

Original article

Association Between Hyperlipidemia and Uterine Fibroid Size

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ABSTRACT

Keywords:

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Leiomyomas, Fibroid Size,
Hyperlipidemia.

Uterine fibroids (leiomyomas) are common benign tumors affecting women, mostly throughout their reproductive years and menopause. Their development is influenced by multiple factors, including age, race, metabolic conditions, lifestyle, reproductive history, genetics, and hormonal exposures. Although often asymptomatic, fibroids can cause uterine bleeding and pain. Lipid metabolism alterations have been implicated in fibroid pathogenesis, with estrogen and progesterone playing key roles in tumor growth and maintenance. This study aimed to investigate the association between uterine fibroid size and lipid profile abnormalities. A cross-sectional study enrolled 70 reproductive-age women with gynecological complaints from Albida City clinics (Nov 2023–Jan 2026). Cases had ultrasound-confirmed uterine fibroids; controls had normal ultrasounds. Data on medical history, BMI, and fibroid characteristics were collected. Fasting lipid profiles were measured. Analysis was done using SPSS v26, reporting percentages and means \pm SD. This research involved 70 women with an average age of 34.8 years, predominantly aged 31–40 years. Most participants were overweight or obese (mean BMI 29.4 kg/m²). Over half reported no significant medical history, and the majority were not on regular medication. Lipid profiles revealed elevated cholesterol and triglyceride levels in a considerable portion of the sample. Submucous fibroids were the most common type (45.7%), followed by intramural fibroids (28.6%). No significant associations were found between fibroid size and age or BMI categories. Similarly, total cholesterol, HDL, LDL, and VLDL levels showed no significant relationship with fibroid size. However, triglyceride levels were significantly higher in women with large fibroids (≥ 5 cm) compared to those with smaller fibroids ($p = 0.020$). Pearson correlation analysis identified a weak but statistically significant positive correlation between LDL cholesterol levels and fibroid size ($r = 0.257$, $p = 0.032$), while other lipid parameters and BMI showed no meaningful correlations.

Introduction

Uterine fibroids, called leiomyomas, are one of the common benign tumors in females [1, 2]. This tumor, derived from smooth muscle and connective tissue, is seen in the reproductive age group and in more than 70% of females at menopausal age [3]. The likelihood of developing fibroids grows with age and depends on various interrelated factors. These include demographic elements (age and race), metabolic factors (obesity), lifestyle behaviors (diet, exercise, and consumption of caffeine and alcohol), reproductive characteristics (timing of menarche and parity), genetic factors, and exposure to hormone replacement therapy. Additionally, "Epidemiological evidence indicates that environmental exposures play a role in leiomyoma pathogenesis, with nicotine consumption appearing to exert a protective effect against their development" [4, 5]. The most common symptoms of uterine fibroids are uterine bleeding and pain; however, most cases are asymptomatic and discovered accidentally by ultrasound [6]. The exact cause of uterine fibroids is still unknown; nevertheless, the pathogenesis of uterine fibroids is multifactorial. Elevated or altered levels of lipid-based biomarkers have been strongly correlated with uterine fibroid development [7]. Additionally, both estrogen and progesterone are essential for fibroid development and maintenance. Estrogen drives this process by creating an environment rich in estrogen, whereas progesterone plays a more intricate role by regulating growth factors and proteins that prevent cell death [8].

The International Federation of Gynecology and Obstetrics (FIGO) utilizes a classification system for uterine fibroids that consists of eight distinct subtypes. These categories are defined primarily by the fibroid's anatomical location relative to the endometrial cavity (9). The system classifies fibroids into eight main types (0-8), with Type 0 representing pedunculated intracavitary fibroids, Types 1 and 2 being submucous fibroids with less than 50% and 50% or greater intramural extension, respectively, and Type 3 describing fibroids that contact the endometrium but are 100% intramural. Type 4 represents completely intramural fibroids, while Types 5 and 6 are subserous fibroids with varying degrees of intramural involvement ($\geq 50\%$ and $< 50\%$, respectively). Type 7 indicates subserous pedunculated fibroids, and Type 8 encompasses other specified

locations, such as cervical fibroids (10). The present study aimed to evaluate the possible associations between the size of uterine fibroids and hyperlipidemia.

Methods

In this cross-sectional study, we enrolled 70 women of reproductive age who were followed up in a general and specialized outpatient clinic in Albida City from November 2023 to January 2026. Participant privacy is strictly maintained; all data is kept confidential, with results presented as aggregate statistics to ensure anonymity. The study enrolled individuals presenting with gynecological issues, such as infertility, pelvic pain, or irregular uterine bleeding. Conversely, individuals who were pregnant or diagnosed with an active malignancy were excluded from the research. The case group consisted of patients who had ultrasound reports indicating the site and size of uterine fibroids, while the control group included those who had normal ultrasound reports.

A detailed medical history was taken, including age, weight, height, gynecological history, past medical history, past surgical history, and drug history, such as hormonal therapy, contraception, and lipid-lowering agents. Height and weight were recorded using a portable digital scale to determine body mass index (BMI). Additionally, participants received transvaginal or abdominal ultrasonography to assess uterine fibroids, documenting their size, quantity, and specific anatomical classifications. Lipid profiles were determined from fasting blood samples taken after an overnight period. This process involved measuring VLDL, triglycerides, HDL-C, LDL-C, and total cholesterol.

All statistical evaluations were then performed with version 26 of the SPSS software. Categorical variables were displayed as percentages and absolute values, while continuous data were given as means \pm SD.

Results

Age Distribution of the Study Participants

(Table 1) presents the distribution of the study participants according to age categories. The mean age of the participants was 34.83 ± 5.998 years, indicating that the sample consisted predominantly of females in their mid-thirties. The largest proportion of participants (61.4%, $n = 43$) belonged to the 31–40 years age group, followed by 21–30 years (20%, $n = 14$), and the smallest proportion was in the 41–50 years group (18.6%, $n = 13$). This distribution shows that most participants were in the middle-aged range, which may reflect the typical age profile of the studied population.

Table 1 . Distribution of the Study Participants by Age Categories

Age groups	Frequency	Percentage%	Mean SD (\pm)
21 – 30	14	20%	34.83 \pm 5.998
31 – 40	43	61.4%	
41 – 50	13	18.6%	
Total	70	100%	

Distribution of the Study Participants According to Body Mass Index (BMI) Classification

(Figure 1) shows the distribution of the study participants according to body mass index (BMI) classification. The mean BMI of the participants was 29.39 ± 4.68 kg/m², indicating that the sample tended toward the overweight range. Most participants were classified as overweight (44.3%, $n = 31$), followed by obese (40%, $n = 28$), while only a smaller proportion fell within the normal BMI range (15.7%, $n = 11$). This distribution suggests that a significant part of the study population had elevated BMI levels, which may be relevant to the health outcomes being investigated.

Distribution of the Study Participants According to Their Clinical Histories (Medical, Surgical, and Drug History)

According to the participants' medical history, as shown in Table 2, most of the study sample were generally healthy, with more than half (54.3%, $n = 38$) reporting no medical conditions. Among those with medical conditions, the most common were diabetes mellitus, hypertension, and bronchial asthma (each 5.7%, $n = 4$), followed by hyperthyroidism (4.3%, $n = 3$), hypothyroidism (4.3%, $n = 3$), heart disease (2.9%, $n = 2$), bronchial asthma/hypertension (2.9%, $n = 2$), and less frequent conditions including diabetes mellitus/bronchial asthma, diabetes mellitus/deep vein thrombosis, polycystic ovary syndrome, multiple sclerosis, and epilepsy (each 1.4–2.9%). Regarding surgical history, the majority (62.9%, $n = 44$) reported no previous surgeries. Among those who had undergone surgery, the most frequent procedures were caesarean section (11.4%, $n = 8$), appendectomy (4.3%, $n = 3$), and thyroidectomy (2.9%, $n = 2$), along with several less frequent surgeries (1.4–2.9%). Concerning drug history, most participants (91.4%, $n = 64$) did not take regular medication. Among those taking drugs, the most common were thyroxine (2.9%, $n = 2$), followed by

adalate, depakin, ator/concor, and statin (each 1.4%, n = 1).

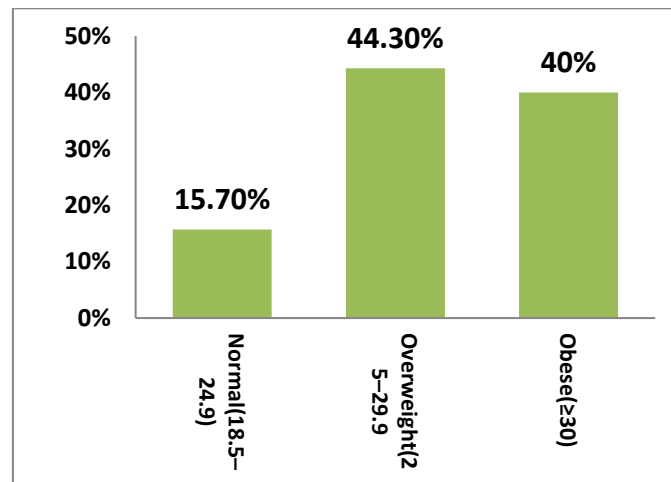


Figure 1. Distribution of Body Mass Index (BMI) Among the Study Participants

Descriptive Statistics for Cholesterol, Triglycerides (TAG), HDL, LDL, and VLDL Levels

(Table 3) provides a comprehensive overview of the lipid profile among the study participants. Starting with total cholesterol, nearly 43% of participants exhibited high cholesterol levels (≥ 240 mg/dL), while 27.1% were borderline high and 30% fell within the desirable range (< 200 mg/dL). The mean cholesterol level of 228.83 ± 50.58 mg/dL suggests a tendency towards elevated cholesterol in this sample. Regarding triglycerides (TAG), the distribution indicates that 42.9% of participants had borderline high levels (150–199 mg/dL) and an equal proportion (42.9%) had high levels (200–499 mg/dL). Only 14.3% maintained normal triglyceride levels (< 150 mg/dL), with a mean value of 187.69 ± 48.12 mg/dL, reflecting a notable prevalence of hypertriglyceridemia. Analysis of HDL (high-density lipoprotein) revealed that 40% of participants had low HDL (< 50 mg/dL), while the remaining 60% fell within the normal desirable range (≥ 50 mg/dL). The mean HDL value of 58.73 ± 16.62 mg/dL indicates that, overall, the sample maintained adequate levels of “good cholesterol,” although a considerable minority remains at risk.

For LDL (low-density lipoprotein), the majority (88.6%) were within the normal or optimal range (< 130 mg/dL), with small percentages classified as borderline high (2.9%) or high (8.6%). The mean LDL level of 75.25 ± 40.95 mg/dL demonstrates that most participants were within safe thresholds, suggesting limited exposure to “bad cholesterol”-related risks in the sample. Finally, VLDL (very low-density lipoprotein) levels showed that 65.7% of participants were within the normal range (5–40 mg/dL), whereas 34.3% had elevated VLDL (> 40 mg/dL).

Table 2. Distribution of the Study Participants According to Their Clinical Histories (Medical, Surgical, and Drug History)

Parameters (Characteristics)	Frequency	Percentage %
Medical History		
Diabetic mellitus only	4	5.7%
Hypertension only	4	5.7%
Both (Hypertension/Diabetes mellitus)	4	5.7%
Both (Diabetic mellitus/bronchial asthma)	1	1.4%
Diabetic Mellitus/ Deep Vein Thrombosis	1	1.4%
Heart Disease	2	2.9%
Both(bronchial asthma/Hypertension)	2	2.9%
Hyperthyroidism	3	4.3%
Only bronchial asthma	4	5.7%
Multiple sclerosis	1	1.4%
Epilepsy	2	2.9%
Hypothyroidism	3	4.3%
Polycystic ovary	1	1.4%
Non	38	54.3%
Total	70	100%

Surgical History		
Thyroidectomy	3	4.3%
Caesarean section	8	11.4%
Myomectomy	2	2.8%
Appendectomy	3	4.3%
Lipoma Breast	1	1.4%
RT. Ovary. Cystectomy/ Appendectomy	2	2.9%
Cholestcetomy	2	2.9%
Head Surgery/ Myomectomy	1	1.4%
Heart Surgery	1	1.4%
breast lumpectomy	2	2.9%
Caesarean section/appendectomy	1	1.4%
Non	44	62.9%
Total	70	100%
Drug History		
Thyroxine	2	2.9%
Adalate	1	1.4%
Depakin	1	1.4%
Ator/Concor	1	1.4%
Statin	1	1.4%
None	64	91.4%
Total	70	100%

Table 3. Distribution of Lipid Profile Parameters

Parameters	Frequency	Percentage %
Cholesterol		
Desirable / Normal < 200	21	30%
Borderline High 200 – 239	19	27.1%
High ≥ 240	30	42.9%
Mean SD (228.8329±50.57947)		
Triglycerides (TAG)		
Normal < 150	10	14.3%
Borderline High 150 – 199	30	42.9%
High 200 – 499	30	42.9%
Mean SD (187.6900±48.12418)		
HDL High Density Lipoprotein		40%
Low HDL < 50 mg/dL	28	60%
Normal HDL ≥ 50 mg/dL	42	
Mean SD (58.7300±16.62346)		
LDL Low Density Lipoprotein		
Normal / Optimal < 130	62	88.6%
Borderline High 130 – 159	2	2.9%
High ≥ 160	6	8.6%
Mean SD (75.2514±40.95102)		
VLDL		
Normal 5 – 40 mg/dL	46	65.7%
High > 40 mg/dL	24	34.3%
Mean SD (37.5714±9.59706)		

Distribution and Proportions of Fibroid Types and Their Size Among Study Participants

(Figure 2) illustrates the patterns of fibroid characteristics among the study participants, focusing on both fibroid type and size. In terms of fibroid type, submucous fibroids were the most frequently observed, representing 45.7% of cases, followed by intramural fibroids at 28.6%. Multiple submucous fibroids accounted for 15.7%, while subserosal fibroids were least common at 10%, indicating a predominance of submucous and intramural forms in this population.

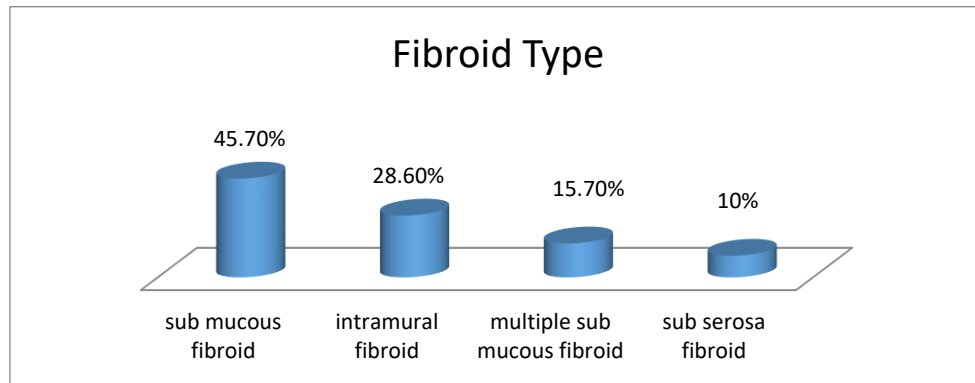


Figure 2. Distribution of Fibroid Types Among the Study Participants

Statistical Comparison between Fibroid Size Groups According to Age Categories

(Table 4) presents the distribution of participants according to fibroid size (large ≥ 5 cm vs. small < 5 cm) across different age groups. Among participants with large fibroids ($n = 28$, 40%), the majority were in the 31–40 years category (18 participants, 64.3%), followed by 41–50 years (6 participants, 21.4%) and 21–30 years (4 participants, 14.3%). In the small fibroid group ($n = 42$, 60%), most participants were also in the 31–40 years group (25 participants, 59.5%), followed by 21–30 years (10 participants, 23.8%) and 41–50 years (7 participants, 16.7%).

No significant relationship was found between age categories and fibroid size through Pearson Chi-Square analysis ($\chi^2 = 1.029$, $p = 0.598$). Consequently, the data indicates that age did not substantially influence fibroid growth among these participants. The distribution suggests that both small and large fibroids are most prevalent among women aged 31–40 years.

Table 4. Distribution of Study Participants by Fibroid Size and Age Categories

Fibroid Size	21–30	31–40	41–50	Total	Pearson Chi-Square	P. value
Large ≥ 5 cm	4 (14.3%)	18 (64.3%)	6 (21.4%)	28 (40.0%)	1.029a	0.598
Small < 5 cm	10 (23.8%)	25 (59.5%)	7 (16.7%)	42 (60.0%)		
Total	14 (20.0%)	43 (61.4%)	13 (18.6%)	70 (100%)		

Note: a: Pearson Chi-Square test assumes that expected cell counts are 5 or more. Some cells may have counts less than 5, which could affect the validity of the test results and should be interpreted with caution

Statistical Comparison between Fibroid Size Groups According to BMI Categories

Table 5 demonstrates the distribution of participants according to fibroid size (Large ≥ 5 cm vs. small < 5 cm) and BMI categories. In the large fibroid group ($n = 28$, 40%), most participants were overweight (53.6%), followed by obese (35.7%) and normal BMI (10.7%). In the small fibroid group ($n = 42$, 60%), the distribution was more balanced: obese (42.9%), overweight (38.1%), and normal (19.0%).

The Pearson chi-square test showed no statistically significant association between fibroid size and BMI categories ($\chi^2 = 1.865$, $p = 0.394$), indicating that BMI does not appear to significantly influence the size of uterine fibroids in this study.

Table 5: Distribution of Study Participants by Fibroid Size and BMI Categories

Table 5. Distribution of Study Participants by Fibroid Size and BMI Categories

Fibroid Size	Large ≥ 5 cm	Small < 5 cm	Total
Normal (18.5–24.9)	3 (10.7%)	8 (19.0%)	11 (15.7%)
Over-weight (25–29.9)	15 (53.6%)	16 (38.1%)	31 (44.3%)
Obese (≥ 30)	10 (35.7%)	18 (42.9%)	28 (40.0%)
Total	28 (40.0%)	42 (60.0%)	70 (100%)
Pearson Chi-Square	1.865a		
P. value	0.394		

Note: a: Pearson Chi-Square test assumes that expected cell counts are 5 or more. Some cells may have counts less than 5, which could affect the validity of the test results and should be interpreted with caution

Statistical Comparison between Fibroid Size Groups and Total Cholesterol Categories

(Table 6) illustrates the distribution of participants according to fibroid size (Large ≥ 5 cm vs. Small < 5 cm) and total cholesterol levels. In the large fibroid group (n = 28, 40%), 42.9% of participants had high cholesterol, 32.1% were in the desirable/normal category, and 25.0% were borderline high. In the small fibroid group (n = 42, 60%), 42.9% were also high, 28.6% desirable, and 28.6% borderline high.

The Pearson chi-square test indicated no statistically significant association between fibroid size and cholesterol levels ($\chi^2 = 0.150$, $p = 0.928$), suggesting that total cholesterol does not appear to have a significant effect on the size of uterine fibroids in this sample.

Table 6. Statistical Comparison between Fibroid Size Groups According to Total Cholesterol Levels

Fibroid Size	Large ≥ 5 cm	Small < 5 cm	Total
Desirable / Normal (< 200)	9 (32.1%)	12 (28.6%)	21 (30.0%)
Borderline High (200–239)	7 (25.0%)	12 (28.6%)	19 (27.1%)
High (≥ 240)	12 (42.9%)	18 (42.9%)	30 (42.9%)
Total	28 (40.0%)	42 (60.0%)	70 (100%)
Pearson Chi-Square	0.150a		
P. value	0.928		

Note: a: Pearson Chi-Square test assumes that expected cell counts are 5 or more. Some cells may have counts less than 5, which could affect the validity of the test results and should be interpreted with caution

Statistical Comparison between Fibroid Size Groups and Triglyceride Categories

(Table 7) presents the comparison between fibroid size groups and triglyceride (TAG) levels among the study participants. In the large fibroid group (≥ 5 cm), half of the participants (50.0%) exhibited high triglyceride levels, while 25.0% were classified as borderline high and another 25.0% had normal triglyceride levels. In contrast, among participants with small fibroids (< 5 cm), the largest proportion (54.8%) fell within the borderline high category, followed by 38.1% with high triglyceride levels, and only 7.1% with normal levels. A statistically significant correlation was revealed via the Pearson chi-square test between fibroid size and triglyceride levels ($\chi^2 = 7.778$, $p = 0.020$), indicating that higher triglyceride levels were more frequently observed among participants with larger fibroids. These findings suggest a potential relationship between lipid metabolism abnormalities and fibroid size, which may have clinical relevance in understanding metabolic factors associated with uterine fibroid progression.

Table 7. Statistical Comparison between Fibroid Size Groups According to Triglyceride (TAG) Levels

Fibroid Size	Large ≥ 5 cm	Small < 5 cm	Total
Normal (< 150)	7 (25.0%)	3 (7.1%)	10 (14.3%)
Borderline High (150–199)	7 (25.0%)	23 (54.8%)	30 (42.9%)
High (200–499)	14 (50.0%)	16 (38.1%)	30 (42.9%)
Total	28 (40.0%)	42 (60.0%)	70 (100%)
Pearson Chi-Square	7.778 a		
P. value	0.020*		

Note: a: Pearson Chi-Square test assumes that expected cell counts are 5 or more. Some cells may have counts less than 5, which could affect the validity of the test results and should be interpreted with caution

Statistical Comparison between Fibroid Size Groups and HDL Cholesterol Categories

(Table 8) presents the distribution of participants according to fibroid size and HDL cholesterol levels. Among participants with large fibroids (≥ 5 cm), 35.7% had low HDL levels, while 64.3% showed normal HDL levels. In the small fibroid group (< 5 cm), 42.9% had low HDL and 57.1% had normal HDL levels. The Pearson chi-square test revealed no statistically significant association between fibroid size and HDL cholesterol levels ($\chi^2 = 0.357$, $p = 0.550$), indicating that HDL status does not appear to significantly influence fibroid size in

the current study sample.

Table 8. Statistical Comparison between Fibroid Size Groups According to HDL Cholesterol Level

Fibroid Size	Large ≥5 cm	Small <5 cm	Total
Low HDL (<50 mg/dL)	10 (35.7%)	18 (42.9%)	28 (40.0%)
Normal HDL (≥50 mg/dL)	18 (64.3%)	24 (57.1%)	42 (60.0%)
Total	28 (40.0%)	42 (60.0%)	70 (100%)
Pearson Chi-Square	0.357 a		
P. value	0.550		

Note: a: Pearson Chi-Square test assumes that expected cell counts are 5 or more. Some cells may have counts less than 5, which could affect the validity of the test results and should be interpreted with caution

Statistical Comparison between Fibroid Size Groups and LDL Cholesterol Categories

(Table 9) shows the distribution of participants according to fibroid size and LDL cholesterol categories. Most participants in both groups were classified within the normal/optimal LDL range, representing 82.1% of the large fibroid group and 92.9% of the small fibroid group. Only a small proportion of participants were categorized as having high LDL levels (14.3% in the large fibroid group and 4.8% in the small fibroid group). No significant relationship was found between the variables using a Pearson's chi-square analysis ($\chi^2 = 2.079$, $p = 0.354$). Therefore, LDL levels do not appear to have a significant relationship with fibroid size in this study sample.

Statistical Comparison between Fibroid Size Groups and VLDL (Very Low-Density Lipoprotein) Categories

(Table 10) presents the distribution of participants according to fibroid size and VLDL (Very Low-Density Lipoprotein) levels. In the large fibroid group, 64.3% of participants had normal VLDL levels, while 35.7% showed high VLDL levels. Similarly, in the small fibroid group, 66.7% had normal VLDL levels and 33.3% had high levels. The Pearson Chi-Square test demonstrated no statistically significant association between fibroid size and VLDL levels ($\chi^2 = 0.042$, $p = 0.837$), suggesting that VLDL status does not appear to be related to fibroid size in the current study sample.

Table 9 Statistical Comparison between Fibroid Size Groups According to LDL Cholesterol Levels

Fibroid Size	Large ≥5 cm	Small <5 cm	Total
Normal / Optimal (<130)	23 (82.1%)	39 (92.9%)	62 (88.6%)
Borderline High (130–159)	1 (3.6%)	1 (2.4%)	2 (2.9%)
High (≥160)	4 (14.3%)	2 (4.8%)	6 (8.6%)
Total	28 (40.0%)	42 (60.0%)	70 (100%)
Pearson Chi-Square	2.079a		
P. value	0.354		

Note: a: Pearson Chi-Square test assumes that expected cell counts are 5 or more. Some cells may have counts less than 5, which could affect the validity of the test results and should be interpreted with caution.

Correlation Between Fibroid Size, Lipid Profile Parameters, and Body Mass Index (BMI) Using Pearson's Correlation Test

(Table 11) explores the linear relationships between uterine fibroid size and selected metabolic parameters, including lipid profile components and body mass index (BMI), using Pearson correlation analysis. Overall, the correlation coefficients demonstrate weak associations between fibroid size and most investigated variables, indicating that changes in these parameters are not strongly accompanied by proportional changes in fibroid size. Beginning with BMI, the analysis revealed a very weak positive correlation ($r = 0.052$) that did not reach statistical significance ($p = 0.669$), suggesting that body mass index has minimal influence on fibroid size within this study population. Similarly, total cholesterol showed a weak negative relationship ($r = -0.123$, $p = 0.309$), indicating that cholesterol levels were not meaningfully associated with variations in

fibroid dimensions.

Table 10. Statistical Comparison between Fibroid Size Groups According to VLDL (Very Low-Density Lipoprotein) levels

Fibroid Size	Large ≥5 cm	Small <5 cm	Total
Normal VLDL (5–40 mg/dL)	18 (64.3%)	28 (66.7%)	46 (65.7%)
High VLDL (>40 mg/dL)	10 (35.7%)	14 (33.3%)	24 (34.3%)
Total	28 (40.0%)	42 (60.0%)	70 (100%)
Pearson Chi-Square	0.042a		
P. value	0.837		

Note: a: Pearson Chi-Square test assumes that expected cell counts are 5 or more. Some cells may have counts less than 5, which could affect the validity of the test results and should be interpreted with caution

Regarding triglycerides (TAG) and HDL, only mild positive correlations were observed ($r = 0.062$ and $r = 0.106$, respectively), both lacking statistical significance, which implies the absence of a clear linear relationship between these lipid fractions and fibroid size. In contrast, LDL cholesterol emerged as the only parameter demonstrating a statistically significant positive correlation with fibroid size ($r = 0.257$, $p = 0.032$). Although the strength of this association remains weak, the finding suggests that higher LDL levels may be accompanied by an increase in fibroid size, highlighting a possible metabolic contribution that may warrant further investigation. Finally, VLDL showed a negligible positive correlation ($r = 0.059$, $p = 0.626$), reinforcing the overall pattern of limited linear relationships between fibroid size and most lipid profile components.

Table 11. Pearson Correlation Between Uterine Fibroid Size, Lipid Profile Parameters, and Body Mass Index (BMI)

Pearson Correlation	Fibroid size (cm)	
	Pearson Correlation	Sig. (2-tailed)
BMI	0.052	0.669
Cholesterol	-0.123-	0.309
TAG	0.062	0.607
HDL	0.106	0.381
LDL	0.257*	0.032
VLDL	0.059	0.626

Discussions

The most prevalent benign tumors affecting women of reproductive age are uterine fibroids, which can hurt fertility and cause serious morbidity. To determine whether there is a possible correlation between the size of UFs and the lipid profile (HDL, LDL, VLDL, TG, and total cholesterol), by making a comparison between patients who have uterine fibroids $\geq 5 \text{ cm}^3$ and those who have uterine fibroids $< 5 \text{ cm}^3$ as determined by previous studies [11, 12]. Consistent with prior research [13, 14], which found a direct correlation between elevated total cholesterol levels and the dimensions of uterine fibroids (UFs). This relationship is likely rooted in the role of cholesterol as a fundamental precursor for steroid hormone biosynthesis. Specifically, estrogens are implicated in the proliferation of UFs; upon binding to estrogen receptor alpha and estrogen receptor beta, these hormones initiate the cellular pathways responsible for fibroid growth. However, our research did not find a strong correlation between the total cholesterol level with the fibroid size.

According to prior research [15], women with fibroids had serum HDL-C values that were noticeably greater than those of control patients. In our study. We observed only mild positive correlations between HDL-C levels and the size of uterine fibroids (UFs), a finding consistent with the results reported by previous studies [14, 16]. In contrast, other studies [15, 17] reported higher HDL-C levels in their cohorts; however, these discrepancies may be attributable to limitations such as small sample sizes or inadequate adjustment for confounding variables.

Consistent with previous literature, a positive correlation was identified between LDL-C levels and uterine fibroid (UF) size. [13, 14]. Multiple earlier studies have similarly reported significant associations between LDL-C and UFs. Notably, however, some of these earlier investigations were retrospective in design—relying on medical records and patient interviews [16,19,20]. While others did not report specific data on HDL-C or LDL-C levels [18].

Regarding other lipid parameters, no significant correlation was found between VLDL levels and fibroid size, aligning with existing literature [16, 17]. However, the results are consistent with prior studies [14, 22] that reported a statistically significant correlation between elevated triglycerides and UF size. It should be noted that in those studies, all participants met surgical criteria—indicating either a large fibroid burden or significant symptomatology—which may reflect a link between triglycerides and the progression or clinical manifestation of uterine leiomyomas, rather than early development.

Taken together, these findings indicate that while most lipid parameters and BMI do not demonstrate meaningful linear associations with fibroid size, TGs and LDL cholesterol appear to have a modest but statistically significant relationship, potentially reflecting a subtle metabolic influence on fibroid growth. This supports the hypothesis that lipid metabolism plays a role in fibroid pathogenesis, potentially via cholesterol-driven local estrogen synthesis or triglyceride-mediated inflammation. While causality cannot be established in this cross-sectional study, the strength, consistency, and biological plausibility of the association warrant further investigation into lipid-modifying interventions as potential adjunct therapies for fibroid management.

Conflicts of Interest

There are no personal, financial, or professional conflicts of interest to declare.

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