Janaki Medical College Journal of Medical Sciences (2026); Vol.14 (1):64-73

JMCJMS

Research Article

Clinicopathological spectrum of ovarian cystic lesions with ultrasonographic correlation in a tertiary care hospital in Nepal

Bandana Gauli[1*], Chin Bahadur Pun[2], Binita Goyal[3], Akshunna Rup Shrestha[4]

Author's Affiliations

[1]Lecturer, Department of Pathology, Karnali Academy of Health Sciences, Jumla, Nepal

[2]Professor, Department of Pathology, College of Medical Sciences, Kathmandu University, Chitwan, Nepal

[3]Associate Professor, Department of Pathology, College of Medical Sciences, Kathmandu University, Chitwan, Nepal

[4]Lecturer, Department of Pathology, College of Medical Sciences, Kathmandu University, Chitwan, Nepal

Correspondence to:

Dr. Bandana Gauli,
Lecturer
Department of Pathology,
Karnali Academy of Health Sciences, Jumla, Nepal
Email ID: gaulibandana@gmail.com

ABSTRACT

Background & Objectives: Cystic lesions of the female genital tract, especially ovarian cysts, range from functional to malignant. While ultrasonography aids initial evaluation, histopathology is the gold standard. This study aimed to assess the histopathological spectrum and its correlation with imaging and clinical findings.

Materials and Methods: This analytical cross-section study was carried out among 33 cases presenting as cystic masses from October 2022 to September 2023. For histopathological analysis, the specimens were grossed, processed, and embedded using standard procedures. For inferential statistics, Cohen's Kappa was calculated to access agreement between imaging and histopathological diagnosis as well as sensitivity, specificity and diagnostic accuracy of imaging studies.

Results: Out of 33 cases, the maximum number, 14 (36.7%), belonged to the 21– 40-year age group. Among the clinical features, incidental findings accounted for the largest proportion, seen in 15 (45.5%) patients. Histopathological evaluation classified the lesions into non-neoplastic, 21 (63.3%), and neoplastic 12 (36.7%). Follicular cyst, 8 (24.2%), emerged as the predominant non-neoplastic lesion, while mature cystic teratoma, 5 (15.4%), was the most common among neoplastic lesions.

Conclusions: Most ovarian cystic lesions are benign and non-neoplastic in nature and occur predominantly in women of reproductive age. Histopathology was found to have moderate degree of aggregability with imaging findings. However, due to high specificity and moderate sensitivity of imaging findings, it can be used as a good adjunct tool along with histopathology for ruling in the disease if any clinical suspicion arises.

Keywords: cystic lesions. histopathology, ovarian cyst, ultrasonography

INTRODUCTION

A cyst is defined as any closed cavity or sac, normal or abnormal, lined by epithelium, and especially one that contains a liquid or semisolid material [1]. Cysts can be benign or malignant and can vary in size, from microscopic to large enough to be visible on imaging scans. Cystic lesions of the ovary are among the most frequently encountered gynecological conditions. These lesions include functional cysts, benign neoplasms, and malignant tumors.

With the highest mortality rate of all gynecological malignancies and an overall 5year survival rate of 46%, ovarian cancer is the second most common gynecological malignancy and seventh most common cancer affecting women [2]. The majority of benign epithelial tumors have a cystic appearance and are more common in younger age groups. The malignant counterparts, on the other hand, are cystic with a predominance of solid components [3].

The ovary is particularly prone to cyst formation due to the cyclical hormonal changes associated with ovulation. Many ovarian cysts remain asymptomatic and are often detected incidentally during imaging studies performed for unrelated complaints. However, some patients may present with abdominal pain, pelvic mass, menstrual irregularities, or complications such as torsion and rupture. Ultrasonography is widely used as the first-line imaging modality for the evaluation of ovarian cysts because it is non-invasive, readily available, and cost-effective. Despite advances in imaging techniques, histopathological examination remains the gold standard for establishing the exact diagnosis and determining the nature of the lesion. The present study aimed to evaluate the clinicopathological spectrum of ovarian cystic lesions and to correlate ultrasonographic findings with histopathological diagnosis.

MATERIALS AND METHODS

The present analytical cross-sectional study comprised of 33 ovarian specimens presenting with cystic lesions that were received in the Department of Pathology, College of Medical Sciences, Chitwan, Nepal over the study period of 1 year (October 2022 to September 2023). The ethical approval was obtained from Institutional Review Committee (Ref: IRC/2022-119) COMS-TH, Chitwan, Nepal. The specimens were obtained from patients who underwent surgical procedures for ovarian masses. Only cases in which the lesion was confirmed to be cystic in

nature on gross and histopathological examination were considered for analysis. Relevant clinical information such as patient age, presenting symptoms, and ultrasonographic findings was collected from pathology request forms and hospital medical records.

Each specimen was examined macroscopically to note the size, external surface, and cystic characteristics. The tissues were then fixed in 10% neutral buffered formalin and processed using routine histopathological techniques. Paraffin-embedded sections of approximately 3–5 μm thickness were prepared and stained with hematoxylin and eosin (H&E). Microscopic examination was performed to establish the final diagnosis. Statistical analysis was done using Statistical Packages for Social Sciences (SPSS, version 21). For inferential statistics, Cohen's Kappa was calculated to check the agreeability between imaging and histopathological diagnosis. Kappa value of >0.8 was required to prove high agreeability. A p-value < 0.05 was considered statistically significant. Histopathological findings were correlated with imaging diagnoses, and the sensitivity, specificity, and overall diagnostic accuracy of the imaging modalities were subsequently evaluated. Based on histopathological features, the lesions were categorized into non-neoplastic and neoplastic cystic lesions of the ovary. The findings were subsequently analyzed to determine the distribution and clinicopathological characteristics of ovarian cystic lesions.

RESULTS

A total of 33 ovarian cystic lesions were included in the present study. The age of the patients ranged from 14 to 80 years, with a mean ± SD of 40.24 ± 16.87 years**.** The maximum number of cases, 13 (36.7%), were observed in the 41–60 years age group (Figure 1). Among the clinical features, incidental findings accounted for the largest proportion, seen in 15 (45.5%) patients. Pain, swelling, pain with swelling, and pain with bleeding were observed in 3 (8.3%), 4 (12.1%), 5 (15.2%), and 6 (18.2%) patients, respectively (Figure 2).

Out of the total cases, 21 (63.6%) were non-neoplastic, in nature. Among the non-neoplastic cystic lesions**,** follicular cyst (Figure 3) was the most common, accounting for 8 cases (37.6%)**,** followed by endometriotic cysts**,** which constituted 6 cases (28.6%). Corpus luteal cyst and cortical inclusion cyst comprised 3(14.1%) cases each and hemorrhagic corpus luteal cyst with 1(4.7%) case.

Out of total cases, 12(36.4%) were neoplastic in nature. Among the neoplastic cystic lesions, 9 (75%) were benign and 3 (25%) were malignant. Among the benign lesions, mature cystic teratoma (Figure 5) was the most common, accounting for 5 (55.5%) cases, followed by serous cystadenoma (Figure 6) with 4 (44.4%) cases. Among the malignant lesions, serous cystadenocarcinoma was the most frequent, comprising 2 (66.6%) cases, followed by immature teratoma with 1 (33.3%) case (Table 1).

Using histology as the gold standard, the diagnostic accuracy and contingency coefficient of cystic lesions were assessed. The sensitivity, specificity and diagnostic accuracy of imaging techniques in diagnosing ovarian cystic lesions were 66.7%,90.5% and 81.81% respectively (Table 2).

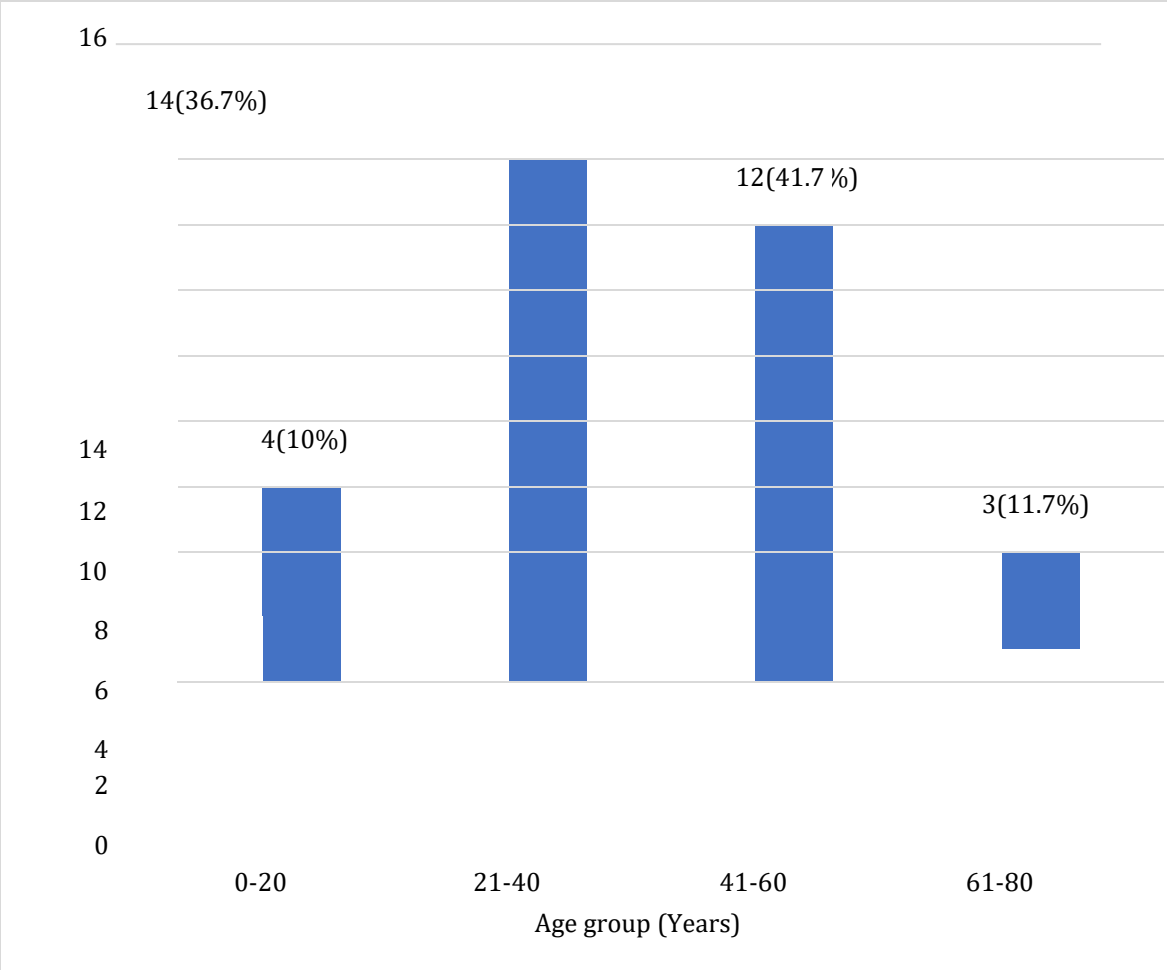

Figure 1: Distribution of cystic lesion in various age groups(n=33)

Figure 3: Cystic follicle (H&E, 400X)

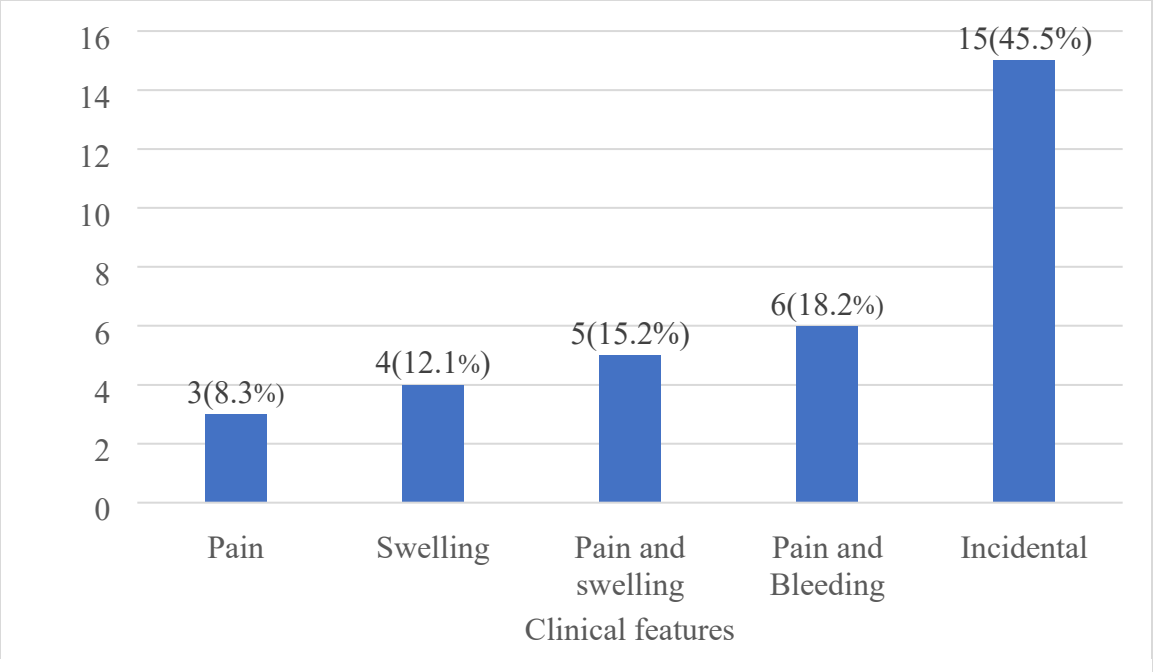

Figure 2: Clinical feature of cystic lesion (n=33)

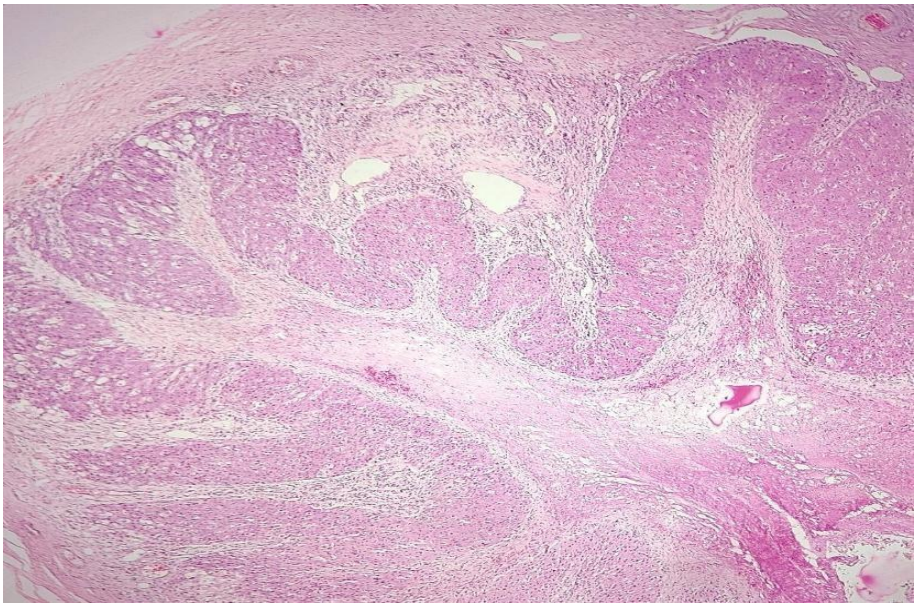

Figure 4: Corpus leuteal cyst (H&E,100X)

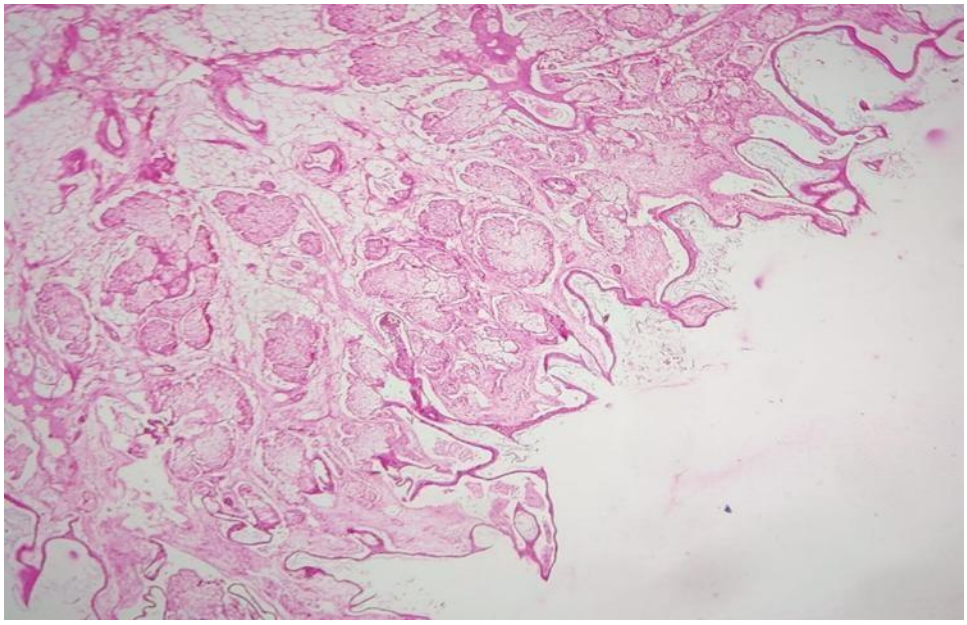

Figure 5: Mature cystic teratoma(H&E,100X)

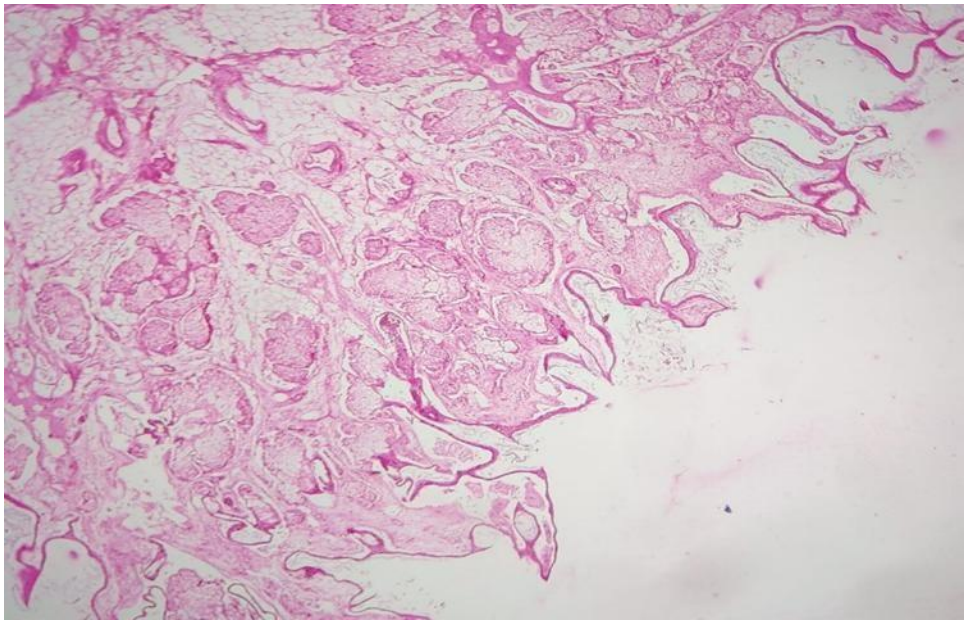

Figure 5: Mature cystic teratoma(H&E,100X)

Table 1: Histopathological diagnosis of ovarian cystic lesion (n=33)

Site	Non-neoplastic	n (%)	Neoplastic		n (%)
Ovaries	Follicular cyst	8(24.2%)	**Benign**	Mature cystic teratoma	5(15.2%)
	Endometriotic cyst	6(18.2%)		Serous cystadenoma	4(12.1%)
	Inclusion cyst	3(9.1%)	**Malignant**	Serous cystadeno carcinoma	2(6.1%)
	Corpus luteal cyst	3(9.1%)		Immature Teratoma	1(3%)
	Hemorrhagic corpus luteal cyst	1(3.0%)			
Total		**21(63.6%)**			**12(36.4%)**

Table 2: Sensitivity, specificity and diagnostic accuracy of Imaging (n=33)

Imaging Result	Histological Result		Total
	Neoplastic	Non-neoplastic	
Neoplastic	8 (TP)	2(FP)	10
Non-neoplastic	4(FN)	19(TN)	23
Total	12	21	33
K= 0.593, p=0.141			

	Formula	Calculation	Calculated Value
Sensitivity	$\frac{TP}{TP+FN} \times 100$ TP	$\frac{8}{8+4} \times 100$	66.66%
Specificity	$\frac{TN}{TN+FP} \times 100$ TN	$\frac{19}{19+2} \times 100$	90.47%
Diagnostic Accuracy	$\frac{TP + TN}{TP + FN + TN + FP} \times 100$	$\frac{8+19}{8+4+19+2} \times 100$	81.81%

DISCUSSION

In the present study, ovarian cystic lesions were most frequently observed in the 21–40-year age group, accounting for 42% of cases. This pattern is comparable to findings reported by Mankar DV and Jain GK, who documented a similar predominance (43%) in the same age group [4]. Likewise, Malli M et al. observed that half of the cases (50%) occurred in women aged 21–40 years [5]. In contrast, Kant RH et al. reported a relatively

narrower age distribution, with most cases clustered between 30–39 years [6]. These findings suggest that ovarian cystic lesions are largely influenced by reproductive hormonal activity.

Non-neoplastic lesions constituted the majority (63.6%) in this study. This observation is consistent with the reports of Hatwal D et al. and Butt S et al., who documented non-neoplastic lesions in 69.5% and 62% of cases, respectively [7-8]. However, Verma R et al. reported a higher proportion of neoplastic lesions (61.25%), exceeding non-neoplastic lesions (38.75%) [9]. Such variation may reflect differences in study population, referral patterns, and diagnostic criteria.

Among non-neoplastic lesions, follicular cyst was the most common entity (37.6%). A similar trend was noted by Maurya G et al., who reported follicular cyst as the predominant lesion, although with a higher frequency (51.7%) [10]. In contrast, Alam S and Bhatti N identified corpus luteal cyst as the most frequent non-neoplastic lesion [11]. These differences may be attributed to variations in sample size and population characteristics.

With regard to neoplastic lesions, mature cystic teratoma was the most frequently encountered tumor (55%) in the present study. This finding is in agreement with the study by Gurung P et al., who also reported mature cystic teratoma as the most common neoplastic lesion [12]. However, Kanthikar S et al. observed serous cystadenoma as the predominant neoplastic lesion, accounting for 35% of cases [13]. Such discrepancies highlight the heterogeneity in the distribution of ovarian neoplasms across different regions.

The diagnostic performance of ultrasonography in this study showed a sensitivity of 66.7%, specificity of 90.5%, and overall accuracy of 81.81%. These findings indicate that ultrasonography has high specificity but moderate sensitivity. Sarbhai V and Yadav M similarly reported a high specificity of 88.97% for ultrasound in evaluating ovarian lesions [14]. On the other hand, Jabeen N et al. documented higher sensitivity (82.11%) but lower specificity (70.32%), with an overall accuracy of 80.54% [15], indicating variability in diagnostic performance across studies.

The observed differences in sensitivity and specificity may be explained by overlapping imaging characteristics between benign and malignant lesions. For example, cyst adenofibroma may appear predominantly cystic on ultrasonography despite having a substantial fibrous component on histopathology. Similarly, cystadenocarcinoma may mimic a simple cyst on imaging when malignant features are minimal or microscopic.

Another important observation in the present study was the inconsistent use of the term “simple cyst” in radiological reports, where it was occasionally used synonymously with “benign.” This lack of uniform terminology may lead to discrepancies in radiologic–pathologic correlation. Furthermore, difficulty in distinguishing functional cysts from benign neoplastic lesions on imaging may contribute to diagnostic challenges, although this may not significantly alter clinical management in most cases.

Overall, ultrasonography remains the first-line imaging modality for the evaluation of ovarian cystic lesions due to its accessibility

and cost-effectiveness. While its high specificity makes it useful for confirming suspected lesions, its moderate sensitivity necessitates histopathological confirmation for definitive diagnosis, particularly in cases with equivocal imaging findings [16].

CONCLUSIONS

Ovarian cystic lesions are primarily benign and occur in women of reproductive age. Histopathological examination remains the gold standard for definitive diagnosis of ovarian cyst. Although ultrasonography demonstrates high specificity, its moderate sensitivity limits its ability to reliably exclude disease. Therefore, imaging should be used as an adjunct to histopathology, especially in cases with clinical suspicion, to ensure accurate diagnosis and appropriate management.

ACKNOWLEDGEMENT

The authors sincerely acknowledge the Department of Pathology, College of Medical Sciences, Chitwan, Nepal, for its invaluable institutional support and for providing the essential facilities that enabled the successful completion of this study.

Conflict of interest: None declared

Funding: None

Author's Contribution: Concept, design, planning, Literature review, Data collection, data analysis, manuscript writing- **BG, CBP;** Second draft and final revision- **BG, CBP** All authors approved the manuscript towards final publication.

REFERENCES

1. Dorland WAN. *Dorland's illustrated medical dictionary*. 28th ed. Philadelphia: Saunders; 1994:512–513.
2. Siegel R, Ward E, Brawley O, Jemal A. Cancer statistics. CA Cancer J Clin 2011;61(4):212–236.
3. Wasnik AP, Menias CO, Platt JF, Lalchandani UR, Bedi DG, Elsayes KM. Multimodality imaging of ovarian cystic lesions. World J Radiol 2013;5(3):113.
4. Mankar DV, Jain GK. Histopathological profile of ovarian tumours. Muller J Med Sci Res 2015;6(2):107–111.
5. Malli M, Vyas B, Gupta S, Desai H. A histological study of ovarian tumors in different age groups. Int J Med Sci Public Health 2014;3(3):338–341.
6. Kant RH, Rather S, Rashid S. Clinical and histopathological profile of patients with ovarian cyst presenting in a tertiary care hospital of Kashmir, India. Int J Reprod Contracept Obstet Gynecol 2016;5(8):2696–2700.
7. Hatwal D, Choudhari S, Batra N, Bhatt P, Bhatt S. Clinicohistopathological analysis of neoplastic and non-neoplastic lesion. Indian J Pathol Oncol 2016;3(2):133–140.
8. Butt S, Fazili M, Rathore S, Ibnerasa N. Histopathological study to see the incidence of neoplastic and non-neoplastic lesions in ovaries received in a tertiary care hospital. Pak J Med Health Sci 2019;13(4):148–152.
9. Verma R, Singh K, Kaur S, Mahendru R, Agarwal D, Rana P. Clinico-pathological study of neoplastic and non-neoplastic ovarian lesion. Int J Med 2019;3(10):175–180.
10. Maurya G, Singh SK, Pandey P, Chaturvedi V. Pattern of neoplastic and non-neoplastic lesions of ovary. Int J Res Med Sci 2018;6(7):2418–2422.
11. Alam S, Bhatti N. Pattern of non-neoplastic lesions of ovary. Pak Inst Med Sci 2010; 6:156–159.
12. Gurung P, Hirachand S, Pradhanang S. Histopathological study of ovarian cystic lesions in tertiary care hospital of Kathmandu, Nepal. J Inst Med Nepal 2013;35(3):44–47.
13. Kanthikar S, Dravid N, Deore P, Nikumbh D, Suryawanshi K. Clinico-histopathological analysis of neoplastic and non-neoplastic lesions of the ovary. J Clin Diagn Res 2014;8(8):FC04–FC07.

14. Sarbhai V, Yadav M. Diagnostic accuracy of ultrasonography with laparoscopy for assessment of benign adnexal masses. Int J Reprod Contracept Obstet Gynecol 2020; 9:284–288.
15. Jabeen N, Sattar A, Bakhsh MM, Farhan N, Siddiqui RQU, Noorani A. Positive predictive value of ultrasonography for detection of ovarian masses taking magnetic resonance imaging as a gold standard. Pak J Med Health Sci 2023; 17:163–166.
16. Poureisa M, Refahi S, Moghangard F. The diagnostic accuracy of abdominal ultrasound imaging for detection of ovarian masses. Iran J Radiol 2007;4(2):103–107