FREQUENCY OF UTERINE FIBROIDS AMONG WOMEN PRESENTING WITH SUBFERTILITY

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ABSTRACT

Objective: To determine the frequency of uterine fibroids among women presenting with subfertility

Methods: A cross-sectional study was conducted from October 25, 2020, to April 25, 2021, involving 148 sub fertile women recruited through consecutive sampling. Participants underwent ultrasound evaluation to detect uterine fibroids. Data was analyzed using SPSS version 20. Mean ± SD was calculated for quantitative variables, and frequencies and percentages for categorical variables. The association between fibroid presence and categorical variables like age group and BMI category was evaluated using the chi-square test. Statistical significance was set at $p < 0.05$.

Results: The mean age of participants was 29.5 years, and the mean BMI was 24.3 kg/m². Uterine fibroids were identified in 20.9% of participants. A higher fibroid prevalence was noted in women aged 30-40 years (26.1%) versus 20-30 years (16.5%), though not statistically significant ($p = 0.151$). No association was found with BMI ($p = 0.797$). Logistic regression identified age as a significant predictor (OR = 1.08; $p = 0.028$), but not BMI ($p = 0.612$).

Conclusion: Uterine fibroids were detected in approximately one-fifth of sub fertile women, suggesting that fibroids may be a notable finding in this population. Although bivariate analysis did not show significant associations with age or BMI, multivariate analysis identified increasing age as an independent risk factor. These findings highlight the need for further research using larger and more diverse cohorts.

Keywords: Subfertility, fibroids, myomas, pregnancy.

INTRODUCTION

Subfertility, defined as the failure to conceive after 12 months of regular unprotected intercourse, affects a significant proportion of couples worldwide and is a growing concern in reproductive health. It is a multifactorial condition influenced by a wide range of anatomical, physiological, genetic, and environmental factors.

Among the many gynecological conditions associated with subfertility, uterine fibroids (leiomyomas) have received increasing attention due to their potential impact on female reproductive function [1,2]. Infertility is not an irrevocable condition like sterility [3]. The relationship between fibroids and subfertility, however, remains complex. While not all fibroids cause infertility, their high prevalence among women of reproductive age and their potential to impair uterine function necessitate careful evaluation in women presenting with subfertility [4]. The failure to conceive after a year of frequent coitus is the current clinical definition of subfertility [5, 6]. The prevalence of infertility is roughly 10% in men and 13% in women[7]. According to reports, 57% of infertile women and 53% of infertile males sought infertility treatment [8]. Women are more likely to seek treatment for infertility if they have higher incomes and use the healthcare system more frequently [9]. The prevalence of infertility in women rises with age [10]. Infertility was reported by 12% and 21% of women in one research at ages 32 and 38, respectively [11]. The majority of medical professionals advise starting an infertility examination six months after trying to conceive for women aged 35 to 40 and three months after attempting to conceive for women

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aged over 40, as the female partner's reproductive potential declines beyond the age of 35. Women who have amenorrhea or other known reasons for infertility should begin an evaluation right once to determine the cause and develop a treatment plan [11, 12].

The smooth muscle tissue of the uterus can grow benignly into uterine fibroids (UFs), commonly referred to as myomas. These are the most prevalent lower abdominal tumors in women who are not yet menopausal. Although they can appear at any age, fibroids are present in 30 to 40% of women between the ages of 30 and 40 [13]. The deleterious effects of fibroids on fertility can be attributed to several different processes [14]. Larger or localized fibroids can make it more difficult for sperm and egg to be transported and implanted [15]. Submucosal fibroids appear to affect the amounts of glycodelin and IL-10. It is believed that these cytokines aid in implantation and the early stages of embryonic development. IL-10 and glycodelin levels seem to drop when fibroids are present [16]. Fibroids are benign myometrial tumors that grow in or near the uterus. The range of fibroids' prevalence is 4.5% to 68.6%, with some variation based on major risk factors such as age and race[17]. Common signs and symptoms include heavy or protracted menstrual flow, pelvic pain or pressure, decreased fertility, and subsequent disruption of everyday activities and mental health[18]. According to recent research, the key elements influencing the development and proliferation of (UFs) are stem cells, growth factors, ovarian steroid hormones, cytokines and chemokines, genetic and epigenetic factors, and extracellular matrix components[19]. These risk factors contribute to the pathogenesis of UFs by influencing a number of important processes, such as the β-catenin pathway, inflammation, DNA damage repair pathway, and genetic instability, among others. Although UFs are important for women's health, there are currently no treatments that are specific to UFs because they vary in number and composition across women, even within the same individual [20].

MATERIAL AND METHOD

This cross-sectional study was conducted in the Department of Obstetrics and Gynecology at Hayatabad Medical Complex, Peshawar, from October 25, 2020, to April 25, 2021. A total of 148 participants were enrolled, based on a 25.2% prevalence of uterine fibroids among infertile women, using WHO sample size calculation guidelines with a 95% confidence level and a 7% margin of error [21]. Participants were recruited through non-probability consecutive sampling. Inclusion criteria encompassed all women experiencing subfertility along with UFs within the reproductive age range of 15 to 45 years. Exclusion criteria included prior diagnoses of bilateral tubal blockage, history of intrauterine contraceptive device use, and BMI over 30 kg/m², to reduce potential confounding factors. The study received approval from the hospital's research and ethical board. Informed written consent was obtained from all participants. Data collection involved detailed history-taking, physical and gynecological examinations, and abdominal ultrasonography to detect uterine fibroids. All procedures were conducted under the supervision of a gynecologist with at least five years of clinical experience. Relevant information including patient name, age, and address was recorded in a prestructured proforma, and strict adherence to inclusion and exclusion criteria ensured the integrity and validity of the study findings.

Data analysis

All data were recorded and analyzed using SPSS version 20. The mean and standard deviation were computed for quantitative variables such as age, height, weight, and BMI. Frequencies and percentages were calculated for categorical variables, including subfertility type and the presence of uterine fibroids. To evaluate the association between uterine fibroids (present/absent) and potential risk factors such as age and BMI, binary logistic regression analysis was performed. Results were expressed as odds ratios (ORs) with 95% confidence intervals (CIs) to quantify the strength of association. A p-value of less than 0.05 was considered statistically significant. Additionally, the relationship between uterine fibroids and categorical groupings of age and BMI was assessed using the chi-square test to evaluate potential effect modification. All findings were presented in the form of tables and graphs for clarity.

RESULTS

This study aimed to investigate the prevalence of uterine fibroids among sub fertile women. A total of 148 women diagnosed with infertility were enrolled in the study. To determine whether age and BMI independently predict the presence of uterine fibroids, a binary logistic regression analysis was conducted. The model

was statistically significant, $\chi^2 = 6.12$, $p = 0.047$, indicating that the predictors as a set reliably distinguish between women with and without fibroids. Age was a significant predictor (OR = 1.08, 95% CI: 1.01–1.16, p = 0.028), suggesting that with each additional year of age, the odds of having fibroids increased by approximately 8%. BMI was not a statistically significant predictor. The mean age of the participants was 29.5 years, ranging from 20 to 40 years. Notably, 57.4% of the participants were within the 20 – 30, year age group, while the remaining 42.6% were aged 30 - 40 years. The distribution of BMI among the participants revealed a mean value of 24.3 ± 2.4 kg/m², with women categorized into BMI groups based on established classifications. These demographic details are summarized in Table 1. Uterine fibroids were identified in 20.9% of the study participants through ultrasound examination (Table 3). The prevalence of uterine fibroids increased with age among infertile women, but the difference between age groups 20-30 and 30-40 years was not statistically significant (p = 0.151) as in Table 4. Similarly, when the prevalence of uterine fibroids was analyzed across different BMI categories, no statistically significant association was found (p = 0.797). Although previous studies have suggested that higher BMI may contribute to fibroid development, our findings indicate that in the context of subfertility, BMI does not appear to significantly influence the risk of fibroids, suggesting that fibroid-related subfertility in this population may be independent of body weight. Table 5 presents the detailed stratification of fibroid prevalence by BMI.

Table 1: AGE-WISE DISTRIBUTION OF SAMPLE (n=148)

Age (Years)	Frequency	Percent (%)
20-30	79	53.4
30-40	69	46.6
Total	148	100.0

Table 2: BODY MASS INDEX OF THE SAMPLE (n=148)

BMI	Frequency	Percent (%)
20 - 23	51	34.5
23 - 25.5	42	28.4
25.5 – 28	55	37.2
Total	148	100.0

Table 3: FREQUENCY OF UTERINE FIBROIDS (n=148)

Fibroids	Frequency	Percent (%)
Yes	31	20.9
No	117	79.1
Total	148	100.0

Table 4: AGE WISE STRATIFICATION OF FIBROID

Age (years)	Fibroids	
	Yes	No
20 – 30	13 (16.5%)	66 (83.5%)
30 - 40	18 (26.1%)	51 (73.9%)
Total	31 (20.9%)	117 (79.1%)

The difference was not statistically significant ($\chi^2 = 2.06$, $p = 0.151$)

Table 5: BMI WISE STRATIFICATION OF FIBROID

	Age (Years)	Fibroids	
		Yes	No
	20 – 23	12 (13.5%)	39 (76.5%)
BMI	23 - 25.5	09 (21.4%)	33 (78.6%)
	25.5 - 28	10 (18.2%)	45 (81.8%)
	Total	31 (20.9%)	117 (79.1%)

No significant association was found ($\chi^2 = 0.46$, $p = 0.797$)

DISCUSSION

This study examined the prevalence of uterine fibroids among women presenting with subfertility and explored the influence of age and BMI as potential predictors. The rate of uterine fibroids among sub fertile women in this study was increased, aligning with other research indicating a comparatively high frequency of fibroids in this demographic [22]. Although stratified analysis showed that the prevalence of fibroids increased with age from 16.5% in women aged 20-30 years to 26.1% in those aged 30-40 years the association was not statistically significant. However, in binary logistic regression, age was found to be a significant independent predictor of fibroid presence. On the other hand, BMI did not show a statistically significant association with fibroid presence in either the chi-square test or logistic regression model. This contrasts with some studies that suggest a positive association between higher BMI and fibroid development, possibly due to increased estrogen levels in adipose tissue [19]. However, our findings indicate that, within the BMI range of 20-28 kg/m² observed in this study, BMI may not be a major determinant of fibroid risk among infertile women. The overall model in the logistic regression was statistically significant, indicating that age and BMI together had a predictive value for fibroid occurrence.

The majority of women with uterine fibroids are often asymptomatic in the early stages, resulting in diminished clinical attention due to undiscovered conditions. Conversely, symptomatic women usually report abdominopelvic masses, with or without abnormal uterine bleeding, primarily menorrhagia[23, 24]. The Black Women's Health Study (BWHS) indicates that elevated dietary glycemic index (GI) and glycemic load (GL) may correlate with an increased risk of uterine myomas in certain women for hormone-responsive malignancies, including endometrial and ovarian cancers, via a shared mechanism [25]. Uterine fibroids (UFs) are monoclonal neoplasms, and accumulating evidence suggests they originate from a singular myometrial stem cell (MMSC) [26]. While the majority of women with fibroids remain asymptomatic, around 30% will exhibit significant symptoms, including abnormal uterine bleeding, anemia, pelvic discomfort and pressure, back pain, urinary frequency, constipation, or infertility, requiring intervention. Moreover, fibroids have been linked to worse obstetrical outcomes [27]. Benign uterine tumors frequently manifest as iron deficiency anemia, mass symptoms (such as pelvic pressure/pain, and obstructive symptoms), fertility problems, and protracted menstrual abnormalities (such as heavy, irregular, and prolonged uterine bleeding) [28]. Fibroids have been connected to both infertility and repeated pregnancy loss, depending on where they are located in the uterus [24].

The findings of this study demonstrate that the prevalence of uterine fibroids tends to increase with advancing age. This trend aligns with a prospective study conducted among Chinese couples of childbearing age, which reported a rising prevalence of infertility with age [29]. Patients of reproductive age are comparatively likely to have leiomyomas. After a myomectomy, almost half of women with myomas and infertility become pregnant. In terms of outpatient visits and surgical hospital expenses, uterine leiomyoma is a significant public health issue for the community [30].

It is yet unclear how uterine fibroids contribute to infertility. There is no conclusive evidence linking fibroids to infertility. Pregnancy rates comparing women with and without known fibroids should ideally be compared. Since no such studies have been done, our understanding of the connection between

myomas and infertility comes from indirect research. Pregnancy rates seem to decrease solely when myomas are submucosal, according to the IVF model.

CONCLUSION

This study demonstrates that uterine fibroids are a relatively common finding among sub fertile women in our population, with a prevalence of approximately one-fifth. Although the frequency of fibroids tended to increase with age, and statistically significant association was observed. These findings suggest that uterine fibroids may contribute to subfertility, potentially independent of body weight. Given the complex and multifactorial nature of infertility, further research particularly well-designed case-control studies is needed to clarify the causal relationship between fibroids and reproductive outcomes. Additionally, randomized controlled trials are recommended to evaluate the impact of myomectomy on fertility. Incorporating early detection and individualized management of uterine fibroids into infertility assessments may improve patient outcomes and guide more targeted interventions.

DISCLAIMERS

Author Contributions

Dr. Rabia Ismail conceptualized the study, designed the methodology, and led the data collection process. Dr Javeria Saleem was responsible for data analysis and interpretation, and also coordinated the overall project as the corresponding author. Dr. Shagufta Naz, Dr. Nilma Hassan, Dr. Nafeesa Ghani and Dr. Mawara Iftikhar contributed to the literature review, manuscript writing, and provided critical revisions to improve the content. All authors read and approved the final manuscript.

Conflict of Interest

The authors declare that there are no conflicts of interest.

Data Availability

Data and supplements available on request to the corresponding author.

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