

## Incidence of Cervical Cancer in Calabar, Nigeria

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### Authors' contributions

*This work was carried out by the gynaecological cancer research team of the department of pathology, University of Calabar in collaboration with the gynaecological oncology team and public health team all of University of Calabar and the Calabar cancer registry. Author GAE collated the data and wrote the work. Author OEO analysed the results. Author IAE provided the data and carried out the editing work. All the other co-authors provided the patients or pathology reports and read the manuscripts and effected corrections as well as approved the final manuscript.*

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## ABSTRACT

**Aim:** The aim of this study is to determine the incidence of cervical cancer among women living in Calabar.

**Place and Duration of Study:** Calabar cancer registry, May to June 2015.

**Methodology:** Data of cervical cancer diagnosed between 1<sup>st</sup> of January 2004 and 31<sup>st</sup> December 2013 and stored in the Calabar cancer registry were accessed and fed into spss version 21 for analysis. Important data captured included the patients age, sex, place domiciled within last one year, whether rural or urban dwelling, date of incidence as well as topography and morphology of the cervical cancer. Other gynaecological cancers outside the cervix were excluded as well as all other cancers occurring in females outside cervical cancer. The data so captured was subjected to statistical analysis.

**Results:** One hundred and thirty (130) cases of cervical cancer were recorded during this period Mean (SD) age of female cases was 44.6 (10.2) years, ranging from 30 to 76 years. There appears

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to be a fairly steady decrease in the mean age at diagnosis, especially in the later years. The crude incidence, adjusted rate and age specific incidence were, 17 per 100,000, 15 per 100,000 and 20 per 100,000 respectively.

Within the 5-year period from 2004 to 2008, there was an average annual decrease in incidence rate of 9.4% (95% CI: 3.8%-11.2%). However, within the 5-year period from 2009 to 2013, there was an average annual increase in incidence rate of 12.1% (95%CI: 2.31% to 14.4%).

**Conclusion:** Cervical cancer is common in Calabar effort must be redoubled towards public health measures that will bring about reduction in its incidence. This is because cervical cancer is the most easily preventable cancer.

*Keywords: Calabar; cervical cancer; incidence females.*

## 1. INTRODUCTION

Nigeria is situated in the Gulf of Guinea in West Africa, with an estimated population above 170 million in 2014 [1]. It is politically divided into 36 states which are grouped into six zones (North west, North central, North east, South east, South West and South- South) using a combination of geographical proximity, linguistic inclination as well as ethnicity. There are more than 300 ethnic groups spread across slightly more than 923,000 sq km of land space. The Southern vegetation comprises mangroves forest, tropical rain forest and Guinea savannah the northern vegetation ranges from Guinea savannah, through sahelian belt and the extreme North joins the Sahara desert. Nigeria is a tropical country with variable duration of rainy and dry seasons depending on the location. In the south rainy season last from March to November while in the North it last from May to September. The average rainfall in some parts of the South may be 3000 mm of rain in a year, in extreme North it may not exceed 500 mm a year. In the same vain coastal temperatures may average 32°C a year and in extreme north 38°C. Calabar is in the South - south geographical zone and is the capital city of Cross River State. The state has eighteen Local government areas and a population of nearly 3 million people. The Calabar cancer registry only covers comprehensively the capital city Calabar and Akpabuyo comprising three local councils viz: Calabar municipality, Calabar South and Akpabuyo local government areas. The population of these three local government areas as estimated from 2006 national population census using a growth rate of 3% is a little above 700,000 [1]. Data from the rest of the state is being improved to make them truly population based. The Calabar cancer registry operates from the Department of Pathology University of Calabar Teaching Hospital. Funding is mainly from Teaching Hospital and technical support is

obtained from "The international Agency for cancer research and control" (IARC). The registry has 5 permanent staff and a director who is a professor in the department of Pathology. The main sources of data are: the teaching hospital, General hospital Calabar, St. Josephs Hospital Ikot Ene Akpabuyo and Seven Private Clinics in Calabar. The registry visits cancer patients admitted in the General hospital and Teaching hospital while collecting data from the rest of the centres every 2 weeks for documentation and follow up. The Calabar cancer registry is entering its fourth decade of existence and has perfected its data collection system in Calabar and Akpabuyo. Baseline data on common cancers are only now being published to fill the yearning gap in knowledge from this part of the world.

According to GLOBOCAN 2012, cervical cancer is the 4<sup>th</sup> commonest cancer in women and the 7<sup>th</sup> overall worldwide. Its highest incidence occurs in less developed areas of the world where 85% of the cases now occur [2-4]. The risk factors are early age of initiation of sexual activity, multiple sexual partners by a woman, multiparty, having a male partner with multiple sexual partners [5]. These sexual risk factors favour the sexual transmission of a carcinogen-Human Papilloma virus (HPV), which is associated with nearly all cervical cancers [4,6,7]. To date more than 150 HPV types have been isolated. The high risk HPV types are 16 and 18, which are associated with most cervical cancers [4,8-10]. Current vaccination programmes cover types 16 and 18, which is reported to prevent 66.2 % of cervical cancers [11]. It is observed that HPV infections occur in the sexually active women [9,12,13] with 90% clearing spontaneously within months [4]. Infected cells in the cervix could progress into premalignant lesions known as "cervical intraepithelial neoplasia "(CIN), graded as CIN1, CIN2 and CIN 3 and eventually invasive cervical

cancer, through a multistep process [14]. Other risk factors such as immuno compromised status as seen in HIV/AIDS predispose the patients to cervical cancer due to weakened immune system [15-19]. Smoking, Diethyl stilbesterol use during pregnancy as was the case those days and poverty as well as family history of cervical cancer [4]. Poverty as a risk factor can be explained by the lack of access to screening while family history will suggest some bit of familial predisposition.

The true incidence of cervical cancer in Nigeria is unknown. GLOBOCAN estimates that cervical cancer is the second commonest cancer in Nigerian women with an Age Standardized Incidence Rate (ASR) of 29.0 per 100,000 [3]. This is similar to rates quoted from Abuja and Ibadan cancer registries, which are among the only three population based cancer registries in Nigeria. In these registry reports, the age specific incidence using world standardised population, was 30.3 per 100,000 and 36.0 per 100,000 respectively [20]. Incidentally GLOBOCAN data had relied on estimates from the population based registries which cover less than 5% of Nigeria's population [3,20]. Although the larger population of the country is not covered by a population based cancer registry, institution based reviews across the country suggest that cervical cancer is common. For instance, a ten year review of Gynaecological (Gynae.) cancers in a reference teaching hospital in South Eastern region, showed that it accounted for 78% of Gynaecological cancers [21]. Briggs and Katchy in a South - South zone reference hospital, as well as a histopathological review of Gynaecological. cancers in University of Uyo teaching hospital in the South- South zone showed a predominance of cervical cancers [22-24]. A large review carried out in Lagos and Ibadan(South West Nigeria ) in 2011 showed that cervical cancer was second only to breast cancer as the commonest cancer in the region [25]. The pattern from Aminu Kano Teaching hospital in the largest metropolis in the north west of the country equally shows that cervical cancer is the commonest Gynaecological. malignancy in women [26].

It is possible that regional variations exist in cervical cancer incidence in Nigeria. But without a national cancer registry, we have to look at Ibadan, South West, Nigeria, the oldest population- based registry in the country and institution based registry reports from the rest of the country to draw an inference. At inception in

the sixties, cervical cancer was the commonest cancer in females in Ibadan. Breast cancer progressively increased and overtook cervical cancer in the nineties [27]. Unpublished data from Calabar dating from the late seventies also witnessed the same early cervical cancer dominance but was later overtaken by breast cancer. Presently breast cancer is the dominant female cancer in the South West [28] South East [29]. It is possible these regions started with initial cervical cancer dominance before breast cancer overtook it, as was reported in Ibadan and observed in Calabar. Reports from the northern part of the country are mixed, there are areas where cervical cancer is the commonest cancer in Females such as Kano, North West Nigeria (2008 analysis [30]). Areas that have witnessed a transition in 20 years such as Jos in North Central Nigeria. From 1985-1994, cervical cancer was the commonest cancer in females in Jos followed by breast cancer, Ten years later between 1995-2002 breast cancer overtook cervical cancer as the commonest cancer in females in Jos. The general statement to make at this point is that cervical cancer is common in Nigeria. There is the likelihood that the disease is fairly commoner in the northern part of the country where some socio-cultural and economic factors favour the disease. Adewuyi et al. for example reported that in part of Northern Nigeria majority in the cohort they studied had initiated sexual activity by age 17, were in polygamous marriages and are multiparous [31]. Also the northern part of the country ranks low on education and other parameters of human development index which may militate against uptake of knowledge attitude and practice of cervical cancer prevention.

There is empirical evidence to suggest a high burden of cervical cancer in Nigeria. This can be inferred from a few surveys of Human Papilloma virus burden (HPV), the causative agent of cervical cancer. Although studies on Age Specific rates of the virus in the population at risk are few, in a limited survey in Abuja, Akarolo- Anthony et al, estimated the HPV prevalence to be 37%, and HPV type 35 was the commonest, while Okolo et al in Ibadan found a prevalence of 26.3% [32,33]. Again a population survey of HPV antibodies in the Nigerian population can be a pointer to the prevalence of cervical cancer in Nigeria. In a study in the North west Aminu et al. found out that 42.9% of the women attending a Gynaecological. clinic in their hospital had antibodies to HPV [34]. A study of a population of 231 women in a medical project in rural middle

belt of the country discovered that 21.6% had high risk HPV while 16.6% had low risk HPV [35]. There is equally a strong link between cervical cancer in Nigeria and HPV infection. A multinational study of cervical cancer tissue involving Nigeria, Ghana and South Africa found out that HPV was associated with 90.4% of invasive squamous cell carcinoma samples surveyed [36]. Human Immuno Deficiency (HIV) Virus Infection and Acquired Immuno Deficiency Syndrome (AIDS), which follows HIV infection is now worse in Sub Saharan Africa and has compounded the cervical cancer picture. Some studies, although limited in scope, have shown that high risk HPV are common in premalignant cervical lesions in these patients [15,17]. It is noted however that high risk HPV are also common in HIV positive patients with normal cervical cytology [37].

The disparity in cervical cancer rates noted between the less developed areas of the world and the developed areas can be explained by the massive deployment of resources by the latter in studying the evolution of premalignant lesions of the cervix into invasive cancer; the institution of population screening for premalignant lesions, and early treatment, as well as understanding the role of high risk HPV in cervical cancer aetiology. GLOBOCAN 2012 states that 85% of cervical cancer occur in the less developed areas of the world, the highest ASR above 30 per 100,000 occur in Melanesia 33.3, East Africa 42.7, South Africa 31.5, while the lowest risk areas are the more developed areas of Australia / New Zealand 5.5 and Western Asia 4.4 per 100,000 [3]. For improvement in cervical cancer incidence and prevalence to be noticed in this part of the world, effort must be made towards improving the low knowledge attitude and practice of cervical cancer screening by the population. Governments / non governmental agencies, public health practitioners and care givers are regularly reported to exhibit poor knowledge of this disease and its prevention [38-52]. By way of comparison, cervical cancer screening in the Faroe Islands over a three year period attained a high coverage of 67%, 81 and 71% [53]. And in Norway, country- wide cervical cancer screening carried out between 1956 and 2010 caused a 68% reduction in cervical cancer incidence [54]. Here in Calabar cervical cancer screening is opportunistic and recent baseline data on cervical cancer incidence is being determined using data over a five year period 2009-2013 at the Calabar Cancer Registry.

## 2. MATERIALS AND METHODS

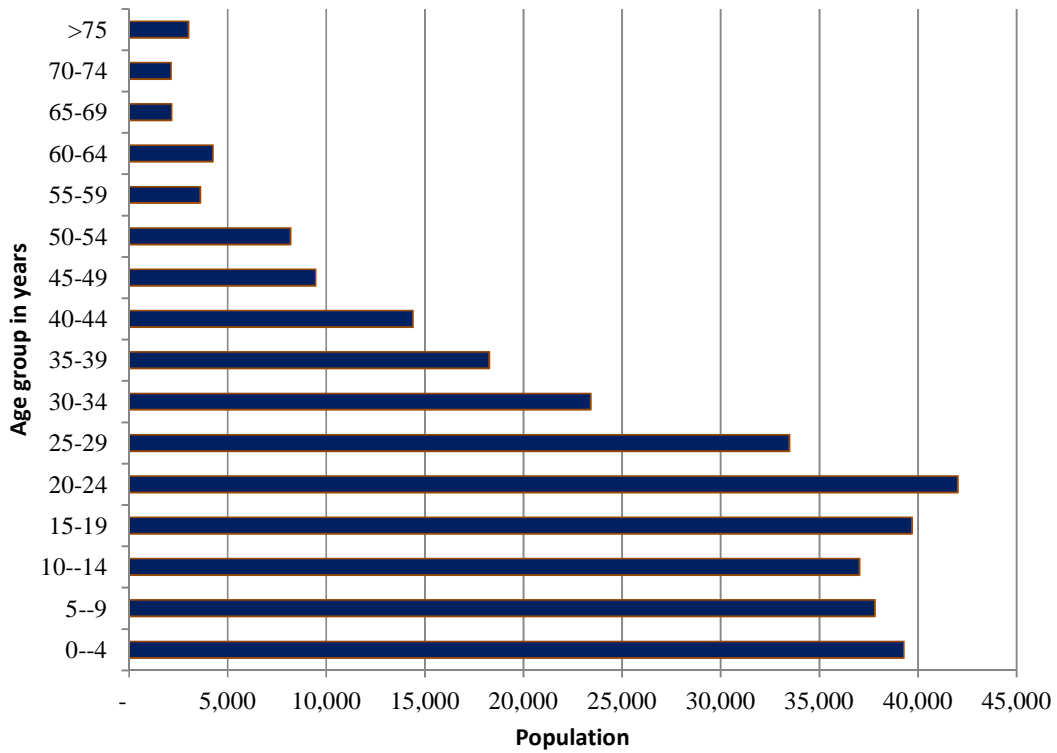
Data kept in the Calabar cancer registry between 1st January 2004 and 31<sup>st</sup> was assessed, information sought after is cervical cancers within this period, the age of patients, and morphology of cervical cancers. All cervical cancer cases occurring in women domiciled in Calabar and Akpabuyo between 1<sup>st</sup> January 2004 and 31<sup>st</sup> December 2013 were included. All other gynaecological cancer cases outside cervical cancer were excluded. In addition all cervical cancer cases in patients domiciled outside Calabar and Akpabuyo, were excluded from the study. The study is a Retrospective study of cervical cancer incidence in Calabar Nigeria and involves a trend analysis of this cases between 1<sup>st</sup> January 2004 to 31<sup>st</sup> December 2013. The data from the registry was analysed using SPSS version 21.

### 2.1 Population

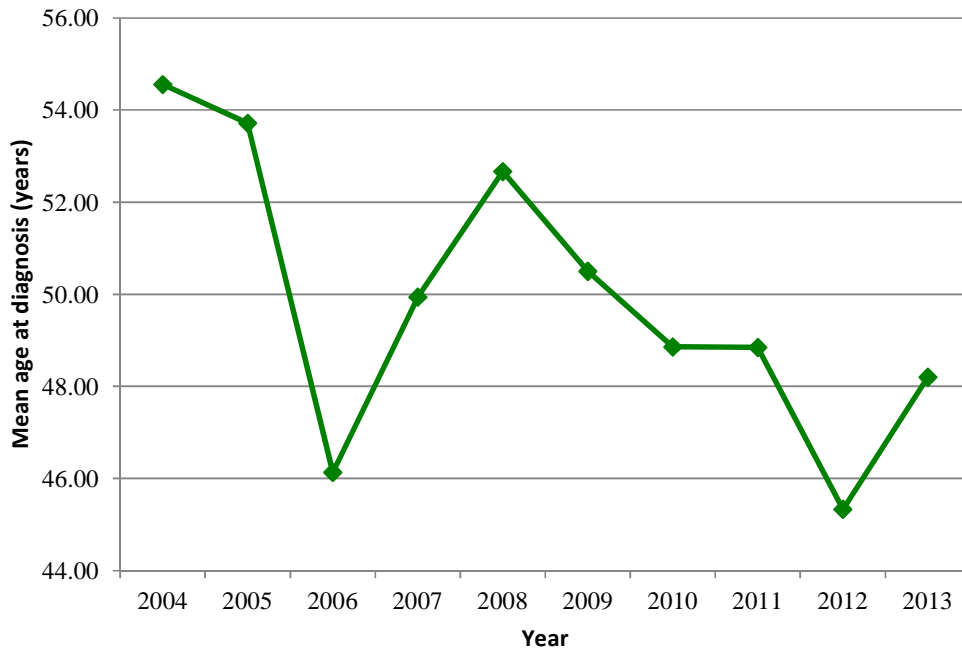
Age distribution of the population of females resident in the study area was obtained from database of population census conducted in 2006, with intercensal estimations made in collaboration with the National Population Commission, Calabar, Nigeria, using constant annual growth rate of 3.0% (Fig. 1). World standard population was used to calculate the age-standardized or adjusted rates. The patients were grouped into a ten tier age group structure of five years interval in each tier.

## 3. RESULTS

Within the study period, one hundred and thirty cases of cervical cancer were seen. Mean (SD) age of female cases was 44.6 (10.2) years, ranging from 30 to 76 years. There appears to be a fairly steady decrease in the mean age at diagnosis, especially in the later years (Fig. 2), but there was no significant difference in mean age comparing the years ( $F=0.77$ ,  $p=0.74$ ). Approximately three-quarters of cases seen (98, 75.4%) were between 40 and 64 years old at time of diagnosis, with the commonest age group being 45-49 years (Table 1). Annual frequency distribution pattern was observed to be bimodal with peak frequencies at 2007 (16, 12.3%) and 2010 (28, 21.5%), and most cases (77, 59.6%) seen at the latter half of the 10-year study period (Table 2, Fig. 3).



**Fig. 1. Female population of Calabar Registry study Area (Calabar Municipality, Calabar-South and Akpabuyo), by age group, census of 2006 [1]**



**Fig. 2. Mean age at diagnosis of cervical cancer in Calabar, by year (2004-2013)**

**Table 1. Age-group distribution of cervical cancer subjects (N=130)**

Age group (years)	Frequency	Percentage
30-34	6	4.6
35-39	12	9.2
40-44	21	16.2
45-49	29	22.3
50-54	25	19.2
55-59	9	6.9
60-64	14	10.8
65-69	8	6.2
70-74	4	3.1
≥ 75	2	1.5
Total	130	100.0

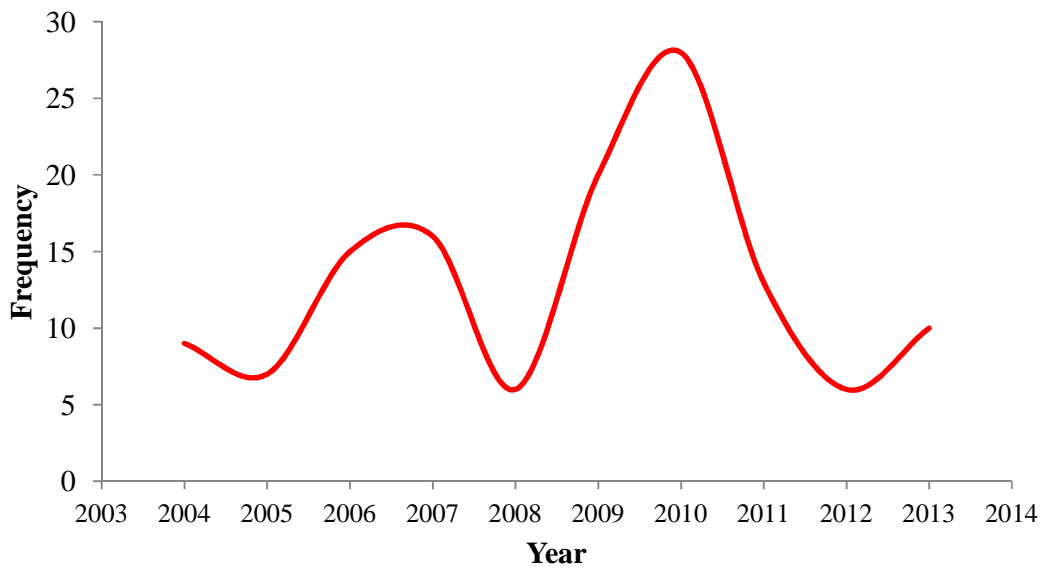
The only type of cervical cancer seen during the study period was cervix uteri (ICD - 53.9).

Adjusted incidence rate was highest in 2010 (31.1 per 100,000), and high incidence rates

were found among subject in 65-69 year age group in 2007 and 2010 (92.3 and 92.4 per 100,000, respectively), and 50-54 year age group in 2004 (86.8 per 100,000) (Table 3).

**Table 2. Annual distribution of cervical cancer cases seen in Calabar (N=130)**

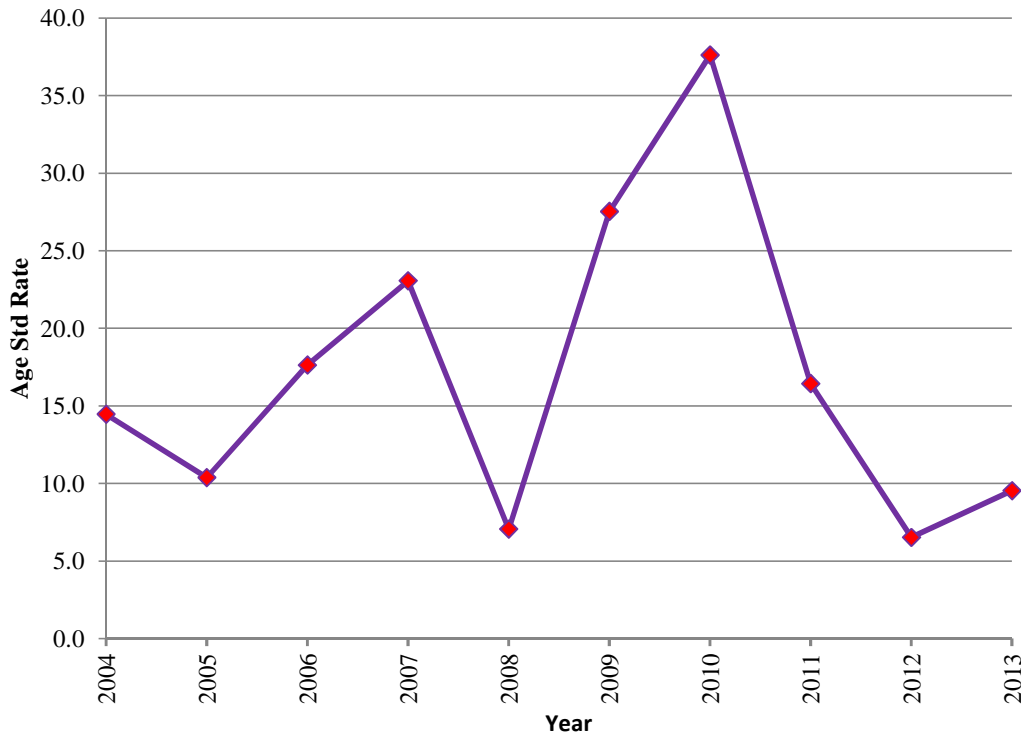
Year	Frequency	Percentage
2004	9	6.9
2005	7	5.4
2006	15	11.5
2007	16	12.3
2008	6	4.6
2009	20	15.4
2010	28	21.5
2011	13	10.0
2012	6	4.6
2013	10	7.7
Total	130	100.0



**Fig. 3. Annual distribution of cervical cancer cases seen in Calabar (N=130)**

**Table 3. Annual crude, adjusted and age-specific incidence rates of cervical cancer in Calabar (2004-2013)**

Year	Crude	Adj.	30-34 yr	35-39 yr	40-44 yr	45-49 yr	50-54 yr	55-59 yr	60-64 yr	65-69 yr	70-74 yr	≥75 yr
2004	14.5	10.2	0.0	6.0	7.0	0.0	86.8	28.0	23.6	46.6	47.4	0.0
2005	10.4	7.9	0.0	0.0	0.0	21.2	36.7	27.8	0.0	0.0	47.3	0.0
2006	17.6	16.9	4.3	5.5	20.9	63.5	24.4	27.8	23.5	0.0	0.0	0.0
2007	23.1	18.0	8.5	16.4	6.9	21.1	24.3	55.4	46.9	92.3	0.0	0.0
2008	7.1	6.7	4.3	5.4	6.9	0.0	12.1	0.0	23.4	0.0	0.0	33.0
2009	27.5	22.3	0.0	5.4	27.6	6.9	36.3	55.1	46.6	44.6	0.0	32.9
2010	37.6	31.1	8.4	21.7	34.3	52.3	36.2	54.9	92.9	92.4	46.2	0.0
2011	16.4	14.4	4.2	0.0	27.4	20.8	48.1	0.0	0.0	45.6	46.5	0.0
2012	6.5	6.6	4.2	0.0	0.0	31.2	24.0	0.0	0.0	0.0	0.0	0.0
2013	9.5	11.0	0.0	0.0	0.0	20.7	12.0	0.0	46.0	45.4	0.0	0.0



**Fig. 4. Trend in age-standardized incidence rate of cervical cancer in Calabar (2004-2013)**

Within the 5-year period from 2004 to 2008, there was an average annual decrease in incidence rate of 9.4% (95% CI: 3.8%-11.2%). However, within the 5-year period from 2009 to 2013, there was an average annual increase in incidence rate of 12.1%% (95%CI: 2.31% to 14.4%) (Table 4, Fig. 4).

**Table 4. Incidence rate of cervical cancer cases seen in Calabar (N=130)**

Year	Age std. rate
2004	14.5
2005	10.4
2006	17.6
2007	23.1
2008	7.1
2009	27.5
2010	37.6
2011	16.4
2012	6.5
2013	9.5

#### 4. DISCUSSION

The mean age of diagnosis of cervical cancer in Calabar is 44.6 (10.2) years, with the last five years of the survey showing a progressive

decrease in the mean age of diagnosis of this disease .Most of the patients fell in the age bracket of 45- 49 years, which is similar to 40 - 49 years reported in Ilorin in Middle belt of Nigeria [55] and 40- 49 in Kenya [56]. This is significantly lower than 60-69 years reported in Nnewi in the south east of the country [57], 50.4 reported in Benin, mid west of Nigeria [58], as well as 54.5 by Onwudiegwu [59], and 50-69 years in South- south Nigeria [23]. The age trend in Calabar conforms with earlier reports suggesting that cervical cancer tended to occur in the 40-49 age bracket in developing countries while in developed countries 50- 59 years [56]. Several reports have documented adverse socio-demographic factors favourable for early development of cervical cancers in this part of the world. Adewuyi et al. in Northern Nigeria reported that majority in the cohort they studied had initiated sexual activity by age 17, were in polygamous marriages and were multiparous [31,60]. Equally impactful is the contribution of HIV and AIDS in the cervical cancer aetiology in the younger women in this environment [15,61]. The HIV epidemic in Nigeria is described as generalized with wide regional variation [62]. The last 2012 sentinel survey reported a national HIV

prevalence of 3.4%; the highest prevalence was reported in the 35-39 age group. By zones the highest prevalence was recorded in the South South zone (5.5%), followed by, North East 3.5%, North Central 3.4%, North West 3.2%, South West 2.8% and South East 1.8% [62]. There is no national data of HIV associated cervical cancers. In our study the commonest age of cervical cancer incidence is a decade later than the commonest age of HIV prevalence in the country (45-49 years and 35-39 years respectively).

A frequency trend, showed a bimodal peak with the first and second troughs occurring in 2007 and 2010 respectively. There were more incident cases in the latter half of the study period; the last five years accounting for 59.6% of the cases. This is in agreement with current surveys which ascribe 85% of the world burden of cervical cancer to developing countries [3], as well as 83% of all new cases [63]. A high prevalence of cervical cancer is reported in several Nigerian [57,64-67] and West African studies [68-70]. The need for population screening of at risk women for cervical cancer in this environment cannot be over stated. Currently only opportunistic screening is taking place in institutions [49,71] or occasional public outreaches dotted across the country. It has been argued that the cost of screening test may be militating against universal access [72,73], however more studies seem to suggest that the knowledge of the disease is at best poor or in some cases nonexistent [39,43, 74-78]. Sometimes even among care givers in this environment the awareness may not be matched with attitudinal change in favour of adoption of the actual screening [38,42,44, 79-81].

Wide variations in incidence was noticed between some years under study, in a manner that appears to be out of sync with the norm. Particularly the incidence for years 2005, 2008 and 2012 showed very wide variations from what appears biologically possible. The reason for this wide variation between some years was not obvious. Questions have however been asked if occasional health workers strike involving the major government hospital-the Teaching Hospital which is the major source of the patients for the registry might have affected the entry. Of the three years mentioned only the year 2005 recorded significant workers restiveness to have affected patients turnout in that centre. The other concern is the manner in which the patients residence is captured under CanReg 4; the

patients residence in the past one year is what is entered. It is possible that Calabar being the capital City of Cross River State, nearly every patient could lay claim of having resided in the city at one time or the other. It may be possible that residence of individuals in the city if not properly captured may contribute to this unpredictable swings in incidence. An earlier study of Cervical cancer in Calabar between January 1997 and December 2006 was not helpfully in resolving previous patterns for two reasons; (1) it was a hospital based study involving cervical cancers received from the whole state (2) the yearly breakdown of the frequencies was not considered [82]. It is important to note that no disaster or epidemic occurred during this period to have accounted for this observed trend.

The crude incidence, adjusted rate and age specific incidence stood at, 17 per 100,000, 15 per 100,000 and 20 per 100,000. This is high by world standards for instance GLOBOCAN 2012 reported that the highest ASR above 30 per 100,000 occur in Melanesia 33.3, East Africa 42.7, South Africa 31.5, while low ASR areas are the developed areas of Australia / New Zealand 5.5 and Western Asia 4.4 per 100,000 [3]. The Calabar ASR is lower than the values reported by Ibadan and Abuja registries, 36 per 100,000 and 30.3 per 100,000 respectively [20]. Recall that both registries and Calabar are the only population based registries in Nigeria with a combined coverage of less than 5 % of the population. Looking at reports from both registries and the institution based reports and empirical evidence earlier alluded to, one can most certainly conclude that cervical cancer incidence is high in Nigeria. Effort must be redoubled at improving cervical cancer awareness which is still very low [39,41,51,63, 73] as well as institution of population screening which is nonexistent up to this moment [83-86]. The prevailing diagnostic approach of waiting for symptoms to appear before patients seek consultations should be discouraged. Cervical cancer screening should be incorporated into the primary health care and the cost of screening (\$10) in Calabar should be borne by Government. It is not surprising that most patients present with highly advanced cancers; often stage 3 and above [87]. This has warranted a suggestion that a nation-wide onetime screening of all women at risk be carried out in a year, to fish out nearly estimated 8000 cases, which may include 6400 stage 3 disease and the rest being lower stage disease [87]. This will be a



daunting task as nearly 30 million women may have to be screened and may task the whole national resources. Also advocated is the adoption of culturally oriented strategies that will overcome both religious and cultural barriers to health education [40,46,88,89].

## 5. CONCLUSION

Cervical cancer is a common disease in Calabar. Its incidence ranks among the high incidence zones of the world.

## 6. LIMITATIONS OF STUDY

The area covered by the cancer registry is small (three local government areas out of 18) and 700,000 people out of a possible 3 million in the state.

## 7. RECOMMENDATIONS

Both local, regional and national resources must be concentrated first at creating sufficient awareness of the disease in the population, followed by institution of local, regional and national cervical cancer screening programs. For a disease that has been proven to be easily preventable, it suggest a failure of our public health system, to have this high cervical cancer incidence in our environment. Effort must therefore be redoubled to reverse the trend.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

Permission for this study was granted by the Calabar cancer registry.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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