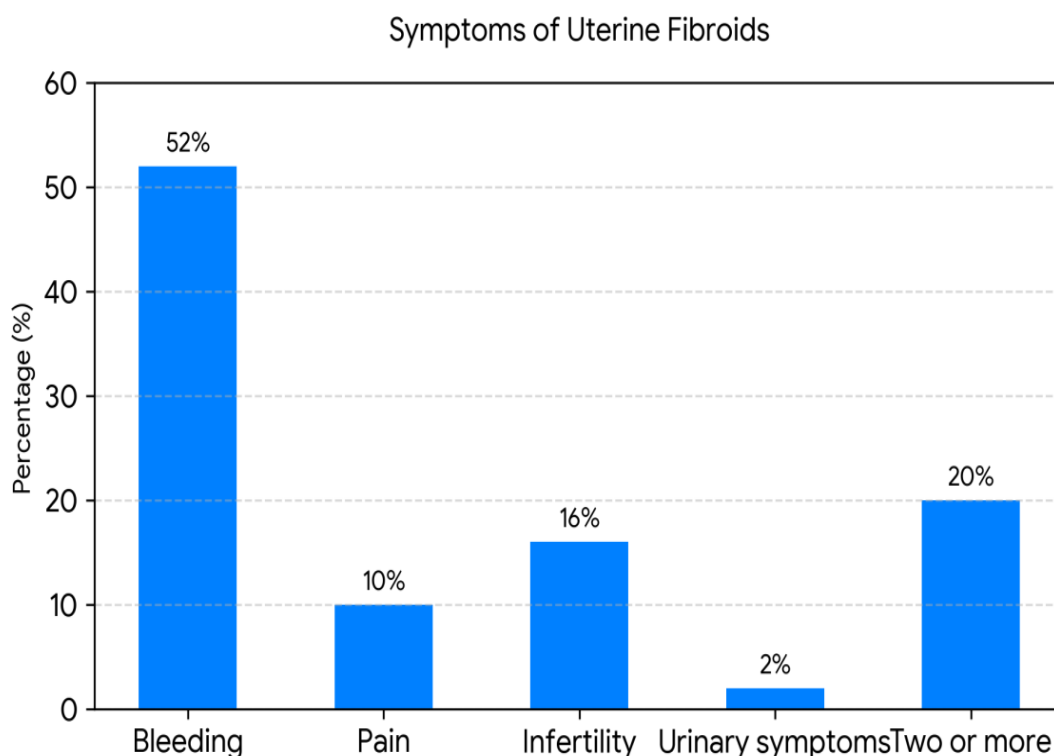


Figure 3-2 Symptoms of uterine fibroids.

The mean $\pm$ SD of fasting blood sugar for cases was 97.2 ± 14.2 and only 4%(2) of cases had FBS level more than 125mg/dL while The mean $\pm$ SD of fasting blood sugar for cases was 91.1 ± 11.2 and only 2%(1) of control had FBS level more than 125mg/dL, figure 3-3.

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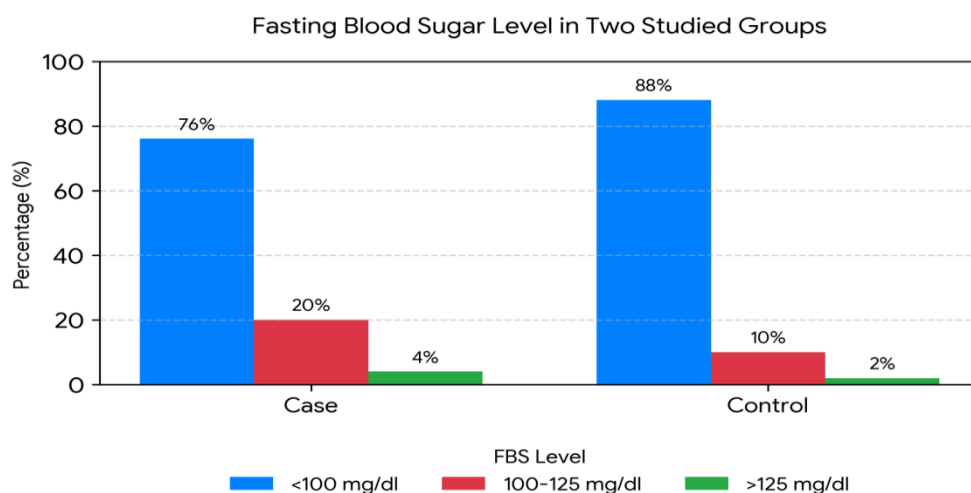


Figure 3-3 Fasting blood sugar level in two studied groups.

The lipid profiles for two groups shown that, the total cholesterol was significantly higher in case than control group ($p=0.050$), while there was no significant difference in triglyceride, high-density lipoprotein and low-density lipoprotein ($P=0.27, 0.81$ and 0.058 respectively), table 3-2.

Table 3-2 Difference in lipid profile between studied groups.

Lipid profiles	Participants		P value
	Case Mean $\pm$ SD mg/dL	Control Mean $\pm$ SD mg/dL	
Total cholesterol	190 $\pm$ 54.6	168.3 $\pm$ 55.3	0.050* S
Triglyceride	151.9 $\pm$ 88.2	132.8 $\pm$ 85.9	0.27* NS
HDL	46.6 $\pm$ 30.8	47.7 $\pm$ 12.5	0.81* NS
LDL	119.9 $\pm$ 48.2	101.4 $\pm$ 48.1	0.058* NS

*Student T test, S= significant ≤ 0.05 , NS= non significant.

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The uterine fibroid largest diameter was not correlated with lipid profile ($p > 0.05$), table 3-3.

Table 3-3 Correlation of lipid profile with uterine fibroid size.

Lipid profiles	UF largest diameter Correlation coefficients	P value
Total cholesterol	-0.053	0.71* NS
Triglyceride	-0.027	0.85* NS
HDL	0.036	0.8* NS
LDL	-0.12	0.4* NS

*Correlation test, NS= non significant.

Discussion

Uterine fibroids are the most common benign gynecological tumors and a cause of concern for many women. The etiology of these cancers is still uncertain (59), but experimental and epidemiological research has demonstrated that ovarian hormones play an important role in the pathogenesis of these tumors. Uterine fibroids are illnesses of ovarian steroid-dependent growth potential, which develop during the reproductive years and disappear after menopause.

Most of the instances of fibroids in this study (66%) were among adults >40 years, consistent with earlier work demonstrating that the prevalence of fibroids is highest among people aged 41–50 years (Ofori & Antwi, 2010; Magda et al., 1961). Obesity: There is substantial evidence that obesity increases the chance of uterine fibroids. The study indicated that 40% of the women with fibroids were obese and 44% were overweight. This is in accordance with prior studies where more than half of the women with fibroids were obese and fewer than a third were overweight. A greater body mass index (BMI) was associated with an increased risk of fibroids, according to the Wise & Laughlin study. (62) Increased BMI was

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connected with the probability of fibroids but not with the largest fibroid dimension, according to Dandolu et al. (63). Research by Bray et al. (64) found no relationship between body mass index and number and size of fibroids. Possible explanations for the disagreement are the difference in lifestyle, different categories of body mass index (BMI), sample sizes, and the variables assessed (e.g., central fat criteria or BMI). One possible explanation for these findings is that anthropometric measurements, such as weight, waist circumference, and body mass index (BMI), may not be a true representation of fat distribution in the body. Therefore, sonographic indicators like subcutaneous fat thickness or preperitoneal fat thickness may provide a true picture of the central fat deposition in a woman with uterine fibroids. We discovered 22% of cases and 12% of controls were nulliparous. This would suggest that women with fibroids may have a reduced fertility rate (65) and an increased incidence of fibroids in infertile women (66). In the present investigation, age, parity, and body mass index (BMI) were matched in both groups to rule out any bias due to the effect of these parameters on lipid profile. The most prevalent complaint in our study was abnormal vaginal bleeding, similar to earlier studies by Sharami et al. (67), Huda et al. (55), and Mahmood et al. (68). Hormonal dysfunctions, for example, low estrogen levels, can be the reason for this sort of bleeding. A solitary intramural fibroid was also present in most cases. This conclusion is in agreement with Sharima et al. (67, 69) and Naftalin et al. (67, 69), who also found that the majority of fibroids were intramural. This finding may be related to the fact that the myometrium is the main location of uterine fibroids. Moreover, the majority of cases (58%) had a parity of 4 or greater, which would explain their susceptibility to ischemia of the uterus during labor. This finding supports the concept that the number of gestations or labors is involved in the preventative effects of uterine fibroids (70). It is said that there is an inverse correlation between estrogen and cholesterol levels (50). We can expect a decreased risk of fibroids to be associated with hyperlipidemia, since fibroids are estrogen-

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dependent malignancies. The study observed a correlation between the uterine fibroid and lipid profile variables. The cholesterol levels were significantly higher in the case group than the control group (190 mg/dL vs. 168 mg/dL), but the triglyceride and low-density lipoprotein (LDL) levels were higher in the case group than the control group, though the difference was not statistically significant. The association between uterine fibroids and lipid profile factors varied between studies, with one reporting significantly higher levels of cholesterol and LDL-C levels in the case group than the control group (67). However, Akinlua et al. (71) showed that the case group had considerably higher levels of triglycerides and cholesterol than the control group. Vignini et al. (53) found a statistically significant decrease of HDL cholesterol and an increase of LDL cholesterol. However, Parazian et al. and Ratch et al., utilizing data acquired from medical records and retrospective investigations, arrived at the opposite conclusion, and their analyses did not consider the levels of LDL and HDL (58, 72). Similarly, Swarnaltha et al. did not find any statistically significant difference when the case and control groups were compared for triglyceride and cholesterol levels (73). Some studies support the estrogen theory of myomatosis. An Iraqi study by Lilyan et al. (52) reported that uterine fibroids were associated with low levels of total serum cholesterol and low-density lipoprotein cholesterol and significantly high levels of serum HDL in women with the tumors compared to controls. And Huda et al. and Sadlonova et al. both reported that patients with uterine fibroids had increased HDL levels (54, 55). Sadlonova et al. suggested that the increased HDL-C levels might be due to the important role of estrogen in the development of UFs. Thus, it could be that increasing levels of estrogen would necessarily lead to a protective lipid profile with decreased LDL and increased HDL levels. A previous study has determined that a negative correlation exists between the levels of estrogen and the levels of LDL (as evaluated by the activation of LDL receptors in the liver). It has been proposed that estrogen is involved in hepatic LDL catabolism (74). This idea is still debatable. So the

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findings could be due to a limited sample or an unadjusted study population. The present analysis found no association between the lipid profile and the largest diameter of uterine fibroids. However, Lilyan et al. (52) established a major relationship between HDL serum levels and the largest fibroid volume. There was a strong direct correlation between the two. In a subgroup of patients aged 30-45 years, Sadlonova et al. (54) reported that the fibroids were larger in patients with higher HDL-C levels. Our results were pretty similar to their.

Conclusion

- 1) Women with uterine fibroids have a distinct lipid profile from women without these tumors.
- 2) Serum cholesterol levels were significantly greater in fibroid patients than in those who did not have uterine fibroids.

Recommendation

- 1- There is a need to raise awareness about the association between obesity and uterine fibroids in women.
- 2- Other research has examined the features of women with uterine fibroids using nationwide samples.
- 3- Further research is required to evaluate the impact of uterine fibroids on quality of life and to predict the association between socio-demographic and reproductive characteristics and the risk of developing these disorders.
- 4) Studies in the future that encompass numerous centers and have longer evaluation durations.

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Appendix

- Participants ID:
- Participants age:
- Parity:
- Weight:
- Height:
- BMI:

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- Symptom of UF:
- Ultrasound finding: site of UF:
Largest diameter:
- Lipid profiles: Fasting blood sugar:
Cholesterol:
LDL:
VLDL:
HDL:
Triglyceride: