Age and Pattern of Pap Smear Abnormalities: Implications for Cervical Cancer Control in a Developing Country

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Abstract

Aim: To characterize the age and pattern of Pap smear abnormalities in a major teaching hospital in Southwestern Nigeria. Design: This is a review of medical records of patients that came for cervical cancer screening. Materials and Methods: The Pap smear results of women between May 2013 and April 2015 were retrieved. A total of 2048 Pap smear results were retrieved during the study period and analyzed with Statistical Package for Social Sciences (SPSS) version 20. A total of 252 (12.3%) samples were excluded from the analysis. Results: The mean age of the women was 45.77 ± 9.9 years and the mode was 50 years. Normal Pap smear result was reported in 728 (40.6%) women. Only 20 women has had more than one more than one Pap smear done. The most common abnormality was inflammatory smear result as this was reported in 613 (29.9%) women. Atypical squamous cell of undetermined significance, low-grade squamous intraepithelial lesion (LGSIL), and high-grade squamous intraepithelial lesion (HGSIL) were reported in 117 (5.7%), 209 (10.2%), and 111 (5.4%) women, respectively. Atypical glandular cell and squamous cell carcinoma were reported in 12 (6.0%) and 3 (1.0%), respectively. Conclusion: There is a high incidence of abnormal Pap smear in this environment and women start cervical cancer screening late in their reproductive life, past the age at which cervical premalignant lesions peak. This may be a contributing factor to the high burden of cervical cancer in developing countries.

Keywords: Age of women, cervical cancer, Pap smear, pattern of Pap results

Introduction

Cervical cancer is a major public health problem in many developing countries with over 75% of incidence and mortality.[1] Developing countries bear the brunt of cervical cancer due to lack of effective population-based cervical cancer screening program. Countries that have successfully reduced their burden of cervical cancer have been able to do this through organized screening programs.[2,3] Cervical cancer has well-defined premalignant lesions before the development of invasive lesions.[4] The objective of cervical cancer screening, therefore, is the detection of these lesions before developing into invasive cervical cancer. Treatment of these lesions is highly effective in preventing cervical cancer.

The introduction of cytological screening by George Papanicolaou in the late 1940s was a great public health success story in cervical cancer prevention.[5] Prior to this, cervical cancer was the leading cause of cancer deaths among women in the western world. Since the introduction of the conventional cytology or Pap smear, named after the man who popularized this method of screening, the incidence, and mortality of cervical cancer has dramatically decreased in many developed countries.[6]

Cytology, either conventional or liquid-based cytology (LBC), is meant to detect cervical premalignant lesions from the cervix also known histologically as cervical intraepithelial neoplasia (CIN). Pap smear involves collection of exfoliated cells from the cervix onto glass slides which are processed in the laboratory and examined for the presence of cervical premalignant cells.

There are several screening guidelines for the successful implementation of cytological screening. Until recently, most

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guidelines recommended annual screening starting at the age of 21 till three consecutive negative results before lengthening the screening interval depending on the risk group of the woman. The US. Preventive Services Task Force and the American Cancer Society now recommends cytological screening every 3 years starting from age 21 but not lower.\textsuperscript{7,8} The reason why repeated Pap smear screening is recommended is that the cervix desquamates irregularly, thus repeated testing over time increases the chances of detecting a missed abnormality in a previous testing.

**Objective**

The aim of the study was to characterize the age and pattern of Pap smear abnormalities in a major teaching hospital and secondary care center in Southwestern Nigeria.

**Materials and Methods**

The Pap smear results of women attending the gynecological clinics of a university teaching hospital and a secondary hospital between May 2013 and April 2015 were retrieved from the tumor registries of both hospitals. Ethical approval was obtained from the respective institutions. The Pap smears were convectional smears and were reported using the revised Bethesda System of 2001. Relevant information were retrieved from the case files and entered into a proforma designed for this study. The data was analyzed with Statistical Package for Social Sciences (SPSS) version 20.

A total of 2048 Pap smear results were retrieved during the study period. Forty-five samples (2.2%), 118 were atrophic samples (5.8%), and results were not available for 89 (4.3%) women. Therefore, a total of 252 (12.3%) samples were excluded from the total analysis.

**Results**

The mean age of the women screened was 45 years (19 to 83) and the mode was 50 years. Women above 40 years constituted 64.9% of the total number of women [Table 1]. Only 20 women had more than one Pap smear done in the past 5 years. Normal Pap smear result was reported in 728 (40.6%) women. The commonest abnormality was inflammatory Pap smear as this was reported in 613 (29.9%) of the women. Inflammatory Pap smear results increased across all age groups and peaked in the age group 51 to 60 years (36.2%). The prevalence of cervical epithelial abnormalities was 34.6% excluding inflammatory smear results. Atypical squamous cell of undetermined significance, low grade squamous intraepithelial lesion (LGSIL), and high grade squamous intraepithelial lesion (HGSIL) were reported in 117 (6.5%), 209 (11.7%), and 111 (6.2%) women respectively. Atypical glandular cell and squamous cell carcinoma were reported in 12 (0.7%) and 3 (0.2%) respectively. However, 45 (2.2%) of the Pap smears were unsatisfactory for evaluation Table 1.

Distribution of the cytology results showed that women above 50 years had the highest prevalence of atypical squamous cells of undetermined significance (ASCUS) results (32.5%). Overall prevalence of ASCUS was very low in women less than 30 years and highest in women above 40 years (70.1%) [Table 2].

Older women above 40 years were also likely to have LGSIL results compared with younger women 77.9% versus 22.1% respectively. Likewise, the prevalence of HGSIL was more in older women 58.3% and suspicious for malignancy results were all in women in this age group.

**Discussion**

With a mean age of 45 years, it showed from this study that it was the older women that screen for cervical cancer in this part of Nigeria. This mean age was past the peak age of premalignant lesions of the cervix. In a study conducted by Herbert and Smith (1999),\textsuperscript{9} cervical premalignant lesions peak in the late 20s. Human papillomavirus (HPV) the causative organism of cervical cancer is mainly sexually transmitted, it follows that peak incidence of HPV infection like any other sexually transmitted infection will be shortly after commencement of sexual intercourse and CIN the precursor lesions of cervical cancer also peaks about a decade after the peak incidence of HPV infection and a decade earlier than invasive cervical cancer. That is one of the reasons why screening for cervical cancer is recommended to start in the early 20s. This is the age that screening is most likely to be successful in preventing cervical cancer. Screening beyond this age will detect more advanced lesions or invasive cancer. The implication of this finding is that women in this environment commence screening for cervical cancer late, past the age at which premalignant conditions can be detected and treated. It is an important public health concern because it implies that cervical screening programs in countries like Nigeria where women commence screening late may be ineffective because most preinvasive lesions might have been missed. The United States Preventive Services Task Force (USPSTF) and the American Cancer Society (ACS) recommend that screening for cervical cancer should commence at the age of 21 years and should be done every 3 years.\textsuperscript{7,8}

Of equal public health importance was that only one Pap smear had ever been done by the vast majority of the women in this study (99.9%). Pap smear due to its relatively low sensitivity and high false negative rate, requires that a woman does

| Table 1: PAP smear results |
|-----------------------------|
| **Frequency** | **Percentage** |
| Normal | 728 | 40.6 |
| Inflammation | 613 | 34.2 |
| ASCUS | 117 | 6.5 |
| LGSIL | 209 | 11.7 |
| HGSIL | 111 | 6.2 |
| AGC | 12 | 0.7 |
| Suspicious for malignancy | 3 | 0.2 |
| Total | 1793 | 100 |
repeated screening in order to reduce her risk of developing cervical cancer.\textsuperscript{[10,11]} A study by Sirovich and Welch, (2004) showed that in the United States about 55% of women with no history of abnormal Pap smear reported doing Pap smear annually.\textsuperscript{[12]} Factors responsible for the very low frequency of screening in Nigeria due to poverty, poor health seeking behavior, and ignorance. These same factors are adducible for the high incidence of cervical cancer in Nigeria.

Globally, cervical cancer screening is discouraged before the age of 21 years because many consider it to be a waste of scarce resources since cervical cancer is rare below this age and screening below this age does not lead to decrease in the incidence of cervical cancer. Screening before the age of 21 years is also associated with high false positive rates, lower detection, and may likely lead to unnecessary intervention which may cause more harm than good.\textsuperscript{[17]} In this study, women who were less 20 years of age constituted less than 1% of the women screened. Though presently Nigeria does not have a cervical screening policy, this is in line with global practice.

In this study, approximately 22% of the study population had squamous cell abnormalities excluding inflammatory smear results. This was considerably higher than the reported figure from Enugu in Eastern Nigeria where a prevalence of 12.2% was discovered by Ajah et al. (2015).\textsuperscript{[13]} In Bangladesh, epithelial cell abnormalities constituted 8.18% of the Pap smear results in the study conducted by Banik et al. (2011).\textsuperscript{[14]} This was also higher that the figures reported from several parts of Saudi Arabia and from Turkey. In Turkey, in a study done by the Turkish Cervical Cancer And Cervical Cytology Research Group (2009),\textsuperscript{[15]} prevalence of cervical cytological abnormalities was 1.8% while in Saudi Arabia Jamal and Al-Maghrabi (2003) reported prevalence varied from 1.7% to 29.9%.\textsuperscript{[16]} This was not surprising as sub-Saharan African has one of the highest prevalence of cervical cancer.\textsuperscript{[17]}

Infectious processes were seen across all age groups, but women within the age group 31 to 50 years have the highest number of infectious processes on cytology reports. This was in sharp contrast to the study done by Mohammed and Mohammed (2012) in which women less than 31 years had the highest number of infectious Pap smear reports.\textsuperscript{[18]}

Among the epithelial abnormalities, ASCUS constituted 6.5% and this was the least category of all epithelial cell abnormalities unlike in Romania where ASCUS was the most common epithelial cell abnormality, constituting 2.6% of cases reviewed.\textsuperscript{[19]}

Prevalence of high-grade lesions was high and not surprisingly was commonly seen in older age group women. The high prevalence in this population was a reflection of the high incidence of cervical cancer in sub-Saharan Africa. This value was considerably higher than the figures obtained from Eastern Europe and North America.\textsuperscript{[19,20]} Prevalence of high-grade cytological smears results was 6.2%, while in Romania; prevalence of high-grade smear was 0.9%.\textsuperscript{[19]} The predominance of high-grade cytological results among older women could be explained by the fact that cervical cancer peaks among women in their late 40s and 50s.

**Conclusion**

Women in this part of the country start cervical cancer screening late in their reproductive life and this may be a contributing factor to the high burden of cervical cancer in developing countries. The prevalence of epithelial cell abnormalities was considerably higher than in many parts of the world. Efforts should be intensified to encourage women to screen at an earlier age. Equally important is that a method that reduces the frequency of screening should be introduced.

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**Conflicts of interest**

There are no conflicts of interest.

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