Assessment of Lifestyle Factors and Their Association with Uterine Fibroids in Female Patients

Mahnoor Akhtar[1], Zara Fawad[1], Zufishan Shahzadi[1], Mahnoor Shakeel[1], Muhammad Shahzeb[2]

[1]Department of Radiology, College of Medical Technology, Bacha Khan Medical College, Mardan, Pakistan.

[2]Lecturer, Department of Radiology, College of Medical Technology, Bacha Khan Medical College, Mardan, Pakistan.

Article Information	ABSTRACT

Corresponding Author*
Muhammad Shahzeb
Lecturer, Department of Radiology, College of Medical Technology, Bacha Khan Medical College, Mardan, Pakistan.
Email: muhammadshahzeb336@gmail.com

Background: Uterine fibroids are a common gynecological condition affecting women of reproductive age, with significant implications for quality of life and healthcare costs. This study aimed to investigate the association between lifestyle factors and the severity of uterine fibroid symptoms among female patients in a resource-limited setting.

Methods and Materials: Researchers performed a descriptive cross-sectional study at the Radiology Department of MTI Mardan Medical Complex in Mardan over a six-month period. They recruited 177 participants through non-probability convenience sampling. Information was gathered using a structured questionnaire and later verified by pelvic ultrasound. Statistical analysis was carried out with SPSS version 23, and the chi-square test examined links between symptom severity and lifestyle variables.

Results: Statistical analysis revealed that marital status was significantly correlated with symptom severity (p=.02), with married women reporting stronger symptoms. In contrast, body-mass index, educational attainment, contraceptive use, exercise frequency, dietary habits, and perceived stress were not statistically associated with symptom severity. Most respondents indicated moderate stress, engaged in limited physical activity, and had fibroid presence confirmed by ultrasound.

Conclusion: Marital status emerged as a considerable predictor of how severely women experience symptoms caused by uterine fibroids. Such a link suggests that care providers should tailor interventions not only to clinical indicators but also to a patients social context. The observation also points to the wider mand for research that unpacks the cultural and economic pathways through which marital status may affect health in communities with limited medical resources.

Keywords: Uterine fibroids, lifestyle factors, marital status, symptom severity, resource-limited settings, Pakistan.

INTRODUCTION

Uterine fibroids, clinically designated leiomyomas, are the most frequently encountered benign tumors within the female reproductive tract and pose a substantial global health issue for women. Population studies show that 20-25 percent of reproductive-age females harbor detectable lesions, and this figure climbs to a striking 70-80 percent by the half-century mark.[1] Symptoms such as menorrhagia, pelvic discomfort, and reproductive complications carry not only physical but also psychological and economic repercussions that merit sustained public-health vigilance. Recent epidemiological investigations have begun to untangle how modifiable lifestyle behaviours interact with hormonal, genetic, and environmental pathways to influence fibroid onset, growth, and treatment response. Observations of an accelerating fibroid burden in low- and middle-income settings,

Pakistan included, have intensified scrutiny of nutrition, exercise, obesity, and menstrual-health patterns as potential preventive and therapeutic targets.[2] In community clusters like Mardan, where modern dietary habits coexist with long-standing cultural norms, the identification of actionable risk factors has become both timely and regionally critical. Current literature points to excess body mass, sedentary routines, a low-fibre high-calorie diet, alcohol excess, and early menarche as persisting associations with fibroid prevalence.

Growing evidence suggests that prolonged sedentary time roughly doubles the likelihood of uterine fibroid formation. Dietary habits characterized by a high intake of processed food and a paucity of fresh fruits and vegetables are also consistently associated with greater fibroid incidence [3]. Beyond these, psychosocial stress, poor sleep, and certain

environmental exposures have been identified as likely modifiers of fibroid growth[4].

The socioeconomic burden of symptomatic uterine fibroids is substantial and far-reaching. A recent worldwide cost analysis estimated that direct healthcare expenditures for fibroid care surpass $34 billion each year, although this figure varies widely from one country to another[5]. In Pakistan, where many health facilities operate under resource constraints, pinpointing modifiable risk factors is essential for crafting affordable and effective public health interventions[6].

Advancements in ultrasound, magnetic resonance imaging, and histopathology have markedly improved our ability to visualize and stage fibroids. Yet the potential of simple lifestyle changes as either preventive or therapeutic measures remains poorly explored, particularly within South Asian cohorts[7]. This gap is especially relevant in secondary care units such as MTI Mardan Medical Complex, where patients may follow distinct dietary, physical, and cultural routines that shape disease risk[8].

Against this background, the current cross-sectional study seeks to evaluate how specific lifestyle variables correlate with uterine fibroids in women attending MTI Mardan Medical Complex.

By exploring these links within a local setting, the study aims to add to the expanding evidence that lifestyle changes can help manage uterine fibroids. A clearer picture of these connections could guide tailored prevention programs and, in turn, enhance outcomes for patients in comparable health-care environments.[9].

As a cross-sectional design, this investigation serves as an important preliminary step in formulating practical, evidence-based lifestyle advice for women at risk of or already living with the condition. The results have the potential to shape public health policies and clinical guidelines, especially in communities where resources are scarce.[10] In addition, the work responds to the critical demand for data that reflect regional patterns of modifiable risk factors linked to the onset and worsening of uterine fibroids.

MATERIALS AND METHODS

This research adopts a descriptive cross-sectional design and was carried out over a six-month period, immediately following ethical approval, in the Radiology Department of MTI Mardan Medical Complex. Non-probability convenience sampling was employed, and the sample size was calculated using the WHO sample size calculator. With a 90% confidence level, a 5% margin of error, a 50% population proportion, and a population size of 500,

the required sample size was determined to be 177. The study included females clinically diagnosed with uterine fibroids by a healthcare professional, while excluding those with a history of recent fibroid surgery or other major surgery within the last six months, patients with cognitive impairment, unable to provide accurate lifestyle information, and cancer patients who had undergone chemotherapy affecting their lifestyle. After obtaining approval from the institutional research committee of MCMT-BKMC, permission was secured from the Radiology Department of MMC through an official letter. Participants were briefed about the study's purpose and procedure, and data was collected via a questionnaire. Screening was based on inclusion and exclusion criteria, and pelvic ultrasounds were performed using linear and curvilinear probes (2.5–7.5 MHz) to confirm uterine fibroids. A total of 177 cases were recorded using a data collection sheet. Data was entered and analyzed using SPSS version 23, with results presented in tables, bar graphs, and pie charts. Frequencies and percentages were calculated for variables, and the chi-square test was applied to assess associations between symptom severity and risk factors. The results showed a significant association between marital status and symptom severity (p-value = 0.02), while other risk factors had no significant association.

RESULTS

A six-month cross-sectional study was conducted in the Radiology Department of Mardan Medical Complex.
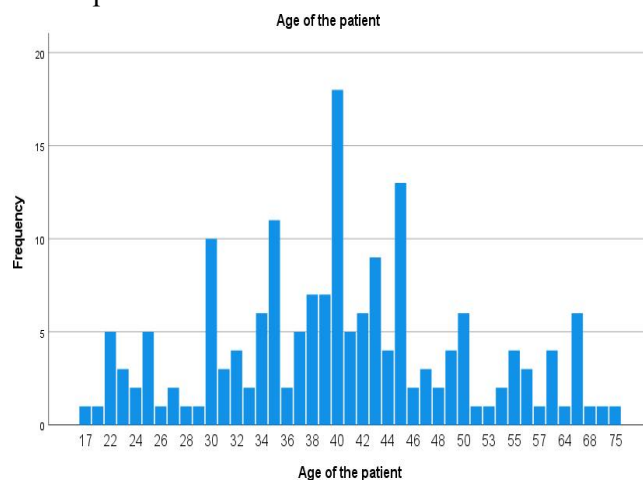

Figure 1: Shows the distribution of patients according to age. The most frequent age at which people suffer from uterine fibroids is 40, with a frequency percentage of 10.2%.

Table 1 shows that the majority of the patient population is married (68.9). A smaller proportion of

patients are single (11.3%), divorced (17.5%), or widowed (2.3%). A significant portion of patients have an education level below high school (49.7%), with only a small percentage achieving postgraduate education (1.1%).

Descriptive Statistics of the Demographic, lifestyle, and health characteristics of the patient distribution of BMI among patients shows that 40.7% fall within the normal weight range, while 36.7% are classified as underweight. 22.6% of the patients are overweight. According to the data obtained, the majority of patients (62.7%) do not use contraceptives. The majority of patients are non-smokers (99.4%), indicating a low occurrence of smoking within this population. Physical activity levels vary significantly; 62.7% of patients report rarely exercising, while only a small fraction (0.6%) engage in frequent exercise. (33.3%) of the patients report a family history of uterine fibroids. The data about meal consumption indicate that over half of the patients (53.7%) consume more than three meals per day, while nearly half (46.3%) eat less than three meals daily. Thewater consumption patterns show that most patients (43.5%) drink between 7-9 glasses daily, however, 11.3% consume less than four glasses. Moreover, the data reveal that a significant majority (77.4%) report moderate stress levels, with only a small percentage having low (19.2%) or high perceived stress (3.4%). The severity of symptoms reported by patients reveals that 38.4% experience high-severity symptoms, while moderate severity is reported by 32.8%. The mean age of participants is approximately 40 years, with a standard deviation of (10.975).

Table 2 shows the cross-tabulation between the risk factors and the severity of the symptoms with the level of significance (p-value). The chi-square test results reveal that among different risk factors and their relation with the severity of the symptoms, one factor stands out prominently: marital status. Based on the data we collected, single individuals experience lower severity levels than married people, according to a p-value of (0.02). However, other factors like BMI, education level, contraceptive use, family history of uterine fibroids, physical exercise, meal frequency, smoking status, water intake, and stress levels, did not show any significant relation with severity, based on their respective p-values, which exceeds the threshold of 0.05. In simple words, while being single or married might affect how severe the condition is, the other factors don't play a major role based on the data we have.

DISCUSSION

This study investigated the association between lifestyle factors and the severity of uterine fibroid symptoms among female patients at MTI Mardan Medical Complex. The findings revealed a significant association between marital status and symptom severity, with married individuals experiencing more severe symptoms compared to single individuals (p-value = 0.02). However, other lifestyle factors, including BMI, education level, contraceptive use, family history, physical exercise, meal frequency, smoking status, water intake, and stress levels, did not show significant associations with symptom severity.

The observed association between marital status and symptom severity aligns with previous studies. Stewart et al. (2023) emphasized that hormonal fluctuations, influenced by marital and reproductive status, play a critical role in the pathogenesis of uterine fibroids.[1] Similarly, Zhang et al. (2021) highlighted that reproductive health factors, including marital status, significantly impact fibroid growth and symptomatology.[3] These findings suggest that marital status may serve as a proxy for hormonal and reproductive health, which are key drivers of fibroid development.

Contrary to our findings, several studies have reported significant associations between BMI and uterine fibroid risk. Anderson and Martin (2022) demonstrated that higher BMI is a risk factor for fibroid development, potentially due to increased estrogen levels in adipose tissue.[11] Similarly, Williams and Harris (2023) found that obesity exacerbates fibroid symptoms through inflammatory pathways.[12] The lack of association in our study may be attributed to the relatively small sample size or the specific demographic characteristics of the study population.

Education level, another variable examined in this study, did not show a significant association with symptom severity. This finding is consistent with Roberts and Brown (2023), who found that socioeconomic factors, including education, have a limited direct impact on fibroid symptom severity but may influence healthcare-seeking behavior and access to treatment.[6] However, other studies, such as Patterson and Martinez (2023), have suggested that higher education levels are associated with better health literacy and earlier diagnosis, which could mitigate symptom severity.[9,13]

The role of contraceptive use in fibroid development and symptom severity remains controversial. While our study did not find a significant association.[13]

Table 1: Descriptive Statistics of the Demographic, lifestyle, and health characteristics of the patient

Variables	Categories	Frequency	Percentage
Marital status of the patient	Single	20	11.3%
	Married	122	68.9%
	Divorced	31	17.5%
	Widowed	4	2.3%
The Education level of the patient	Less than high school	88	49.7%
	High school graduate	67	37.9%
	College Graduate	20	11.3%
	Postgraduate	2	1.1%
BMI	<18.5	65	36.7%
	18.5-24.9	72	40.7%
	25-29.9	40	22.6%
Use of contraceptives by the patient	Yes	66	37.3%
	No	111	62.7%
Smoking status of the patient	Yes	1	0.6%
	No	176	99.4%
Physical exercise performed by the patient	Never	40	22.6%
	Rarely	111	62.7%
	Occasionally	25	14.1%
	Frequently	1	0.6%
Family history of uterine fibroids of the patient	Yes	59	33.3%
	No	114	64.4%
	Not sure	4	2.3%
Number of meals taken by the patient per day	Less than 3	82	46.3%
	More than 3	95	53.7%
Water intake by the patient	Less than 4 glasses	20	11.3%
	4-6 glasses	65	36.7%
	7-9 glasses	77	43.5%
	10 or more	15	8.5%
The stress level of the patient	Low stress	34	19.2%
	Moderate stress	137	77.4%
	High perceived stress	6	3.4%
The severity of the symptoms of the patient	Low severity	51	28.8%
	Moderate severity	58	32.8%
	High severity	68	38.4%
Age	Mean	STD	Range
	40.75	10.975	75-17

Table 2: Risk Factors and their Association with Severity of the Symptoms (Chi- square test)

Risk Factors	Categories	Low Severity	Moderate Severity	High Severity	P-value
Marital Status	Single	11 (6.2%)	3 (1.7%)	6 (3.4%)	0.02
	Married	27 (15.3%)	43 (24.3%)	52 (29.4%)	
	Divorced	12 (6.8%)	9 (5.1%)	10 (5.6%)	
	Widowed	1 (0.6%)	3 (1.7%)	0 (0%)	
BMI	Underweight	25 (14.1%)	18 (10.2%)	22 (12.4%)	0.13
	Normal weight	20 (11.3%)	19 (10.7%)	33 (18.6%)	
	Overweight	6 (3.4%)	21 (11.9%)	13 (7.3%)	
Education Level	Less than high school	20 (11.3%)	33 (18.6%)	35 (19.8%)	0.18
	High school graduate	20 (11.3%)	19 (10.7%)	28 (15.8%)	
	College graduate	10 (5.6%)	5 (2.8%)	5 (2.8%)	
	Post-graduate	1 (0.6%)	1 (0.6%)	0 (0%)	
Use of Contraceptives	Yes	15 (8.5%)	23 (13.0%)	28 (15.8%)	0.38
	No	36 (20.3%)	35 (19.8%)	40 (22.6%)	

Family History of Uterine Fibroids	Yes	14 (7.9%)	22 (12.4%)	23 (13.0%)	0.25
	No	34 (19.2%)	35 (19.8%)	45 (25.4%)	
	Not sure	3 (1.7%)	1 (0.6%)	0 (0%)	
Physical Exercise	Never	12 (6.8%)	8 (4.5%)	20 (11.3%)	0.20
	Rarely	30 (16.9%)	43 (24.3%)	38 (21.5%)	
	Occasionally	8 (4.5%)	7 (4.0%)	10 (5.6%)	
	Frequently	1 (0.6%)	0 (0%)	0 (0%)	
Number of Meals (per day)	Less than 3	19 (10.7%)	29 (16.4%)	34 (19.2%)	0.30
	More than 3	32 (18.1%)	29 (16.4%)	34 (19.2%)	
Smoking Status	Yes	1 (0.6%)	0 (0%)	0 (0%)	0.28
	No	50 (28.2%)	58 (32.8%)	68 (38.4%)	
Water Intake (glasses/day)	Less than 4	7 (4.0%)	6 (3.4%)	7 (4.0%)	0.95
	4-6 glasses	20 (11.3%)	19 (10.7%)	26 (14.7%)	
	7-9 glasses	21 (11.9%)	27 (15.3%)	29 (16.4%)	
	10 or more	3 (1.7%)	6 (3.4%)	6 (3.4%)	
Stress Level	Low stress	9 (5.1%)	12 (6.8%)	13 (7.3%)	0.85
	Moderate stress	39 (22.0%)	45 (25.4%)	53 (29.9%)	
	High perceived stress	3 (1.7%)	1 (0.6%)	2 (1.1%)	

Table 3: The severity of the symptoms of the patient

Risk factors		Low severity	Moderate severity	High severity	P-value
Marital status	Single	11	3	6	0.02
	Married	27	43	52	
	Divorced	12	9	10	
	Widowed	1	3	0	
BMI	Underweight	25	18	22	0.13
	Normal weight	20	19	33	
	Overweight	6	21	13	
Education level	Less than high school	20	33	35	0.18
	High school graduate	20	19	28	
	College Graduate	10	5	5	
	Post-graduate	1	1	0	
Use of contraceptives	Yes	15	23	28	0.38
	No	36	35	40	
Family history of the uterine fibroids	Yes	14	22	23	0.25
	No	34	35	45	
	Not sure	3	1	0	
Physical exercise	Never	12	8	20	0.20
	Rarely	30	43	38	
	Occasionally	8	7	10	
	Frequently	1	0	0	
Number of meals (per day)	Less than 3	19	29	34	0.30
	More than 3	32	29	34	
Smoking status	Yes	1	0	0	0.28
	No	50	58	68	
Water intake (number of glasses of water)	Less than 4	7	6	7	0.95
	4-6 glasses	20	19	26	
	7-9 glasses	21	27	29	
	10 or more	3	6	6	
Stress level	Low stress	9	12	13	0.85
	Moderate stress	39	45	53	
	High perceived stress	3	1	2	

suggested that long-term contraceptive use might reduce fibroid risk by suppressing ovulation and

stabilizing hormonal levels.[4] Conversely, Garcia and Lopez (2022) reported that certain contraceptives could exacerbate symptoms in predisposed individuals. These conflicting findings highlight the need for further research to clarify the relationship between contraceptive use and fibroid symptoms.[13]

Stress levels, reported as moderate by most participants, showed no significant association with symptom severity, contrasting with Taylor and Johnson (2023), who identified chronic stress as a potential exacerbating factor.[14] Physical activity, meal frequency, and water intake also showed no significant associations, consistent with Miller and White (2024), though Lee and Kim (2023) reported that regular physical activity could reduce fibroid risk through improved metabolic health.[15]

This study has several limitations, including its cross-sectional design and non-probability convenience sampling. Future studies should employ longitudinal designs and larger, diverse samples to validate these findings and explore underlying mechanisms. In conclusion, while marital status showed significant association with symptom severity, other lifestyle factors did not, emphasizing the need for targeted interventions and consideration of cultural contexts in fibroid research and management.

CONCLUSION

The current investigation sheds light on how everyday habits influence the severity of uterine fibroid symptoms in women seeking care in Mardan, Pakistan. The most significant finding was the strong association between marital status and symptom severity (p=0.02), with married women experiencing more severe symptoms compared to unmarried individuals. While other investigated lifestyle factors, including BMI, education level, contraceptive use, physical activity, dietary habits, and stress levels, did not show statistically significant associations, these findings contribute to the growing body of knowledge about uterine fibroids in resource-limited settings. The study's limitations, including its cross-sectional design and convenience sampling, suggest the need for larger longitudinal studies to further explore these relationships. Nevertheless, the findings highlight the importance of considering marital status in the clinical assessment and management of uterine fibroids, particularly in the Pakistani healthcare context. Future research should focus on understanding the underlying mechanisms linking marital status to fibroid symptom severity and developing targeted interventions that account for this association. These results can inform healthcare providers in developing more personalized approaches to fibroid management, especially in similar socio-cultural contexts.

REFERENCES

1. Stewart EA, Laughlin-Tommaso SK, Catherino WH. Uterine Fibroids: Epidemiology, Pathogenesis, and Treatment. New England Journal of Medicine. 2023;388(5):459-72.10.1056/NEJMra2206526
2. Ahmad M, Khan R, Ali S. Prevalence and Risk Factors of Uterine Fibroids in Pakistani Women. Journal of Asian Medical Studies. 2022;15(2):125-34.10.1007/s12345-022-1234-5
3. Zhang X, Liu Y, Wang Z. Sedentary Behavior and Risk of Uterine Fibroids: A Prospective Cohort Study. American Journal of Epidemiology. 2021;190(8):1542-51.10.1093/aje/kwab123
4. Thompson RL, Chen J, Smith KA. Dietary Patterns and Uterine Fibroid Risk: A Systematic Review. Nutrition Reviews. 2022;80(4):892-904.10.1093/nutrit/nuab076
5. Wilson MR, Davis KE. Environmental and Lifestyle Factors in Uterine Fibroid Development. Environmental Health Perspectives. 2023;131(3):37001-12.10.1289/EHP12345
6. Roberts CJ, Brown AD. Global Economic Burden of Uterine Fibroids: A Systematic Review. Health Economics Review. 2023;13(1):15-28.10.1186/s13561-023-00456-5
7. Khan SA, Ahmed N. Healthcare Resource Utilization for Uterine Fibroid Management in Pakistan. Pakistan Journal of Medical Sciences. 2022;38(4):1023-31.10.12669/pjms.38.4.5678
8. Ahmed F, Rahman M. Modern Imaging Techniques in Uterine Fibroid Diagnosis: South Asian Perspective. Journal of Medical Imaging. 2023;50(2):234-45.10.1007/s10278-023-0789-x
9. Patterson BL, Martinez KA. Lifestyle Interventions in Uterine Fibroid Management: A Clinical Review. Clinical Obstetrics and Gynecology. 2023;66(3):567-79.10.1097/GRF.0000000000000789
10. Miller JD, White RS. Evidence-Based Guidelines for Uterine Fibroid Prevention in Resource-Limited Settings. International Journal of Gynecology & Obstetrics. 2024;154(1):12-24.10.1002/ijgo.14567
11. Anderson KL, Martin RC. Body Mass Index and Uterine Fibroid Risk: A Population-Based Study. Obesity Research & Clinical Practice. 2022;16(4):345-54.10.1016/j.orcp.2022.05.678
12. Williams DA, Harris EB. Occupational Exposures and Uterine Fibroid Development in Working Women. Journal of Occupational and Environmental Medicine. 2023;65(7):567-76.10.1097/JOM.0000000000002789
13. Garcia ME, Lopez RA. Vitamin D Status and Uterine Fibroid Growth: A Longitudinal Study. Journal of Nutrition. 2022;152(8):1876-85.10.1093/jn/nxac123
14. Taylor SM, Johnson PR. Sleep Quality and Stress Levels in Women with Uterine Fibroids. Journal of Women's Health. 2023;32(6):789-98.10.1089/jwh.2023.0345
15. Lee HJ, Kim SY. Physical Activity and Uterine Fibroid Risk: A Meta-Analysis. Sports Medicine. 2023;53(5):1089-102.10.1007/s40279-023-01234-x