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# Epidemiological Analysis of Uterine and Ovarian Pathologies: A Cross-sectional Study

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## ABSTRACT

**Background:** With disorders like endometritis affecting up to 11% of women of reproductive age and leading to infertility, women's uterine and ovarian health concerns have a substantial influence on reproductive health. **Objective:** To ascertain the frequency of ovarian and uterine infections and pathologies across different districts of Khyber Pakhtunkhwa, with an emphasis on finding trends in the conditions' distribution. **Study Design:** A retrospective cross-sectional study. **Settings:** Hayatabad Medical Complex, Peshawar Pakistan. **Duration:** September 2023 to September 2024. **Methods:** 389 female patients who presented with gynecological complaints were enrolled in the study. Age, district, and diagnostic results were obtained from medical records. With a significance level of $p<0.05$, statistical analysis, including chi-square tests, was performed using SPSS version 22. **Results:** The study examined 389 individuals and found that with majority of participants (n=256, 65.8%) were in the 36–50 age group. With n=306 (78.7%) participants from Peshawar. According to statistical analysis, there was no significant geographic variation by age p=0.924. According to diagnostic results, 25.4% of patients had benign diseases upon presentation, and 71.5% of patients had no substantial pathology. Moreover, n=2 (0.5%) of the patients were diagnosed with endometrioid carcinoma (Grade 1), signifying a minor yet clinically important incidence of cancer within this cohort. **Conclusion:** The study highlights the need for decentralized gynecological services to alleviate healthcare strain in Peshawar and improve access in rural areas.

*Keywords:* *Uterine pathology, Uterine infections, Ovarian infections, Ovarian pathology, Prevalence.*

## INTRODUCTION

Globally, women frequently have uterine and ovarian health problems, such as infections and organ lesions, which greatly exacerbate reproductive health difficulties.[1] Up to 11% of women of reproductive age worldwide are thought to be afflicted by uterine infections such as endometritis, cervical erosions, and pelvic inflammatory disease (PID), which can have major repercussions like infertility and persistent pelvic discomfort if left untreated.[2] Comparably, ovarian infections, which affect a smaller but noteworthy proportion of women, particularly in underprivileged areas, have been connected to unfavorable reproductive outcomes despite being less researched.[3]

Another common issue is uterine and ovarian pathologies brought on by diseases, including leiomyomas, adenomyosis, ovarian cysts, and polycystic ovary syndrome (PCOS).[4] According to studies, 30-77% of women of reproductive age suffer from pathology rates may be greater in other groups because of lifestyle, genetic, and healthcare access variables.[5]

There are millions of women affected by uterine and ovarian health problems worldwide, which pose serious public health problems. Around 5–10% of women in their reproductive years worldwide suffer from conditions like PCOS, and in other groups, such as South Asian women, the prevalence is much greater because of variables including genetics and lifestyle choices.[6]

Another prevalent illness is uterine leiomyomas, which are estimated to affect 70–80% of women of reproductive age, particularly in African and certain Asian populations.[7] Infertility, irregular bleeding, persistent discomfort, and an elevated risk of other reproductive system abnormalities are just a few of the serious reproductive issues that these illnesses are known to induce.[8]

Although there is little information on the frequency of ovarian and uterine disorders nationwide in Pakistan, what is known from the research that is accessible indicates that problems with reproductive health are common and frequently go undiagnosed, especially in neglected and rural areas.[9] According to estimates, 20–52% of Pakistani women in some regions suffer from PCOS, which is more common among them than in many Western nations.[10]

Studies specifically focusing on Khyber Pakhtunkhwa reveal significantly higher incidence rates, especially in rural regions like Buner.[11] A study found that around 70% of participants had Pelvic Inflammatory Disease, a proportion far greater than that observed in many metropolitan regions and that roughly 52% of women had PCOS.[12] Perhaps as a result of restricted access to routine gynecological examinations and treatment, ovarian cysts are also prevalent, with around 85% of women in some rural regions receiving a diagnosis. Prevalence rates for uterine prolapse and dysfunctional uterine hemorrhage are 68% and 60%, respectively, highlighting the significant burden on reproductive health in the area.[13,14] The aim of this study was to ascertain the frequency of ovarian and uterine infections and lesions in different districts of Khyber Pakhtunkhwa, Pakistan, with an emphasis on finding trends in the conditions' distribution.

## METHODS

From September 2023 to 2024, the Hayatabad Medical Complex (HMC), Peshawar, patients' prevalence of ovarian and uterine pathologies were evaluated using a retrospective cross-sectional approach. While this study was conducted at a single healthcare facility, it drew patients from diverse regions of Khyber Pakhtunkhwa, providing insights into the prevalence and distribution of these illnesses within a broad patient population. Ethical approval for this study was obtained from the Ethical Review Committee under reference number 934/HEC/B&PSC/2023.

In this study, 389 female patients who had symptoms indicative of ovarian or uterine diseases were included in the study. In this study, 389 female patients who had symptoms indicative of ovarian or uterine diseases were included. The sample size was calculated using the WHO sample size calculator, with a 95% confidence level, 5% margin of error, and an assumed prevalence of 50% due to the unavailability of prior prevalence data. Female patients who had comprehensive medical records, including imaging, histology, and clinical history reports, had diagnostic examinations at HMC and displayed clinically suggestive symptoms were necessary to meet the inclusion criteria. Patients with inadequate medical records, those with unrelated diseases, and situations where a diagnosis was established only based on clinical suspicion without imaging or pathology confirmation were excluded from the study.

Clinical information, such as demographics (age, residence district), clinical symptoms, and diagnoses based on histological and standardized imaging investigations, were taken from patient records. Diagnostic assessments were carried out via imaging and clinical exams, with ultrasound being the primary method used to diagnose diseases such as ovarian cysts, endometrial/endocervical polyps, uterine pathology, and pelvic inflammatory disease (PID). The study's prevalence evaluation was more accurately diagnosed because of the trustworthy foundation that ultrasound imaging offered for assessing organ size and structural anomalies.

To further clarify the diagnosis in instances with suspected infection or notable tissue abnormalities, histological evaluations were carried out. The tissue architecture and cellular alterations were seen using hematoxylin and eosin (H&E) staining, which made it easier to identify inflammation and other lesions-related changes.

Data analysis was performed using SPSS version 22. Chi-square tests were utilized to evaluate variations among districts, and descriptive statistics were employed to determine prevalence rates. A p-value of less than 0.05 was used to analyze correlations between conditions and demographic characteristics.

## RESULTS

The age distribution of participants revealed that n=256 (65.8%) are between the ages of 36 and 50. This indicates a high frequency of reproductive health difficulties in middle-aged women, who are also likely to have a greater incidence of gynecological problems during this time. With 75 patients (19.3%) in the 51–65 age range, this age group is the second largest, underscoring the ongoing healthcare need of post-reproductive women. The age group of 19-35 years comprises n=35 (9%), whereas the group under 18 years includes only n=3 (0.8%). For those over 66 years, there are n=20 (5.1%), which suggests a consistent demand for gynecological services among the elderly as well.

**Table 1: Frequency distribution of patients by age group**

| Age Groups | Frequency (%) |
|---|---|
| **<18 years** | 3 (0.8%) |
| **19—35 years** | 35 (9%) |
| **36—50 years** | 256 (65.8%) |
| **51—65 years** | 75 (19.3%) |
| **>66 years** | 20 (5.1%) |
| **Total** | 389 |

According to the patient distribution by district, Peshawar is the main healthcare facility, accounting for n=306 (78.7%) of the n=385 total patients, highlighting its crucial significance in gynecological treatment. With Charsadda reporting n=15 (3.9%), Dir reporting n=13 (3.3%), and Bara reporting n=10 (2.6%), adjacent districts make up lesser percentages, suggesting a moderate demand for healthcare services from surrounding areas. The underrepresentation of districts like Nowshera n=2 (0.5%), Karak n=2 (0.5%), and Khyber n=1 (0.3%) may be due to localized access issues or the establishment of Medical Teaching Institutes in Nowshera, Kohat and Bannu. Peshawar's status as a regional healthcare center is further supported by the fact that n=5 (1.3%) from Afghanistan emphasizes the use of cross-border healthcare. Landi Kotal n=4(1.0%), Parachinar n=3(0.8%), and Kohat n=4(1.0%) are other districts with lower patient counts.

**Table 2: Frequency distribution of patients by district**

| Districts | Frequency (%) |
|---|---|
| **Peshawar** | 306 (78.7%) |
| **Charsadda** | 15 (3.9%) |
| **Swabi** | 5 (1.3%) |
| **Bara** | 10 (2.6%) |
| **Dir** | 13 (3.3%) |
| **Nowshera** | 2 (0.5%) |
| **Hangu** | 6 (1.5%) |
| **Afghan refugees** | 5 (1.3%) |
| **Landi Kotal** | 4 (1.0%) |
| **Parachinar** | 3 (0.8%) |
| **Kohat** | 4 (1.0%) |
| **Karak** | 2 (0.5%) |
| **Mohmand** | 4 (1.0%) |
| **Other** | 6 (1.8%) |
| **Total** | 385 |

The distribution of age groups across various districts highlights the demographic characteristics of the patient population in this study. Only n=3 (100%) were under the age of 18 years; n=2 (66.7%) resided in Peshawar, while n=1 (33.3%) lived in Hangu.

About n=35 (100%) participants were in the 19–35 age range, with n=29 (82.86%) of them residing in Peshawar. Although other regions also play a part, Peshawar's position as a hub for young people's access to healthcare was highlighted by the lower percentages that were split across Charsadda n=1 (2.86%), Dir n=2 (5.71%), Hangu n=1 (2.86%), Kohat n=1 (2.86%) and Afghan refugees n=1 (2.86%).

About n=256 (100%) participants were in the age category of 36 to 50, which was the most represented. 196 (76.5%) of these were in Peshawar. In Swabi n=4 (1.6%) and Charsadda n=11(4.3%), smaller percentages also suggest that this group has healthcare requirements. Further instances in Afghanistan n=3(1.2%), Nowshera n=2 (0.8%), Hangu n=4(1.6%), Bara n=7(2.8%), Dir n=8(3.2%), and combined districts (n=21, varied) demonstrate a distributed but concentrated demand in Peshawar. There were about 75 patients in the 51–65 age range, and n=63 (84%) of them lived in Peshawar. Charsadda, Bara, and Dir had smaller numbers, each with n=3 (4%), suggesting a decline in but continued engagement with healthcare. All n=20 patients who were 66 years of age or older were included, with n=16 (80%) in Peshawar and smaller numbers in Swabi n=1(5%), Afghan refugees n=1(5%).

The results of the Chi-square analysis showed no statistically significant correlation between the distribution of district and age groups (p-values >0.05) as shown in Table 3.

**Table 3: Cross-tabulation of age groups and district in the study population**

| Age Groups | District | Frequency | % within Districts | p-value |
|---|---|---|---|---|
| **<18 years** | Peshawar | 2 | 66.7% | 0.901 |
| | Hangu | 1 | 33.3% | |
| | **Total** | **3** | **100.0%** | |
| **19—35 years** | Peshawar | 29 | 82.86% | 0.994 |
| | Charsadda | 1 | 2.86% | |
| | Dir | 2 | 5.71% | |
| | Hangu | 1 | 2.86% | |
| | Afghan refugees | 1 | 2.86% | |
| | Kohat | 1 | 2.86% | |
| | **Total** | **35** | **100.0%** | |
| **36—50 years** | Peshawar | 196 | 76.5% | 0.997 |
| | Charsadda | 11 | 4.3% | |
| | Swabi | 4 | 1.6% | |
| | Bara | 7 | 2.7% | |
| | Dir | 8 | 3.2% | |
| | Nowshera | 2 | 0.8% | |
| | Hangu | 4 | 1.5% | |
| | Afghan refugees | 3 | 1.2% | |
| | Other | 21 | 8.2% | |
| | **Total** | **256** | **100.0%** | |
| **51—65 years** | Peshawar | 63 | 84.0% | 0.924 |
| | Charsadda | 3 | 4.0% | |
| | Bara | 3 | 4.0% | |
| | Dir | 3 | 4.0% | |
| | Other | 3 | 4.0% | |
| | **Total** | **75** | **100.0%** | |
| **>66 years** | Peshawar | 16 | 80.0% | 0.911 |
| | Swabi | 1 | 5.0% | |
| | Afghan refugees | 1 | 5.0% | |
| | Other | 2 | 10.0% | |
| | **Total** | **20** | **100.0%** | |

Of the total of 389 patients, there was a very low prevalence of malignant illnesses among individuals with noteworthy diagnoses, since n=99 (25.4%) showed no signs of malignancy. Bilateral withered cell nests were less frequent, occurring in n=1 (0.3%) of patients, followed by para tubal cysts in n=1 (0.3%), unremarkable fatty tissue in n=1 (0.3%), unremarkable omental tissue in n=1 (0.3%), and unremarkable ovaries in n=1 (0.3%). These results all represented small occurrences within the sample.

Due to a likely clinical association, n=1 (0.3%) was recommended for TB PCR testing, underscoring the importance of ruling out infectious diseases when necessary. Moreover, n=2 (0.5%) of the patients were diagnosed with endometrioid carcinoma (Grade 1), signifying a minor yet clinically important incidence of cancer within this cohort as shown in Table 4.

**Table 4: Diagnostic Findings in Study Sample**

| Diagnosis | Frequency |
|---|---|
| **No Significant Findings** | 278 (71.5%) |
| **Bilateral Walthered Cell Nest** | 1 (0.3%) |
| **Clinical Correlation T.B PCR** | 2 (0.6%) |
| **Endometrioid Carcinoma, Grade 1** | 2 (0.5%) |
| **No Chorionic Villi Seen** | 1 (0.3%) |
| **No Evidence of Malignancy** | 99 (25.4%) |
| **Para tubal Cyst** | 1 (0.3%) |
| **Unremarkable Fatty Tissue** | 3 (0.9%) |
| **Unremarkable Omental Tissue** | 1 (0.3%) |
| **Unremarkable Ovaries** | 1 (0.3%) |
| **Total** | **389 (100%)** |

## DISCUSSION

The current study offers an in-depth investigation of gynecological health trends across all age groups and areas in Khyber Pakhtunkhwa. With results highlighting Peshawar's crucial significance as a regional healthcare center, the current study offers significant insights into the distribution of gynecological health issues. Similar research from low-resource settings, where large urban areas serve as focal points for healthcare because of their superior facilities and accessibility, is consistent with the 78.7% concentration of cases in Peshawar. Due to a lack of healthcare alternatives in their local communities, according to Aylia *et al.,* 2023 patients from nearby rural areas frequently n=41 (34.7%) depend on the services of the metropolitan center, according to research done in Lahore.[15]

According to Christina Williams MD in a 2019 study that South Asia, middle-aged women are more likely to suffer from illnesses including pathology, endometriosis, and other perimenopausal difficulties.[16] According to the age distribution, the age group of 36 to 50 years old, which accounts for 65.8% of cases, has the highest prevalence of gynecological problems. According to Lan *et al.,* 2024; Alqallaf *et al.,* 2017 studies conducted in South Asia, middle-aged women are more likely to suffer from endometriosis and pathology, India found that 60% of women aged 35 to 49 had leiomyoma, which often necessitates medical or surgical operations due to delayed diagnosis and inadequate access to healthcare.[17,18] According to Poornima & Vinay, 2013 study done in metropolitan Belgaum, 70.5% of women had reproductive tract infections, underscoring the high prevalence of gynecological diseases.[19] Additionally, compared to other age groups, middle-aged women were more likely to seek gynecological treatment, according to Thiyagaraja *et al.,* 2023 research, highlighting the need for specialized reproductive health services for this population.[20]

Gynecological problems are common in postmenopausal women, as seen by the 19.3% of cases in this research that fell into the 5th group. This highlights the necessity for ongoing medical treatment in this population. Sreelatha *et al.,* 2017 and Najnin & Haque, 2020 Studies show that serious gynecological issues continue after reproductive age, with research from Bangladesh and Nepal focusing on diseases such as pelvic organ prolapse, which affects over 30% of women over 50 in Nepal.[21,22] According to Gupta *et al.,* 2023 and Betschart & Rizk, 2014 studies that Continuous gynecological care is necessary due to the multifactorial nature of these illnesses, which include variables like parity and postmenopausal status, to reduce the chance of untreated conditions including cervical and endometrial cancer.[23,24] Additionally, according to Banke *et al.,* 2020 the predictable doubling of the elderly population by 2050 highlights the necessity of addressing these health objectives due to the worldwide rise in life expectancy, which calls for a change in health policy to incorporate sexual and reproductive health for older persons.[25]

The study highlights the necessity of healthcare resources in Khyber Pakhtunkhwa. In addition to reducing the burden on Peshawar's healthcare system, the establishment of gynecological clinics in underprivileged regions will promote more equitable access to care. Targeted healthcare treatments are necessary to address common problems in middle-aged and post-menopausal women in particular. According to studies, regional health policies that strengthen rural healthcare infrastructure have a major positive impact on early diagnosis rates and decrease the need for long-distance travel for treatment. For instance, India's attempts to decentralize healthcare have improved the lives of rural women, illustrating the value of easily available local healthcare.

The distribution of middle-aged and post-menopausal women, who represent the largest demographic in our sample, underscores the critical importance of prioritizing reproductive health services for these groups. Moreover, the data suggests no significant age-based geographic variation, as patients from all age categories are primarily found in Peshawar. This trend underscores the city's central role in providing medical care to patients from surrounding areas. The diagnostic distribution reflects diverse gynecological health statuses, with a substantial number of benign conditions and fewer malignant cases. These findings point to the necessity of routine diagnostic assessments to detect both common and rare reproductive health issues affecting women in the community.

## CONCLUSION

This study shows that gynecological diseases are significantly treated in Peshawar's medical facilities, exposing serious gaps in accessible treatment in the neighboring areas. The largest frequency of diseases is shown in middle-aged women, whereas younger patients are underrepresented, most likely as a result of social restrictions. In rural locations, decentralized and specialized gynecological treatments are crucial to meeting these demands. Such programs would support fair access to healthcare throughout the area, improve timely care, and lessen the burden on metropolitan centers, all of which would be in line with global aspirations for sustainable reproductive healthcare.

## LIMITATIONS

The study's findings are limited by a geographic bias toward Peshawar, reducing generalizability across the broader region. The cross-sectional design and lack of follow-up data restrict the ability to assess long-term trends or outcomes. Additionally, the absence of socioeconomic and clinical background information hinders a comprehensive understanding of healthcare disparities. The small number of significant pathological findings may reflect underdiagnosis or limited diagnostic scope rather than true prevalence. Low patient counts from several districts might result from access barriers or reporting gaps, rather than actual healthcare demand. These limitations suggest a need for broader, longitudinal, and more demographically diverse studies to better inform healthcare policy and planning.

## SUGGESTIONS / RECOMMENDATIONS

The study highlights a significant concentration of gynecological healthcare demand in Peshawar, emphasizing the need for sustained investment in its medical infrastructure and services. Efforts should also be made to strengthen peripheral districts like Charsadda, Dir, and Bara through enhanced healthcare accessibility and outreach initiatives. Special attention must be directed toward the 36–50 age group, which forms the majority of the patient population, by implementing targeted preventive programs. Despite lower representation, younger and elderly age groups should not be overlooked, necessitating inclusive healthcare strategies. Furthermore, the presence of Afghan patients underscores the importance of cross-border healthcare coordination, while the rare but clinically important findings, such as endometrioid carcinoma, warrant the integration of routine cancer screening and early diagnostic protocols into gynecological care.

## CONFLICT OF INTEREST / DISCLOSURE

The study's authors disclose that they have no conflicts of interest.

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