RESEARCH PAPER

Pharmacist-Led Interventions and Their Impact on Symptom Severity, Quality of Life, and Psychological Outcomes in Women with Uterine Fibroids: A Prospective Study from a Tertiary Care Centre in India

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ABSTRACT

Background

Uterine fibroids (UFs) are among the most common gynecological disorders and can adversely affect physical health, psychological well-being, and overall quality of life. Pharmacists can play an important role in patient education, lifestyle modification, and treatment adherence, potentially improving patient outcomes.

Objective

To evaluate the impact of pharmacist-led interventions on symptom severity, health-related quality of life, anxiety, and depression among women with uterine fibroids using the Uterine Fibroid Symptom and Quality of Life (UFS-QOL) questionnaire and the Fibroid-Related Anxiety and Depression Scale (FRADS).

Methods

A prospective interventional study was conducted in the Department of Obstetrics and Gynaecology of a tertiary care teaching hospital over 8 months. Seventy-seven women with confirmed uterine fibroids were enrolled. Baseline assessments included demographic and clinical data, UFS-QOL, and FRADS scores. Pharmacist-led interventions consisted of patient counseling on medication adherence, dietary modifications, physical activity, stress management, and lifestyle changes. Follow-up assessments were performed at 3 and 6 months. Data were analyzed using descriptive statistics and paired t-tests, with statistical significance set at $p < 0.05$.

Results

Among the 77 participants, symptom severity scores decreased significantly from 69.12 ± 12.15 at baseline to 30.76 ± 6.59 at 6 months. Overall health-related quality of life improved from 33.55 ± 11.56 to 64.66 ± 2.77. Significant improvements were observed across all UFS-QOL domains, including concern, activity, energy, control, self-consciousness, and sexual function. Anxiety and depression scores demonstrated significant reductions at the 3-month follow-up compared with baseline ($p < 0.001$), indicating enhanced psychological well-being following intervention.

Conclusion

Pharmacist-led interventions significantly improved symptom burden, quality of life, and psychological outcomes in women with uterine fibroids. These findings support the integration of pharmacists into multidisciplinary care teams to optimize clinical and patient-reported outcomes in uterine fibroid management.

Keywords: Uterine Fibroids, Quality of Life, UFS-QOL, Anxiety, Depression.

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Introduction

Uterine fibroids, also known as leiomyomas or myomas, are benign tumours arising from the smooth muscle of the uterus[1,2]. They are among the most common gynaecological disorders, affecting up to 70–80% of women by menopause. Although non-malignant, fibroids can significantly affect quality of life by causing symptoms such as menorrhagia (heavy menstrual bleeding), pelvic pain, urinary or bowel disturbances, constipation, and fertility issues[3]. The severity of symptoms depends on the size, number, and location of fibroids. While many women remain asymptomatic, others may experience debilitating symptoms that require medical or surgical management[4].

The exact pathophysiology of uterine fibroids remains unclear, though it involves complex interactions between genetic, hormonal, and environmental factors. Oestrogen and progesterone play a central role in stimulating fibroid growth, which explains their predominance during reproductive years and regression after menopause[5]. Risk factors include family history, nulliparity, obesity, and the use of oestrogen or progestin-based hormonal therapies. Obesity not only increases the likelihood of fibroid development but also aggravates symptoms due to excess hormone production[6].

Globally, fibroids contribute substantially to gynaecological morbidity, with prevalence varying by age, ethnicity, and geography. African-American women tend to experience earlier onset and more severe disease compared to Caucasian women[7]. In Asia, prevalence ranges between 30–50%, though underdiagnosis remains common due to asymptomatic cases and limited screening[8,9]. In India, around 37.6% of women aged 30–45 years are affected, particularly in urban areas where lifestyle factors, stress, and delayed childbirth may contribute to higher rates[10,11].

Beyond physical symptoms, fibroids exert significant psychosocial and emotional impacts[12]. Many women experience fatigue, anxiety, depression, and diminished self-esteem, all of which contribute to reduced quality of life[13,14]. To evaluate these multidimensional outcomes, validated tools such as the Uterine Fibroid Symptom and Quality of Life (UFS-QOL) questionnaire are used. This instrument comprises two components—the Symptom Severity Scale (SSS) and the Health-Related Quality of Life (HRQOL) scale—which assess physical and emotional aspects of the disease[15,16]. Additionally, the Fibroid-Related Anxiety and Depression Scale (FRADS) was developed to specifically measure psychological distress, focusing on anxiety, depression, self-esteem, and behavioral changes.

Management of uterine fibroids involves pharmacological therapy, minimally invasive procedures, and surgery. While hysterectomy remains the definitive treatment, fertility-preserving options like myomectomy are preferred in women wishing to conceive[17]. Lifestyle modification and supportive care have also gained importance as adjuncts to medical therapy[18]. Within this multidisciplinary approach, pharmacists play a vital role by promoting medication adherence, educating patients on modifiable risk factors, and offering psychological support[19]. Hence, this study aims to evaluate the impact of pharmacist-led interventions on the quality of life of women with uterine fibroids using UFS-QOL and FRADS as standardized assessment tools.

The present study is grounded in the Pharmaceutical Care Model and Self-Efficacy Theory (Bandura, 1977), which collectively provide a theoretical basis for understanding how structured pharmacist counselling can improve health outcomes. The Pharmaceutical Care Model posits that pharmacist-patient interactions aimed at resolving drug-related problems and promoting lifestyle modification lead to measurable improvements in clinical and humanistic outcomes. Self-Efficacy Theory proposes that individuals who gain confidence in their ability to manage their condition are more likely to adopt health-promoting behaviours. Within the context of uterine fibroids, this theoretical pathway can be articulated as follows: pharmacist-led counselling on medication adherence, diet, physical activity, and stress management → enhanced disease knowledge and self-efficacy → improved symptom control and quality of life → reduction in anxiety and depression. This framework guided the design of the intervention and the interpretation of outcomes, and is revisited in the Discussion section.

Subjects and Methods

This study was designed to assess the impact of pharmacist-led interventions on the quality of life and psychological well-being of women diagnosed with uterine fibroids. A prospective interventional approach was adopted to evaluate outcomes using two validated instruments—the Uterine Fibroid Symptom and Quality of Life (UFS-QOL) questionnaire and the Fibroid-Related Anxiety and Depression Scale (FRADS). These tools collectively capture both physical and psychological dimensions of disease burden, enabling a comprehensive understanding of treatment impact. The methodology included patient recruitment, informed consent, baseline and follow-up assessments, pharmacist counselling, and statistical evaluation of pre- and post-interventional data (Fig 1).

Study Design and Participants

A prospective interventional study was conducted over eight months, comprising seven months of data collection and one month of statistical analysis. All patients who met the inclusion criteria during the study

period were enrolled, yielding a final sample size of 77.

Ethical approval was obtained from the Institutional Ethics Committee. All participants were provided with a Patient Information Sheet and an Informed Consent Form in their preferred language (English, Kannada, Marathi, or Hindi). The study objectives, procedures, potential benefits, risks, and the voluntary nature of participation were explained before obtaining written informed consent.

The inclusion criteria consisted of adult women (>18 years) with confirmed uterine fibroids, including those attending either the inpatient (IPD) or outpatient department (OPD), those who had undergone fibroid-related surgery, and patients with or without comorbidities. The exclusion criteria included unwilling participants, postmenopausal women, pregnant women, unconscious patients, and individuals with severe or uncontrolled systemic diseases.

Study Setting

The study was conducted in the Department of Obstetrics and Gynaecology at a tertiary care teaching hospital that functions as a major referral centre, providing access to a large and diverse patient population. Data were collected using a structured data collection form that captured demographic characteristics, clinical history, and symptom profiles. Written informed consent was obtained from all participants prior to the initiation of the study. Pharmacist-led counselling and questionnaire administration were performed in a private and confidential setting to ensure participant comfort and enhance the reliability of responses.

Use of Uterine Fibroid Symptom and Quality of Life (UFS-QOL) Questionnaire

The UFS-QOL questionnaire was used as a standardized tool to evaluate symptom severity and health-related quality of life among participants. It consists of two major components: The Symptom Severity Scale (SSS) and the Health-Related Quality of Life (HRQOL) subscales. The SSS includes eight items assessing symptoms such as pain, menorrhagia, and bulk-related discomfort. The HRQOL section comprises six domains—concern, daily activities, energy/mood, control, self-consciousness, and sexual function.

Scores were transformed to a standardized 0–100 scale, where higher SSS scores indicate worse symptoms, and higher HRQOL scores reflect better quality of life. The UFS-QOL was administered at three intervals: baseline (pre-intervention) and post-intervention (3 months and 6 months. The pharmacist-led intervention was delivered through structured face-to-face individual counselling sessions conducted in a private and confidential setting within the Department of Obstetrics and Gynaecology. Each participant received a minimum of three counselling sessions over the six-month study period: at baseline (Session 1), at the three-month follow-up (Session 2), and at the six-month follow-up (Session 3). Each session lasted approximately 20–30 minutes. Topics covered during counselling included: (a) disease education — explanation of uterine fibroid pathophysiology, treatment options, and expected outcomes; (b) medication adherence — importance of prescribed medications, potential side effects, and strategies to improve adherence; (c) dietary guidance — reduction of red meat and caffeine intake, increased consumption of green vegetables, fruits, and vitamin D-rich foods; (d) physical activity — individualised advice on initiating and maintaining moderate physical activity for at least 30 minutes per day; (e) stress management — breathing exercises, relaxation techniques, and coping strategies; and (f) lifestyle modification — sun exposure for vitamin D synthesis, tobacco cessation, and weight management. Educational materials including printed leaflets in the participant's preferred language (English, Kannada, Marathi, or Hindi) were distributed. Consistency of counselling was ensured through use of a standardised counselling checklist, and all sessions were conducted by trained pharmacists who had undergone a structured orientation before study initiation. Follow-up assessments evaluated improvements in symptom severity and functional well-being following intervention.

Scoring and Interpretation of the UFS-QOL Questionnaire

The Uterine Fibroid Symptom and Quality of Life (UFS-QOL) questionnaire comprises two major components: The Symptom Severity Scale (SSS) and the Health-Related Quality of Life (HRQOL) scale. The SSS is derived from eight symptom-related items, with raw scores ranging from 8 to 40. These are transformed using the formula:

$$\text{Transformed score} = \frac{\text{Actual raw score} - \text{Lowest possible row score}}{\text{Possible raw score range}} \times 100$$

Higher transformed SSS scores indicate greater symptom severity.

The HRQOL section consists of six subscales—Concern, Activities, Energy/Mood, Control, Self-Consciousness, and Sexual Function. Each subscale's raw score is transformed using the following formula:

$$\text{Transformed score} = \frac{\text{Highest possible score} - \text{Actual raw score}}{\text{Possible raw score range}} \times 100$$

Higher HRQOL scores reflect better quality of life, with total scores ranging from 29 to 145.

The UFS-QOL is a validated and widely used tool for quantifying both symptom burden and quality of life in women with uterine fibroids. It provides a comprehensive assessment of physical and psychosocial outcomes, thereby assisting healthcare professionals—including pharmacists—in monitoring treatment effectiveness and guiding individualized patient care.

Use of Fibroid-Related Anxiety and Depression Scale (FRADS)

The FRADS was utilized to assess the psychological burden associated with uterine fibroids, specifically targeting domains of anxiety and depression. The scale was developed and validated through expert review and pilot testing to ensure content validity and internal consistency. It consists of 26 items divided into two domains—Anxiety and Depression—each further subdivided into four dimensions: emotional impact, cognitive-behavioral responses, self-esteem and body image, and physical manifestations.

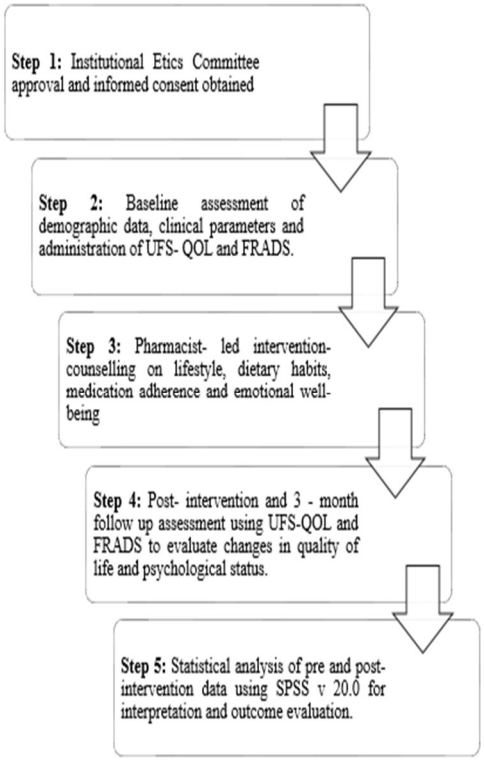
Each item was scored on a 4-point Likert scale ranging from 0 ("Not at all") to 3 ("All the time"). The Anxiety and Depression scores were categorized as low (0–13), moderate (14–26), and high (27–39). Internal consistency was confirmed by Cronbach's Alpha values of 0.900 for Anxiety and 0.945 for Depression**,** indicating excellent reliability. The FRADS questionnaire was administered at baseline, post-intervention, and three months post-surgery to evaluate psychological improvement and the effectiveness of pharmacist counselling on emotional well-being.

The FRADS is an original instrument developed and validated by the study authors specifically to assess fibroid-related anxiety and depression. Validation was conducted through a rigorous multi-stage expert-review process. An initial item pool of 32 items was generated—16 items in the Anxiety domain and 16 items in the Depression domain—based on a systematic literature review and clinical expert input. Content validity was established through a panel of eighteen subject matter experts comprising gynaecologists, psychologists, academicians, and clinical researchers, yielding a Content Validity Index (CVI) > 0.80 for all retained items. Pre-correction internal consistency of the initial 32-item scale was assessed using Cronbach's alpha, yielding $\alpha = 0.889$ for the Anxiety domain and $\alpha = 0.877$ for the Depression domain, both indicating good reliability. Following expert review, items with low discriminability or conceptual redundancy were revised or removed, resulting in a refined 26-item scale comprising 13 items per domain. Post-correction internal consistency improved substantially, with Cronbach's alpha of $\alpha = 0.93$ for Anxiety and $\alpha = 0.91$ for Depression, both indicating excellent reliability. The two-domain structure (Anxiety and Depression), each comprising four sub-dimensions (emotional impact, cognitive-behavioural responses, self-esteem and body image, and physical manifestations), was retained based on expert consensus and theoretical alignment. The tool is fully copyrighted under Certificate No. LD-20250177988.

Statistical Analysis

All collected data were entered and organized using Microsoft Excel and analyzed with SPSS version 20.0 (IBM Corporation, USA). Descriptive statistics such as mean, standard deviation, frequency, and percentage were used to summarize demographic and clinical data. Inferential statistics, including the paired t-test**,** were employed to assess differences in UFS-QOL and FRADS scores before and after intervention, as well as to determine associations between demographic factors and outcome variables. A p-value < 0.05 was considered statistically significant.

Fig 1: Schematic representation of methodology



Results

Of the 86 patients who received UF treatment, 7 did not complete the 6-month follow-up assessment and 2 did not provide baseline information, resulting in a

final sample of 77 patients. Prior to enrollment, the study objectives were clearly explained to all participants, and all individuals voluntarily provided their consent to participate.

Data evaluation based on demographic details of the patients

Among the 77 study participants, the majority belonged to the 36–45 years age group (38.9%), followed by 26–35 years (36.4%). Most participants were married (85.75%), illiterate (63.6%), and resided in rural areas (70.1%). Only a small proportion were aged above 56 years (2.6%), unmarried, widowed, or divorced. (Table 1)

Table 1: Socio-Demographic details of participants:

Variable	Category	No. of Participants	Percentage (%)
Age Groups	26- 35	28	36.4
	36- 45	30	38.9
	46- 55	17	22.1
	>56	2	2.6
Marital Status	Married	66	85.75
	Unmarried	4	5.2
	Widow	4	5.2
	Divorced	3	3.9
Education	Literate	28	36.4
	Illiterate	49	63.6
Residency	Urban	23	29.9
	Rural	54	70.1

Analysis of the modifiable and non-modifiable risk factors associated with prevalence of uterine fibroids

At baseline, with respect to modifiable risk factors, the majority of participants were overweight (50.6%), while 31.2% had normal BMI and 15.6% were obese, indicating a high prevalence of excess body weight. Nearly half of the study population reported no sun exposure (49.3%) and no physical activity (49.3%), reflecting a predominantly sedentary lifestyle. Regarding personal habits, 55.8% reported no habits, whereas 33.8% consumed caffeine and 10.4% practiced tobacco chewing.

Regarding non-modifiable and clinical characteristics, hemoglobin assessment revealed that the majority of patients were anemic, with mild anemia observed in 51.9% and moderate anemia in 23.4%; 5.2% had severe anemia, while only 19.5% were non-anemic. With respect to obstetric history, 46.7% of patients had no previous miscarriages, 29.9% had experienced one miscarriage, and 23.4% had a history of more than one miscarriage. (Table 2).

Table 2: Data on Modifiable and non – modifiable risk factors of Uterine Fibroids patients

Variable	Category	Number of Patients (n= 77)	Percentage %
BMI Classification	Normal	24	31.2%
	Obese	12	15.6%
	Overweight	39	50.6%
	Underweight	2	2.6%
Sun Exposure	Nil	38	49.3%
	≤ 30Min	23	29.8%
	> 30 Min	16	20.8%
Physical Activity	Nil	38	49.3%
	≤ 30Min	23	29.8%
	> 30 Min	16	20.8%
Habits	Caffeine Intake	26	33.8
	Tobacco Chewing	8	10.4
	Nil	43	55.8
Hemoglobin	Mild (9-10.9)	40	51.9
	Moderate (7-8.9)	18	23.4
	Severe (≤7)	4	5.2
	Non-Anemic (≥ 11)	15	19.5
Miscarriage	0	36	46.7%
	1	23	29.9%
	>1	18	23.4%

Improvement in symptom Severity and HRQOL Among Uterine Fibroid Patients

As described in Table 3, Among the 77 women with uterine fibroids, Symptom Severity scores decreased markedly from 69.12 at baseline to 30.76 at the second follow-up (mean change: −38.36; effect size: −3.16), indicating substantial reduction in symptom burden. All HRQOL subscales showed improvement: large improvements were observed in Concern, Activity, Energy, and Control, reflecting reduced distress, better daily functioning, increased vitality, and enhanced self-management. Moderate improvement was noted in Self-consciousness, while Sexual Function showed a smaller but positive change. Overall HRQOL scores increased from 33.55 at baseline to 64.66 at the second follow-up (mean change: 31.11; effect size: 2.69), demonstrating significant enhancement in physical, emotional, and functional well-being following management of uterine fibroids and intervention.

Table 3: UFS-QOL scores at baseline, First, and Second follow-up

UFS-QOL Subscales	Baseline Mean (SD)	First follow-up (3 Months) Mean (SD)	Mean Change Score	Second follow-up (6 Months) Mean (SD)	Mean Change Score	Effect Size
Symptoms	69.12 (12.15)	35.11 (7.52)	-34.01	30.76 (6.59)	-38.36	-3.16
Concern	31.43 (12.74)	85.32 (16.43)	53.89	88.05 (11.79)	56.62	4.44
Activity	31.77 (12.43)	52.55 (5.37)	20.78	66.74 (4.57)	34.97	2.81
Energy	33.35 (13.98)	44.67 (5.36)	11.32	58.67 (4.2)	25.32	1.81
Control	32.73 (15.78)	49.55 (7.91)	16.82	58.57 (9.24)	25.84	1.64
Self-consciousness	35.28 (17.83)	39.07 (7.8)	3.79	50.87 (8.18)	15.59	0.87
Sexual Function	45.29 (24.5)	45.29 (15.18)	0	55.68 (12.59)	10.39	0.42
HRQOL	33.55 (11.56)	53.88 (4.51)	20.33	64.66 (2.77)	31.11	2.69

UFS-QOL Responsiveness: Improved vs. Same/Worse Symptom Groups

As shown in Table 4, Significant differences were observed between the worse/same and improved groups across all UFS-QOL subscales ($p < 0.001$ for all). The symptom severity score was significantly higher in the worse/same group (33.1 ± 0.47) compared to the improved group **(**26.7 ± 0.36**),** with a mean difference of 6.4. Similar significant differences were noted for concern (difference = 4.2)**,** activity (6.0)**,** energy (6.8)**,** control (5.4)**,** self-consciousness (3.8)**,** and sexual function (3.3)**,** all favoring the improved group. Overall, HRQOL was significantly better in the improved group (41.5 ± 1.02) than in the worse/same group (21.0 ± 0.48), with a large mean difference of −20.5, confirming a substantial improvement in quality of life following intervention.

Table 4: Differences in UFS-QOL Subscale scores at month 3 based on Patient-Reported Treatment outcomes**.**

UFS-QOL Subscales LS Mean (SE)	Worse/Same	Improved	Difference Between Same/Worse - Improved	p-value
Symptom severity	33.1 (0.47)	26.7 (0.36)	6.4	0.000*
Concern	20.4 (0.25)	16.2 (0.20)	4.2	0.000*
Activity	28.8 (0.22)	22.7 (0.36)	6.0	0.000*
Energy	29.0 (0.22)	22.2 (0.38)	6.8	0.000*
Control	20.7 (0.18)	15.3 (0.39)	5.4	0.000*
Self-Consciousness	12.3 (0.16)	8.6 (0.18)	3.8	0.000*
Sexual function	7.6 (0.17)	4.3 (0.19)	3.3	0.000*
HRQOL	21.0 (0.48)	41.5 (1.02)	-20.5	0.000*

FRADS Psychological Outcomes: Changes in Anxiety and Depression Over Time

Paired samples t-tests showed no significant change in anxiety (Mean Difference = 0.13, p = 0.603) or depression (Mean Difference = 0.19, p = 0.129) immediately post-operatively. However, both anxiety and depression scores significantly decreased from post-operative to 3-month follow-up (anxiety: 11.71, p = 0.000; depression: 4.91, p = 0.000) and from pre-operative to 3 months (anxiety: 11.84, p = 0.000; depression: 5.10, p = 0.000), indicating substantial long-term improvement in psychological well-being (Tables 5).

Table 5**:** Statistical Comparison of Anxiety & Depression Scores at Different Time Intervals Using Paired Samples t-Test

Statistical Comparison of Anxiety Scores at Different Time Intervals Using Paired Samples t-Test						
Paired Groups (Anxiety)	Mean Difference	95% Confidence Interval		t-value	df	p-value
		Lower	Upper			
Pre-Operative vs. Post-Operative	0.1298	-0.3659	0.6257	0.522	76	0.603
Post-Operative vs. 3 Months	11.7142	10.4815	12.9469	18.93	76	0.000*
Pre-Operative vs. 3 Months	11.8441	10.4753	13.2129	17.23	76	0.000*
Statistical Comparison of Depression Scores at Different Time Intervals Using Paired Samples t-Test						
Paired Groups (Depression)	Mean Difference	95% Confidence Interval		t-value	df	p-value
		Lower	Upper			
Pre-Operative vs. Post-Operative	0.19481	-0.05772	0.44733	1.536	76	0.129
Post-Operative vs. 3 Months	4.90909	3.71136	6.10683	8.163	76	0.000*
Pre-Operative vs. 3 Months	5.1039	3.9515	6.25629	8.821	76	0.000*

Discussion

This prospective study shows that pharmacist-led interventions substantially improved health-related quality of life (QoL), clinical parameters, and psychological outcomes in women with uterine fibroids. The mean age was 39.58 years, with most between 36–45 years, consistent with [1]. A predominance of married participants (85.7%) aligns with [20], suggesting reproductive and marital factors may influence fibroid progression.

Baseline data showed strong associations between elevated BMI and fibroid occurrence, with 50.6% overweight and 15.6% obese, supporting [21]. After pharmacist counseling and lifestyle modification, normal BMI increased to 42.8% and obesity declined to 10.5%, echoing findings from [18] and lifestyle-focused interventions described by [2]. Nearly half of the cohort was initially physically inactive, similar to observations by [22]. Hemoglobin levels improved notably following counseling, iron therapy, and diet optimization, resembling outcomes reported by [16].

In our study, over 70% of fibroid cases were reported among women from rural areas, where limited access to healthcare facilities may contribute to delayed diagnosis. Additionally, 63.6% of the study population was illiterate, which may reduce awareness of reproductive health and hygiene, further delaying timely medical attention for early reproductive health concerns.

Miscarriage history (28.6%) reflected established links between fibroids and pregnancy loss [7] emphasized the role of submucosal fibroids in implantation disruption, underscoring the need for timely management. Low vitamin D intake, inadequate sun exposure (67.5%), and poor diet were common at baseline. Symptom improvement following supplementation and dietary correction parallels [2,18] who highlighted the hormonal benefits of vitamin D.

UFS-QOL outcomes showed marked reductions in Symptom Severity Scale scores and improved functional domains after intervention, comparable to improvements seen in [16]. Anxiety reduction in the Concern domain mirrored results from[14]. Enhanced activities, energy, and mood were consistent with[13], while increased control over symptoms reflected patient-education benefits described by[23]. Lower self-consciousness scores and improved sexual function aligned with [4,7]

The FRADS tool revealed significant baseline anxiety and depression, exacerbated by high caffeine use (33.8%) and tobacco consumption (10.4%). Both reduced significantly post-intervention. Psychological improvements align with [7,14]

Treatment patterns included hysterectomy (57.1%) and myomectomy (42.9%), similar to distributions in

[4]. Myomectomy's favorable QoL profile, as reported previously, and the importance of shared decision-making echo[9]. Pharmacist involvement improved adherence and postoperative recovery. Physical activity increased from 20.8% to 32.5%, consistent with postoperative trends validated by [16].

Overall, the findings emphasize the value of pharmacist-led care in fibroid management by improving modifiable risk factors, treatment adherence, psychological well-being, and QoL. These results highlight the pharmacist's central role within multidisciplinary care. Consistent with the theoretical framework outlined in the Introduction, the observed improvements in symptom severity and HRQOL appear to have been mediated through a chain of mechanisms: pharmacist counselling → enhanced disease knowledge and self-efficacy → improved adherence and lifestyle modification → better symptom control and QoL → reduced psychological distress. The significant reductions in anxiety and depression scores observed between the post-operative and three-month follow-up assessments are consistent with this model. Multiple plausible mechanisms may have contributed to psychological improvement: (i) better symptom control following surgery and pharmacist-guided lifestyle changes reduced the physical burden and associated distress; (ii) pharmacist education enhanced patients' understanding of their condition, fostering a sense of control and reduced uncertainty; (iii) regular counselling interactions provided emotional support and a therapeutic relationship; and (iv) lifestyle modifications such as increased physical activity and improved diet are independently associated with reductions in anxiety and depressive symptoms. It is notable that anxiety and depression scores did not differ significantly between the pre-operative and immediately post-operative assessments ($p = 0.603$ and $p = 0.129$, respectively), whereas significant improvements emerged only at the three-month follow-up. This temporal pattern suggests that surgery alone is unlikely to explain the psychological gains; rather, it is the combination of surgical relief from physical symptoms and the sustained pharmacist counselling delivered over the follow-up period that produced meaningful psychological benefit. However, because hysterectomy (57.1%) and myomectomy (42.9%) both independently relieve fibroid-related symptoms, the relative contribution of surgery versus pharmacist intervention to the observed improvements in QoL cannot be precisely quantified from the present data. Where possible, future analyses should stratify outcomes by treatment type (hysterectomy versus myomectomy) to better isolate the pharmacist-specific effect. Future studies should explore long-term sustainability and additional mechanisms through which pharmacist interventions may further optimize outcomes. Several limitations of this study merit acknowledgement. First, the absence of a control group receiving usual care without pharmacist intervention represents a significant methodological limitation. All enrolled participants received both surgical or medical treatment and pharmacist counselling concurrently, making it impossible to attribute the observed improvements exclusively to pharmacist-led intervention. Future studies should incorporate a randomised controlled design with a usual-care comparator arm to permit causal attribution. Second, the single-centre design limits generalisability of findings to other settings. Third, the relatively short six-month follow-up precludes assessment of the durability of improvements. Fourth, as noted above, subgroup analyses by treatment modality (hysterectomy versus myomectomy) were not feasible in the current sample size but are recommended in future work.

Ethical Statement: This study was conducted in accordance with the ethical standards of the Declaration of Helsinki. Ethical approval was obtained from an appropriate institutional ethics committee prior to commencement of the study (Ref: KLECOPBGMEC/D004-2024).

Consent Statement: Written informed consent was obtained from all participants before enrolment. Confidentiality and anonymity of participant information were maintained throughout the study.

Conflicting Interest: Nil

Authors Contribution: M.A.D., R.S., A.D., V.R.B., and R.M.C. contributed to the conceptualization of the study. Study design was developed by M.A.D., R.S., A.D., and V.R.B. M.A.D. and R.S. were responsible for defining the intellectual content and conducting the literature search. Clinical and experimental components of the study, as well as data acquisition, were performed by M.A.D. and R.S., with support from R.M.C. Data analysis and statistical analysis were carried out by M.A.D. and V.R.B. Manuscript preparation and editing were undertaken by M.A.D., R.S., A.D., and V.R.B. The manuscript was critically reviewed by V.R.B. and R.M.C. All authors read and approved the final manuscript.

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