

## Original Research Article

# Morphological spectrum and epidemiological profile of ovarian tumours in black West African women at Lagos state university teaching hospital, Ikeja, Nigeria

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### ABSTRACT

**Background:** This study was done to evaluate the histological types, frequency and age distribution of ovarian tumours in Lagos State University Teaching Hospital (LASUTH), Ikeja, Lagos State. This study also aims to classify ovarian tumours in this centre according to the World Health Organisation (WHO).

**Methods:** A retrospective, descriptive hospital study of all ovarian specimens that were sent to the department of pathology and forensic medicine, LASUTH between 1<sup>st</sup> January, 2011 and 31<sup>st</sup> December, 2019 was done. Relevant data composed of the age distributions and histopathological types were extracted from the departmental information system and filed documents. The data was analysed using the IBM-SPSS version 25.0.

**Results:** There were 198 cases of ovarian tumours. The mean age at diagnosis of ovarian tumours was 34.6±15.3 years. Unilateral ovarian tumour was observed in 91.9% of cases while bilateral disease was seen in 8.1%. Primary ovarian tumours constitute 97.0% of all diagnosed tumours of the ovary. Germ cell tumour was the most frequently diagnosed ovarian tumour; and teratoma was the most common, representing 91.2% of germ cell tumours and 47.0% of all ovarian tumours. Primary ovarian cancer peaked at the 6<sup>th</sup> decade of life and metastatic ovarian cancer was infrequently seen. Serous carcinoma is the most commonly diagnosed ovarian cancer.

**Conclusions:** Ovarian tumour presents most frequently at the 4<sup>th</sup> decade of life, and germ cell tumour is the most common.

**Keywords:** Age at diagnosis, Histological type, Ovarian tumour, World Health Organisation classification

### INTRODUCTION

Ovarian cancer is the 8<sup>th</sup> most commonly occurring cancer in women and the 18<sup>th</sup> most commonly occurring cancer overall worldwide.<sup>1</sup> Ovarian cancer is a common gynecological cancer, and it rank third after cervical and uterine cancer.<sup>1</sup> In 2018, there were nearly 300,000 new cases of ovarian cancers globally and Serbia had the highest rate with an incidence of 16.6/100,000.<sup>1</sup> In Sub-

Saharan Africa, most especially in Nigeria, new cases of ovarian cancer was about 2792 and mortality was 2063.<sup>1</sup> Ovarian tumours have diverse ways of presentation which stems from the origin of the tumour. The tumour tends to recapitulate the developmental lineage of normal ovary, which are derived from the coelomic, the totipotential germ cell and the sex cords/stromal cells.<sup>2-5</sup> These different cell types give rise to different ovarian tumours.<sup>2-5</sup>

These tumours do not manifest early clinically and about 60-70% of the tumours present in late stage, as either stage iii or iv with consequential high mortality.<sup>5-7</sup> The high mortality from ovarian tumours are due to asymptomatic and ‘concealed’ growth of the tumour arising from its location and lack of proper screening resulting in late diagnosis in advanced stage.<sup>5</sup> Furthermore, poverty, lack of public awareness and low socioeconomic status, in addition to late presentations, all contribute to the high mortality.<sup>5-7</sup>

The etiology of ovarian tumours is not well understood. Nulliparity, advanced age, positive family history of ovarian cancer is associated with increased risk of epithelial ovarian cancers. Multiparity, gynecological surgeries, especially tubal ligation and hysterectomy, and use of oral contraceptives are protective. Use of exogenous hormones during pregnancy is associated with increased risk of germ cell tumours. The use of oral contraceptives and estrogen replacement reduce the risk of development of sex cord-stromal tumours.<sup>8,9</sup> Mutations of breast cancer genes (BRCA 1 and BRCA 2) are risk factors for development of breast, ovarian and contralateral breast cancers.<sup>10</sup>

This study aims to evaluate the frequency of histopathologically diagnosed ovarian tumours in black women in Lagos State University Teaching Hospital, Ikeja, Nigeria, and classify it according to the World Health Organization (WHO).

**METHODS**

This was a retrospective study of all consecutive cases of ovarian tumours that were presented to the department of pathology and forensic medicine, LASUTH between 1<sup>st</sup> January, 2011 to 31<sup>st</sup> December, 2019. Lagos State university teaching hospital, one of the two teaching hospitals in the state is a large referral multispecialty hospital. Lagos state has a diverse population of over 20 million people who are from different ethnic and racial background.

The laboratory receives histopathological samples from obstetrics and gynecology departments of LASUTH and both general and private hospitals within and outside of the state. Relevant information, especially the demographic and pathological data of the patients were sourced from the laboratory information system of the department and filed copies of the requisition form.

The corresponding slides and blocks of patients with these tumours were retrieved. Patients without adequate information and with slides and blocks missing were excluded from this study. Patients whose slides had faded or broken had recut from the main block and re-stained with hematoxylin and eosin. The slides were reviewed by pathologists in the study. Special stains where indicated were also performed.

**Inclusion criteria**

- All cases of ovarian tumours were included in the study.

**Exclusion criteria**

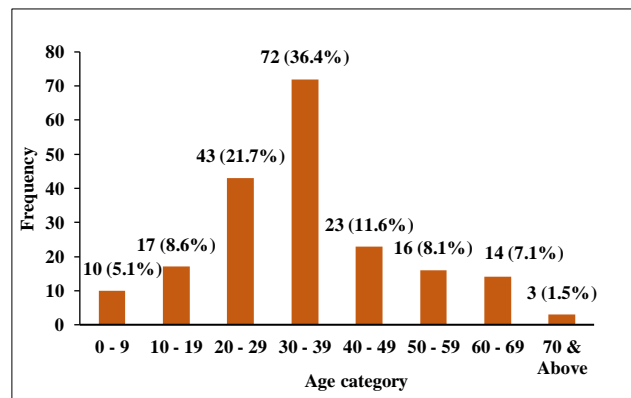
- Cases with missing blocks and clinical information were omitted from the study.

**Statistical analysis**

The result of this study was analysed using statistical package for social sciences (SPSS) version 25.0.

**RESULTS**

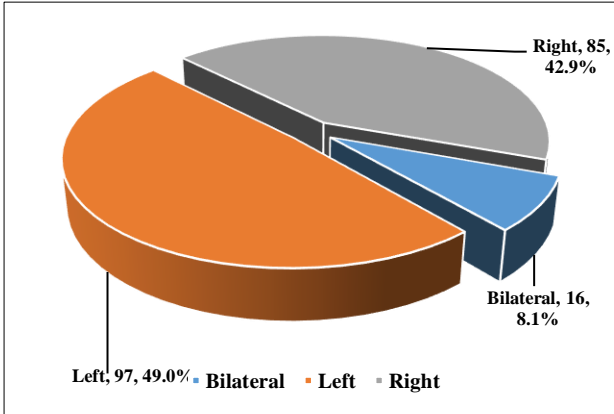
There were 376 cases of ovarian lesions; out of which 198 (52.7%) were neoplastic tumours while 178 (47.3%) were either non-neoplastic or functional cysts. The mean age of diagnosis of patients who had neoplastic tumours was 34.62±15.27 years and the age range was from 2 to 82 years. The peak incidence of neoplastic ovarian tumour was within age group 30-39 (72, 36.4%) as shown in Figure 1. Approximately 8% of the neoplastic ovarian tumours were bilateral while 92% was unilateral (right-42.9% and left-49.0%) as depicted in Figure 2. According to World Health Organization histological classification of ovarian tumours, germ cell tumours constituted 102 (51.3%) while surface epithelial tumours accounted for 67, (33.8%). Sex cord-stromal tumours and metastatic cancers from non-ovarian tumours represented 23 (11.6%) and 6 (3%) respectively as shown in Figure 3. Majority of surface epithelial tumours were malignant 47 (49.0%) while 44 (45.8%) were benign and 5 (5.2%) were borderline tumours.



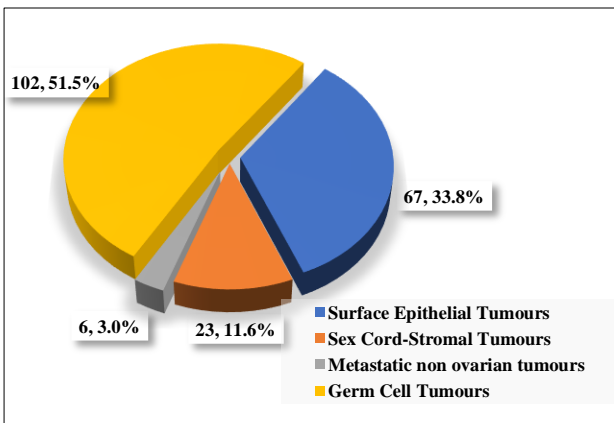
**Figure 1: Distribution of ovarian tumours in different age groups.**

As shown in Table 1, surface epithelial tumours were divided into four sub-classes in line with WHO classification. Of the 67-surface epithelial tumours, serous tumours were 40 (60.6%), followed by mucinous 16 (24.2%), endometrioid 8 (12.1%) and transitional cell tumours 2 (3.0%). Majority of serous tumours were

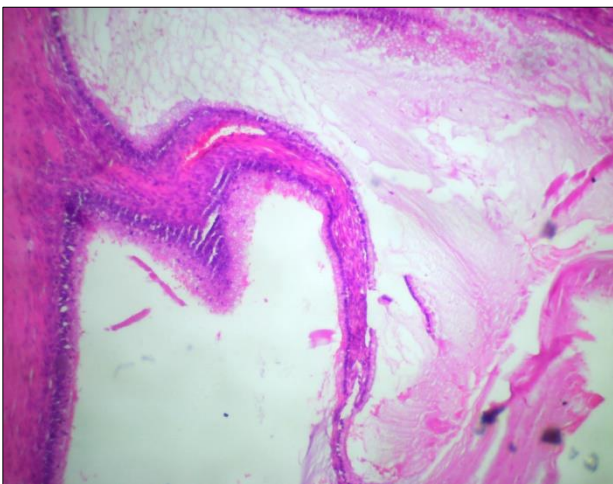
benign with cystadenomas in 28 cases but 10 cases were malignant. Also, there were 12 mucinous cystadenomas, which were benign and 3 were malignant tumours. Endometrioid tumours showed equal number of benign and borderline cases of 2 each, but there were 4 malignant tumours.



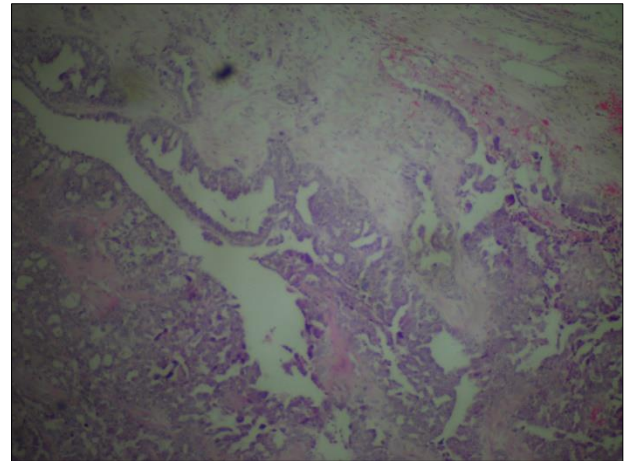
**Figure 2: Distribution of ovarian tumour by side.**



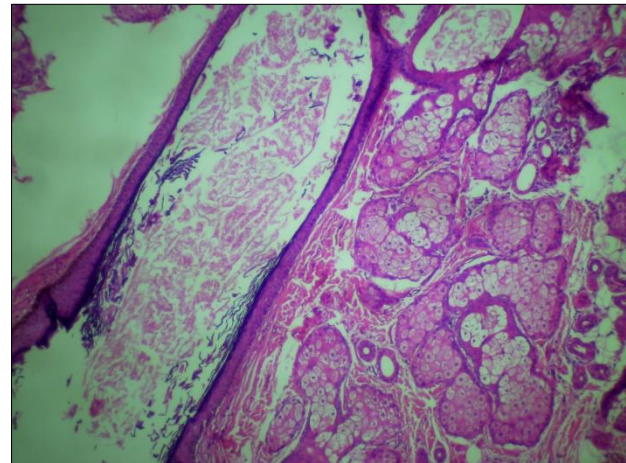
**Figure 3: WHO histological distribution of neoplastic ovarian tumours as seen in LASUTH.**



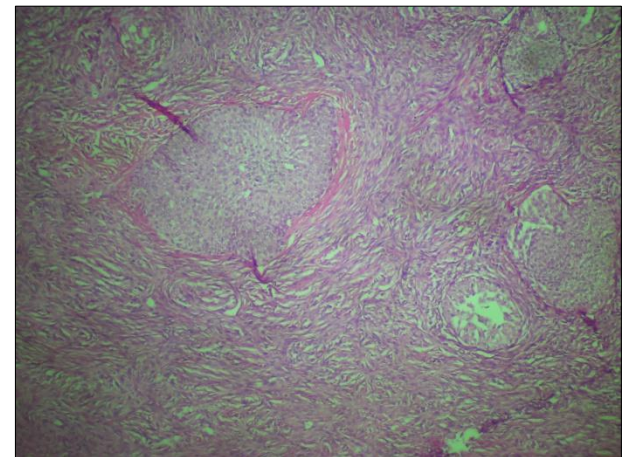
**Figure 4: Mucinous cystadenoma ×40 magnification.**



**Figure 5: Serous cystadenocarcinoma ×40 magnification.**



**Figure 6: Mature teratoma ×40 magnification.**



**Figure 7: Brenner tumour ×40 magnification.**

Majority of germ cell tumours seen were teratomas 93 (91.2%); out of which, immature teratomas were 3 and mature teratomas were 90. Other germ cell tumours were composed of dysgerminomas (5, 4.9%), and Yolk sac



tumour (4, 2.1%). Of the 24-sex cord-stromal tumours seen in this study, 16 (66.7%) were granulosa-theca cell tumours and others were fibro-thecomomas, 8 (33.3%).

Figures 4-7 show photomicrographs of mucinous cystadenoma, serous papillary carcinoma, mature ovarian teratoma, and Brenner's tumour.

**Table 1: Histopathological spectrum of ovarian tumours according to WHO classification.**

Histopathological diagnosis	Number of tumour, n (%)	Types	No. of cases	% total (n = 198)
Surface epithelial tumours	Serous, 40 (60.6%)	Benign	28	14.1%
		Borderline	2	1.0%
		Malignant	10	5.1%
	Mucinous, 16 (24.2%)	Benign	12	6.1%
		Borderline	1	0.5%
		Malignant	3	1.5%
	Endometrioid, 8 (12.1%)	Benign	2	1.0%
		Borderline	2	1.0%
		Malignant	4	2.0%
	Transitional cell tumour, 2 (3.0%)	Benign	2	1.0%
Borderline		0	0.0%	
Malignant		0	0.0%	
Germ cell tumours	Teratoma (91.2%)		93	47.0%
	Dysgerminoma (4.9%)		5	2.5%
	Yolk sac tumour (3.9%)		4	2.0%
Sex cord-stromal tumours	Granulosa-theca cell tumour (66.7%)		16	8.1%
	Fibro-thecomomas (33.3%)		8	4.0%
Metastatic Ca from non-ovarian tumours	-		6	3.0%

**Table 2: Distribution of ovarian tumours in different age groups based on cell of origin.**

Age group	Surface-epithelial	Sex cord-stromal	Germ cell	Metastatic Ca from non-ovarian tumours	Total	p value
0-9	2 (3.0%)	3 (13.0%)	5 (4.9%)	0 (0.0%)	10	<0.001*
10-19	1 (1.5%)	1 (4.3%)	15 (14.7%)	0 (0.0%)	17	
20-29	9 (13.4%)	7 (30.4%)	27 (26.5%)	0 (0.0%)	43	
30-39	30 (44.8%)	5 (21.7%)	37 (36.3%)	0 (0.0%)	72	
40-49	8 (11.9%)	3 (13.0%)	12 (11.8%)	0 (0.0%)	23	
50-59	9 (14.4%)	2 (8.7%)	3 (2.9%)	2 (33.3%)	16	
60-69	7 (10.4%)	2 (8.7%)	2 (2.0%)	3 (50.0%)	14	
70 and above	1 (1.5%)	0 (0.0%)	1 (0.0%)	1 (16.7%)	3	
Total	67 (100.0)	23 (100.0)	102 (100.0)	6 (100.0%)	198	

**Table 3: Distribution of ovarian tumours in age groups up to 30 and above 30 years based on cell of origin.**

Age group	Surface-epithelial	Sex cord-stromal	Germ Cell	Metastatic cancer from non-ovarian tumours	Total	p value
≤30	15 (22.4%)	12 (52.2%)	49 (50.0%)	0 (0.0%)	77	0.001*
>30	52 (77.6%)	11 (47.8%)	52 (51.0%)	6 (100.0%)	121	
Total	67 (100.0%)	23 (100.0%)	102 (100.0%)	6 (100.0%)	198	

Tables 2 and 3 show the distribution of ovarian tumours in different age groups according to their cell of origin. Table 2 shows high incidence of surface epithelial tumours and germ cell tumours were predominant in the 4th decade of life while sex cord-stromal tumours and

metastatic cancers from non-ovarian tumours were most common in the 3<sup>rd</sup> and 7<sup>th</sup> decade of life respectively. Metastatic cancer from non-ovarian tumours were predominantly found in adults from age 50 years and above. These tumours are from the stomach and colon. Further analysis showed high incidence of epithelial

tumours among patients older than 30 years (77.6%). Germ cell tumours were also slightly higher among women older than 30 years (51.0%) while sex cord-stromal tumours were slightly more prevalent among women younger than 30 years (52.2%) Table 3.

Table 4 shows the distribution of surface epithelial tumours in different age groups. The prevalence of benign tumours was generally in women less than 50 years. Malignant surface epithelial tumours peaked at the 6<sup>th</sup> decade of life.

Most of yolk sac, fibro-thecomomas, and dysgerminoma tumours were found in lower age groups (<30) than in older age groups. On the other hand, most of mucinous, serous, endometrioid, granulosa-theca cell, teratoma and transitional cell tumours were seen among women in higher age groups (30 and above) than in lower age groups, Table 5.

Table 5 shows teratoma as the most frequently diagnosed ovarian tumour while transitional cell tumour is the least diagnosed tumour.

**Table 4: Distribution of surface epithelial tumours in different age groups based on malignant status.**

Age group	Benign	Borderline	Malignant	Total	P
0-9	2 (100.0%)	0 (0%)	0 (0%)	2	0.003*
10-19	1 (100.0%)	0 (0%)	0 (0.0%)	1	
20-29	8 (88.9%)	1 (11.1%)	0 (0%)	9	
30-39	23 (79.3%)	3 (10.3%)	3 (10.3%)	29	
40-49	6 (75.0%)	0 (0%)	2 (25.0%)	8	
50-59	0 (0.0%)	1 (11.1%)	8 (88.9%)	9	
60-69	3 (42.9%)	0 (0%)	4 (57.1%)	7	
70 and above	1 (100.0)	0 (0.0%)	0 (0.0%)	1	
Total	44 (66.7%)	5 (7.6%)	17 (25.8%)	66 (100.0%)	

**Table 5: Distribution of histological subtypes of ovarian tumours in different age groups based on WHO classification.**

Histological type	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70+	Total
Mucinous	1	0	2	5	3	3	2	0	16
Serous	1	1	6	20	2	4	5	1	40
Endometrioid	0	0	1	3	2	2	0	0	8
Transitional cell tumour	0	0	0	1	1	0	0	0	2
Granulosa-theca cell tumour	2	0	3	5	3	2	1	0	16
Fibro-thecomomas	1	1	4	1	0	0	1	0	8
Teratoma	4	14	23	37	10	3	1	1	93
Dysgerminoma	0	0	3	0	1	0	1	0	5
Yolk sac tumour	1	1	1	0	1	0	0	0	4
Total	11	17	49	67	23	14	11	1	192

## DISCUSSION

Ovarian tumours give clinical and diagnostic challenge because of its location. Most times, it would have reached significant size before clinical detection. It should however be borne in mind that most ovarian tumours are benign.<sup>4</sup> This is consistent with this finding as benign tumours were the most common.

The mean age of diagnosis of ovarian tumours was 34.6±15.3 years (4<sup>th</sup> decade) of life. Similar observation was made by Sabageh et al at Ife, Nigeria, where the average age of diagnosis was 34.8 years.<sup>11</sup>

Ovarian tumours can affect both ovaries at the same time. Bilateral ovarian involvement in this study is 8.1%.

Unilateral ovarian involvement is usually the typical presentation. This agrees with the studies done in many centres, including Ife, Ibadan, Lagos, Benin in Nigeria and India.<sup>11-15</sup> Ovarian tumours could either be on the left or right side, but in this study, the left predominates with 49.0%. There is no reason for this observation but it is reported for purpose of epidemiological documentation. This result is at variance with report of similar study from Ife and Ibadan, Nigeria where the right ovary was majorly involved.<sup>11,13</sup> There was neither reason cited for this finding nor was there any specific clinical implication arising from either left or right sided ovarian involvement.

Germ cell tumours in the literature, notably teratomas are the most common ovarian tumours. Similar finding was

made by Onyiaorah et al in which germ cell tumours constituted 52.7% of all ovarian neoplasms in their study.<sup>12</sup> This however, is in contrast with studies done at Ife and Ibadan where surface epithelial tumour accounted for the majority of primary ovary neoplasms.<sup>11,13</sup> Teratomas constituted 91.2% of all germs cell tumours in this study. This finding compares favorably with studies done at Ibadan, Lagos, and Ife in western Nigeria.<sup>11-13</sup> Teratomas also peaked in this patient in the 4<sup>th</sup> decade of life, and are largely benign. Only three cases (3%) in this study were malignant.

Surface epithelial tumours were the next most common ovarian tumours. Though they were largely benign; benign and borderline tumours together constituted 51.0% in this study. Serous tumours are the most common surface epithelial tumours in this study. This finding agrees with the study done at Ibadan and Benin in Nigeria and India.<sup>11-13</sup> Transitional cell tumour however is the least common surface epithelial tumour. Brenner tumour comprise 3.0% of all surface epithelial tumours in this study.

Malignant serous tumours constituted the most common cancer of the ovary. This was corroborated by results of study done by various authors in different parts of Nigeria, at Ibadan (76.2%), Benin (73.8%), and Enugu (68%).<sup>11,12,16</sup> Akakpo et al reported that serous ovarian cancer constituted 52.1% of all ovarian cancers in Ghana and Yousif HM reported similar findings at kingdom of Saudi Arabia.<sup>17,18</sup>

Ovarian cancer in literature is found to be a disease of older women, although no age is exempt.<sup>17-19</sup> In this study, ovarian cancer was most common in 50-59 age group. This agrees with the study done in Zaria, northern Nigeria.<sup>19</sup>

Metastatic ovarian cancers in this study were basically from the gastric and colonic cancers and were found in individuals older than 50 years ( $p < 0.001$ ). It accounted for 3% of this study while 97% were primary tumours. This finding compares favorably with study done in Nigeria, where Sabageh et al and Ajani et al found an incidence of 4.3% and 5.3% at Ife and Ibadan respectively.<sup>11,20</sup> Singh et al and Tejeswini et al in India however found lower incidence of metastatic tumours as 0.83% and 1.08% respectively.<sup>21,23</sup>

## CONCLUSION

This study showed that ovarian tumours exhibit unilaterality in most cases and benign ovarian tumours predominate over malignant tumours.

Germ cell tumours were the most common ovarian tumours; and mature cystic teratoma was the most frequently diagnosed germ cell tumour. These tumours occur in younger age groups and were benign in majority

of cases. This is the pattern seen in many Nigerian and African studies.

Metastatic ovarian tumours constituted only a small percentage of ovarian tumours in this study. Malignant ovarian tumours were frequently seen in elderly patients.

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