Gynaecological health burden among women in the Niger Delta region of Nigeria: A hospital based analysis

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Abstract

Background

Increasingly, residents of the Niger Delta region of Nigeria are reporting health impacts that they believe are linked to environmental pollutions relating to oil and gas activities. Hence, this study aimed to assess the gynaecological health burden among women in the Niger Delta region receiving medical care at the Rivers State University Teaching Hospital (RSUTH) in Port Harcourt, Nigeria.

Methods

Data used for this study (n=697) were obtained from the RSUTH, Port Harcourt, Nigeria and covered the period between 2010 and 2014. The data were generated from patients who had partial or total hysterectomy or diagnosed of gynaecological lesion between 2010 and 2014. We extracted from the records, age, type of lesions and the origin of the tissue. Data obtained from this study were subjected to both descriptive and inferential statistics. All tests performed were two-tailed, with a probability value of .05 used as the statistical significance level. All statistical analyses were conducted using SAS 9.4 version (SAS Institute, Cary, NC, USA).

Results

The distribution of the gynaecological lesions differed significantly ($p < 0.001$) by year of diagnosis, developmental stage, age category and types of lesion. Leiomyoma was the highest number of lesions identified (56.0%, n=390), followed by ovarian cyst (10.0%, n=70) and retained product of conception (8.0%, n=56). Women of age group 30-39 years and 40-49 years had the highest number of lesions during the period with a range of 21-71% and 17-34 %, respectively.

Conclusion

The preponderance and characteristics of gynaecological lesions in our study sample point to the potential public health consequences, and strong need for creation of awareness campaigns and mass health screenings in the Niger Delta region of Nigeria.

Background

Gynaecological lesions are common among women of reproductive age exposed to pollutants and can also be influenced by lifestyle (1). It constitute important public health challenges globally, where they cause considerable reproductive morbidity and mortality especially in developing countries (2, 3). In a study of cancer registry, obtained all over the world indicates that only 1% of the literature emanated from Africa compare to 34% and 42% from Europe and Asia respectively (4). This is partly due to inaccurate population statistics which makes age specific incidence rates impossible or if available inaccurate. Large proportion of the population still have not sought orthodox medical care and so are not recorded, other reasons are inadequate diagnostic facilities, limited access to care, inadequate technical manpower

and infrastructure as well as quality of cancer data systems, all of which contribute to inaccurate data on gynaecological cancer burden. Data on gynaecological lesions in some developing countries show a prevalence of cancer of the cervix (5, 6). Cervical carcinoma in developing countries, accounts for 80% of the estimated 231,000 deaths that occur from it annually (7). The incidence and prevalence of other female genital lesions vary from one geographical region to another (8).

Uterine leiomyomas (commonly called *fibroids*) are perhaps the most common tumor affecting the health of millions of women and leading indication for hysterectomy in the world. These benign tumours may be present in about 75% of females of reproductive age, and each uterus harbours an average of 6.5 tumours. Each uterine leiomyoma is a unique clonal neoplasm (9).

The lack of awareness in the villages and cities, as well as lack of screening facilities and manpower has been major concern (10–12). Similarly, delayed presentation of cases, which could have been averted by early detection and prompt treatment have also been implicated in poor health outcomes. This study aimed to assess the gynaecological health burden among women in the Niger Delta region receiving medical care at the Rivers State University Teaching Hospital (RSUTH) in Port Harcourt, Nigeria

Materials And Methods

Study Area

Rivers State University Teaching Hospital (RSUTH) formerly Braithwaite Memorial Specialist Hospital (BMSH) was established in 1925. It is a government owned hospital, named after a British doctor Eldred Curwen Braithwaite. It is located in the old Government Reserved Area (Old GRA) in Port Harcourt, Rivers State, Nigeria. The hospital initially served as a medical facility for senior civil servants, later became a General Hospital and presently is a major University Teaching Hospital with the mandate to deliver comprehensive and integrated health care services to the metropolitan city of Port Harcourt and the surrounding oil producing rural areas of Rivers State and the Niger Delta region of Nigeria.

Rivers State is one of the six states that make up the South-South geopolitical zone of Nigeria. Rivers State lies at latitude 4°45' north and longitude 6°50' east and covers an area of 10,432.3 square kilometres. As of 2010, it has a population of 5,198,716 million with a density of 468 people per square kilometre and represents 3.7% of Nigeria's total population. Port Harcourt is the capital of Rivers State and one of Nigeria's leading industrial centres. The City lies at latitude 4°47'21" north and longitude 6°59'55" east, with a population of 1,382,592 million.

The natives of Rivers State are mainly farmers and fishermen, and they speak more than 23 main languages. The State is known as the *treasure base of Nigeria* due to its abundant oil and gas resources. Oil explorations in Rivers State began in 1956 and since then, there has been a paradigm shift in the occupation and life style of the natives resulting from reckless environmental pollution and industrialization. There is very little data quantifying the oil's impact on the health of people whose

property, crops and livestock, drinking water, and air are polluted by oil, waste products from exploration and extraction, and extensive waste gas flaring.

Data Source and Participants

A total of six hundred and ninety-seven (n=697) records were obtained from the from the archives of Histopathology Laboratory of the Rivers State University Teaching Hospital (RSUTH), Port Harcourt, Rivers State, Nigeria. The data were generated from patients who had partial or total hysterectomy or diagnosed of gynaecological lesion between 2010 and 2014. The following data were extracted from the records; age, type of lesion (*adenocarcinoma, adenoma, adenomyosis, cervical polyp, chronic endometritis, CIN, condyloma acuminatum, endometrial hyperplasia, endometrial polyp, leiomyoma, ovarian cyst, ovarian cyst, retained products of conception, squamous cell carcinoma. Other minor lesions identified and classified under "others" in our study include the following: Basal cell epithelioma, Brenner tumour. cervical cyst, chronic endocervitis, chronic vulvitis, endometrial carcinoma, epidermal cyst, fibroma, haemangioma, ovaritis, vulva cyst, vulva warts, vulvaritis and yolk sac tumour (Hepatoid variant). These lesions occurred very rarely and therefore were grouped for statistical convenience*) and the origin of the tissue.

Ethical Approval

Ethical approval was sought and obtained from the hospital management board of Rivers State, Nigeria through the Ethics Committee of RSUTH formerly BMSH.

Statistical Analysis

Data obtained from this study were subjected to both descriptive and inferential statistics. All tests performed were two-tailed, with a probability value of 0.05 used as the statistical significance level. All statistical analyses were conducted using SAS 9.4 version (SAS Institute, Cary, NC, USA).

Results

Table 1 shows the distribution of gynaecological lesions and histopathological characteristics of patients by year of diagnosis. Out of the 697 lesions which occurred from 2010-2014, 186 (26.7%) lesions were reported in 2013 recorded, while in 2014 it was only 46 (6.6%) lesions that were reported. There was significant difference ($p<0.0001$) in the various years of distribution of lesions. The occurrence of lesion in age recorded a mean $\pm$ SD of 39.1 ± 12.8 , with age group 30-39 recoding the highest lesion (263; 39.5%), this was followed by age group 40-49 (148; 22.3%). There was significant difference ($p<0.0001$) when the age groups were compared.

Figure 1 show leiomyoma, muscle, endometrium, postmenarchal, and age group 30-39 were denser when compared to other interactions.

The highest recorded lesion was leiomyoma 390 (56.0%), followed by ovarian cyst 70 (10.0%), and retained product of conception 56 (8.0%). They were significantly different ($p<0.0001$) when compared. However, the lesions of the muscle origin (456; 65.5%) were more than the lesions of the epithelia origin (165; 23.7%) and sex cord origins (71; 10.2%). The most predominate site of occurrence of lesion was the endometrium (526, 75.5%), followed by ovary (80, 11.5%) and cervix (75, 10.8). The various tissue origins were significant ($p<0.0001$) when compared to each other.

Table 2 shows the association between gynecological and histopathological characteristics of patients by year of diagnosis. Age groups 30-39 and 40-49 recorded the highest number of lesions from 2010 to 2014 with a range of 21-71% and 17-34 % respectively.

Table 1: Distribution of Gynecological and Histopathological Characteristics of Patients by Year of Diagnosis (2010-2014)

Characteristic	N	Percent (%)	Test Statistics	
			χ^2 Value (df)	P-value
Year				
<i>2010</i>	157	22.5		
<i>2011</i>	150	21.5		
<i>2012</i>	158	22.7		
<i>2013</i>	186	26.7		
<i>2014</i>	46	6.6	83.7 (4)	0.0001****
Developmental Stage				
<i>Infant</i>	2	0.3		
<i>Teenager</i>	5	0.8		0.0001****
<i>Adult</i>	658	98.9	1288.4 (2)	
Age Category (Years)				
<i>0-19</i>	12	1.8		
<i>20-29</i>	124	18.6		
<i>30-39</i>	263	39.5		
<i>40-49</i>	148	22.3		
<i>50-59</i>	46	6.9		
<i>60-69</i>	51	7.7		
<i>70+</i>	21	3.2	511.3 (6)	0.0001****
Mean $\pm$ SD	39.1 $\pm$ 12.8			
Lesion				
<i>Adenocarcinoma</i>	9	1.3		
<i>Adenoma</i>	5	0.7		
<i>Adenomyosis</i>	21	3.0		
<i>Cervical Polyp</i>	6	0.9		
<i>Chronic Cervicitis</i>	44	6.3		
<i>Chronic Endometritis</i>	7	1.0		
<i>CIN</i>	9	1.3		
<i>Condyloma Accumulatum</i>	5	0.7		

<i>Endometrial Hyperplasia</i>	28	4.0		
<i>Endometrial Polyp</i>	14	2.0		
<i>Leiomyoma</i>	390	56.0		
<i>Ovarian Cyst</i>	70	10.0		
<i>Retained product of Conception</i>	56	8.0		
<i>Squamous Cell Carcinoma</i>	13	1.9		
<i>Others</i>	20	2.9	2840.1 (14)	0.0001****
Origin of Tissue				
<i>Blood Vessels</i>	2	0.3		
<i>Connective Tissue</i>	2	0.3		
<i>Epithelial Tissue</i>	165	23.7		
<i>Muscle</i>	456	65.5		
<i>Sex Cord/Stroma</i>	71	10.2	1029.6 (4)	0.0001****
Region				
<i>Cervix</i>	75	10.8		
<i>Endometrium</i>	526	75.5		
<i>Fallopian Tube</i>	2	0.3		
<i>Ovary</i>	80	11.5		
<i>Vagina</i>	1	0.1		
<i>Vulva</i>	13	1.9	1789.7 (5)	0.0001****

Note: The percentages may not add up to 100 due to rounding; SD=Standard Deviation

***** Significant at $p < 0.0001$*

Table 2: Association between Gynaecological and Histopathological Characteristics of Patients by Year of Diagnosis

		Year					Test Statistics	
Characteristic	N	2010	2011	2012	2013	2014	χ^2 Value (df)	P-value
		n (%)	n (%)	n (%)	n (%)	n (%)		
Developmental Stage								
Infant	2 (0.3)	2 (1.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	14.2 (8)	0.077 ^{ns}
Teenager	5 (0.8)	1 (0.7)	3 (2.2)	0 (0.0)	0 (0.0)	1 (2.2)		
Adult	658 (98.9)	150 (98.0)	135 (97.8)	147 (100)	181 (100)	45 (97.8)		
Age Category								
0-19 yrs	12 (1.8)	4 (2.6)	4 (2.9)	2 (1.4)	1 (0.6)	1 (2.2)	44.10 (24)	0.007 ^{**}
20-29 yrs								
30-39 yrs	124 (18.6)	21 (13.7)	38 (27.5)	29 (19.7)	33 (18.2)	3 (6.5)		
40-49 yrs	263 (39.5)	71 (46.4)	42 (30.4)	55 (37.4)	74 (40.9)	21 (45.7)		
50-59 yrs								
60-69 yrs	148 (22.3)	34 (22.2)	28 (20.3)	33 (22.4)	36 (19.9)	17 (37.0)		
70+ yrs	46 (6.9)	4 (2.6)	6 (4.3)	14 (9.5)	20 (11.0)	2 (4.3)		
	51 (7.7)	15 (9.8)	15 (10.9)	9 (6.1)	10 (5.5)	2 (4.3)		
	21 (3.2)	4 (4.6)	5 (3.6)	5 (3.4)	7 (3.9)	0 (0.0)		
Lesion								
Adenocarcinoma	9 (1.3)	3 (1.9)	1 (0.7)	3 (1.9)	1 (0.5)	1 (2.2)		
Adenoma								
Adenomyosis	5 (0.7)	2 (1.3)	2 (1.3)	1 (0.6)	0 (0.0)	0 (0.0)		
Cervical Polyp	21 (3.0)	7 (4.5)	3 (2.0)	3 (1.9)	7 (3.8)	1 (2.2)		
Chronic Cervicitis								
Chronic Endomeritis	6 (0.9)	3 (1.9)	2 (1.3)	1 (0.6)	0 (0.0)	0 (0.0)		
CIN	44 (6.3)	10 (6.4)	11 (7.3)	12 (7.6)	8 (4.3)	3 (6.5)		
Condyloma Accumulatum	7 (1.0)	4 (2.5)	3 (2.0)	0 (0.0)	0 (0.0)	0 (0.0)		

<i>Endometrial Hyperplasia</i>	9 (1.3)	1 (0.6)	6 (4.0)	0 (0.0)	2 (1.1)	0 (0.0)	104.73 (56)	0.0001****
<i>Endometrial Polyp</i>	5 (0.7)	0 (0.0)	3 (2.0)	1 (0.6)	1 (0.5)	0 (0.0)		
<i>Leiomyoma</i>	28 (4.0)	15 (9.6)	9 (6.0)	3 (1.9)	1 (0.5)	0 (0.0)		
<i>Ovarian Cyst</i>	14 (2.0)	4 (2.5)	4 (2.7)	3 (1.9)	3 (1.6)	0 (0.0)		
<i>Retained Product of Conception</i>	390 (56.0)	74 (47.1)	66 (44.0)	99 (62.7)	119 (64.0)	32 (69.6)		
<i>Others</i>	70 (10.0)	5 (3.2)	16 (10.7)	17 (10.8)	24 (12.9)	8 (17.4)		
	56 (8.0)	14 (8.9)	16 (10.7)	11 (7.0)	14 (7.5)	1 (2.2)		
	13 (1.9)	5 (3.2)	4 (2.7)	1 (0.6)	3 (1.6)	0 (0.0)		
	20 (2.9)	10 (6.4)	4 (2.7)	3 (1.9)	3 (1.6)	0 (0.0)		
Origin of Tissue								
<i>Blood Vessels</i>	2 (0.3)	2 (1.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	39.87 (16)	0.001***
<i>Connective Tissue</i>	2 (0.3)	1 (0.6)	0 (0.0)	1 (0.6)	0 (0.0)	0 (0.0)		
<i>Epithelial Tissue</i>	165 (23.7)	46 (29.3)	51 (34.2)	32 (20.3)	31 (16.7)	5 (10.9)		
<i>Muscle</i>	456 (65.5)	102 (65.0)	82 (55.0)	108 (68.4)	131 (70.4)	33 (71.7)		
<i>Sex Cord/Stroma</i>	71 (10.2)	6 (3.8)	16 (10.7)	17 (23.9)	24 (12.9)	8 (17.4)		
Region								
<i>Cervix</i>	75 (10.8)	17 (10.8)	25 (16.7)	14 (8.9)	15 (8.1)	4 (8.7)	24.95 (20)	0.204 ^{ns}
<i>Endometrium</i>	526 (75.5)	121 (77.1)	101 (67.3)	120 (75.9)	150 (80.6)	34 (73.9)		
<i>Fallopian Tube</i>	2 (0.3)	1 (0.6)	0 (0.0)	1 (0.6)	0 (0.0)	0 (0.0)		
<i>Ovary</i>	80 (11.5)	12 (7.6)	20 (13.3)	20 (12.7)	20 (10.8)	8 (17.4)		
<i>Vagina</i>	1 (0.1)	0 (0.0)	1 (6.7)	0 (0.0)	0 (0.0)	0 (0.0)		
<i>Vulva</i>								

13 (1.9)	6 (3.8)	3 (2.0)	3 (1.9)	1 (0.5)	0 (0.0)
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*Note: The percentages may not add up to 100 due to rounding; Significance level: *= $p<0.05$; **= $p<0.01$; ***= $p<0.001$; $p<0.0001$; ns= Not Significant ($p>0.05$).*

Discussion

The results of this research revealed that the number of lesions diagnosed across the years under study were comparatively stable except for the year 2014, which was reported to have the lowest number of lesions. This is at variance with an earlier work on cervical cancer in Port Harcourt where 38.9% of the lesions occurred in 2009 against 5% in 2010 fluctuating outcome (21 to 69%) from 2007 to 2009 was reported (13). Majority of the gynaecological lesions occurred in adults within the age range 30-39years. This agrees with the research of You *et al.* (14) who reported that gynaecological lesions in children and adolescents are rare compared to adults. Nwachokor and Forae (15) reported a peak age range of non-neoplastic cervical lesions in Warri, Nigeria as 40-49 years accounting for 33.7% of the total cases. Okeke *et al.* (16) in Enugu, Nigeria, reported a peak age of 51-60 years for female genital malignancies. They observed that the late presentation might be due to low awareness, perception to seek for medical advice, lack of health care providers and policy makers, absence or poor quality of screening programs, limited access to health care services, and lack of functional referral systems (9).

Forae and Aligbe (17) reported that endometrial lesions are ranked among the most common gynaecological disorders that affect women globally, cutting across all ages and contributing significantly to increased maternal morbidity and mortality. In the present study, the endometrium was seen as the site most prone to lesions, followed by the ovary and the cervix. The high prevalence of the lesions on the endometrium has been attributed to several causes including exogenous estrogen without progesterone (18), defective immune response (19), retrograde menstruation, apoptosis suppression and alteration of endometrial cell fate, familial aggregation amongst others (20). Zanotti (21) reported that endometrial cancer is the most common of the gynaecologic malignancies. She further added that approximately 2% to 3% of women in the United States will develop cancer of the endometrium at some point during their lives. The result of this research also agrees with the result of Nnamdi *et al.* (22), who recorded 11.4% and 0.3% for the ovary and vagina respectively.

On year-to-year basis, the endometrium was also the most affected site. This is not in line with the findings in Sokoto by Nnamdi *et al.* (22), where 69% of the lesions were seen in the cervix. Our result for the vagina is also similar the research on the pathology of vagina cancers by Seleye-Fubara *et al.* (23) where 0.63% was reported. In Enugu Okeke *et al.* (24) reported 0% lesion on the vagina. Most of the lesions (66.0%) in this research originated from muscle tissue and 23% originated from epithelial tissue. Sex cord stroma lesions were 10.4% while the least were lesions from connective tissue (0.3%) and blood vessel (0.3%) origin. This result did not agree with the result of Sanni *et al.* (25) who reported lesions of

epithelia origin (61.2%) as the highest in malignancies and their least were tissue of sex cord/ stroma origin (16.1%).

There was disparity in the region of occurrence based on age, as the youngest and oldest groups were not endometrial predominant. Ovarian cyst (58.3%) was prevalent among age 0-19 years, while in the oldest group (70 and above years) the lesions of the cervix were more prevalent with 54.1%. The other age groups; age 20-29, 30-39, 40-49, 50-59 and 60-69 years all recorded high prevalence in endometrium 71.8%, 83.3%, 86.5%, 60.9% and 54.9% respectively. Typically, ovarian cysts are frequently seen in young females due to failure of ovulation. However, fewer cases could also be seen in older women, studies have shown that 90% of these cysts are resolved spontaneously (26).

Leiomyoma, which is uterine fibroid, is the most common lesion in this research with 390 cases representing 56.0%. The preponderance of leiomyoma was on the increase from 2011 to 2014. This is similar to the result of Mohammed *et al.* (27) where leiomyoma (52.6%) was the highest among 19 lesions in Zaria. In Gombe Nigeria, 54% of operative findings were fibroid (28). In eastern part of Nigeria, it was lower with 25.9% (6) when compared with the results from the north and the present research, though the highest among other lesions. The findings of our study is also in line with the work of Nnoli *et al.* (29), where researchers reported that 1 in every 5 women of child bearing age of over 30 years had fibroids and that 20-30% of women of this age harbor uterine fibroids thus accounting to 3.2 –7.6% of new gynaecological cases and 68.1% of hysterectomies (30). On the other hand, ovarian cyst, which was the second highest (10.0%) reported lesion in our study, did not agree with the result of Ikechebelu (31) in Nnewi where 0.67% was reported as the prevalence of ovarian cyst in gynaecological diseases.

Retained products of conception which is the 3rd most prevalent lesion in this study are complication of labour and delivery. The retained tissue can cause prolonged postpartum haemorrhage and endometritis. The usual treatment is curettage, which results in further complications in 7% of patients, including uterine perforation, cervical laceration, and subsequent synechia formation. Retained products of conception are suspected when routine examination of the placenta at delivery reveals an incomplete placenta or when a patient has signs of endometritis or prolonged vaginal bleeding in the postpartum period (32). In most centres, it is a routine practice to submit tissues obtained by uterine evacuation for histopathologic examination to confirm the presence of intrauterine fetal tissue. The main rationale is to detect an ectopic pregnancy, which requires immediate further management, or a molar pregnancy, which necessitates special follow up. Other reasons include detecting surgical complications, such as incomplete or failed pregnancy evacuation; determining the cause of recurrent pregnancy loss; or detecting unexpected fetal pathology (33).

Retained products of conception in this present research recorded 56 cases representing 8.0% with peak age range of 20-39 years (figure 4.5), which is lower than the findings of other authors. Forae and Aligbe (26) reported that retained product of conception was the most commonly encountered among reproductive women in Benin City, Nigeria with 27.7%, Ozumba *et al.* (6) reported 20.7% in Enugu with mean age range of 24.9-36.9 years.

Cervical inflammation may be acute or chronic. Each of these may be as a result of non-infective or infective causes. Non-infective cervicitis is most often caused by chemical while infective consist commonly of sexually transmitted diseases. Chronic Cervicitis was the fourth most prevalent lesion in this research with 6.3% this is lower compared to 17.1% reported by Nwachokor and Forae (15), who reported a higher prevalence of 52.2% for chronic cervicitis.

Cervical cancer has been reported severally by researchers as the commonest malignancy of the female genital tract in developing countries. However, this has been mostly through pap smear screening. The histopathological tissue block screening of squamous cell carcinoma in our present study show low prevalence of 1.9%. This is similar to the 5% of squamous cell carcinoma reported in a clinico-pathological assessment of hysterectomies (34).

The limitation of this research is similar to our earlier study (35), this present study was based on data collected from only one tertiary hospital, and thus, may not be representative of the actual prevalence of the various gynaecological lesions in the general population. Also, several independent factors of interest including participants' occupation and race/ethnicity were not captured in the original data making it impossible to associate these factors with the distribution.

Conclusion

Leiomyoma, ovarian cyst and retained product of conception are the most prevalent gynaecological lesions affecting women residing in oil and gas production area of Niger Delta. However, application of effective intervention and control measures such alteration of life style (multiple sexual partners, alcohol, smoking etc), vaccination against human papillomavirus (HPV), cytological screening and early detection, treatment and improved therapy and reduced environmental pollution could help reduce incidence and mortality rates associated with these diseases. Further studies that associates these exposures and lifestyles to the various gynaecological lesions are highly recommended.

Declarations

Data availability

The data used during the current study are available from the corresponding author on reasonable request.

Conflict of Interests

Authors declare that there are no conflicts of interest

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This research was self-sponsored

Authors' contributions

OFM Conceived the study, OFM, NAA, AGO and LAE, structured the method, OFM collected the from RUSTH, MOO analysed and interpreted the data regarding the gynaecological lesion, OFM and MOO wrote the manuscript.

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Figures

Figure 1

Scatterplot Matrix of Lesion Group by Lesion Classification, Origin of Tissue, Region of Diagnosis, Reproductive Stage and Age Category of patients (2010-2014)