

# Human Papillomavirus and Its Related Cause of Cervical Cancer, Review

Amani Hamed H Suqi

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**Abstract:** The primary aim in this specific review was to discuss the relationship between cervical cancer and human papillomavirus and its prevention, to analyze the scientific knowledge about HPV types and their outcomes. As well below we discussed about primary prevention and available HPV vaccines.

Comprehensive review of literature was performed among biomedical electronic databases; PubMed, and Embase, for relevant studies published up to September, 2017. Provided that HPV is the cause for almost all cervical cancers. Since it does not always show symptoms, it is important to check on existence of HPV virus. As the main transmission of this virus is through sexual interaction, it's possible to prevent through vaccination especially in teenage. It is expected that HPV vaccines will eventually decrease cervical and also other genital system premalignant and malignant illness. Good-organized programs of regular gynecological screening and treatment of precancerous lesions have been very effective in preventing squamous cervical cancer.

**Keywords:** Human papillomavirus, cervical cancer, tumour, HPV, virus, gynaecology, vaccination.

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## 1. INTRODUCTION

Human papillomavirus (HPV) is a double-stranded DNA virus which infects squamous epithelia, including the epidermis and membrane of the upper respiratory tract and urogenital system and also relentless HPV infection is highly connected with danger of cervical cancer [1]. In spite of significantly decreased cervical cancer incidence in industrialized countries with arranged screening programs, cervical cancer continues being the 2nd very most frequent reason for mortality from cancer in females around the world, since nations do not have sources to get global, top quality screening [2].

Genital HPV obtained via the contact of skin to skin, not only through penetration of vagina or anal during the sexual intercourse, it was reported in some virgin females [3] and has a lifespan risk of infection of till 80% in exposed people[4]. Females having sex-related contact with males that use condoms are still in danger of getting an infection, as condoms do not protect 100% [5]. HPV triggers higher than 5% of cancers all over the world, involving all of the cervical cancers and an alarmingly raising percentage of oropharyngeal cancers (OPCs). The abundance of HPV in women decreases with age but grows with increasing the numbers of sexual partners and mostly they do not show any symptoms, most people are unaware that they even have this virus and can transmit it to others without unknowingly.

Walboomers and Meijer [6] made a proposal in which the appearance of cervical cancer" without having the participation of particular HPVs is impossible or exceptional." Constant expression of the viral E6 and also E7 genes appears to be actually needed for cervical carcinogenesis, together with new genetic modifications being needed to keep the malignant phenotype [7].

The primary aim in this specific review was to discuss the relationship between cervical cancer and human papillomavirus and its prevention, to analyze the scientific knowledge about HPV types and their outcomes. As well below we discussed about primary prevention and available HPV vaccines.

## 2. METHODOLOGY

Comprehensive review of literature was performed among biomedical electronic databases; PubMed, and Embase, for relevant studies published up to September, 2017. References list of identified studies was screened manually to add more evidence to support our study. Restriction to English language and human subjects were applied in our search strategies.

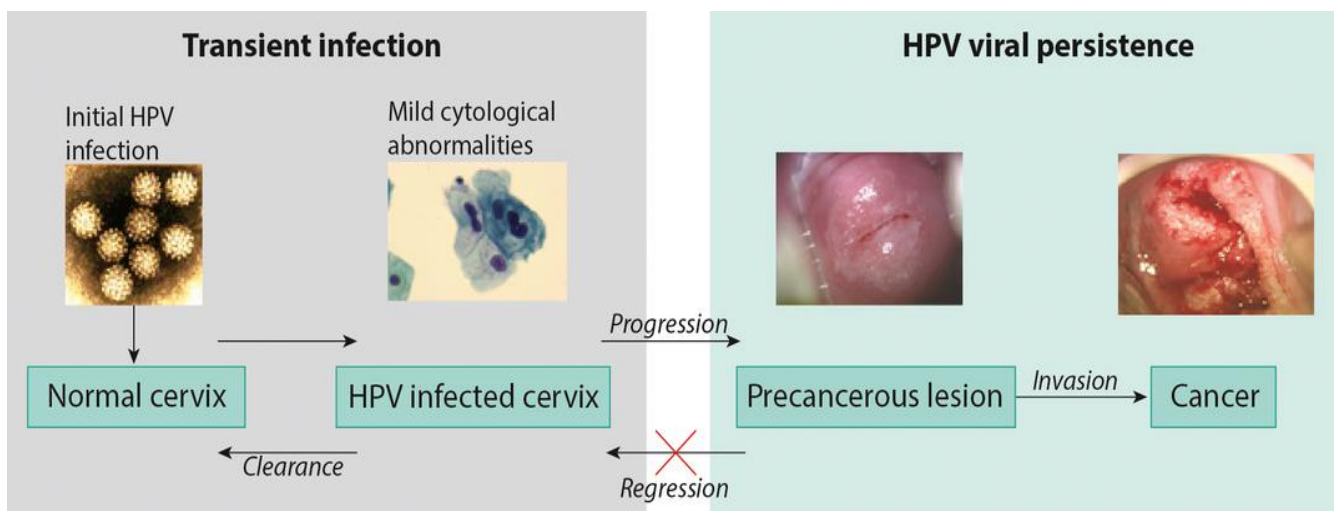
### 3. DISCUSSION

- **Overview of HPV and its relation to cervical cancer:**

A determined 371 000 latest incidents of invasive cervical cancer are actually examined globe every year, presenting almost 10% of whole cancers in females. Inconstancy, it is the 7th cancer site third and overall among females, right after breast and also colorectal cancer [2]. Around growing countries, cervical cancer was actually one of the most common neoplastic illness amongst females till the very early 1990s, after breast cancer ended up being the primary cancer site[8].

Subtypes 16 and also 18 (HPV-16 and HPV-18) have been discovered as the most pathogenic of the high-risk HPV types. Collectively they account for 70-- 80% of cervical cancers, 40-- 50% of vulval and oropharyngeal cancers and 70-- 80% of anal cancers [9].

(Figure 1) explains the development of HPV [10]. Simply, the progression of cancer from HPV has actually been illustrated in several phases. (Phase 1) is represented by HPV achievement, what can be continued by persistence (Phase 2). (Phase 3) is premalignant condition and the last is intrusion causing cancer (Phase 4) [11].



**Figure1.Development of HPV**

The majority of human papillomavirus infection is benign and cleans up in an instant however consistent infection along with risky human papillomavirus (particularly type 16) may trigger cancer of the cervix, vulva, vaginal area, anus, oropharynx, and penis. The infection specifically affects epithelium and also generates brand-new virus-like particles just in completely developed epithelial cells. Human papillomavirus interrupts regular cell-cycle management, aiding uncontrollable cellular division and also the collection of genetic damages [12].

Out of approximately 40 discovered sexually transferred HPV types, about 15 have been actually founded as oncogenic risky kinds in epidemiologic researches [13]. Global case-control researches have demonstrated the relative percentage of squamous cell cervical carcinoma in which every single oncogenic HPV type is obligated: HPV16 triggers greater than 50% of cancers, HPV18 triggers 10%-- 15%, HPV45 the reason roughly 7% of diseases, and also HPV31 causes around 3%[14]. Some other oncogenic HPV types separately cause lower than 2% of cervical squamous cell cancer. HPV18 also a reason greater than 35% of cervical adenocarcinomas, which in turn are hard to identify even through present cytological screening methods. HPV16 and 18, both are actually the most common HPV types in females even without having cancer too [15].

(Fig. 2) presents age-standardized occurrence and also fatality rates for cervical cancer in Canada, the United States along with the cancer monitoring areas of the World Health Organization (WHO). The top danger regions remain in Central and South America, eastern and southern Africa, and the Caribbean, along with occurrence rates of at minimum 30 new cases for every 100 000 women yearly. Generally, there is a connection in between occurrence and fatality throughout all of the places, however, a few spots, like Africa, appear to have an overmuch greater death. Occurrence and fatality rates in North America are actually comparatively lower. The fatality rate in Canada is the least within all areas.

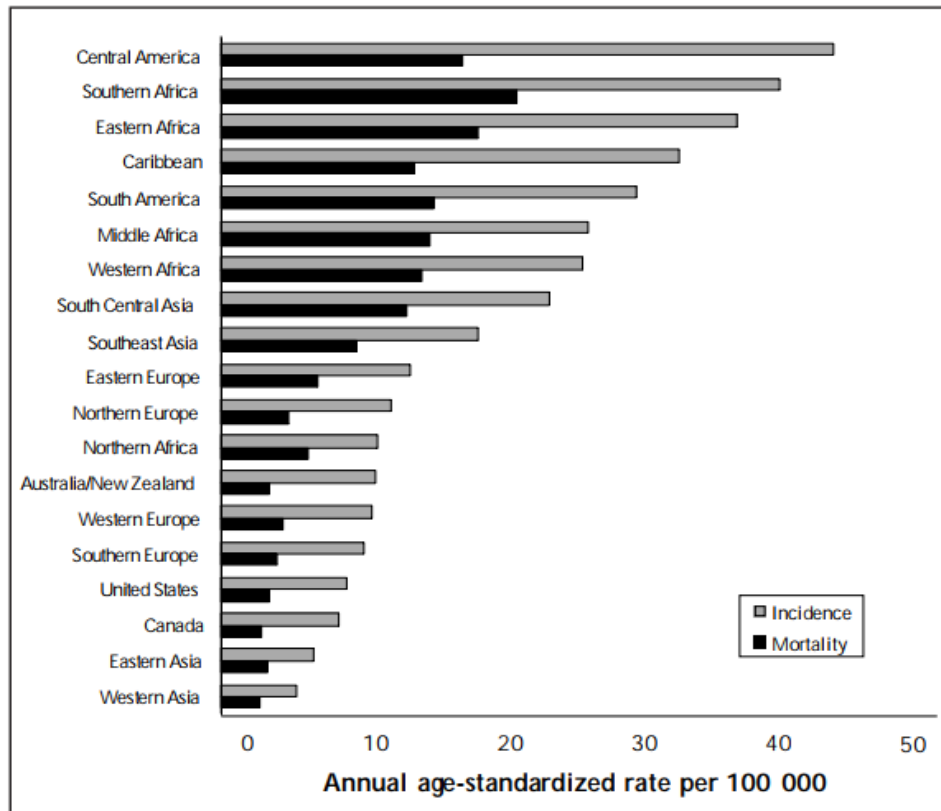


Fig. 2: Yearly occurrence and fatality rates (per 100 000 women) of invasive cervical cancer in the United States, Canada and cancer monitoring areas of the World Health Organization. Rates are standard, based on the age of planet populace in 1960 [16]

- **Subtypes of HPV and their contribution to cervical cancer:**

Sexually sent HPV infection can bring to 3 possible outcomes, depending greatly on which HPV kind is entailed. The very first is urogenital warts (condyloma acuminatum) on or around the genital areas and also rectum in both females and also males. Urogenital warts are usually connected with HPV-6 as well as HPV-11 and also do not cause cancer. The majority of them are asymptomatic and also might automatically appear within 3 to 4 months, continue to be the exact same, or boost in dimension and also in numbers. Therapy alternatives consist of ablation, excision, or topical representatives such as 0.5% podophyllin (Podocon) or 5.0% imiquimod (Aldara) [17].

The 2nd outcome is a non-active or hidden infection, where couple of individuals recognize they are infected because visible signs are rarely generated as well as the infected region stays cytologically usual.

The 3rd outcome is active infection, which is connected with risky HPV types in which the infection triggers transformations in attacked cells which could cause penile, urethral, bladder, genital, vulvar, or cervical intraepithelial neoplasia and also could result in cervical cancer[18].

Greater than 100 various sorts of the virus exist, consisting of around 30 to 40 pressures that identified inside the genital region, 10 (HPV types 16, 18, 31, 33, 35, 45, 51, 52, 58, and also 59) have actually been completely determined as risky types in the relationship in order to intrusive cervical cancer. For every one of those HPV types, danger approximations were higher than 30 (range, 35 to 350), highly proposing that those linkages are not derivable to the possibility or to biased research design. HPV16 represent 50% to 70% of the cervical cancer situations in the majority of regions, complied with by HPV18 (10% to 12%) and HPV31 and 45 (4% to 5% each). Cervical adenocarcinoma demonstrated a little various division. The nearly all frequent types are HPV16 (around 45%), HPV18 (around 40%), and HPV45 and 59 (4% to 5% each). In a variety of females without having cervical lesions, (conforming to control subject matters in many case-control reports or HPV occurrence studies from the overall community), the distribution of HPV types is broader. HPV 16 remains the very most popular type (about 20%), continued by HPV18 (around 10%) HPV45 (around 8%), HPV59 (around 2%), and much smaller percentages of several 30 extra HPV types. Most of these uncommon types are sometimes nevertheless brings to a higher risk of cervical cancer [19].

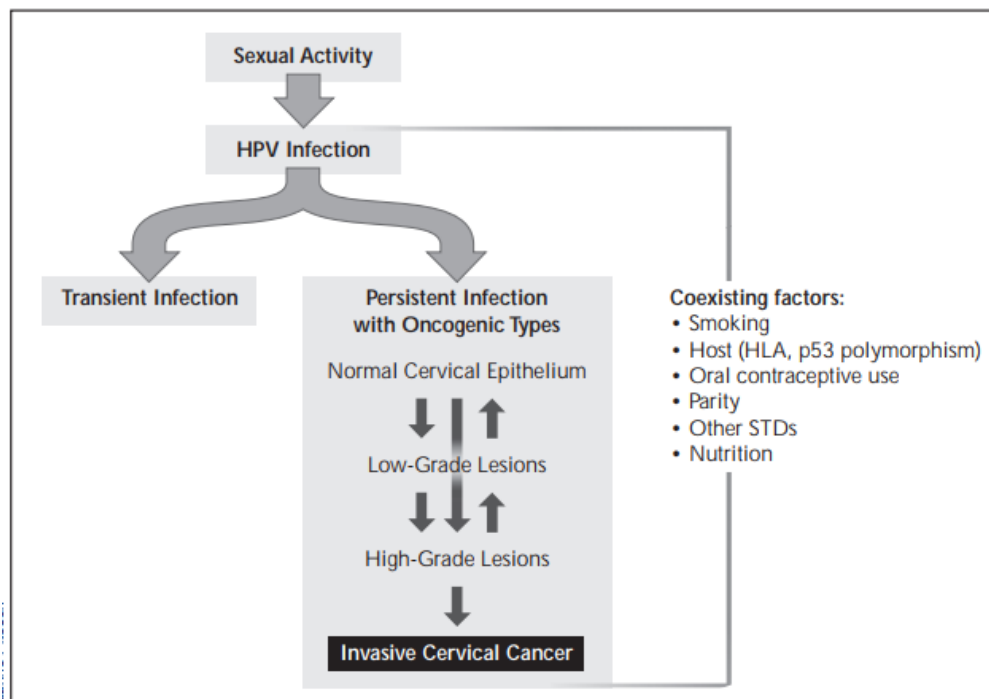
• **Risk factors:**

Epidemiological studies conducted during the past 30 years have consistently indicated that cervical cancer risk is strongly influenced by measures of sexual activity: number of sexual partners, age at first sexual intercourse and sexual behavior of the woman's male partners. Circumstantial evidence for sexual transmission of an infectious agent comes from studies showing that wives of patients with penile cancer are at an increased risk of cervical cancer later in life. [18] Such researches are additionally assisted by results from correlation studies, where tight relation was found between penile and cervical cancer mortality and incidence [20].

Tobacco smoking has been a well-known risk factor for cervical cancer. A straight cancer causing activity of smoking the tobacco on the cervix has been supported on the reasons that nicotine particles may be found in the cervical mucus of female types who are smoking [21]. Considering that using cigarettes is associated with sexual actions, it is challenging to figure out if this specific association is unwarranted provided the impossibility of efficiently getting rid of confusing with modification for procedures of sex-related activity. The amount of live birthing is a regular danger aspect for cervical cancer. Aside from problems of screening protection and high quality, the high parity and poor nutrition of females in growing countries may be contributing aspects for increasing the percentage of cervical cancer.

The documentation for an impact of food on probability of cervical cancer shows that an elevated consumption of meals including beta-carotene and vitamin C and also, to a minimal level, vitamin A can decrease the risk of cervical cancer [22].

There is an excess risk of cervical cancer associated with long-term use (12 years or more) of oral contraceptives. The association is stronger for adenocarcinomas than for squamous cell carcinomas[23].



**Fig. 3: Etiological relation of human papillomavirus (HPV) infection and cervical cancer, showing possible role of remote behavior risk elements for consistency of infection and aspects that can provide developmental lesion.**

• **Methods for prevention and detection of HPV:**

The primary procedure for recognition of risky HPV is still the Papanicolaou-stained (Pap) smear. This procedure was called for pathologist George Papanicolaou, that presented the method in 1949 prior to the reason for cervical cancer was recognized. Because its intro, the Pap smear has actually helped in reducing cervical cancer occurrence as well as death rates by about half to two-thirds [24] The Pap smear is a testing device that searches for modifications in cells of the change area of the cervix. Commonly these modifications are brought on by HPV.

Primary methods to prevent HPV infection run the risk of both consist of decrease and also growth of HPV injections. Use latex condoms and also a spermicide might lower the threat of having HPV by lowering the chance of transmission of

HPV. Condoms, nonetheless, are not completely reliable, considering that HPV might be gotten by contact with various other parts of the body, such as the scrotum, labia, or rectum, that are not protected by a condom [25].

The main aim of cervical cancer screening have to be prevention and the emphasis of these particular instructions is the correct recognition and appropriate therapy of intraepithelial precursor lesions of the cervix at a community level for the reason of cervical cancer protection, instead of cancer management as for lots of other types of cancers. Because these precursor lesions are readily foundable and diagnosable and are easily and effectively treated through hospital services with minimal adverse events, this is. Sooner detection of cervical cancer at a lower stage is additionally an advantage of screening, leading to decreased morbidity and death.

Human papillomavirus (HPV) triggers practically all of cervical cancer and its instant precursors all of the planet. Top-quality screening methods are able to decrease the incidence of cervical cancer by almost to 80%[26].

HPV vaccination is useful for avoiding HPV-related diseases. It is prepared that vaccine against HPV will decrease the incidence of (and the morbidity connected with) premalignant cervical diseases, and also various other HPV-related genital illnesses, involving penile, vulvar, anal and vaginal cancer and precancerous lesions [27] . HPV injections are prepared from unfilled healthy protein coverings called virus-like fragments (VLP) created by recombinant technology. They do not consist of any kind of lively organic item or DNA, so they are non-infectious. Existing HPV vaccinations are developed to defend from HPV 16 and also 18; the quadrivalent vaccination additionally defends versus low-risk genotypes 6 and also 11[28]. Testing is not required to make a decision on qualification for vaccination, testing will certainly still be required amongst immunized ladies. Defense against consistent infection or a consolidated endpoint of consistent infection and all genital illness has actually been shown for as much as 5 years post-enrollment, the lengthiest reported follow-up thus far [29].

#### **4. CONCLUSION**

Provided that HPV is the cause for almost all cervical cancers. Since it does not always show symptoms, it is important to check on existence of HPV virus. As the main transmission of this virus is through sexual interaction, it's possible to prevent through vaccination especially in teenage. It is expected that HPV vaccines will eventually decrease cervical and also other genital system premalignant and malignant illness. Good-organized programs of regular gynecological screening and treatment of precancerous lesions have been very effective in preventing squamous cervical cancer.

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