Review Article

Journal of Brahmanbaria Medical College
Volume 07 Issue 01 January 2025 ; 30-35

# Immunoprophylaxis of Cancer Cervix

Seema Bhattacharjee[1*]

## ABSTRACT

**Background:** Cervix is an integral part of anatomy, physiology, pathology including obstetrics and gynaecology.

Anatomical continuity, contiguity with parametrium and urology e.g. bladders base and ureter including endocrine influences on cervical mucus responsible for diagnosis of ovulation followed by pregnancy and childbirth.

Obstetrics injury, postpartum lochia, reduced cellular immunity, opportunistic infection favourable infusion and inflammation by organisms sometimes responsible for producing recurrent attack may be a probability of persistence of infection and chronic morbidity. The progress and Challenges in the development of immunopropylaxis approach for the prevention, the advantages of HPV vaccination and treatment of cervical cancer are summarised in this review article.

**Methodology:** This review to published studies and articles by using Google. Search strategy using appropriate key words and title.

**Conclusion:** Vaccinations against all HPV are available but financial issues are the prime barrier to HPV vaccination.

## KEY WORDS

Cancer; Cervix; HPV; Immunity; Vaccine.

## INTRODUCTION

Global challenges include rish assesment, screening, vaccine administration including mass coverage of population specially in developing countries.

Stillnow vaccine is the latest historical discovery for cancer cervix prophylaxis in the young female before coitarche, as because it is the 2nd commenest female malignancy affecting globally that provide a major health problems burden.

Discovery of immuno prophylactic vaccine against high oncogene are mainly two types e.g. quadrivalent and bivalent.

Cervical cancer is the seventh most frequent malignancy affecting worldwide. Every year almost 6,60,000 new cases are diagnosed and 3,50,000 death was recorded in 2022.[1,2]

Among the prevalent women more sufferer are detected in those areas where screening programme are inadequate or not available specially in eastern Europe, Sub Saharan Africa and south east Asia.[3]

Cancer cervix remain and important public health problem; even in Europe annual detection of 66,000 new cases and 29,000 death occur. So ratio of mortality to incidence is 55%.[4]

Peak incidence of age between 30-40 years, but decline after words but peak again during post menopausal period.[5]

Awareness regarding disease prevalence, serious consequences and prophylaxis availability should be noticeably concerned.

Disease produced by Human Papilloma Virus (HPV) mainly genital warts and cervical malignancy are protected by administration of vaccine and observed about 1 in 100 young or sexually active having genital wants in US.[6,7]

(i) Both high and low oncogene are involved.

(ii) Cancer produced by HPV beside Cervix are :

- * Anal cancer
- * Penile cancer
- * Vaginal cancer
- * Vulvar cancer

(iii) Common sites involved by HPV are mucus membrane of both male and female :
Such as :

1. Associate Professor of Obstetrics & Gynaecology
Army Medical College, Chattogram.
*Correspondence : Dr. Seema Bhattacharjee
Email: docseema65@gmail.com
Cell : +88 01817 73 15 89

Date of Submitted : 20.01.2025
Date of Accepted : 28.01.2025

Journal of Brahmanbaria Medical College
Volume 07 Issue 01 January 2025 ; 30-35

| | Among GI | Genitalia |
|---|---|---|
| | * Mouth | * Vulva |
| | * Throat | * Vagina |
| | * Rectum | * Cervix |
| | * Anus | * Penis |
| | | * Scrotum |

## SEARCH STRATEGY

Available studies and abstract were identified through Google Scholar (2010-2024). Key search topics were "Immunoprophylaxis of Cancer Cervix" relevant articles from references list of reviewed articles were also searched. The search term were the following key words used in combination : Cancer; Cervix; HPV; Immunity; Vaccine.

## DISCUSSION

HPV is a double stranded small DNA virus having affinity to affect cutaneous and mocasa anogenital region including hands and feel. HPV affect both sexes globally invading gradually initiating skin, mucus mucus membrane and genitalia.

HPV is one of the most common STI in US. Study revealed that more than 40 types are involved during their journey from pre invasion to invasive malignancy that involve lining epithelia of cervix, vagina, vulva, penis, anus and rectum etc.

The other areas that can also affected are oropharynx, base of the tongue, tonsils, though the progression of preinvasion to invasive malignancy requires longer period even many years.

The lesion may be benign (Warts) or malignant, it has also been found that internal organs such as stomach also affected by malignancy but mechanism is not clear.

The most prevalent areas worldwide affected by cervical cancer among female population by HPV:[8-10]

* Sub Saharan Africa : 24%
* Eastern Europe : 14%
* South east Asia : 14%

Researcher observational study revealed that higher prevalence of infection among :

* Women living with HIV
* Homosexual male
* Co-infection with other STI
* Person receiving immuno suppression therapy.
* Sexually abused children.

Prevalent of male infection is highly variable that depends on sexual trends as Transgender male still having cervix.

The highest rate of involvement of cervical cancer mortality more in low and middle income countries, this is a reflexion of major inequalities probably due to lack of access to health care fascilities, including vaccination, screening programe, treatment services, social and economical determinator.

HPV infection usually clears by immunological system within 1-2 years without any longterm or lasting adverse effect.

Yearly diagnosed new cases are 660,000 and 3,50,000 death globally during the year 2022. More than 90% of cervical cancer are due to HPV infection in female.[2]

Voluntary male circumcission may also reduce the infection, using condom not only fully protected as inguinoscrotal contact may not covered by condom.

Invasion by HPV producing microabrasions and basal layer are exposed that provide an opportunity to offer a non infected individual. Primary mode of transmission by genital to genital interaction, orogenital interaction or deep kissing.

News and views of HPV infection are that it may produce life time risk almost in 85% people. Observations revealed that sexually active unvaccinated persons are affected, specially in US, about 13 million individual affected including teens but mostly may be cleared.[11]

From the affection by high oncogene HPV usually take 15-20 years to become metaplastic to precancerous and frank invasive malignancy, though may remain asymptomatic for many years during initial stage.[12]

The management cost of cervical cancer both in early and advanced stage really a burden for that particular female family, finance, future and fear of uncertainity of hope for improvement or palliation. So prophylaxis is one of important state.

HPV is a common virus having 100 types including 100 types, including various strains. Low risk strains producing warts and hands, feet and fae etc. High risk strains specially 30 variants producing malignancy involving vulva, vagina, cervix, anorectal regions and penis etc.[13]

Different types of warts are :

* Flat warts
* Planter warts
* Common warts
* Sublingual warts etc.

All warts are produced by HPV but not all forms of HPV cause warts. The strains of HPV can progress to cancer does not produce warts.

High risk strains e.g. 16, 18 initially change cervical mucosa e.g. dysplasia, if left untreated lead to CIN and later invasive malignancy.[14]

Journal of Brahmanbaria Medical College
Volume 07 Issue 01 January 2025 ; 30-35

Regardless of sex and reproductive anatomy the most important issue to prevent malignancy and its spread, so immunoprophylaxis should be duely considered.

**Regarding Vaccine**

**Types**

i. Gardasil 9V, 9V PPV
ii. Gardasil 4V, 4V HPV - both are quadrivalent
iii. Cervarix, 2V, HPV – bivalent.

All are effective against type 16, 18 that are responsible for cancer cervix.[15]

Component of Vaccine[16]

* Using recombinant DNA technology used to generate Virus Like Particular (VLP).
* Vaccines are safe and effective.
* So content are VLP but not the actual virus.
* Stimulation of immune system by the vaccine that produce antibody capable of fighting against HPV infection.
* HPU vaccine is a series of shots that are protective against HPV that often transmitted through sexual relationship.
* There are almost 40 strains of HPU, among them 80% of sexually active individual gained the infection.
* HPU vaccine is recommended for 9-45 years of age.
* So children between 11-12 years are the best candidate for vaccination.
* The most important protection provided by HPV vacination :
  (a) 90% of HPU strains that are responsible or cancer of cervix, vaginal and vulva.
  (b) 90% of HPU strains that produce genital warts.
  (c) 90% of HPV strains that produce anal and penilecaneare.
  (d) Most of the strains that are responsible for anal and throat cancer (Cancer of the back of the throat).[17]

It is the tragedy that millions of women die from cancer cervix in Bangladesh; prevented by HPV vaccination in earlier age group female starting from 10-14 years providing single dose.

It is estimated that approximately 8300 news cases of cancer cervix are diagnosed and resulting in 4900 death.[18]

**HPV Vaccine for Male**

One HPV vaccine Gardasil recommended for boys. Protective against getting infected from HPV types that are responsible for cancer of mouth, throat, penis and anus as well as genital warts.[19]

**Importance of Vaccine**

Protective against warts produced by HPV, as before administration of vaccine almost 3,40,000-3,60,000 suffered yearly. US people having 1 in 100 sexually active adult are the sufferer.[20]

Vaccine provide protection against genital strains, strains responsible for cancer of cervix vagina, vulva, penis or anus including malignancy of mouth, throat, head and neck.[21]

By building immuno modulation awareness of some strains of HPV, next dose may help to clear the infection.

CDC and FDA approved that vaccine should be administered before 1st sexual debut, the vaccine provide prophylaxis for new infection. Observation revealed that vaccines are safe and effective.

**Contraindication of Vaccine**

* During pregnancy
* Hypersensitivity
* Moderate to severe illness.

**Adverse Effect of Vaccine**

* Nausea
* Vomitting
* Headache
* Dizziness
* Soreness

Cell mediated immunity offer natural clear up of HPV; so no role of antibiotic for cure or prophylaxis.[22]
Malignancy produced by HPV in male individual they are treatable if recognized during early stage.[23]
Researcher observed that in 2022, estimated 6,60,000 malignancy produced by HPV in female.[24]

**Recommended Vaccine in US**

* All preteens including boys and girls at the age of 11-12 years or earlier at the age of 9 years.
* Vaccine upto the age of 26 years.
* Vaccination is not recommended for every one beyond 26 years.
* Folic acid and B vitamins are crucial for DNA function including cell growth so may reduce the risk of HPV.[25]

**Regarding Transmission and Global Burden of HPV**

As HPV is a group of papillomavirus having highly epitheliotrophic, so productive infection are astablished within stratified squamous epithelium of the skin, anogenital and oral cavity.
As viral life cycle is linked to differentiation of the infected epithelia.[26]
HPV is the most common STI in the USA. Infection originates having vaginal, anal or oral sex with the individual already affected by the virus.

Journal of Brahmanbaria Medical College
Volume 07 Issue 01 January 2025 ; 30-35

Persistence of HPV for a longer period specially when cell mediated immunity is lowered, even take years together turn to malignancy.

Oral sex affect back of the throat e.g. oropharyngeal cancer that may involve base of the tongue and base of the tonsil.

At any age having new sex partner is a risk of developing new HPV infection; so monogamous partner is safer.

Observational study revealed that even in the US, 12,000 women develop cervical cancer and among them 4000 died due to cervical cancer even with screening and treatment.

Every year about 19,400 female and 12,000 male experience cancer by HPV.[27]

People who are taking biologics due to Inflammatory Bowel Disease (IBD) Rheumatoid Arthritis (RA) psoviasis and other autoimmune disease can also set off symptoms.

With an estimated 14 million new cases are observed annually, so it is a very common infection.[28]

HPV affect stratum basale of lowermost epidermal layer, so persistent of infection capable of hijacks the keratinocyte differentation process to continue the purpose of productive life cycle of virus.[29, 30]

**Steps to Reduce HPV Infection**

* To stop smoking
* To reduce stress
* Diet modification
* Search for support.

**Regarding global burden of HPV noticed that**

* More than 42 million US population are affected by HPV that are responsible for disease production.
* Every yearly about 13 million including teens are infected with HPV.[31]
* High risk HPV oncogene are as follows :[32] 16, 18, 31, 33, 34, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68, 70.
* Some of the HR strains can attack innate immune system, so that expression of T-lymphscyte related cells are reduced.
* Impairment of important pathway involve the transcription factors e.g. Nuclear Factor Kappa B (NF-LB) Including Interferon Regulatory Factor 3 (IRE-3).[33]

National immunisation programme since 2007 introduced HPV vaccine in Australia.
Australian Immunisation Handbook recommends HPV vaccination for younter group i.e. 9-25 years including male to male homosexual persons.[34]

HPV vaccine is recommended for all children starting 8 years to 12-13 years old including high risk individual. All girls before 25 years old by NHS.[35]

In Australia almost 80% of people having HPV sometimes in their lives.[36]

In Australia, the "Therapeutics Goods Association" has approved "Gardasil 9" for use in female of 9-45 years and 9-26 years of male.[37]

Doctors recommendation for all children with 2 doses of HPV vaccine between 11-12 years of age and as early as 9 years.[38]
World Health Assembly (WHA.73.2) adopted the global strategy to accelerate the cervical cancer elimination as a public health problem with the following target along with WHO response.

* Coverage of 90% girls should be fully vaccinated with HPV vaccine by the age of 15 years.
* 70% women are screened with a high performance test by 35 years and 45 years age again.

Identification of 90% women with cervical disorder receive treatment such as : 90% of preinuasive malignancy should be treated and 90% of invasive cancer in women should be managed.

Prevention of HPV associated precancer and cancer is also a key element of WHO's. Global health sector strategy on respectively as HIV, HBV, STI 2022-2030 and the resolution WHA 74.5 (2021) on oral health includes actions on and mouth and throat Ca.[39,40,41]

Regarding incidence of cancer cervix in Nordic countries; observation revealed that screening has helped to reduce the disease, but still-now the disease remain a burden for women.

The incidence of cancer cervix is the highest in Greenland (25 per 100000) and lowest in Finland (4 per 1000000) and of variable range in other Nordic countries of variable range between 7-11 per 1,000000.

Among the Nordic countries Denmark was first introduced HPV vaccination programme followed by sweden and Iceland. Finland has recently recommended.[42]

Among the Scandinavian countries HPV vaccination program in 2008-2009 resulted in a marked decrease of HPV types disease in general population.[43]

Regarding the high risk HPV oncogene specially type 16 responsible for Oropharyngeal Squamous Cell Carcinoma (OPSCC) incidence is increasing in among middle aged (50-69 years old) individual. Male has trippled in four high income Nordic countries e.g. Denmark, Finland, Norway and Sweden over the last 30 years.

Journal of Brahmanbaria Medical College
Volume 07 Issue 01 January 2025 ; 30-35

Observation revealed that in fertile aged population during 1980's HPV 16 epidemic was the main culprit.

Administration of prophylactic HPV vaccination implementation programe in school base (both boys and girls) student gradually reduced the incidence of some OPSCC's.

The WHO campaign observered that 2-5 types high risk HPV such as 16, 31, 33 and 18, 45 are responsible for scc and adenocarcinoma respectively.

HPV 16 epidemic responsible for OPSCC's incidence in Sweden, Finland and USA (Even 10-20 years after epidemic) so current gender neutral vaccination programme that are predicted in eliminating HPV infection.

OPSCC in increasing in last 30 years specially in men of high income Nordic countries. But female are also affected. These are probably due to changes in sexual behaviour or due to persistent or sustainability of infection.

OPSCC was first observed in Stockholm region. Over the last 25 years similar changes OPSCC incidence are observed in the capitals of four Nordic countries.[44]

Incidence of HPV associated head and neck cancers are raising. So HPV vaccination lowers these incidence but with a long delay.[45]

HPV vaccines were included in child vaccination proramme in the Nordic countries between 2009-2013.[46,47]

HPV vaccine is very effective in preventing or protective against 9 types of HPV infection.[48]

During 2.10.23; the Government of Bangladesh (GOB) supported by UNICEF, vaccine Alliance (Gavi) and WHO has launched a ground breaking HPV vaccine campaign.

To protect health and future safeguard of millions of girls across Bangladesh by providing vaccine against cancer cervix.[49]

## CONCLUSION

The HPV Vaccine is Crucial for public health. Vaccinations against all HPV subtypes, ie. bivalent, quadrivalent and nonavalent are available. Financial issues are the prime barrier to HPV Vaccination. The framework for behavioural and Social drivers of Vaccination, which includes practical concerns, motivation, social processes, thoughts and feelings is widely used to uncover important aspects linked with HPV Vaccination.

## DISCLOSURE

The author declared no conflict of interest.

## REFERENCES

**1.** https://www.cde.gov > stdfact : hpv.

**2.** https://www.cancergov > risk > hpv.

**3.** https://www.plannet parenthood.org

**4.** https://www.slideshare.net > role of... .

**5.** https://www.mayoclinic.org > syc... .

**6.** https://www.cdc.gov > basic...info.

**7.** https://www.cdc.gov > stdfact : hpv.

**8.** https://www.who.int > detail > human.

**9.** Ferlay J, Laversanne M, Ervik M, Lam F, Colombet M, MeryL, Pineros M, Znaor A, Soerjom at aram I, Bray F (2024).

**10.** Global cancer observatory : Cancer Tomorrow, Lyon, France : International Agency for Research on cancer.

**11.** https:// u > news > new.

**12.** https://www.cdc.gov > six reasons.

**13.** https://www.who.int > α etail > human papilloma virus.

**14.** https://my.clevlandclinic.org.

**15.** https://www.cdc > gov > hpv > parents.

**16.** https://www.gov > hpv > public.

**17.** https://www.cdc > gov > hpv > parents.

**18.** https://www.myoclinic.org > art.

**19.** https://www.cdc.gov > std fact.hpv.

**20.** https://www.ncbl.nlm.nih.gov > NB.

**21.** https://www.ncbl.nlm.nih.gov > pmc.

**22.** https://healthclinics.superdrug.com.

**23.** https://www.hpv.info.ca > treatment.

**24.** https://www.cdc.gov std > std fact.

**25.** deMartel et al, Lancet Global Health 2019 https://pubmed. nibi.nlm.nih.gov/31 86 22 45.

**26.** https://www.medical news today.com.

**27.** UNICEF https://www.unicef.org > bangladesh.

**28.** https://my.eleveland clinic.org.

**29.** https://www.nfid.org > resource.

**30.** https://www.who.int > detail.

**31.** https://www.fda.gov > media.

**32.** https://www.cdc.gov > hpv > parents.

**33.** https://www.ncbi.nim.nih.gov > pmc.

**34.** https://ncirs.org.au > public > hpv.

**35.** https://www.health.gov.au > topics.

**36.** https://www.nhs.uk > vaccination.

**37.** https://www.fpns w.og.all > factsheets.

**38.** https://www.hpvvaccine.org.all > ho.

**39.** https://health.gov > vaccine shots.

Journal of Brahmanbaria Medical College
Volume 07 Issue 01 January 2025 ; 30-35

**40.** Buni L et al. Cervical human papillomavirus prevalence in 5 countries : meta analysis of 1 million women with normal cytological findings : J Infact Dis. 2010; 202 (12) : 1789-1799.

**41.** https://pubmed.nibi.nlm.nih.govt 2106 7374 Ferlay J, Laversanne M Ervik M, Lam F, Colombet M, Meryl, Pineros M, Znaova Soerjomataram I, Bray F (2024). Global cancer observartory : Cancer tomorrow, Lyon, France. International Agency for Research an cancer.

**42.** https://gco.iarc.fr / tomorrow.

43. https://pubmed.ncbi.nlm.nih.gov.

**44.** https://www.sciencedirect.com.

45. Sciene Direct.com; https://www.science direct.com) pil.

**46.** Research Gate; https://www. researchgate.net > 518.

**47.** Collaboration with University of Copenhagen.

* Kavolinska Institute (Sweden)

* National Institute of Health and Welfare (Finlan)

* Norwegian Institute of Public Health (Norway) &

* Statens seruminstritut.

**48.** Syddansk Universited; https://www. sdu.dk.sif > projeckter.

**49.** https://www.immunise.health.n3.