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Female Reproductive System Cancers in Northern Ghana: A Retrospective Histopathological Review in A Tertiary Referral Hospital in Northern Ghana

Der EM[1,2*], Gyilbagr F[3], Akorli E[4], Wewoli BA[5], Kwadwo F.A[6], Zielley TM[7] and Munkaila A[8]

[1]*Department of Pathology, School of Medicine, University for Development Studies.*

[2]*Department of Pathology, Tamale Teaching Hospital, Ghana.*

[3]*Department of Medical Laboratory Science, Tamale Teaching Hospital, Ghana.*

[4]*Department of Radiology, School of Medicine, University for Development Studies.*

[5]*Department of Surgery, School of Medicine, University for Development Studies.*

[6]*Department of ENT, School of Medicine, University for Development Studies, Tamale, Ghana.*

[7]*Department of Pathology, Upper West Regional Hospital, Ghana.*

[8]*Department of Obstetrics and Gynecology, School of Medicine, University for Development Studies.*

[*]Correspondence:
Prof. Edmund Muonir Der, Department of Pathology, School of Medicine, University for Development Studies, Ghana, Tel: +233248416288.

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ABSTRACT

Background: *There is scarcity of baseline data on the burden of female reproductive systems cancers (FRSCs) in northern Ghana. The aim of this study was to summarize anatomic distributions and the clinico-pathological characteristics of FRSCs in our institution, and to offer recommendations for early diagnosis and prompt management.*

Material and Methods: *Data on the clinico-pathological characteristics of FRSCs were extracted from archived material, entered into a statistical database and analysed using SPSS software version 26.0 (Chicago). Fisher's exact test was used to compare clinical variables of significant and a P-Value < 0.05 was considered statistically significant.*

Results: *A total of 687 (31.9%), out of the 2,154 female cancers, reviewed in the department of pathology were FRSCs. The cancers were significantly common in young females (P-Value<0.001) with a mean age of 45.99 ±18.089. The common anatomic sites were: uterine cervix (42.9%), ovary (40.9%), endometrium (8.9%) and myometrium (8.8%). The mean ages of FRSCs based on anatomic sites: uterine cervix (53.21 ± 14.59), endometrium (44.26± 14.47), myometrium (45.52 ± 21.32), ovary (38.24 ± 18.43), vulva (56.41 ± 18.96) and vagina (49.00± 17.40). The predominant symptoms were: Bleeding per vaginam: uterine cervix (69.2%), endometrium (75.4%)] and vagina (42.9); intra-abdominal masses: Ovary (90.0%), and myometrium (63.0). Vulva cancers commonly presented as ulcers. (64.7). Invasive SCC was the common type of FRSCs in the uterine cervix (87.8%), vulva (52.9%) and vagina (57.1%). The others were: adenocarcinoma (49.2%) endometrium, MMMT (56.0%) myometrium and serous cystadenocarcinoma (17.0%) ovary.*

Conclusion: *Female reproductive system cancers were common among younger group, with advanced clinical features at diagnosis. The uterine cervix and ovaries being the common anatomic sites. HPV testing and vaccination, regular screenings and social and behavioral change strategies are crucial for reducing morbidity and mortality associated with this gynaecological cancer.*

Keywords
Reproductive system, Cancer, Burden, Tamale, Northern, Ghana.

Introduction
Cancers of the uterine cervix, endometrium, myometrium, ovary, vulvar, vagina, and fallopian tube, collectively called female reproductive system cancers (FRSCs) or gynaecological cancers, are important causes of cancer related morbidity and mortality among females worldwide [1,2]. These gynaecological cancers do not only influence the health needs of affected women during their most active years but adversely affect their sexual and reproductive roles in the society [1-3]. The impact is not only on patients and their families, but also on the healthcare delivery system [3]. Gynaecological cancers have been reported to be on rise globally, with low- and middle-level income countries bearing substantial burden of the disease [2-4]. Among these reproductive cancers, cervical and uterine variants are the leading malignancies reported in the literature [2-8].

The aetiology and risk factors of most FRSCs are not exactly known, but there is evidence that infections with high-risk human papilloma virus (HPV) such as serotypes;16,18,35 and 59, hormonal imbalance, and lifestyle changes [3,9,10] are implicated. Therefore, preventive measures like HPV vaccination, modification of lifestyle, particularly of target groups, and regular screenings are crucial for reducing morbidity and mortality associated with this gynaecological cancer [3,9,10].

What is more disturbing about these cancers is the high diagnostic cost component, complications associated with the primary disease, treatments and treatment outcomes [3]. Infertility and early menopause are common complications associated with surgical and chemotherapeutic management modalities, involving either the removal or damage to the ovaries [3]. Sexual dysfunction is yet another common complication associated with primary gynaecological cancers. Females with these cancers may present with dyspareunia and decreased arousal during sexual intimacy, depending on the type of cancer and the treatment they are receiving [3]. Similarly, affected females might experience pelvic pain, abdominal discomfort, abnormal bleeding, fatigue, and urinary incontinence. Many gynaecological cancer victims experience intractable and persistent psychological distress [3]. Fertility can be a major area of a women's life and diagnosis with iatrogenic or secondary infertility, may be complicated by, depression, grief, and body image dissatisfaction.

Furthermore, it is clear gynaecological cancers do not affect the in-depth patient only, but entire family, the community, health delivery system and the Government [3,4]. Gynaecological cancers are therefore issues of great public health concern globally, but more so in the developing countries [3,4], and this requires urgent attention with focus on early screening and treatment of precancerous lesions. Again, understanding the epidemiological, sociocultural dynamics and the challenges posed by primary disease and the treatments modalities for FRSCs among women in developing countries will help in formulating effective control strategies [3].

There is scarcity of data on FRSCs (gynaecological cancers) in Africa and more so in Ghana, particularly the northern belt. There is therefore a need to expand data on this disease and its burden in northern Ghana, and hence this retrospective histopathological review of FRSCs in northern Ghana. The aim was to summarise gynaecological cancers according to anatomic sites, the clinico-pathological characteristics and suggest recommendations geared at improving cancer reporting, early diagnosis and prompt initiation of the appropriate therapeutic options.

Material and Methods
Research design: This was a retrospective histopathological review, using material and data from 1st January 2012 to 31st December, 2022.

Study Site: The study was conducted in the department of pathology in the Tamale Teaching Hospital (TTH). TTH is the only tertiary referral hospital serving the five regions in northern Ghana and beyond, particularly, neighboring Burkina Faso.

Case selection: This was based on the following steps:
1. We first retrieved the histopathology request forms and reports of all female cancers from archived cases in the department.
2. We selected and reviewed all female reproductive system cancers among the female cancers.
3. Cancers were stratified according to anatomic sites of involvement: Cancers of the uterine cervix, endometrium, myometrium, vulvar, vagina, ovaries, and fallopian tube.
4. The age at diagnosis, clinical and histopathological features of all the female reproductive system cancers (FRSCs) were summarised.
5. The histopathological features of the cancers were all based on the routine Haematoxylin and Eosin (H&E) stains.
6. All the cases were reviewed by a Professor of pathology and Consultant Pathologist.
7. Where there is ambiguity, in reviewing the archived H&E slides, the paraffin embedded tissue block is retrieved, sectioned, stained and the new slide reported.

Data collection, entry and Analysis
1. Data were collected on the age at presentation, relevant clinical history: anatomic sites, primary symptoms, and type of operation.
2. Data were also collected on the histopathological features: subtype of cancer, grade and stage.
3. The extracted data were entered into a statistical database and analysed using SPSS software version 26.0 (Chicago). Frequency distributions and descriptive statistics were calculated. Fisher's exact test was used to compare clinical variables of significance. The results were presented in bar charts and frequency tables. A P-Value < 0.05 was considered statistically significant.

Inclusion criteria
1. The case must have the female (F) gender stated or inferred from the name.

2. The case must have a histopathology request form from the requesting clinician.
3. The case must be diagnosed in the department of pathology of the Tamale Teaching Hospital located in northern Ghana.
4. All female reproductive cancers with complete histopathology report and diagnosis.

Exclusion

1. All benign cases reported in the department during the period of study.
2. All cases with incomplete histopathology data.
3. All poorly fixed samples with obscured features.

Results

Age Distribution of Female Reproductive System Cancers

A total of 687 (31.9%), out of the 2,154 female cancers, reviewed in the department of pathology during the period 1st January, 2012 to 31st December, 2022, were female reproductive system cancers (FRSCs). The ages of females diagnosed with FRSCs ranged from 3 – 89 years, with mean age of 45.99 ±18.089. The predominant age groups were 40 – 49 years; 142 (21.6%), and 50 – 59 years; 124(18.9%) (Figure 1). FRSCs were commonly associated (P-Value<0.001) with patients aged <50-years (Table 1). Approximately 20 (3.0%) of the cases have no stated age at the time of data collection.

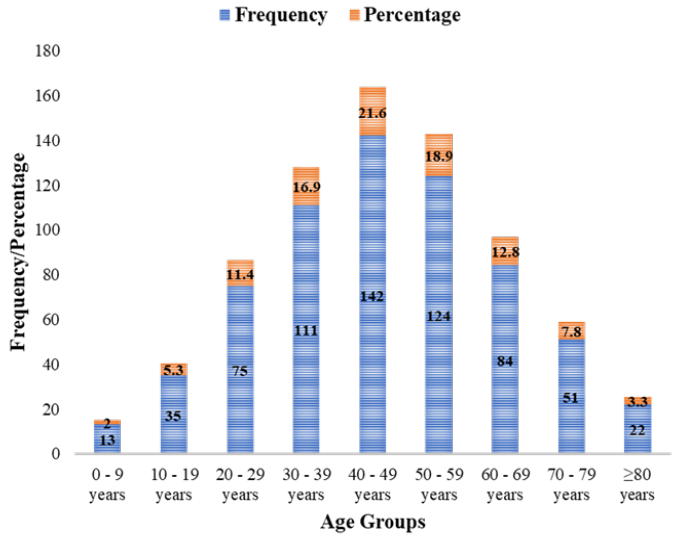

Figure 1: Age characteristics of the entire study population.

Female reproductive system cancers by anatomic location

Female reproductive system cancers were stratified based on anatomic site of involvement and the two most common types were the uterine cervix 295 (42.9%), and the ovary 281 (40.9%) (Figure 2).

Specific anatomic site and the age characteristics of female reproductive system cancers (FRSCs)

The following cancers were commoner in females aged 40 – 49-years; cervical (25.8%), endometrial (25.9%), vulva (29.4%) and vagina (42.9%). Cancer of the uterus was commonly (33.3%) diagnosed in the elderly, 60 – 69-years. However, ovarian cancers were significantly common in females younger than 40-years, with a mean age of 38.24 ± 18.43 and a modal age group of 20 -29-years (21.3%) (Table 1).

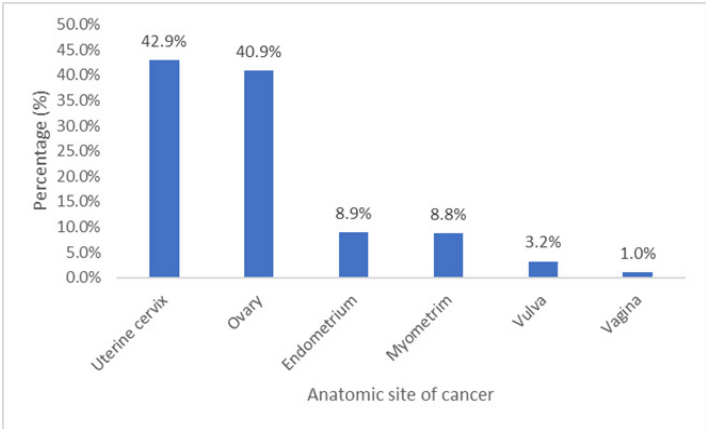

Figure 2: Anatomic sites of female reproductive system cancers.

Clinical presentations of female reproductive system cancers based on anatomic site

The first three common clinical presentations of FRSCs were: mass or swelling (50.1%), abnormal bleeding per vaginam (38.9%) and ulcers (3.9%) (Table 2).

However, there were some anatomic site-specific presentations. For instance; abnormal bleeding per vaginam (69.2%) and mass (21.0%) are the common clinical features of uterine cervix. Majority of the females diagnosed with ovarian malignancy presented with intra-abdominal masses (90.0%), while 75.4% of those with endometrial cancer presented with bleeding per vaginam (Table 2).

Histopathological subtypes of uterine cervix, myometrium, endometrial, vulva and vagina cancers

Invasive squamous cell carcinoma was the commonest histopathological subtype of uterine cervix (87.8%), vulval (52.9%) and vagina (57.1%) (Table 3). Spindle cell sarcoma was also significant in the vulva (23.5%) and vagina (14.3%) (Table 3).

Histopathological subtypes of ovarian malignancies

The main groups of ovarian malignancies were: surface epithelial 79 (27.9%), germ cell 77 (27.2%), and granulosa cell 40 (14.1%) (Table 4). The first 10 common histopathological subtypes of ovarian cancers were: serous cystadenocarcinoma 48 (117.0%), immature cystic teratoma 32 (11.3%), mucinous cystadenocarcinoma 31(11.0%), adult-type granulosa cell tumour 24 (8.5%), York sac tumour 19) 6.7%), primary adenocarcinoma 17 (6.0%), metastatic adenocarcinoma 17 (6.0%), Juvenile -type granulosa cell tumour 16 (5.6%), spindle cell sarcoma 16 (5.6%) and dysgerminoma 13 (14.6%) (Table 4).

Table 1: Association Between Age Group and Anatomical Location of the Surgery.

Age group	Cervix	Endometrium	Myometrium	Ovaries	Vulva	Vagina	Total	P-Value
								<.001
0 – 9	0(0.0)	0(0.0)	3(12.5)	10(3.7)	0(0.0)	0(0.0)	13(2.0)	
10 – 19	0(0.0)	0(0.0)	1(4.2)	33(12.1)	1(5.9)	0(0.0)	35(5.3)	
20 – 29	8(2.9)	8(13.8)	0(0.0)	58(21.3)	0(0.0)	1(14.3)	75(11.4)	
30 – 39	43(15.4)	15(25.9)	5(20.8)	46(16.9)	1(5.9)	1(14.3)	111(16.9)	
40 – 49	72(25.8)	15(25.9)	2(8.3)	45(16.5)	5(29.4)	3(42.9)	142(21.6)	
50 – 59	64(22.9)	11(19.0)	4(16.7)	43(15.8)	2(11.8)	0(0.0)	124(18.9)	
60 – 69	46(16.5)	5(8.6)	8(33.3)	21(7.7)	3(17.6)	1(14.3	84(12.8)	
70 – 79	32(11.5)	3(5.2)	1(4.2)	12(4.4)	2(11.8)	1(14.3)	51(7.8)	
≥ 80	14(5.0)	1(1.7)	0(0.0)	4(1.5)	3(17.6)	0(0.0)	22(3.3)	
Mean age (years)	53.21 ± 14.59	44.26 ± 14.47	45.52 ± 21.32	38.24 ± 18.43	56.41 ± 18.96	49.00± 17.40		

Table 2: The association between anatomic location, signs and symptoms and the type of Surgery.

Signs and Symptoms	Cervix	Endometrium	Myometrium	Ovaries	Vulva	Vagina	Total	
								<.001
Mass	62(21.0)	8(13.1)	17(63.0)	252(90.0)	3(17.6)	2(28.6)	344(50.1)	
Bleeding per vaginam	204(69.2)	46(75.4)	7(25.9)	5(1.8)	2(11.8)	3(42.9)	267(38.9)	
Vaginal discharge	12(4.1)	1(1.6)	0(0.0)	0(0.0)	1(5.9)	0(0.0)	14(2.0)	
Abdominal pain	2(0.7)	2(3.3)	0(0.0)	10(3.6)	0(0.0)	0(0.0)	14(2.0)	
Abdominal distention	0(0.0)	2(3.3)	3(11.1)	11(3.9)	0(0.0)	0(0.0)	16(2.3)	
Urine retention	1(0.3)	2(3.3)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	3(0.4)	
Ulcer	14(4.7)	0(0.0)	0(0.0)	0(0.0)	11(64.7)	2(28.6)	27(3.9)	
Infertility	0(0.0)	0(0.0)	0(0.0)	2(0.7)	0(0.0)	0(0.0)	2(0.3)	
Type of Surgery								<.001
Hysterectomy	12(4.1)	26(42.6)	19(70.4)	91(32.5)	0(0.0)	0(0.0)	149(21.5)	
Biopsy	283(95.9)	35(55.7)	8(29.6)	99(35.4)	14(82.4)	7(100.0)	445(64.8)	
Vulvectomy	0(0.0)	0(0.0)	0(0.0)	0(0.0)	3(17.6)	0(0.0)	3(0.4)	
Cystectomy	0(0.0)	0(0.0)	0(0.0)	90(32.1)	0(0.0)	0(0.0)	90(13.1)	

Table 3: Histopathological subtypes of uterine cervix, vulva, vagina, myometrium and endometrial cancers.

Category of ovarian cancer	Histopathological subtype	Frequency (n)	Percentage (%)
Uterine cervix (n = 295)	Squamous cell carcinoma	259	87.8
	Adenocarcinoma	18	6.1
	Spindle cell	4	1.4
	Verrucous carcinoma	3	1.0
	Clear cell carcinoma	3	1.0
	Adenoid cystic carcinoma	3	1.0
	Adenosquamous carcinoma	2	0.7
	Small cell carcinoma	2	0.7
	Transitional cell carcinoma	1	0.3
Vulva (n = 17)	Squamous cell carcinoma	9	52.9
	Spindle cell sarcoma	4	23.5
	Verrucous carcinoma	3	17.6
	Adenocarcinoma	1	5.9
Vagina (n = 7)	Squamous cell carcinoma	4	57.1
	Spindle cell sarcoma	1	14.3
	Choriocarcinoma	1	14.3
	Adenocarcinoma	1	14.3
Endometrium (n = 61)	Adenocarcinoma	30	49.2
	Choriocarcinoma	24	39.4
	Spindle cell sarcoma	4	6.6
	Neuroendocrine tumour	1	1.6
	Clear cell carcinoma	1	1.6
	Small cell carcinoma	1	1.6
Myometrium (n = 25)	Malignant mixed Mullerian tumour (MMMT)	14	56.0
	Leiomyosarcoma	6	24.0
	Epithelioid sarcoma	2	8.0
	Embryonal sarcoma	3	12.0

Table 4: Histopathological subtypes of ovarian malignancies.

Category of ovarian cancer	Histopathological subtype	Frequency (n)	Percentage (%)
Germ cell (n=77)	Immature cystic teratoma	32	41.6
	Dysgerminoma	13	16.9
	York sac tumour	19	24.7
	Struma ovarii	11	14.3
	Sertoli cell	2	2.5
Surface epithelial cell (n = 79	Serous cystadenocarcinoma	48	60.8
	Mucinous cystadenocarcinoma	31	39.2
Granulosa cell (n= 40)	Juvenile type	16	40.0
	Adult type	24	60.0
Glandular epithelial cells (n = 34)	Primary adenocarcinoma (Endometrioid)	17	50.0
	Metastatic	17	50.0
Mesenchymal cell (n = 18)	Spindle cell sarcoma	16	88.9
	Embryonal rhabdomyosarcoma	2	11.1
Brenner's cell (n = 11)	Malignant Brenner's tumour	11	100.0
Lymphoid cells (n= 8)	Burkitt's lymphoma	8	100.0
Neuroendocrine cells (n=2)	Carcinoid tumour	2	100.0
Other cells (n= 8)	Unspecified	8	100.0

Discussion

Cancers of uterine cervix, myometrium, endometrium, ovary, vulvar, vagina, and fallopian tubes, collectively referred to as the female reproductive system (FRS) are important causes of cancer related morbidity and mortality worldwide [1-3]. In sub-Saharan Africa, a home of many under privilege individuals, female victims may not be able to access or afford the cost of basic diagnostic modalities, treatment and therefore the disease maybe complicated by depression, anxiety, and neglect by family members [1-9]. Knowing the burden of female reproductive system cancers (FRSCs) in any geographical location is very important, for many of these diseases are associated with hormonal imbalances and life style changes, particularly infection by high-risk human papilloma viruses (HPV), which collectively are preventable. What is even more worrying is the fact that published data seem to suggest a rising trend in these cancers in developing countries and the need for collaborative efforts [3,9].

Female reproductive system cancers (FRSCs) in northern Ghana were diagnosed in relatively young women with a mean age of 45.99 ±18.09, with approximately 57.2% aged less than 50-years. The age characteristics of FRSCs observed in this current study, is further strengthened by the type of surgical samples from which these cancers are diagnosed. For instance, 83.3% of cystectomy/ oophorectomy, 54.9% of hysterectomy and 52.6% of small biopsies samples received in our institution were from females aged less than 50-years-old. However, 66.7% of vulva cancers were diagnosed in female aged 50-years and above. The young age at diagnosis with FRSCs in the Tamale Teaching hospital, the largest referral tertiary health facility in northern Ghana is significant and thus differs from studies that reported gynaecological cancers as diseases of the elderly [2,6].

It is a common observation globally that the commonest anatomic site for the FRSCs is the uterine cervix, however, disparities are observed in the spectrum or relative proportions across countries and among studies [1,4-8,11]. The distribution of FRSCs according to anatomic site of involvement in this current study in Northern Ghana were: uterine cervix (42.8%), ovary (40.8%), endometrium (8.9%), myometrium (3.9%), vulva (2.5%) and vagina (1.0%). The pattern observed in this study not only supports cancer of the uterine cervix as the leading gynaecological cancer globally [4,5], but it is in line with some previous studies in Africa [1,4-7]. For instance, in Nigeria, Anorlu et, al., reported the pattern as cervical cancer (44.7%), ovarian cancer (29.8%), endometrial carcinoma (6.4%) and vulva carcinoma (1.1%) [5]. Similarly, in Benin, Sodje et, al., observed the pattern as cervical (62.5%), ovarian (17.0%), endometrial cancers (6.8%) and vulva cancer 28 (5.7%) [6]. Nkyekyer in Ghana, reported the pattern in 2009 as; cervical cancer, ovarian cancer, endometrial cancer, choriocarcinoma and vulvar carcinoma [8].

Cancer of the uterine cervix was commonly diagnosed in persons aged 50-years and above, with a mean age of 53.21 ± 14.59. The age characteristics of females diagnosed with cervical cancer in this study are comparable to previous studies in Ghana and beyond [11-15]. For instance, Akakpo et al., reported a mean age of 57.23±14.639 [14]. Similarly, Chidinma et al., observed 55.0 years (2025) in their study [15]. Majority (69.2%) of the women with cervical cancer presented with bleeding per vaginam, and cervical masses (21.0%), both being evidence of advanced disease, similar to observations made in previous studies conducted across the globe decades ago [2,5,11-15]. Not only is the clinical picture of cervical in keeping with findings decades ago, but this is a wake-up call for a population-based national cervical screening programme, which currently does not exist in Ghana. The focus of such a study will be to identity preneoplastic lesions early for prompt treat to avert progression to invasive cancers. The commonest histopathological subtype of cervical cancer in this current study was squamous cell carcinoma (SCC) (88.1%) and this supports reports of other studies [2,11-15]. For instance, Der et al., reported a rate of 90.1% [12], Akakpo et al., with a rate of 88.6% [14], while Chidinma et al., observed a rate of 59.3% [15].

The incidence rates of ovarian cancer vary between different regions [8,16-22], but what is more disturbing is the rising trends observed in recent studies [16-19,23]. Malignant tumours of ovarian origin were the second commonest FRSCs, in northern Ghana, accounting for 40.8%, next to cancer of the uterine cervix with 42.8%. The relatively high proportion of FRSCs of ovarian cancers in this study, supports published data in recent times that have observed a significant rise in the incidence of the disease globally [16-19,23]. The mean age for females with ovarian cancers was 38.24 ± 18.43 years, with approximately 80.0% being aged less than 40-years. The very young age at diagnosis with ovarian cancers in norther Ghana is a complete departure

from previous published literature [8,22,23]. For instance, Akakpo et al., reported a mean age of 49-years, much older than that in this current study. However, the age characteristics observed in the current study is very closed to the 37-years reported earlier from the same institution by Der et al., [24]. The current study also observed that, the great majority of the females diagnosed with ovarian malignancies, presented with intra-abdominal masses, similar to earlier reports [19-25]. The common histopathological subtypes of ovarian cancers were: serous cystadenocarcinoma (17.0%), immature cystic teratoma (11.3%), mucinous cystadenocarcinoma (11.0%), adult-type granulosa cell tumour (8.5%), York sac tumour (6.7%), primary adenocarcinoma (6.0%), metastatic adenocarcinoma (6.0%), Juvenile -type granulosa cell tumour (5.6%), spindle cell sarcoma (5.6%) and dysgerminoma 13 (14.6%). Our findings differ from results of studies in Ghana [23,24] and India [26]. For instance, Sharma et al., quoted the following percentages: endometrioid carcinoma (38.9%), serous cystadenocarcinoma (16.7%), mucinous cystadenocarcinoma (11.1%), metastatic lesions (11.1%) and immature cystic teratoma (5.6%) [26].

There is paucity of published data in Ghana and Africa on endometrium cancer, and even where it exists, almost all such articles came from South Africa [27]. GLOBOCON (Global Cancer Statistics) in 2020 ranked endometrial cancer as the 5th most common female cancer in South Africa and that the incidence rates were growing faster in developing countries [28]. The current study conducted within the northern part of Ghana, found endometrial cancer as the 3rd common cancer, accounting for 8.9% of the FRSCs. This value is very low compared to previous studies in Africa [29-31]. For instance, Okunowo et al., [30] and Oriji et al., [31], reported 16.0% and 25% in their respective studies, both conducted in neighbouring Nigeria. Endometrial cancer was diagnosed commonly in female younger than 50-years-old (65.6%), with a mean age of 44.26 ± 14.47-years. The very young age at diagnosis with endometrial cancer in this study is a complete departure from published literature in Africa, that found the disease to be common among elderly patients [29-31]. For instance, Moethilalh et al., reported a mean age of 66-years in South Africa [29], while Okunowo et al., reported a mean age of 62.2 ± 5.5years in Lagos Nigeria [30]. The majority (75.4%) of the female presented with bleeding per vaginam, similar to previously published data [29-31]. The common histopathological subtypes were adenocarcinoma (50.8%) and choriocarcinoma (39.3%). Adenocarcinoma as the leading histological subtype of endometrial cancer is supported by previous literature [30,31], but the rarity of choriocarcinoma as a type of endometrial cancer in these previous publications from West Africa is very difficult to explain. For instance, Oriji et al., [31], reported the subtypes as; endometroid adenocarcinoma (70.6%), squamous cell carcinoma (17.6%) adeno-squamous cell carcinoma (5.9%) and papillary (5.9%). Again, Olatunde et al., [32], observed the pattern to be; endometrioid adenocarcinoma (77.2%), serous carcinoma (18.2%), mucinous carcinoma (2.3%) and clear cell (2.3%). The high proportion of choriocarcinoma located in the endometrial is difficult to explain, but in our opinion may be attributed to the young age group of women diagnosed with cancer of the endometrium [33] and what authors accept as a constituent's subtypes of endometrial cancer in previous studies.

In northern Ghana, malignant mesenchymal tumour (sarcoma) of myometrial origin was the fourth cancer, accounting for 3.6% of FRSCs. This value is within the range of 3 – 7% reported in previous studies [34-36]. The current study found that, approximately, 54.7% of myometrial sarcomas were common among elderly females, with a modal age group of 60 – 69 (33.3%), and that female diagnosed with myometrial sarcomas commonly present intra-abdominal mass (63.0%), abnormal bleeding per vaginam (25.9%) and abdominal distension (11.1%). The age at diagnosis and the clinical presentations of myometrial sarcomas are in line with previously published data [34-36]. The common histopathological subtypes of malignant tumours of myometrial origins identified in the current study were: Malignant Mixed Mullerian tumour (MMMT) (56.0%), leiomyosarcoma (24.0%), and embryonal sarcoma (12.0%) and epithelioid sarcoma (8.0%). This pattern is at variance with studies across the globe that reported leiomyosarcoma as the commonest sarcoma of the myometrium [35,36]. Although the pattern observed in this current study is in sighting, it is a single institutional experience and further research need to be conducted to ascertain this histopathological spectrum of myometrial cancers.

Vulva cancer was ranked 5th in this current study, accounting for 2.5% of all FRSCs. The position of vulva cancer in the Tamale study differs from previous study that found this cancer to be the fourth anatomic sites of FRSCs [37,38], however, the relative proportion of 2.5% lines within the range of 2 – 5% quoted in published data [37,39,40]. For instance, it constitutes 2.7% of FRSCs in Senegal [39], and 2.21% in Gabon [40]. Our value of 2.5% is lower than the 4.0% in Cameroon [41] and the 5% in the USA [42]. We observed in this current study that vulva cancer was the commonest FRSC that was diagnosed in elderly females with a mean age of 56.41 ± 18.96 and that 58.8% were aged 50-years and above. The age characteristics of vulva cancer as observed in the northern Ghana study is in accordance with studies reporting it as a disease of elderly females [43,44], but differs from others that associated it with younger age at diagnosis [45,46]. Sajo et al., reported a mean age of 45.1±12.7 in South Africa, with 40.0% being younger than 40-years-old [45]. Similarly, Darré et al., reported a mean age of 48±14.12 years in neighbouring Togo [46]. Females with vulva cancer in our study commonly present with ulcers (64.7%) and as masses (17.6%). The histopathological subtypes of vulva cancers also in this current study were: squamous cell carcinoma (53.0%), spindle cell sarcoma (23.5%), verrucous carcinoma (17.6%) and adenocarcinoma (5.9%). The clinico-pathological characteristics of vulva cancer in the northern Ghana study, generally support previously published data, the difference however lies in the pattern and relative proportions of the histological subtypes [37,42,46-48]. Gunther et al., found the pattern in their study to be: squamous cell carcinoma (95%), with melanoma, sarcoma, and basaloid variant accounting for 5.0% [48]. The exact reason for the geographical variation in the pattern and relative proportions of vulva cancer

is not clearly known, but may be attributed to the prevalence of HIV-AIDS and HPV infections. Unfortunately, HPV testing via PCR or serogate IHC testing is neither routine nor affordable in the study centre.

Vagina cancer was the least (1.0%) subtype of FRSCs in this study, a value that supports previously published literature that found the rate to range from 1- 2% [49-51]. Our value of 1.0%, further agreed with the point made decades ago by authors outside Ghana, about the rare nature of this cancer [51,52]. Our value is however, very low compared to the 3.8% reported in Southern Ghana by Der et al., [11]. The mean age at diagnosis with cancer of the vagina was 49.00 ± 17.40, with a modal age group of 40 -49 years (42.9%), and that 71.5% of the females were younger than 50-years-old. This means, cancer of the vagina in northern Ghana is a disease that affects younger females and thus from the mean age of 52.5±18.1% years reported in Southern Ghana [11]. The very young age at diagnosis with cancer of the vagina may be linked to infection with high-risk HPV serotypes [56] and should be ascertained with a prospective study in northern Ghana. Females with vaginal cancers commonly presented with abnormal bleeding per vaginam (42.8%), ulcers (28.6%) and as masses (28.6%), consistent with previous studies [11,54-56]. The histopathological subtype of vagina cancer in this retrospective histopathological review at the Tamale teaching hospital were squamous cell carcinoma (57.1%), spindle cell sarcoma (14.3%), Choriocarcinoma (14.3%) and adenocarcinoma (14.3%). Invasive squamous cell carcinoma as the predominant subtype of vagina cancer is supported by previously published data [11,54-56], but the variation here is based on the pattern and frequency. For instance, Der et al., in southern Ghana reported the pattern as: SCC (62.1%), adenocarcinoma (22.4%), MMMT (5.2%), leiomyosarcoma (5.2%) and Embryonal rhabdomyosarcoma (1.7%) [11]. Again Adam et al., reported the pattern to be; squamous cell carcinoma (90.0%), adenocarcinoma (8 -10%) with lymphomas, sarcomas, and melanomas of the vagina as extremely rare subtypes [56].

Conclusion

Female reproductive system cancers were common among younger age group, with advanced clinical features at diagnosis. The uterine cervix and ovaries being the common anatomic sites. HPV testing and vaccination, associated with regular screenings and lifestyle modifications are crucial for reducing morbidity and mortality associated with this gynaecological cancer.

Strength of the Study

The strength of our study lies in the large study population from a single academic and a tertiary referral hospital providing health services for the entire northern Ghana and beyond.

Limitations

In this study, all female reproductive system cancers were diagnosed based on haematoxylin and eosin histological features, and no single case had immunohistochemical confirmation. The study being retrospective in nature, is equally associated with all to limitations inherent in retrospective studies.

Recommendation

1. The Ghana Health Service, Ministry of Health and health training institutions in Ghana should develop and implement protocols geared towards modifying risk factors such lifestyle changes and infections with HPV, through stronger and continuous public health education.
2. Regular screenings such as Pap smears, HPV testing and vaccination, and pelvic ultrasound for at risk population should be part of the national health insurance scheme and must be effectively implemented at all levels of our health systems.
3. The government of Ghana should as a matter of urgency implement a national cancer control programme to prevent, detect, treat and track all cancers. This will enable an effective public health response such as early screening, early diagnosis and timely treatment of precancerous lesions. Again, HPV testing and vaccination should mandatory for girls and boys under the ages of 15-years.

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