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Human papillomavirus type 16 in HIV Women

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Abstract

The human papillomavirus (HPV) types 16 and 18 are responsible for about 70% of all cervical cancer cases, followed by other HPV types worldwide. HPV, which is sexually transmitted and most commonly causes genital warts, has been linked to cervical intraepithelial neoplasia and invasive carcinoma. Cervical cancer and the human immunodeficiency virus (HIV) are major public health problems in Africa. The aim of the present study is to determine the prevalence of human papillomavirus (HPV) type 16 among women AIDS patients in different areas of Tanzania, East Africa. Cervical specimens were taken for cytological analysis and HPV testing. A total of 1292 specimens were tested for HPV and HIV. Among them, 870 specimens were HIV-1 positive. The age range of the women was 18 to 65 years, with a male age of 43 years. HPV genotyping was done on a total of 870 samples. Among them, 583 were HPV-positive. Among them, HPV-16 was the most prevalent type detected 236 cases (40%). The non-HPV 16 types were 347 (60%). The prevalence of HPV-16 in AIDS-affected women in Africa is similar to that reported in other regions of the world. Similarly, it appears that HPV-16 is the most common type associated with cervical cancer.

Keywords: Human Papilloma virus, HPV-16, Cervical cancer, Carcinoma.

Woman who has ever been sexually active can develop cancer of the cervix. Higher rates of cases have been reported in those with multiple sex partners, having unprotected sex before age of 18years, presence of other sexually transmitted infections like herpes simplex and Human Immune deficiency Virus infection (HIV).

More than 90 types of HPV have been identified. Human papillomavirus (HPV) types 16 and 18 are responsible for about 70% of all cervical cancer cases worldwide.

Among African women cervical cancer is the second commonest cancer and is the leading cause of cancer mortality (1,2). The age-standardized incidence of cervical cancer in Africa is higher than that in developed countries (3). Unlike in developed countries where the incidence of cervical cancer has declined, the incidence of cervical cancer in Africa has not decreased but has even risen in some regions. Studies from sub-Saharan Africa suggest that other HR-HPV types are more prevalent and more diverse than elsewhere. The reasons for the unusual pattern of HPV in sub-Saharan Africa are unclear but may be linked to HIV (4,5).

Africa is confronted by one of the worst HIV epidemics in the world and it is estimated that there are currently 5.4 million people with HIV/AIDS in Africa, with women more severely affected than men (6). Studies have shown that women infected with HIV have a higher prevalence of human papillomavirus (HPV) infection, are more likely to develop persistent HPV infection, are more frequently infected with multiple HPV types and are at a greater risk of developing cervical squamous intraepithelial lesions (SIL) and cervical cancer. These lesions are more aggressive, persistent and more likely to recur following treatment. A recent study in South Africa has confirmed that HIV positive women are at an increased risk of cervical SILs (7).

Highly active antiretroviral therapy (HAART) has been shown to decrease HIV viral loads, increase CD4 cell counts and decrease most opportunistic infections. Since the introduction of HAART there has been a decline in certain malignancies in HIV infected individuals (8). However studies on the impact of HAART on the natural history of cervical squamous intraepithelial lesions (SILs) have produced inconsistent results (9). As anti-retroviral (ARV) therapy becomes increasingly available in the public sector in Africa, the life expectancy of HIV positive women will increase. Cervical cancer is associated with many risk factors including early sexual debut, having multiple sexual partners or having sex with someone who has multiple sexual partners, being HIV positive, a family history of cervical cancer,

older women, smoking and poverty (10,11). By far the most important risk factor for cervical cancer is genital infection with human papillomavirus (HPV) which is responsible for virtually all cases (12,13). There are many types of HPV classified as low-risk types (LR) that are usually found in non-malignant lesions, and high-risk (HR) types that are associated with cervical cancer (14,15). This study aimed to determine the prevalence of HPV - 16 cervical cancers in AIDS women.

Materials and Methods

A total of 1292 specimens were tested for HIV and HPV. Among of them positive HIV samples were further preceded for HPV diagnosis (Table:1). HPV genotyping was done in cervical cancer specimens obtained from women attending a regional cancer hospital in Africa. The cases were women aged 18 years or more, with newly diagnosed histologically confirmed cancer of the cervix, who participate in the study as well as to HIV testing. They were recruited from the out and in-patient departments and enrolled consecutively. The controls were women aged 18 years or more, without cancer who participate in the study as well as to HIV testing.

HIV serology was performed on cases and controls with commercial ELISA and rapid immunochromatographic assays. Among of them positive HIV samples were further preceded for the diagnosis of HPV. Cervical specimens were taken for cytological analysis and the hybrid Capture 2 technology HPV DNA test was performed for the diagnosis of HPV. The hc2 HPV DNA test using hybrid Capture 2 technology is a nucleic acid hybridization assay with single amplification using microplate chemiluminescence for the qualitative detection of low risk and high risk human papillomavirus (HPV) in cervical samples. Cervical cancer was confirmed on the basis of histological results of cervical specimens and hc2 HPV DNA test.

The controls were selected randomly from women who had accompanied or come to visit patients or women attendants of sick children within one week of selecting the cases. Patients who were too sick or unable to communicate in the language of

the interviewer were excluded from the study. HIV serology was performed on cases and controls with commercial ELISA and rapid immunochromatographic assays. Questionnaires were used to collect data on social demographic characteristics (age, marital status, parity, education level, occupation, region of residence, and zone of residence), reproductive factors (parity of woman, age at first pregnancy, age at first coitus, use of oral contraceptives) and smoking.

Results and Discussion

A total of 1292 specimens were tested for HPV and HIV. Among them, 870 specimens were HIV-

1 positive. HIV-2-positive cases were not found. The age range of the women was 18 to 65 years, with a mean age of 43 years (Fig: 1). The majority of women attending for AIDS and cancer diagnosis and treatment are of low socioeconomic status. The specific details regarding socioeconomic or demographic status were collected from individual women participating in the invasive cancer study. The human papillomavirus genotyping was done on a total of 870 samples (Table: 2). Among them, 583 were HPV-positive. The HPV-16 type was the most prevalent type detected among them 236 (40%), and the non-HPV-16 types were 347 (60%).

Table: 1 Prevalence of HPV 16 in study cases

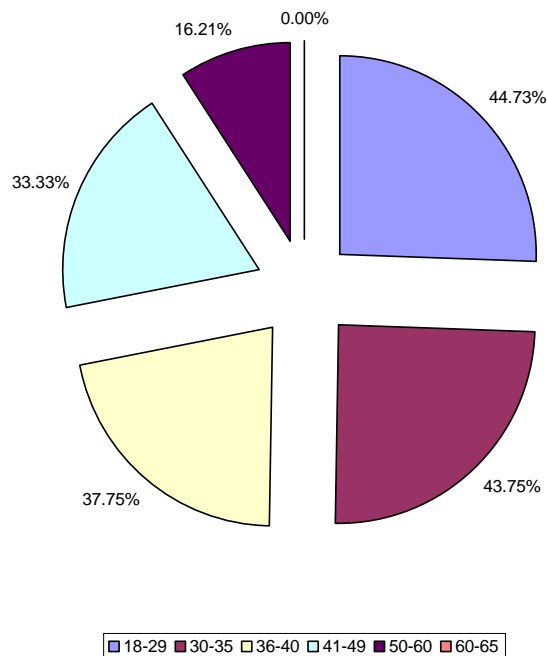
S.no	contents	Total numbers	Percentage (%)
1	Total case study	1292	
2	HIV Positive	870	67 %
3	HIV Negative	422	33 %
4	HPV Positive	583	67 %
5	HPV Negative	287	33 %
6	HPV 16 Positive	236	40 %
7	Non HPV 16	347	60 %

Table: 2 Age Wise Distribution Of HPV- 16 Type In Aids Women

S.No	Age Group	HPV Sample size (Total no - 583)	HPV 16 Positive samples (Total no - 236)	Percentage of HPV 16 Positive (%)
1	18 - 29	266	119	50.42 %
2	30 - 35	128	56	23.72 %
3	36 - 40	98	37	15.67 %
4	41 - 49	54	18	07.62 %
5	50 - 60	37	06	02.54 %
6	60 - 65	0	0	0 %

Figure:1 Age wise prevalence of HPV 16 in aids women

AGE WISE DISTRIBUTION OF HPV- 16 TYPE IN AIDS WOMEN



This present study showed that women with cervical cancer more likely to be infected with HIV-1 than women without cervical cancer. Furthermore, the risk of cervical cancer increased with age, higher parity, and among those who had ever smoked. Few studies have established an association between HIV and invasive cancer of the cervix in Africa (16-19). To explain this situation; there are a number of plausible reasons.

First, though cancer of the cervix is the commonest malignancy in women in Africa, it is rare when compared to many other diseases. The invasive cancer of the cervix is less frequent than pre invasive cervical cancer. Second, it has been suggested that the combination of cancer of the cervix and HIV is usually lethal and many women with these two diseases die before they seek health care (20).

HIV-1 infection is associated with invasive cancer of the cervix. Under developing countries with a high burden of HIV-1 and cervical cancer should adopt a high-risk approach that targets HIV-1 positive women for screening of cervical cancer initially by utilizing HIV/AIDS resources.

Conclusion

The results confirm the earlier studies on the role of high risk HPV infection as a major risk factor for development of cancer in the cervix. Further, the distribution of high risk HPV type 16 is similar to those reported conducted in other part of Africa. The prevalence of HPV-16 in the AIDS women samples suggests that effective vaccination against HPV 16 can considerably bring down the cancer burden in Africa.

However early detection of the virus by diagnostic and screening methods would be much useful for detection and treatment of this virus as early as possible. This will also require the treatment of male partner if infected. Perhaps the vaccination will result in almost complete eradication of this cancer.

Economical serological testing methods, screening and low cost vaccination may prevent the risk of HPV-16 in women. There was a high prevalence of HPV and HIV coinfections among the study population, and the presence of HPV is correlated with some risk behaviors as well as with markers of immune function, such as CD4

and RNA HIV viral load. Although an abnormal pap smear was more frequently associated with the presence of HPV, there were women with HPV expression who had a normal Pap smear. Vaccinations will be key to decreasing the high burden of disease and deaths, attributable to the dual epidemics of cervical cancer and HIV infection in medically underserved women worldwide.

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