Incidence and predictors of premalignant cervical lesions among women in Jos University Teaching Hospital, Plateau State, Nigeria

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Abstract

Background: Premalignant cervical lesions are a potential precursor of cervical cancer, which can be identified through screening. Approximately 80% of cervical cancers occur in developing countries, where routine screening is rare.
Aims: This study aimed to examine the incidence and risk factors of premalignant cervical lesions among women screened at Jos University Teaching Hospital (JUTH) in 2009.
Methods: A purposive sampling technique was used to select a sample size of all the women (1962) who were screened at JUTH during January–December 2009. Data were retrieved with the help of the data manager of the cervical cancer screening unit. Descriptive and multiple regression analyses were done to determine risk factors.
Findings: Of the 1962 subjects, 5.8% tested positive and 94.2% negative. The majority (82.5%) of those with premalignant cervical lesions had experienced sexually transmitted infections. Those using oral contraceptives had a higher rate (44.7%) of lesions than women using other forms of contraception. Women who had first sexual intercourse aged 10–15 years had a higher rate (41.2%) of lesions, as did those who had seven or more sexual partners (50.9%), or with seven or more children (43.9%).
Conclusions: There was a fairly low incidence of positive screening results among the study population. Major risk factors included sexually transmitted infections, early age of first sexual intercourse, increased number of sexual partners, use of oral contraceptive pills and increased parity. The authors recommend a public health campaign on the benefits of cervical cancer screening in Plateau State and across Nigeria.

Keywords: Premalignant lesions, Screening, Cervical cancer

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Cervical cancer is a significant cause of morbidity and mortality in women, particularly in developing countries (Saslow et al, 2002). Despite the availability of a simple and affordable screening called the Papanicolaou test (also known as 'Pap smear'), which can provide early detection, cervical cancer is still the most common malignancy among women (Akin, 2006). In Nigeria, women's major source of information about cancer of the cervix and cervical screening tests is the media (Ijaiya et al, 2004). Barriers to women accessing a Pap smear test include inadequate knowledge about cervical cancer and the screening procedure (Akin, 2006). Evidence from the international literature (Manhart and Koutsky, 2002; Saslow et al, 2002) suggests that if the federal government could implement a national policy for cervical screening of every woman of reproductive age at least once in 3 years, the incidence of cervical cancer arising from premalignant lesions would be minimised.

Premalignant cervical lesions are tissue damage or benign growths on the cervix (Akin, 2006). They are common in premenopausal women and are thought to be due to the effect of unopposed oestrogen, which is common during this period of a woman's life (Gadducci et al, 2011). Cervical lesions may be single or multiple, and may arise from the columnal epithelium and later proliferate into the squamous epithelium at the transformation zone of the cervix. The premalignant disease also known as cervical intraepithelial neoplasia (CIN) could metastasise most actively during fetal development (Piyathilake et al, 2004). The risk of developing CIN and invasive cancer is increased if the transformation zone of the cervix is exposed to carcinogens such as human papilloma viruses (HPV), especially types 16, 18 and 33 (National Cancer Institute, 2010). Premalignant cervical conditions can be detected early through the use of Pap smear screening, which is a microscopic examination of cells taken from the cervix, named after a Greek American, George Papanicolaou, who first performed the smear in 1946. Since the introduction of Pap smear screening, the incidence of cervical carcinoma has decreased, including the advancement of premalignant lesions to cancer of the cervix (American Cancer Society, 2014).

In populations where screening is carried out regularly,

mortality from cervical carcinoma is reduced by as much as 99% (National Cancer Institute, 2010; American Cancer Society, 2014). Many of the cases of cervical lesions and/or carcinoma now occur in women who have not had regular screening (Centers for Disease Control and Prevention, 2011). Cervical cancer screening is recommended annually, beginning when a woman is 18 years old, or when she becomes sexually active if this is earlier than the age of 18 years. The best time to have the screening is when the woman is not menstruating. Sexual intercourse, vaginal douching, vaginal medications and vaginal contraceptives such as creams, foams and jelly should be avoided for 2 days prior to the test. This is advocated to prevent obscurity of any abnormality of cells. Detection of cervical premalignant lesions in their early presentation allows for a cure rate of approximately 92% (Centers for Disease Control and Prevention, 2011). The premalignant disease frequently occurs in younger women, often under the age of 40 years, owing to the use of oral contraceptive pills and hormonal changes, and is common in women of low socioeconomic status, which may be due to inadequate knowledge about cervical cancer and low level of compliance with regular screening among this group of women (Gadducci et al, 2011). This research was conducted to find out more about cervical cancer, in light of its prevalence, the poor prognosis that is usually associated with it, the pain that cancer patients undergo, and the short duration between the time of diagnosis and death (Wong et al, 2008).

Objectives of the study

This study had two aims:

- To obtain the sociodemographic and reproductive variables of subjects who had cervical screening undertaken in Jos University Teaching Hospital (JUTH) and those found having premalignant cervical lesions in the year 2009
- To examine the common predictors of premalignant cervical cancer among women attending the cervical cancer screening unit of JUTH between January and December 2009.

Background

Premalignant cervical lesions are a potential precursor of malignant cervical cancer, often diagnosed on cervical examination, cervical screening or biopsy. The naming and histologic classification of cervical carcinoma precursor lesions has changed many times. The term 'cervical intraepithelial neoplasia' was developed to place emphasis on the spectrum of abnormality in these lesions, and to help standardise treatment. It classifies mild dysplasia as CIN 1, moderate as CIN2, and severe as CIN 3 (Centers for Disease Control and Prevention, 2011).

Screening can identify potentially pre-cancerous changes, and treatment of high-grade changes can prevent the development of cancer. In developed countries, the widespread use of cervical screening programmes has reduced the incidence of invasive cervical cancer by 50% or more (Saslow et al, 2002). The predisposing factors include: HPV, especially types 16 and 18; multiple sexual partners; smoking; HIV infection; chlamydia infections; dietary factors;

Around 80% of cervical cancers occur in developing countries, wher routine screening is rare

hormonal contraception; multiple pregnancies; exposure to hormonal drugs such as diethylstilbestrol; a family history of cervical cancer; as well as low socioeconomic status (Akin, 2006). In the UK, around 11 000 women die of cervical cancer per year (National Cancer Institute, 2012). Figures from the National Cancer Institute (2010; 2012) suggest that cervical cancer screening saves 5000 lives each year in the UK, via early detection and treatment of pre-cancerous lesions. Approximately 80% of cervical cancers occur in developing countries, where routine screening and early detection of pre-cancerous lesions is rare. Worldwide, in 2008, it was estimated that there were 473 000 cases of cervical cancer and 253 500 deaths per year, most of which occurred in developing countries (Reproductive Health Technologies Project, 2009).

In women under the age of 25 years, invasive cervical cancer is extremely rare but changes in the cervix are common. Lesions treated in young women may prevent cancers from developing many years later; therefore, evidence suggests that screening should start at 25 years of age (World Health Organization, 2002). The premalignant lesions of the cervix can be treated before malignancy occurs (Lindeque, 2005). A vaccine for immunisation against premalignancy of the cervix (Gardasil) may protect some women but does not prevent all types of cervical cancer, so it is important to continue regular cervical screening (Lindeque, 2005). Manhart and Koutsky (2002) ascertained that condoms may offer some protection against cervical cancer. Condoms may protect against genital warts and premalignant lesions; they also provide protection against other sexually transmitted infections such as HIV and chlamydia, which are associated with a greater risk of developing premalignancy and malignancy of cervical cancer. Condoms may also be useful in treating potentially precancerous changes in the cervix, because exposure to semen appears to increase the risk of precancerous lesions (CIN 3) (Manhart and Koutsky, 2002). It has been suggested that prostaglandin in semen may fuel the growth of cervical lesions that are a precursor of cervical tumors, and that the use of condoms may serve as a preventive measure (BBC News, 2006).

The American Cancer Society (2014) has stated that carcinogens from tobacco increase the risk of cancers including cervical cancer, and a woman who smokes has about double the chance of developing cervical cancer compared with a non-smoker. Piyathilake et al (2004) reported that lower levels of antioxidants coexisting with low levels of folic acid increase the risk of CIN development, and that improving the folate status of women who are at risk of becoming infected, or are already infected, with high-risk HPV may have a beneficial impact in the prevention of cervical cancer. Cervical cancer screening is typically recommended to be commenced 3 years or more

after first sexual intercourse or starting at age 18. Pap smear screening should be undertaken once a year before the age of 50 years, and once every 5 years thereafter, in the absence of abnormal cells (World Health Organization, 2002). Well-screened women who have not had abnormal smears can stop screening around the age of 60–70 years (Saslow et al, 2002). The treatment success rate of precursor cervical cancer-premalignancy has been reported to be 92% in early detection, monitoring and treatment (American Cancer Society, 2016). In the USA, the success of Pap smear screening and the early detection of premalignant lesions has led to the incidence of—and mortality due to—cervical cancer being reduced by about half between 1980 and 2000 (MacDonald et al, 2008). The incidence of premalignant lesions from Pap smear screening has helped to decrease cervical cancer deaths by 74% in the last 50 years (National Cancer Institute, 2010). In Australia, it has been suggested that regular 2-yearly Pap tests can reduce the incidence of cervical cancer by up to 94% and prevent 2200 Australian women dying from the disease each year (National Cancer Institute, 2010). Therefore, the number of women diagnosed with cervical cancer has dropped since organised screening began.

The major benefit of the Pap smear is to detect changes in the cervix before they become cancerous. An abnormal Pap test is not a diagnosis of cancer but it is an abnormal condition that may require treatment (Sherwani et al, 2007; Centers for Disease Control and Prevention, 2011; Bhattacharyya et al, 2015). Women's attitude towards cervical cancer and screening is said to be highly influential in determining whether or not they would have a Pap smear; women who consider it embarrassing are less likely to have the test (Gamarra et al, 2005). In the UK, in a cross-sectional survey of 650 women aged 15–78 years who were randomly recruited at two hospitals in London, 19.7% believed cervical cancer could be treated if detected early at pre-malignancy, while 66.9% considered the Pap test 'no problem'. Women who considered cervical screening embarrassing constituted 58.8% of those who did not schedule regular visits for a Pap smear. About 72.6% of the women surveyed perceived cervical cancer to be a common disease, and there was a good awareness of the association between cancer and smoking, and between cancer and number of sexual partners (World Health Organization, 2002).

Attitude towards cervical cancer and screening are known to be profoundly affected by cultural beliefs and norms. A study exploring attitudes and socio-cultural beliefs of Malaysian women about cervical cancer screening found that many women believed a Pap smear was a diagnostic test, and because they had no symptoms they felt there was no need to have the test (Wong et al, 2008). In developing countries, many women express feelings of embarrassment, fear, shame, and shyness about undergoing the test (Aboyeji et al, 2004; Ayinde et al, 2005). Other barriers to the uptake of Pap smears include time constraints, fear of screening results or misbelief and lack of information about cervical cancer and its presentation (Wong et al, 2008). The majority of women believe that they need a Pap smear only when they develop symptoms of pelvic infection, or feel that it is only

women who engage in risky sexual behaviours who need a regular Pap smear (Wong et al, 2008). Some women also believe that cancer of the cervix is a form of punishment for promiscuous behaviour (Aboyeji et al, 2004; Ayinde et al, 2005). The main impediment to having the test reported by women in Argentina was the physician or health professional not requesting the test, followed by not being ill or showing gynaecological symptoms (Gamarra et al, 2005). In other studies, the presence of gynaecological symptoms has been reported as one of the major factors associated with taking the test. Other reasons for low uptake of the test include lack of money and ignorance (Gamarra et al, 2005).

In Nigeria, a study of 846 respondents in the South East zone showed that the major reasons for women not undergoing the test—even among those who were aware of the test—were: lack of knowledge that it could be done locally; fear; and anxiety of a positive result (Chukwuali et al, 2003; Udigwe, 2006). Reasons cited for not undergoing the test in Ilorin, Nigeria, included unavailability of the test (52.5%), fear of detection of cancer (19.3%) and religious belief (14.6%). This reveals unavailability of the screening services and poor understanding of the principles behind cervical cancer screening (Ijaiya et al, 2004). The rate of early detection of premalignant cervical lesions in Nigeria is still slow. Therefore, cervical carcinoma is the commonest cancer in the female population. Every year, more than 8000 Nigerian women die as a result of cervical cancer (World Health Organization, 2002). Regular screening can help in early detection and treatment of pre-cancerous changes and early-stage cervical lesions.

Methods

Research design
This hospital-based retrospective study involved the use of data recorded in the cervical screening unit of JUTH. The data were retrieved from the records of all women who reported for cervical cancer screening in JUTH in 2009. Women who had Pap smear screening in JUTH outside of the period January–December 2009 were not included.

Location and population of study
JUTH is located in Jos East Local Government Area of Plateau State. The hospital is made up of 34 units with 600 bed spaces. As a tertiary institution, JUTH offers a standardised screening procedure that identifies premalignant cervical lesions, with adequate records which could be retrieved. The study population and sample size comprised women who reported for cervical cancer screening for possible detection of premalignant lesions between January–December 2009. A purposive sampling technique was used to select the 1962 women who had cervical cancer screening in JUTH during this period.

Method of data collection
The recorded data of subjects were retrieved from computer records by the data manager of the unit and given for the purpose of this study. This was done after presentation of the ethical clearance letter and approval from the head of the department to carry out the research.

Method of data analysis

The data were arranged and simple frequency tables and percentages were used, in which variables were analysed such as age, parity, number of sexual partners, age at first childbirth, age at first sexual intercourse, and types of contraceptives used.

Ethical clearance

A letter of introduction was sent from the Department of Nursing Sciences University of Jos to the ethical committee of JUTH to seek permission for the study. Following submission and defence of the research proposal before the ethical clearance committee, permission was granted to carry out the research. Therefore, a letter of permission was directed to the head of department of the cervical screening unit of JUTH from the committee.

Findings

Table 1 shows that almost half (*n* = 820, 41.8%) of the subjects were between 33–39 years of age; 628 (32.0%) were aged 40 years and above; while 103 (5.3%) were aged 18–25 years. The majority (*n* = 797, 40.6%) had between 4–6 children, while 550 (28.0%) had 0–3 children. Most of the subjects gave birth to their first child when they were aged 22–27 years (*n* = 715, 36.4%) or 16–21 years (*n* = 639, 32.6%), while 301 (15.3%) had their first child when they were aged between 10–15 years.

Table 2 reveals that more than a third (*n* = 711, 36.2%) of the subjects first had sexual intercourse between the ages of 16–21 years; 420 (21.4%) first had sexual intercourse between 10–15 years and 298 (15.2%) had first sex aged 28 years and above. Almost half of the subjects (*n* = 910, 46.4%) had 1–3 sexual partners, while a minority (*n* = 351, 17.9%) had seven or more. The majority of the subjects (*n* = 1442, 73.5%) had not experienced menopause. More than half of the subjects (*n* = 1111, 56.6%) had been infected with sexually transmitted infections.

Regarding the results of the screening, the majority (*n* = 1848, 94.2%) of the subjects were negative, while 114 (5.8%) screened positive at JUTH between January–December 2009 (*Table 3*).

Table 4 indicates that the majority (*n* = 94/114, 82.5%) of subjects with premalignant cervical lesions had been infected with sexually transmitted infections. In addition, the most-used type of contraceptive by the subjects with premalignant cervical lesions (*n* = 51, 44.7%) were oral contraceptive pills.

Table 5 indicates that the presence of cervical premalignant lesions is higher among women who had first sexual intercourse between 10–15 years (*n* = 47, 41.2%), followed by those who had first sexual intercourse between 16–21 years (*n* = 33, 29.0%). Women who had first sexual intercourse aged 22–27 years or 28 years and above recorded 21.9% (*n* = 25) and 7.9% (*n* = 9) of cervical premalignant lesions, respectively. This suggests that early sexual exposure—particularly between 10–21 years—is a risk factor in the occurrence of premalignant cervical lesions. Women who had seven or more sexual partners had the highest incidence of premalignant cervical lesions (*n* = 58, 50.9%), followed by women who had 4–6 sexual partners (*n* = 24, 21.1%). Those women who

had only one sexual partner recorded the least incidence of premalignant cervical lesions (*n* = 12, 10.5%). This suggests that the risk of developing cervical cancer is higher among women who have had multiple sexual partners. Similarly, subjects with seven or more children had the highest rate of premalignant cervical lesions (*n* = 50, 43.9%), followed

Table 1. Subjects' age distributions and parity

	n = 1962	%
Age		
18–25 years	103	5.3
26–32 years	411	20.9
33–39 years	820	41.8
40 years and above	628	32.0
Mean age = 36.2 years		
Parity		
0–3	550	28.0
4–6	797	40.6
7 and above	615	31.4
Age at first child's birth		
10–15 years	301	15.3
16–21 years	639	32.6
22–27 years	715	36.4
28 years and above	307	15.7
Mean = 21.6 years		

Table 2. Sexual behaviour and reproductive history of subjects

	n = 1962	%
Age at first sexual intercourse		
10–15 years	420	21.4
16–21 years	711	36.2
22–27 years	533	27.2
28 years and above	298	15.2
Number of sexual partners/ever had sex with		
1–3	910	46.4
4–6	701	35.7
7 and above	351	17.9
Have you reached menopause?		
Yes	520	26.5
No	1442	73.5
Ever infected with a sexually transmitted infection		
Yes	1111	56.6
No	851	43.4

Table 3. Incidence of premalignant cervical lesions among subjects

Results of Pap smear test	n = 1962	%
Positive	114	5.8
Negative	1848	94.2

Table 4. Relationship between exposure to sexually transmitted infections, use of contraceptives and development of premalignant cervical lesions

	Participants		Lesions	
	n = 1962	%	n = 114	%
Ever had a sexually transmitted infection				
Yes	1111	56.6	94	82.5
No	851	43.4	20	17.5
Contraceptive method:				
Intrauterine contraceptive device				
Yes	712	36.3	21	18.4
No	1250	63.7	93	81.6
Oral pills				
Yes	513	26.2	51	44.7
No	1449	73.9	63	55.3
Injectables (Depo-Provera)				
Yes	609	31.0	11	9.7
No	1353	69.0	103	90.4

Table 5. Relationship between early sexual intercourse, number of sexual partners, increased parity and development of premalignant cervical lesions

	Participants		Lesions	
	n = 1962	%	n = 114	%
Age at first sex				
10–15 years	420	21.4	47	41.2
16–21 years	711	36.2	33	29.0
22–27 years	533	27.2	25	21.9
28 years and above	298	15.2	9	7.9
Number of sexual partners				
One	409	20.9	12	10.5
2–3	501	25.5	20	17.5
4–6	701	35.7	24	21.1
7 and above	351	17.9	58	50.9
Parity				
0–3	550	28.0	17	14.9
4–6	797	40.6	47	41.2
7 and above	615	31.4	50	43.9

by women with 4–6 children ($n = 47$, 41.2%) while women with 0–3 children had the least premalignant cervical lesions ($n = 17$, 14.9%). This suggests that a woman's risk of premalignant cervical lesions may increase as the number of children increases.

Table 6 shows the multiple regression of the risk factors combined together, revealing that the risk of developing premalignant cervical lesions is likely to be higher (35.9%) among women who have previously suffered from sexually transmitted infections, followed by women who had multiple sexual partners (27.4%) and those who had first sexual intercourse at an early age (21.1%). It also shows that, of the factors shown to increase the risk of developing premalignant cervical lesions, the lowest increases were among women who used contraceptives (10.2%) and women with increased parity (4.8%).

Discussion

The mean age of the subjects was 36.2 years. Most of the subjects had 4–6 children, while some had three children or fewer. The age at first birth of most of the subjects was 22–27 years. The study showed that most of the subjects had their first sexual intercourse between the ages of 16–21 years. The number of sexual partners of most of the subjects were 1–3, and the majority had been infected with sexually transmitted infections at some point. Among those subjects using the three major contraceptives, the majority were using an intrauterine contraceptive device.

Most of the subjects' screening results were negative. This shows that the incidence of premalignant lesions (both low-grade squamous intraepithelial lesion (SIL) and high-grade SIL) was fairly low among the 1962 subjects who underwent screening in 2009 at JUTH. The study revealed that most of the subjects ($n = 1111$, 56.6%) who had ever been infected with sexually transmitted infections had a corresponding higher rate of manifestation of premalignant cervical lesions ($n = 94$, 82.5%). This is consistent with previous findings (Walboomers et al, 1999; National Cancer Institute, 2010) in which it was reported that persistent infection with high-risk HPV transmitted sexually is the most important cause of and risk factor for cervical cancer. Medeiros et al (2009) confirmed that about 70% of cervical cancers arising from premalignancy globally are caused by HPV infection; Gadducci et al (2011) support the view that the greatest risk factor for cervical cancer is sexually transmitted infection with HPV. It can be concluded that sexually transmitted infections are a major risk factor in the development of cervical cancer.

The findings showed that the subjects using oral contraceptive pills had a higher rate of premalignant lesions ($n = 51$, 44.7%) than those using an intrauterine device ($n = 21$, 18.4%) or injectable ($n = 11$, 9.7%). This is similar to the findings of National Cancer Institute (2010) which revealed that, among other risk factors for cervical cancer, use of birth control pills for 5 years or more is implicated. Gadducci et al (2011) also reported that long-term use of

Table 6. Multiple regression analysis of risk factors to premalignant cervical lesions

Variables/risk factors	Partial R^2	Model R^2	F	Prob. >F	%
Ever had a sexually transmitted infection	0.066	0.359	1.832	0.212	35.9
Multiple sexual partners	0.091	0.274	2.241	0.201	27.4
Early age at first sexual intercourse	0.142	0.211	3.621	0.182	21.1
Use of contraceptives	0.178	0.102	3.972	0.164	10.2
Increased parity	0.253	0.048	4.833	0.098	4.8

oral contraceptive pills is a risk factor for cervical cancer. This study further showed that subjects who were exposed to sexual intercourse at the age of 10–15 years had the highest rate of premalignant cervical lesions (n = 47, 41.2%) while those whose first sexual intercourse was at the age of 28 years or over had a far lower rate (n = 9, 7.9%); this suggests that the presence of premalignant cervical lesions increases with early sexual intercourse. This is supported in the literature; Plummer et al (2012) reported that early coital practice and frequent change of sexual partners were a major etiology of premalignant cervical lesions in teenagers and women in general.

The relationship between the number of sexual partners and the incidence of premalignant cervical lesions revealed that the subjects who had a lower number of sexual partners (1–3) had less incidence of premalignant cervical lesions, while those who had 4–6 sexual partners had a higher incidence and those with seven or more sexual partners had the highest incidence of premalignant cervical lesions (n = 58, 50.9%). This is similar to the findings of Akin (2006), who reported that incidence of premalignant cervical cancer increases with number of sexual partners, among other risk factors of the disease. The association of parity with incidence of premalignant lesions revealed that presence of premalignant lesions in the subjects increased with parity; subjects with 4–6 children had a higher incidence of premalignant lesions than those with fewer children, while women with seven or more children had the highest incidence of premalignant lesions (n = 50, 43.9%). This is supported by similar findings from the National Cancer Institute (2010) and the Centers for Disease Control and Prevention (2011), which reported that giving birth to three or more children is among the risk factors for cervical cancer.

However, the multiple regression of the risk factors to the development of premalignant cancer lesions among these categories of women seen in JUTH showed that women who had ever had sexually transmitted infections are at higher risk, followed by women who had multiple sexual partners and then those who had first sexual intercourse at an early age. The findings also indicate that, although use of oral contraceptives and increased parity are implicated in the development of premalignant cervical lesions, the risk is lower for these women than for those with the previously mentioned risk factors.

Conclusions

The findings of this study show that the incidence of premalignant cervical lesions among the women who had a Pap smear test at the cervical cancer screening unit at JUTH in 2009 was fairly low; of 1962 women screened, only 114 (5.8%) had positive results. Those who screened positive showed various risk factors such as exposure to sexually transmitted infections, multiple sexual partners, early exposure to sexual intercourse, and—to a lesser extent—use of oral contraceptives and increased parity.

Recommendations

In view of the findings of this investigation, the authors make the following recommendations:

Key Points

- Cervical cancer is a significant cause of morbidity and mortality in women, particularly in developing countries
- Around 80% of cervical cancers occur in developing countries, where screening is rare
- In the present study, most women who tested positive for premalignant cervical lesions had experienced sexually transmitted infections
- Women using oral contraceptives had a higher rate of cervical lesions than women using other contraceptives
- Women who had first sexual intercourse at a younger age (10–15 years), women who had had seven or more sexual partners, and women with seven or more children had higher rates of cervical lesions
- The government should raise awareness of the importance of detecting and treating sexually transmitted infections to prevent the cervix from progressing to a malignant condition
- Women should be educated on the need for regular Pap smears for early detection and treatment of premalignant conditions of the cervix

- The federal government of Nigeria and non-governmental organisations should raise awareness of the importance of early detection and treatment of sexually transmitted infections, especially among women, to prevent possible progression to malignant condition of the cervix
- The federal government of Nigeria and religious leaders should discourage early marriage, adolescent childbirth, early exposure to sex and multiple sexual partners among women
- The federal government of Nigeria should encourage women to have no more than three children, through health education and enlightenment campaigns
- The Ministry of Women Affairs and Ministry of Health should educate women, via mass media, on the need for regular Pap smear examination, for early detection and treatment of premalignant conditions of the cervix, with effect from 21 years of age. **AJM**

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Aboyeji PA, Ijaiya MA, Jimoh AA (2004) Knowledge, Attitude and Practice of Cervical Smear as a Screening Procedure for Cervical Cancer in Ilorin, Nigeria. *Tropical Journal of Obstetrics and Gynaecology* 21(2): 114–17

Akin A (2006) *Textbook of obstetrics and gynaecology for medical students*. 2nd edn. Heinemann Educational Books, Ibadan: 165–77

American Cancer Society (2014) Risk factors of cervical cancer. www.cancer.org/cancer/cervicalcancer/detailedguide/cervical-cancer-risk-factors (accessed 16 June 2016)

American Cancer Society (2016) Cervical cancer. http://tinyurl.com/hbqy8oc (accessed 16 June 2016)

Ayinde OA, Ogunbode OO, Adebayo OJ (2005) Determinants of cervical cancer knowledge and the utilisation of screening among a Nigerian female population. *Tropical Journal of Obstetrics and Gynaecology* 22(1): 21–4

BBC News (2006) Semen 'may fuel cervical cancer'. http://news.bbc.co.uk/1/hi/health/5303054.stm (accessed 1 June 2016)

Bhattacharyya AK, Nath JD, Deka H (2015) Comparative study between pap smear and visual inspection with acetic acid (via) in screening of CIN and early cervical cancer. *J Midlife Health.* 6(2): 53–8

Centers for Disease Control and Prevention (2011) Cervical cancer: Risk factors. www.cdc.gov/cancer/knowledge/provider-education/cervical/risk-factors.htm (accessed 1 June 2016)

Chukwuali LI, Onuigbo WIB, Mgbor NC (2003) Cervical Cancer Screening in Enugu, Nigeria. *Tropical Journal of Obstetrics and Gynaecology* 20(2): 109–12

Gadducci A, Barsotti C, Cosio S, Domenici L, Riccardo Genazzani A (2011) Smoking habit, immune suppression, oral contraceptive use, and hormone replacement therapy use and cervical carcinogenesis: a review of the literature. *Gynecol Endocrinol* 27(8): 597–604

Gamarra CJ, Paz EP, Griep RH (2005) Knowledge, attitudes and practice related to Papanicolaou smear test among Argentina's women. [Portuguese] *Rev Saude Publica* 39(2): 270–6

Ijaiya MA, Aboyeji PA, Buhari MO (2004) Cancer of the cervix in Ilorin, Nigeria. *West Afr J Med* 23(4): 319–22

Lindeque BG (2005) Management of cervical premalignant lesions. *Best Pract Res Clin Obstet Gynaecol* 19(4): 545–61

MacDonald N, Stanbrook MB, Hébert PC (2008) Human papillomavirus vaccine risk and reality. *CMAJ* 179(6): 503, 505

Manhart LE, Koutsky LA (2002) Do condoms prevent genital HPV infection, external genital warts, or cervical neoplasia? A meta-analysis. *Sex Transm Dis* 29(11): 725–35

Medeiros LR, Rosa DD, da Rosa MI, Bozzetti MC, Zanini RR (2009) Efficacy of human papillomavirus vaccines: a systematic quantitative review. *Int J Gynecol Cancer* 19(7): 1166–76

National Cancer Institute (2010) Understanding Cervical Changes. A health guide for women. www.cancer.gov/types/cervical/understanding-cervical-changes (accessed 1 June 2016)

National Cancer Institute (2012) SEER Cancer Statistics Review 1975–2012. http://seer.cancer.gov/archive/csr/1975_2012/results_merged/

topic_year_lost.pdf (accessed 1 June 2016)

Piyathilake CJ, Henao OL, Macaluso M et al (2004) Folate is associated with the natural history of high-risk human papillomaviruses. *Cancer Res* 64(23): 8788–93

Plummer M, Peto J, Franceschi S (2012) Time since first sexual intercourse and the risk of cervical cancer. *Int J Cancer* 130(11): 2638–44

Reproductive Health Technologies Project (2009) HPV vaccine update: October 2009. www.rhtp.org/documents/HPVVaccineFactSheetOct1609.pdf (accessed 5 July 2016)

Saslow D, Runowicz CD, Solomon D, Moscicki AB, Smith RA, Eyre HJ, Cohen C; American Cancer Society (2002) American Cancer Society guideline for the early detection of cervical neoplasia and cancer. *CA Cancer J Clin* 52(6): 342–62

Sherwani RK, Khan T, Akhtar K, Zeba A, Siddiqui FA, Rahman K, Afsan N (2007) Conventional Pap smear and liquid based cytology for cervical cancer screening – a comparative study. *Journal of Cytology* 24(4): 167–72

Udigwe GO (2006) Knowledge, attitude and practice of cervical cancer screening (pap smear) among female nurses in Nnewi, South Eastern Nigeria. *Niger J Clin Pract* 9(1): 40–3

Wong LP, Wong YL, Low WY, Khoo EM, Shuib R (2008) Cervical cancer screening attitudes and beliefs of Malaysian women who have never had a pap smear: a qualitative study. *Int J Behav Med* 15(4): 289–92

Walboomers JM, Jacobs MV, Manos MM, Bosch FX, Kummer JA, Shah KV, Snijders PJ, Peto J, Meijer CJ, Muñoz N (1999) Human papillomavirus is a necessary cause of invasive cervical cancer worldwide. *J Pathol* 189(1): 12–9

World Health Organization (2002) *Cervical Cancer Screening in Developing Countries. Report of a WHO consultation.* WHO, Geneva