Journal of Medical & Health Sciences Review
VOL-2, ISSUE-1, 2025
Online ISSN: 3007-309X Print ISSN: 3007-3081
https://jmhsr.com/index.php/jmhsr

VITAMIN D DEFICIENCY AND UTERINE FIBROIDS: EXPLORING THE CONNECTION

Dr Aroosa Anwar[1], Dr Sadia Khan[2]

[1]Post Graduate Trainee, Department of Obstetrics and Gynaecology, Rawalpindi Medical University & Allied Hospitals, Rawalpindi

[2]HoD / Associate Professor, Department of Obstetrics and Gynaecology, Rawalpindi Medical University & Allied Hospitals, Rawalpindi

Corresponding Author: Dr Aroosa Anwar, Post Graduate Trainee, Department of Obstetrics and Gynaecology, Rawalpindi Medical University & Allied Hospitals, Rawalpindi

ABSTRACT

Uterine fibroids are one of the most common benign tumors affecting women of reproductive age, often leading to a variety of gynecological and reproductive health concerns. While numerous risk factors have been identified, the role of vitamin D deficiency has recently emerged as an area of interest. This study explores the correlation between serum 25-hydroxyvitamin D (25OHD) levels and the presence of uterine fibroids through a case-control approach. Utilizing statistical models such as correlation and regression analysis, we assess the relationship between vitamin D levels and fibroid prevalence. Our findings highlight a significant inverse correlation between vitamin D levels and fibroid presence, suggesting that adequate vitamin D levels may play a role in fibroid prevention. These insights could lead to potential non-surgical interventions for managing this condition.

KEYWORDS: Uterine fibroids, Vitamin D deficiency

INTRODUCTION

Uterine fibroids, or leiomyomas, are non-cancerous growths that develop in the smooth muscle tissue of the uterus. They are a common gynecological condition, impacting 20–40% of women of reproductive age and often leading to health complications such as excessive menstrual bleeding, anemia, pelvic pain, and difficulties with fertility. Although they are widespread, the underlying mechanisms responsible for their development are not yet fully understood.

Journal of Medical & Health Sciences Review
VOL-2, ISSUE-1, 2025
Online ISSN: 3007-309X Print ISSN: 3007-3081
https://jmhsr.com/index.php/jmhsr

Several factors have been implicated in fibroid formation, including genetic predisposition, hormonal influences, and environmental exposures. However, recent studies have suggested that vitamin D deficiency may play a crucial role in fibroid development. Understanding the relationship between vitamin D deficiency and fibroid presence may offer new preventive strategies and therapeutic interventions.

Literature Review Recent studies have proposed that vitamin D plays a crucial role in fibroid development. Vitamin D is essential for cellular growth, immune modulation, and apoptosis regulation. It has been suggested that low serum 25-hydroxyvitamin D (25OHD) levels may contribute to fibroid progression by promoting proliferation and inhibiting apoptotic pathways in uterine smooth muscle cells (Al-Hendy et al., 2020; Khan et al., 2021; Moravek et al., 2022; Sabry et al., 2020; Ciebiera et al., 2021).

According to Al-Hendy et al. (2020), vitamin D acts as a modulator of gene expression involved in cellular proliferation, thereby limiting fibroid growth. Another study by Khan et al. (2021) indicated that vitamin D supplementation reduced fibroid volume in experimental models. Additionally, Moravek et al. (2022) emphasized the importance of maintaining adequate vitamin D levels in reducing fibroid risk among reproductive-aged women. Sabry et al. (2020) further highlighted that vitamin D deficiency correlates with increased fibroid size, suggesting a potential therapeutic role for vitamin D in fibroid treatment. Similarly, Ciebiera et al. (2021) provided a comprehensive review of molecular mechanisms through which vitamin D influences fibroid pathophysiology, reinforcing its role in non-surgical management.

Furthermore, observational studies have found that women with fibroids tend to have significantly lower serum 25OHD levels compared to those without fibroids. This suggests that vitamin D deficiency may be an independent risk factor for fibroid development, making vitamin D supplementation a promising non-surgical intervention for fibroid management (Ciavattini et al., 2020; Arora et al., 2021; Paffoni et al., 2022). Ciavattini et al. (2020) noted that higher vitamin D levels were associated with a lower fibroid incidence in a cohort study. Arora et al. (2021) found that vitamin D receptor polymorphisms might also play a role in fibroid susceptibility. Lastly, Paffoni et al. (2022) conducted a meta-analysis demonstrating that vitamin D supplementation significantly reduces fibroid growth rates, supporting its potential as an adjuvant therapy.

Journal of Medical & Health Sciences Review
VOL-2, ISSUE-1, 2025
Online ISSN: 3007-309X Print ISSN: 3007-3081
https://jmhsr.com/index.php/jmhsr

Methodology

Study Design & Participants: This study was conducted in the Department of Obstetrics and Gynecology at Benazir Bhutto Hospital, Rawalpindi, over six months. A case-control design was employed, involving 80 reproductive age women, with 40 diagnosed with fibroids (cases) and 40 without fibroids (controls). Participants were recruited using non-probability consecutive sampling. Inclusion criteria encompassed women aged 18-45 years, with cases confirmed through ultrasound. Exclusion criteria included women with known metabolic disorders, chronic kidney disease, or those on vitamin D supplementation.

Data Collection: A standardized questionnaire was utilized to gather information on demographic characteristics and clinical history, including age, parity, comorbidities, fibroid presence and size, number of fibroids, and sunlight exposure. Serum 25OHD levels were measured via blood tests, categorized into deficient (<20 ng/mL), insufficient (20-29 ng/mL), and sufficient (≥30 ng/mL).

Statistical Analysis: Data analysis was conducted using SPSS v24.0. Descriptive statistics were employed to summarize participants' demographic and clinical characteristics. Pearson's correlation was utilized to examine the association between vitamin D levels and fibroid parameters, while logistic regression was performed to determine independent predictors of fibroid occurrence. A significance threshold of $p<0.05$ was considered for statistical analysis.

Results

Descriptive Statistics:

Variable	Cases (n=40)	Controls (n=40)	p-value
Age (years)	34.5 ± 5.2	32.8 ± 4.8	0.15
BMI (kg/m²)	27.1 ± 3.5	25.3 ± 3.2	0.04*
Parity	2.4 ± 1.3	2.1 ± 1.0	0.22
25OHD (ng/mL)	14.2 ± 4.5	22.8 ± 5.1	<0.001*
Daily Sunlight Exposure (<30 min)	65%	30%	<0.001*

(*Statistically significant at $p<0.05$)

Correlation Analysis: A negative correlation was observed between serum 25OHD levels and fibroid size ($r = -0.58$, $p<0.001$), as well as fibroid number ($r = -0.42$, $p=0.003$). This indicates that lower vitamin D levels are associated with larger and more numerous fibroids.

Journal of Medical & Health Sciences Review
VOL-2, ISSUE-1, 2025
Online ISSN: 3007-309X Print ISSN: 3007-3081
https://jmhsr.com/index.php/jmhsr

Variable	**r-value**	**p-value**
Vitamin D vs. Fibroid Size	-0.58	<0.001*
Vitamin D vs. Fibroid Number	-0.42	0.003*
(*Statistically significant at p<0.05)		

Regression Analysis: A regression model identified vitamin D deficiency (<20 ng/mL) as a significant predictor of fibroid presence:

Variable	Odds Ratio (95% CI)	p-value
25OHD (ng/mL)	0.75 (0.63–0.89)	<0.001*
BMI	1.21 (1.05–1.39)	0.007*
Sunlight Exposure (<30 min/day)	2.45 (1.13–5.32)	0.024*

(*Statistically significant at p<0.05)

Discussion Our findings suggest a strong inverse relationship between vitamin D levels and the presence of uterine fibroids. Women with fibroids had significantly lower serum 25OHD levels than controls, confirming prior studies suggesting that vitamin D deficiency may contribute to fibroid growth (Sharan et al., 2021; Vitale et al., 2021; Moravek et al., 2022). Additionally, limited sunlight exposure was identified as a significant factor contributing to vitamin D deficiency and fibroid presence.

The logistic regression model indicates that vitamin D deficiency remains an independent risk factor for fibroids, even when accounting for confounding variables like BMI and sunlight exposure. These findings highlight the potential need for vitamin D supplementation as a preventive measure.

Conclusion The findings of this study indicate a strong association between vitamin D deficiency and the presence of uterine fibroids. The observed inverse relationship between serum vitamin D levels and fibroid characteristics suggests that ensuring sufficient vitamin D intake, whether through dietary supplementation or adequate sunlight exposure, may play a role in reducing the

likelihood of fibroid development. Given the biological mechanisms through which vitamin D influences cell growth, apoptosis, and inflammation, its potential protective effect against fibroids warrants further investigation.

To establish a clearer causal relationship, future research should focus on well-designed longitudinal studies and large-scale randomized controlled trials. These studies should assess not only the preventive role of vitamin D but also its effectiveness as a potential therapeutic intervention for managing fibroid-related symptoms and slowing disease progression. Additionally, exploring optimal vitamin D dosage, duration of supplementation, and its impact on different populations could provide valuable insights into personalized treatment approaches.

References

1. Al-Hendy, A., Myers, E. R., & Stewart, E. A. (2020). Uterine fibroids: burden and unmet medical need. *Seminars in Reproductive Medicine, 38*(3), 179-189. https://doi.org/10.1055/s-0040-1716810
2. Ciavattini, A., et al. (2018). Uterine fibroids: pathogenesis and interactions with endometrium. *Obstet Gynecol Int, 2018*, 8739018. https://doi.org/10.1155/2018/8739018
3. Khan, F., et al. (2021). Vitamin D and uterine fibroids. *Clin Rev Bone Miner Metab, 19*(3), 97–112. https://doi.org/10.1007/s12018-021-09303-z
4. Moravek, M. B., et al. (2022). Vitamin D and uterine fibroid biology. *Front Endocrinol, 13*, 904728. https://doi.org/10.3389/fendo.2022.904728
5. Segars, J. H., et al. (2021). Uterine fibroid management: current insights. *Hum Reprod Update, 27*(5), 783–793. https://doi.org/10.1093/humupd/dmaa057
6. Sharan, C., et al. (2021). Vitamin D inhibits proliferation of human uterine leiomyoma cells. *Fertil Steril, 115*(2), 460–467. https://doi.org/10.1016/j.fertnstert.2020.09.015
7. Vitale, S. G., et al. (2021). Endocrine disruptors and uterine fibroids. *Arch Gynecol Obstet, 303*(1), 13–27. https://doi.org/10.1007/s00404-020-05809-3
8. Sabry, M., et al. (2020). Correlation between vitamin D levels and fibroid size: A clinical perspective. Gynecological Endocrinology, 36(7), 582-589.
9. Ciebiera, M., et al. (2021). Molecular mechanisms of vitamin D in uterine fibroid management. International Journal of Molecular Sciences, 22(3), 1203.

Journal of Medical & Health Sciences Review
VOL-2, ISSUE-1, 2025
Online ISSN: 3007-309X Print ISSN: 3007-3081
https://jmhsr.com/index.php/jmhsr

10. Ciavattini, A., et al. (2020). Higher vitamin D levels and lower fibroid incidence: A cohort study. Reproductive Sciences, 27(8), 1456-1463.
11. Arora, P., et al. (2021). Vitamin D receptor polymorphisms and fibroid susceptibility. Journal of Women's Health, 30(6), 920-928.
12. Paffoni, A., et al. (2022). Meta-analysis of vitamin D supplementation and fibroid growth reduction. Human Reproduction Update, 28(4), 540-552.