Epidemiology of Cancer of the Cervix in Rivers State, Niger Delta

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Authors' contributions

This work was carried out in collaboration between both authors. Author AG designed the study, performed the statistical analysis and wrote the protocol. Author TTE wrote the first draft of the manuscript, managed the analyses of the study and managed the literature searches. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

The epidemiology of cancer of the cervix refers to the scientific study of the spread and control of the disease. In the Niger Delta region in Nigeria, cervical cancer presents as a public health concern among women in their prime age. This cancer of the uterine cervix is usually followed by a long phase of pre-invasive disease that lasts for about 10-15 years. It is characterized by a spectrum of events which progresses from cellular-dysplasia to invasive cervical cancer. It is the second most common cancer among women and one of the leading causes of cancer deaths among women not only in Niger Delta Region, but worldwide. Its incidence rate is approximately 25 per 100,000 women. If we were to conduct a one-time screening over one year, 8000 new invasive cervical cancers would be detected. Basic and epidemiologic research conducted during the past 15-20 years has provided overwhelming evidence regarding the etiologic role of infection by the human papilloma virus (HPV) as the primary cause of cervical cancer. The relative risks of cervical cancer following HPV infection as ascertained in case-control and cohort studies are among the highest in cancer epidemiology. Virtually all cervical carcinoma specimens contain HPV DNA, which

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suggests that HPV infection is a related cause of cervical neoplasia. Therefore, detailed knowledge of cervical cancer will help reduce its occurrence in an undeveloped region such as Niger Delta, Nigeria.

Keywords: Cervical cancer; Human Papilloma Virus (HPV); pap smear screening; Niger Delta.

1. INTRODUCTION

Cervical cancer (CC) is a major public health problem. It can be prevented, yet remains one of the leading causes of cancer deaths in women globally as majority of these deaths occur in developing countries [1]. In Nigeria, it is the second most common cancer affecting females after breast cancer responsible for most mortality cases among Nigerian females during their reproductive years [2].

Cervical cancer is the second most common female cancer in women aged 15-44 years, worldwide. In 2012, there were an estimated 528,000 new cases and 266,000 deaths resulting from cervical cancer, with 70% of those deaths occurring in developing countries [3]. In Sub-Saharan Africa, cervical cancer accounts for 22.5% of all cancer cases in women and the majority of women who develop cervical cancer live in rural areas [4]. However, women in developing countries like Nigeria are yet to profit extensively from the benefits of screening programs and recent trends show a resurgence of the disease in developed countries. The past two decades have witnessed substantial progress in our understanding of the natural history of cervical cancer and in major treatment advances. Human papillomavirus (HPV) infection is now recognized as the main cause of cervical cancer, the role of coexisting factors is better understood, a new cytology reporting terminology has improved diagnosis and management of precursor lesions and specific treatment protocols have increased survival among patients with early or advanced disease.

According to Onwasigwe, a one-time screening over one year will detect 8000 new invasive cervical cancers [5]. The cervical cancer burden is high in the Niger Delta region. Current estimates indicate that every year nearly one thousand women are diagnosed with cervical cancer and almost 700 die from the disease [3]. Cervical cancer ranks as the most frequent cancer among women in Niger Delta and the most frequent cancer among women between ages 15 and 44 [6].

In rural and urban areas of Niger Delta Region, most women are yet to hear, have knowledge and understanding of cervical cancer. One of the major causes of continuous increase rate of any disease is lack of adequate knowledge concerning such ailments. Several key risk factors for cervical cancer are common in sub-Saharan countries, including prolonged HPV infections and HIV/AIDS which is endemic in this region [7]. Other risk factors include debut of sexual activity before age 20 years, multiple sexual partners, tobacco smoking, oral contraceptive pill use for more than 5 years, history of cervical cancer in the family, high parity (more than 3 children born) and immune-depression due to malnutrition or other systemic diseases [8].

In low resource countries, cytology-based screening programs and/or DNA typing of HPV are usually beyond the capacity of many health facilities. Visual inspection of the cervix using acetic acid (VIA) or Lugol's iodine (VILI) to highlight precancerous lesions allows identification of these lesions in the clinic instead of the laboratory. With adequate training, any health care provider including doctors, nurses or nurse-midwives, can effectively perform the procedure. VIA may perform as well or better than cervical cytology in identifying pre-cancerous lesions [9].

1.1 Cancer-causing Risk Factors

There are some major categories of external factors or agents that lead to the development of cancer. Long term exposure to one or more of these factors may result in damage of the deoxyribonucleic acid (DNA) of the individual, causing mutation in some genes. Whenever gene controlling cell division is affected and the damage to the gene cannot be repaired, unregulated cell division occurs which may lead to cancer. These cancer-causing agents include:

i. Physical carcinogens such as ultraviolet and ionizing radiation

ii. Chemical carcinogens such as asbestos, components of tobacco smoke, aflatoxin

(toxin produced by some fungi) and arsenic (a drinking water contaminant)

iii. Biological carcinogens such as infections from certain viruses, bacteria or parasites.

iv. Ageing is another fundamental factor for the development of cancer. The incidence of cancer rises dramatically with age, most likely due to a build-up of risks for specific cancers that increase with age. The overall risk accumulation is combined with the tendency for cellular repair mechanisms to be less effective as a person grows older.

v. Heredity: Though most cancers are sporadic (non- hereditary), a small number of cancers occur due to inherited genetic defects. Most of these cancers often occur in a syndromic manner (involves more than one form or conditions in more than one organ of the body). Examples include Li-Fraumeni syndrome associated with development of breast cancer, sarcoma, brain tumour and leukaemia and Lynch syndrome which is associated with increased risk of colon, ovarian and endometrial cancers.

vi. Hormones: Some hormones have been implicated in the development of some malignancies such as the cancer of the breast, prostate and endometrium. For instance, increased incidence of prostate in black men compared to those of European descent is linked to significantly higher levels of testosterone in black men. High level of oestrogen in females is associated with increased risk of breast and endometrial cancers.

vii. Immunological defects: immunological defects such as autoimmune diseases and immune-suppression are associated with increased risk of some cancers such as cancer of the colon, stomach and liver.

The World Health Organization listed the following as cancer risk factors.

Documentation has been a major problem in reporting of trends of cervical incidences in Niger Delta, Nigeria and where there are records, they are limited by poor data quality and inaccurate population estimation [10]. The differential patterns of cervical cancer and the wide variation in incidences are possibly related to environmental differences. Etiologic associations and possible risk factors for cervical carcinoma have been widely studied. The available evidence indicates that the HPV-cervical cancer association satisfies all relevant causal criteria for public health action. Other cervical cancer risk factors are sexual and reproductive factors, socio-economic factors (education and low income), viruses (e.g. herpes simplex virus, human immunodeficiency virus (HIV)), smoking, diet, hormones, use of oral contraceptives and parity [11].

The impact of cancer of the cervix is greater among older, low-income and minority women as evidenced in Niger Delta, Nigeria [12]. This is the first instance in which a necessary cause has been demonstrated in cancer epidemiology–a realization that has obvious implications for primary and secondary prevention of this neo-plastic disease. The accumulated evidence suggests that cervical cancer is preventable and is highly suitable for primary prevention. Sexual hygiene, use of barrier contraceptives and ritual circumcision can undoubtedly reduce cervical cancer incidence [5].

Early detection and treatment of cervical precancerous lesions is associated with high cure rates, whereas failure to detect precancerous lesion increases the risk of cervical cancer development and hence the risk of premature death. This study was therefore carried out to investigate the current knowledge of cervical cancer, cervical screening and prevention among health workers in Rivers State, South- South of Nigeria.

Table 1. Cancer risk factors as reported by WHO, 2014

Risk factors	Males	Females	Total
Current Tobacco Smoking	9.8%	2.3%	6.10%
Total Alcohol per Capita consumption, in litres of pure alcohol (2010)	14.9	5.1	10.1
Physical inactivity (2010)	17.7%	21.9%	19.8%
Obesity (2014)	5.3%	14.3%	9.7%
Household solid Fuel use (2012)			75.0%

1.2 Aim of the Study

The aim of the study was to determine the epidemiology of cancer of the cervix in Rivers State, Niger Delta.

1.3 Objectives of the Study

The objectives of the study were to:

1. Assess the demographic characteristics of the respondents in the study;
2. Determine the percentage of the respondents that have knowledge of cervical cancer (causes, signs and symptoms and screening methods) and
3. Ascertain the percentage of the respondents that practiced cervical cancer screening.

2. METHODOLOGY

2.1 Study Population

The target population comprised of female staff of primary health care centres in Rivers State.

2.2 Study Design

This study was a descriptive cross-sectional, questionnaire-based study carried out to assess the knowledge and utilisation of cervical cancer screening among health worker aged 20 years and above.

2.3 Data Collection

The aim of the paper was explained to the respondents before informed and voluntary consent was obtained. Purposive sampling was used to retrieve information from two hundred and fifty (250) respondents. The questionnaire requested for data related to demography, knowledge of cervical cancer, risk factors, and screening of cervical cancer. Predefined answer categories (Yes, No, Strongly Agree, Agree, Disagree, Strongly Disagree) were provided. Confidentiality of the respondents was ensured.

2.4 Validity of the Instrument

To ensure validity of the instrument, the researcher constructed the questionnaire based on the objectives of the study and later gave it to two specialists in the field of oncology for comments.

2.5 Reliability of the Instrument

Ten (10) copies of the questionnaire were given to ten (10) females seeking for health care in two Primary Health Care Centres in Bayelsa State-a neighbouring State to Rivers State- after verbal consent was obtained from them. Two weeks later, the questionnaires were given to the same set of persons. The variations in responses in the two sets of questionnaires were considered before final draft of the questionnaire used for the study.

2.6 Data Analysis

Statistical Product and Service Solutions (SPSS) version 23.0 was used for data analysis. Percentages of relevant data were obtained and expressed in simple descriptive statistics.

3. RESULTS

Three hundred (300) questionnaires were administered, out of which 250 were usable, giving a response rate of 86%.

3.1 Demography

Fig. 1 shows that 36% of the total respondents were between ages 20-29 years; similarly, 30% were between ages 30-39 years whereas 24% and 10% were between 40-49 years and 50 years & above, respectively. The figure also shows that the majority of the respondents were married as 40.4% ware married, 33.2% and 6.8% were single and widowed, respectively. Most of the respondents were resident in the urban area as 68.8% of the respondents were located in the urban area and 31.2% of the study population were resident in rural area. Of the total respondents, 16.3% has been undergone a cervical cancer screening test while the remaining 83.7% had not undergone any of the screening tests.

Respondents identified positive response on abdominal pain (76%), discharge or pain during sex (87.6%), vaginal bleeding after menopause (98%), vaginal bleeding between periods (93.2%), vaginal bleeding during or after sex (92%) and vaginal itching (77.6%) as signs and symptoms of cervical cancer.

Respondents positively identified smoking (94%), having a weakened immune system (96.4%), having family history (86%), infection with Human Papilloma Virus (HPV) (96%), long term use of contraceptive pill (98.4), not going for regular smear or pap test (59.2%), starting to have sex

before age 17 years (82%) and low diet in fruit (81.6) as risks for contracting CC (Table 3).

Regarding knowledge of Cervical Cancer screening methods, respondents positively identified visual inspection with acetic acid (94.4%), liquid based cytology (79.2%), HPV testing (99.2%) and pap smear (93.2%) as cervical cancer screening methods.

4. DISCUSSION

4.1 Age

It is claimed that girls younger than 15 years rarely develop CC; the risk goes up between the late teens and mid-30 s. Women over 40 remain at risk and need to continue having regular cervical cancer screenings [13]. Thus, age-wise, respondents in this study are at risk of developing cervical cancer as majority (96.3%) of them were between ages 20- 29 years. In a recent study, the risk for cervical pre-cancer and cancer was found to be associated with age (>40 years), the median age observed for an invasive cancer diagnosis or positive screening result was 32 years and the mean age (SD) at first sexual intercourse was 19 (4) years [14]. According to Hoque & Hoque, in a population, a median age of 47 years was observed for cervical cancer diagnosis [15].
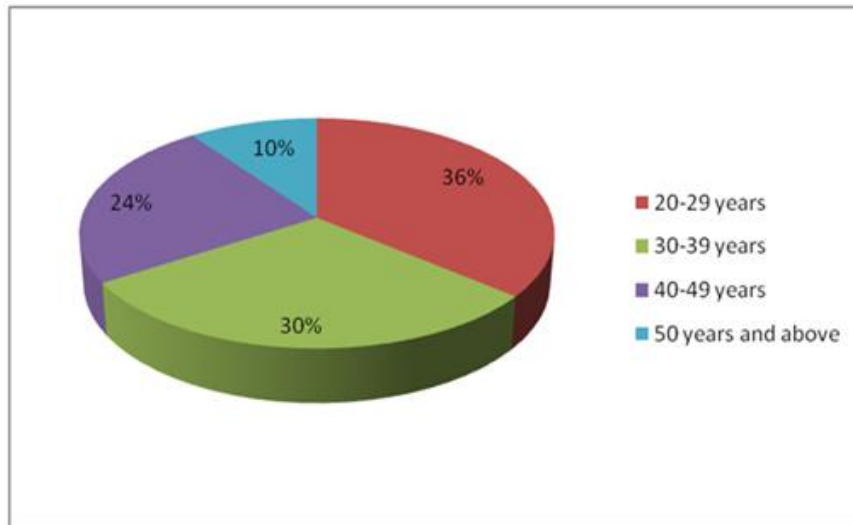

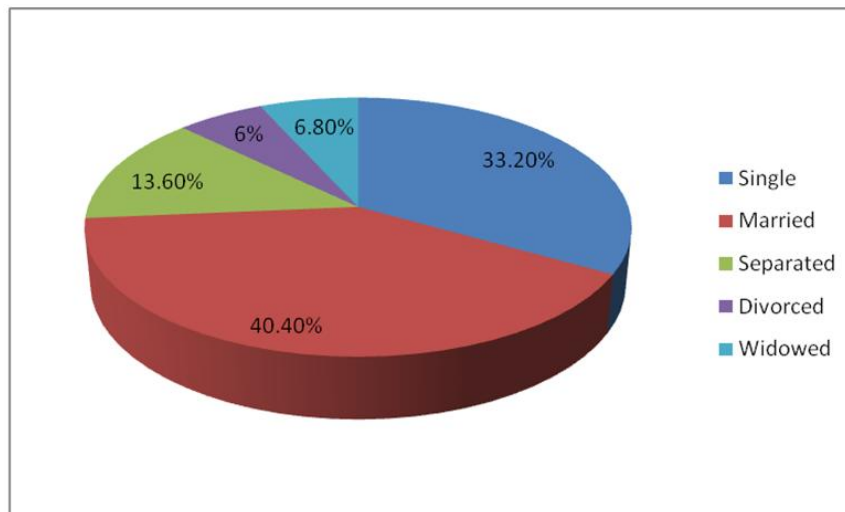**Fig. 1. Percentage distribution by age**

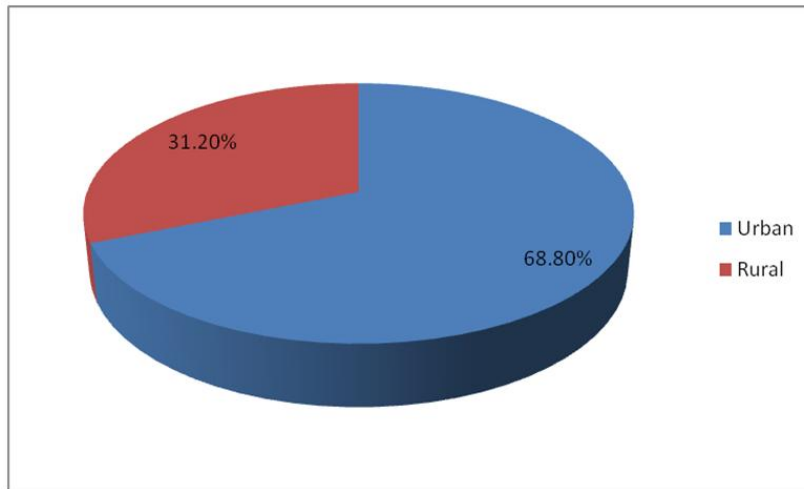**Fig. 2. Percentage distribution by marital status**

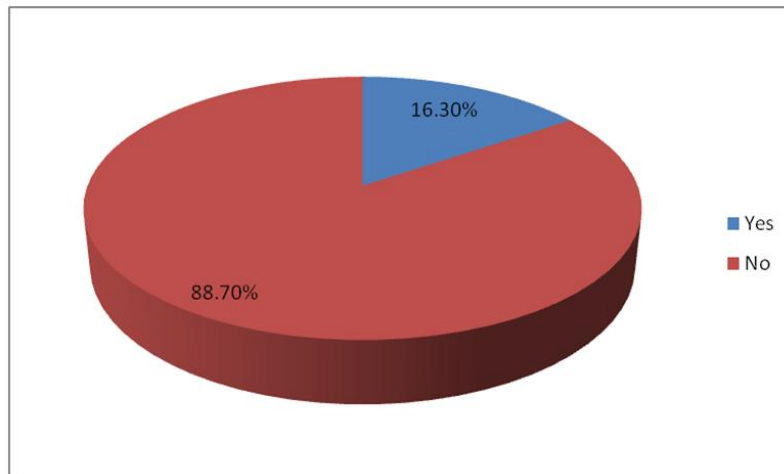**Fig. 3. Percentage distribution by facility location**

Fig. 4. Persons that have been screened for cervical cancer

Most of the respondents were married (40.4%) and within the sexually-active age range of 20 - 30 years (96.3%). All respondents were highly educated, being health professionals. Studies have identified various risk factors for developing cervical cancer including smoking, parity, education, diet, physical inactivity, sexual behaviour, use of oral contraceptives, population growth and aging [16].

4.2 Sexual Activities

It is reported that women with more than one sexual partner have greater risk of HPV infection with consequently increased risk of developing cervical cancer [14]. Similarly, women with partners who in turn have multiple partners are equally at increased risk of contracting cervical

cancer. This results from the connection between multiple sexual partners and increased risk of contracting HPV which is a causative agent of cervical cancer. According to Horo et al. HPV is considered the most prevalent STI globally and that more than 50% of women that have engaged in sexual practice may have been infected at one point in their lifetime [17]. Consequently, respondents in this study are at risk of contracting cervical cancer because some of them were single, separated or divorce, which may warrant multiple sexual partners. In consonance with this study, studies have reported 2-5 lifetime sexual partners among women. It is postulated that indiscriminate sexual practices predispose women to develop cervical cancer [18].

Table 2. Knowledge of signs/symptoms of cervical cancer

Variables		Strongly agree N (%)	Agree N (%)	Disagree N (%)	Strongly disagree N (%)	Positive responses N (%)
Abdominal pain	Frequency	108	82	40	20	190
	Percentage	43.2%	32.8%	16.0%	8.0%	76%
Blood in the stool or urine	Frequency	15	43	154	38	58
	Percentage	6.0%	17.2%	61.6%	15.2%	23.2%
Discharge or pain during sex	Frequency	92	127	11	20	219
	Percentage	36.8%	50.8%	4.4%	8.0%	87.6%
Heavier or longer Periods than usual	Frequency	10	30	150	60	40
	Percentage	4.0%	12.0%	60.0%	24.0%	16%
Irregular menstruation	Frequency	9	16	200	25	25
	Percentage	3.6%	6.4%	80.0%	10.0%	10%
Persistent back pain	Frequency	27	10	157	56	37
	Percentage	10.8%	4.0%	62.8%	22.4%	14.8%
Persistent diarrhoea	Frequency	8	16	122	104	24
	Percentage	3.2%	6.4%	48.8%	41.6%	9.6%
Vaginal bleeding after menopause	Frequency	167	78	5	0	245
	Percentage	66.8%	31.2%	2.0%	0.0%	98%
Vaginal bleeding between periods	Frequency	200	33	15	2	233
	Percentage	80.0%	13.2%	6.0%	.8%	93.2%
Vaginal bleeding during or after sex	Frequency	133	97	15	5	230
	Percentage	53.2%	38.8%	6.0%	2.0%	92%
Vaginal itching	Frequency	107	87	56	0	194
	Percentage	42.8%	34.8%	22.4%	0.0%	77.6%

Table 3. Knowledge on causes of cervical cancer

Variables		Strongly agree	Agree	Disagree	Strongly disagree	Positive responses
Being a smoker	Frequency	111	124	6	9	235
	Percentage	44.4%	49.6%	2.4%	3.6%	94%
Having a weakened immune system	Frequency	140	101	2	7	241
	Percentage	56.0%	40.4%	0.8%	2.8%	96.4%
Having a family history	Frequency	56	159	23	12	215
	Percentage	22.4%	63.6%	9.2%	4.8%	86%

Variables		Strongly agree	Agree	Disagree	Strongly disagree	Positive responses
Having many sexual partners	Frequency	8	10	99	133	18
	Percentage	3.2%	4.0%	39.6%	53.2%	7.2%
Infection with Human Papilloma Virus (HPV)	Frequency	87	153	10	0	240
	Percentage	34.8%	61.2%	4.0%	0.0%	96%
Long term use of contraceptive pill	Frequency	76	170	4	0	246
	Percentage	30.4%	68.0%	1.6%	0.0%	98.4%
Not going for regular smear or pap test	Frequency	81	67	43	59	148
	Percentage	32.4%	26.8%	17.2%	23.6%	59.2%
Starting to have sex before age 17 years	Frequency	41	164	18	27	205
	Percentage	16.4%	65.6%	7.2%	10.8%	82%
Low diet in fruit	Frequency	65	139	31	15	204
	Percentage	26.0%	55.6%	12.4%	6.0%	81.6%

Table 4. Respondents knowledge of cervical cancer screening methods

Variables		Strongly agree N (%)	Agree N (%)	Disagree N (%)	Strongly disagree N (%)	Positive Responses N (%)
Visual inspection with acetic acid	Frequency	138	98	12	2	236
	Percentage	55.2%	39.2%	4.8%	.8%	94.4%
Liquid based cytology	Frequency	78	120	29	23	198
	Percentage	31.2%	48.0%	11.6%	9.2%	79.2%
HPV testing	Frequency	98	150	2	0	248
	Percentage	39.2%	60.0%	.8%	0.0%	99.2%
The Pap smear	Frequency	139	94	15	2	233
	Percentage	55.6%	37.6%	6.0%	.8%	93.2%
Polar probe	Frequency	30	18	145	57	48
	Percentage	12.0%	7.2%	58.0%	22.8%	19.2%
Urinalysis	Frequency	22	10	169	49	32
	Percentage	8.8%	4.0%	67.6%	19.6%	12.8%
Fasting blood test	Frequency	2	2	153	93	4
	Percentage	.8%	.8%	61.2%	37.2%	1.6%

4.3 Age of Initiation of Sexual Intercourse

In this study, sexual intercourse debuted at 15-20 years for about a third of the respondents. This is in consonance with a study that reported the mean age at first sexual intercourse to be 19 years [14]. One other risk factor for cervical cancer is early age of initiation of sexual intercourse. This arises from the fact that commencement of squamous metaplasia occurs at puberty and during first pregnancy. Women who had sexual intercourse a year after menarche had a 26-fold increased risk of contracting cervical cancer compared with women who had first sexual intercourse after the age of 23 [19]. Thus, women in this study cohort are at risk of developing cervical cancer.

4.4 Knowledge and Awareness of Cervical Cancer

Majority of the respondents in this study were aware of CC; almost 70% had knowledge of cervical cancer as 76%, 87% 98%, 93.2 ,92% and 77.6% identified Abdominal pain, discharge or pain during sex, Vaginal bleeding after menopause, Vaginal bleeding between periods, Vaginal bleeding during or after sex and Vaginal itching as signs/symptoms of cervical cancer, respectively. Further, respondents positively identified smoking (94%), having a weakened immune system (96.4%), having family history (86%), infection with Human Papilloma Virus (HPV) (96%), long term use of contraceptive pill (98.4), not going for regular smear or pap test (59.2%), starting to have sex before age 17 years (82%) and low diet in fruit (81.6) as risks for contracting cervical cancer. Respondents in this study thus had a high awareness and knowledge of cervical cancer. This is not coming as a surprise considering their background as health professionals. This is similar to a study conducted among female health workers in Sokoto, Northern Nigeria who demonstrated a very high level of awareness and knowledge of cervical cancer [20]. Expectedly, a much lower level of knowledge and awareness was demonstrated in studies among market women in Zaria, Northern Nigeria and among patients in a tertiary centre in south west Nigeria [21,22]. Furthermore, a good number (68.8%) of respondents in this study also claimed to have read about cervical cancer and about a quarter of them had seen a cervical cancer patient. These factors may have contributed to the high levels of knowledge and awareness demonstrated by respondents in this study. Many of the respondents obtained their information about cervical cancer from seminar, school lecture, magazine, newspapers, radio, internet, conferences television, etc.

4.5 Knowledge and Practice of Cervical Cancer Screening

Respondents in this study demonstrated an appreciable level of knowledge of cervical cancer screening methods as visual inspection with acetic acid (94.4%), liquid based cytology (79.2), HPV testing (99.2%) and pap smear (93.2%). Also, 75.8% of respondents knew the importance of cervical cancer screening. This is comparable to a study by Ahmed et al. but in contrast to others by Ajenifuja and Cyril [20,21,23]. As it were, knowledge does not always translate to practice. The high level of awareness and knowledge of cervical cancer among respondents in this study never correlated with optimal utilization of cervical cancer screening procedures as only 16.3% of the respondents had ever been screened for cervical cancer. This is similar to the 15.4% reported among market women in northern Nigeria and 18% among female health workers in South East Nigeria but higher than the 1.78% reported among market women in South East Nigeria and 3.2% among patients in a tertiary health facility in south west Nigeria [21]. Another study among female health workers in Northern Nigeria reported 10% [20].

Albeit, women's knowledge had been correlated with screening uptake; women with low levels of knowledge about cervical cancer (CC) and its prevention are usually more reluctant and less willing to access screening services [24]. There is a dire need to increase the screening awareness in this population of respondents that have risk factors for developing CC. In some countries women are actively invited to participate in screening programmes. Cervical Cancer remains a significant cause of cancer death among women in areas where organized screening is not available. The benefits of screening are enormous and include the reduction of the risk of cervical cancer by as much as 80% through regular screening. The Papanicolaou (pap) smear has been designated a prominent tool for CC screening and early diagnosis. It has also been discovered to be a very effective measure for CC prevention. This tool is widely available and variously demonstrated to decrease mortality rates by as much as 60-90% in some developed countries [25].

Pap test reduces cervical cancer incidence and mortality and it lowers the progression risks of a precancerous lesion to cancer. It is indicated only in asymptomatic women. It offers about 93.5% protection for women aged 35–64 years following annual screening, 83.5% for screening every 5 years and 64% for screening every 10 years. Also, organized screening has been shown to be capable of reducing cervical cancer mortality by 70% or more, deter the loss of large numbers of life years and to also lower disease burden and costs associated with management of advanced disease. Findings from many studies have suggested that unscreened women were at high risk of cervical cancer [26]. Low utilization of Pap smear has however, been recorded in Nigeria and other countries [10,27]. It is recommended that all women begin cervical screening at age 21; frequency of performance varies from once a year to once every five years, in the absence of abnormal results [11,23].

4.6 Prevention

i. Primary prevention with prophylactic vaccination against the major causes of cervical cancer, the human papilloma virus Type 16 and 18. The first dose could be given to girls at age 11 or 12.

ii. Health education and campaign on media and social platforms e.g. Facebook, twitter, etc.

iii. Any bleeding during intercourse should be evaluated by a gynaecologist.

iv. Those that are sexually active should use a condom every time they have sexual intercourse as condoms help to lower the risk of contracting HPV and developing HPV-related disease including cervical cancer.

v. Practice safe sex: studies have shown that women who have many sexual partners increase their risk of developing cervical cancer

vi. Quit smoking as smoking cigarettes doubles the risk of developing cervical cancer.

vii. Routine screening for cervical cancer abnormalities can detect early stage cancer and precancerous conditions that could progress to invasive disease. This process begins with pap test and follow up on abnormal pap smears.

Interestingly, such properly instituted large-scale screening programmes have not been well established in the Niger Delta and Rivers State especially; because of lack of the necessary resources and political-will to embark on such large-scale cervical cancer screening programmes even though the majority of the participants presently reside in the Niger Delta, Nigeria. Majority of the women diagnosed with cervical cancer came for the first time with advanced disease. Worst-still, most of these women are not only ignorant of the public health importance of cervical cancer in the environment but are also largely unaware of the risk factors for disease development, clinical features and most important, the availability of cost-effective disease screening programmes capable of altering the natural history of pre-invasive cervical lesions.

5. CONCLUSION

Majority of women in this study had characteristics and profiles that make them at high risk of developing Cervical Cancer which include age, multiple sexual partners and early age of initiating sexual activity. Respondents had a high level of Cervical Cancer awareness and knowledge; their level of knowledge of Cervical Cancer risk factors and screening methods was also high. Conversely, CC screening reception was found to be very low. Similarly, knowledge and practice of CC vaccination was very low. The prevalence of CC was however low in this study population. The study recommends intensive awareness programmes in the population; curricula should be beefed up as a platform to inform and educate the health workers who, in turn, are looked upon to educate the public to increase public awareness on issues of cervical cancer, government should also embark on free medical screening for all women (i.e. pap smear for HPV), all facilities to have centres where individuals can go for pap smear at a subsidized rate and finally three doses of human papilloma virus vaccine (HPV4 Gardasil) should be given from age 11 and above.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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