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The role of preventive medicine in addressing HPV-associated diseases: Strategies and challenges in Kyrgyz Republic

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Abstract

HPV stands as a significant global public health concern that extends to Kyrgyzstan. The area experiences inadequate public education about prevention methods and low vaccination rates. This study examines Jalal-Abad residents' understanding of HPV and HPV vaccine alongside vaccination prevalence and healthcare access within Kyrgyzstan's existing system. A cross-sectional survey was conducted in 2023 using a standardized 13-question questionnaire designed by the author. The questions assessed participants' knowledge of HPV, its transmission, and the HPV vaccine. A total of 106 participants from diverse social and occupational backgrounds in Jalal-Abad were surveyed. Of these, 76.4% (n=81) were female and 23.6% (n=25) were male. The age distribution was as follows: 1.9% (n=2) aged 11–16, 15.1% (n=16) aged 16–22, 42.5% (n=45) aged 22–28, 18.9% (n=20) aged 28–35, 16% (n=17) aged 35–46, and 5.7% (n=6) over 46 years old. The survey showed that there were low level of knowledge and many misconceptions about HPV, its medical consequences and the safety and necessity of vaccination. Less than 10% of the respondents were aware that HPV vaccination is included in the national immunization schedule. Lack of information and wrong public health information were found to be the main reasons for vaccine hesitancy. Comprehensive public health education in Kyrgyzstan is of critical importance to raise knowledge about HPV and boost acceptance of the HPV vaccination. Personalized educational campaigns might be very important in debunking disinformation and advancing vaccination as a preventative medical tool.

Keywords: HPV, Vaccination, Prevention, Cervical cancer, Gardasil, Questionnaire

1 Introduction

One of the most frequently spread sexually transmitted diseases (STIs) worldwide, human papillomavirus (HPV) has major consequences for public health. Apart from skin to skin contact, HPV is mostly spread via genital contact including anal and vaginal intercourse [1]. Studies show that at least half of those who have had intimacy will eventually have HPV in some way throughout their lifetime. Despite its great frequency, HPV frequently goes undetectable, mostly because the virus may resolve on its own without generating health problems and there are no clear indications [2]. Although HPV is not a recently identified virus, public awareness of its propagate, impact on health, and preventative measures is still insufficient. Often years after the first contact, many infected people men as well as women can unintentionally infect their partners with the infection. Early initiating of having relations and having many sexual partners are among the several risk factors that raise the chance of HPV infection. Furthermore influencing a person's vulnerability to infection is their sexual history [3].

With more than 100 known types, HPV is a varied collection of viruses not all of which cause major health concerns. Certain high-risk strains, including HPV types 16 and 18, are particularly linked, however, to the development of anal, vaginal, vulvar, and cervical tumors. Other strains, including HPV types 11 and 6, have been shown to cause benign diseases like genital warts. Though treatments for disorders brought on by HPV exist, including genital warts, precancerous cervical alterations, and cervical cancer, there is no clear cure for the virus itself right now. The virus could survive and maintain a transmission risk even after therapy [4,30]. Early diagnosis of cellular abnormalities depends on regular Pap test-based cervical cancer screening, which also helps to enable quick intervention and lowers the chance of progression to cancer. Early

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detection of cervical cancer usually results in effective treatment, therefore greatly reducing death rates [5,32].

With fatality rates are alarmingly high, cervical cancer poses a serious public health threat for Kyrgyzstan. Third most common cancer among women worldwide, it causes a major healthcare load in the Kyrgyz Republic. With over 300 deaths yearly, cervical cancer ranks now as the main cause of cancer-related death among women in the nation [6]. The second most frequent disease among women and the most common among those aged 15 to 44 years, according to World Health Organisation (WHO) estimates, 600 new cases of cervical cancer are detected annually in Kyrgyzstan [7,31]. Reportedly at 20.4 incidents per 100,000 women, Kyrgyzstan's cervical cancer incidence rate is much higher than the average rate across Central Asian nations and 1.3 times higher than the world average [8]. Globally, cervical cancer continues to be a major health issue with over 560,000 new cases identified and over 300,000 fatalities documented in only 2018 alone [9]. On nations where HPV vaccination campaigns have been extensively carried out, however, cervical cancer incidence has clearly dropped [10]. Australia has effectively reduced cervical cancer incidence to around 6 incidences per 100,000, for example; forecasts show that by 2034 the rate will drop to less than 1 case per 100,000 [2]. These numbers show the great part the HPV vaccine plays in reducing the illness load. Although, HPV continues to be a major public health issue in Kyrgyzstan because the population lacks sufficient knowledge about the virus and shows low vaccination rates and holds incorrect beliefs which make people hesitant to get vaccinated, but the health education and preventive care system of the country also faces multiple challenges that affect its ability to address infectious diseases and other health issues. University students in Southern Kyrgyzstan face concerning health issues because half of them have ongoing medical conditions and their numbers of digestive and respiratory and ophthalmic and skin disorders have risen substantially. The research shows that insufficient public health education combined with restricted preventive care access creates high risk for young people who need immediate implementation of comprehensive awareness programs and early disease detection systems and health promotion initiatives. The main objective of this study is to highlight the need for educating the people about the HPV vaccine as a fundamental preventative strategy against cervical cancer in Kyrgyzstan. Specifically, the study intends to evaluate the degree of awareness among the population of Jalal-Abad about HPV and its related health hazards, assess the frequency of HPV vaccination acceptance, and pinpoint the main obstacles preventing the execution of efficient preventive policies in the region. By tackling these elements, the research aims to provide insightful analysis that may guide focused public health initiatives, improve awareness campaigns, and finally help to lower the incidence of HPV-related conditions in Kyrgyzstan.

What is already known on this topic?

1 Global HPV burden and cervical cancer link: Human papillomavirus (HPV) is a common sexually transmitted disease that is associated with cervical cancer and its high-risk types (HPV 16/18) are responsible for approximately 70% of cervical cancer cases worldwide. The vaccination programs in high-income countries such as Australia have decreased the incidence of cervical cancer.

2 LMIC challenges: Low- and middle-income countries (LMICs) experience multiple barriers to HPV prevention because they have restricted vaccine availability and insufficient public knowledge about the vaccine and other healthcare needs take precedence. The combination of rural-urban differences and cultural resistance creates additional challenges for HPV vaccination programs.

3 Vaccine efficacy and guidelines: HPV vaccines given for prevention (Gardasil, Cervarix) are safe and effective when given before the patient becomes sexually active. The World Health Organization (WHO) recommends HPV vaccination for adolescents, but LMICs often struggle with implementation because of cost, logistics, and misinformation.

What does this study add on this topic?

1 First localized evidence from Kyrgyzstan: This study gives the first evaluation of HPV knowledge, vaccine acceptance, and misconceptions in Jalal-Abad, Kyrgyzstan, showing important gaps: Only 60.4% knew about HPV, less than 10% knew it was

included in the national immunization program, and 14.2% coverage despite policy adoption. The study reveals demographic differences where rural people depend on school-based campaigns that reach only 11.3% and where misinformation about HPV causes link it to unrelated conditions like hemorrhoids (13.2%) or uterine fibroids (24.5%).

2 Structural and cultural barriers in LMICs: Observes specific barriers in Kyrgyzstan such as most HPV information coming from social media and other informal channels (55.7%), incorrect assumptions about vaccine eligibility among sexually active individuals (65.1%), and widespread misconceptions about HPV curability (38.7%). Stresses the necessity of culturally adapted interventions to overcome parental hesitancy and enhance trust in healthcare systems.

3 Policy-to-practice implementation gaps: The paper reveals the gap between the national HPV vaccination policy of Kyrgyzstan in 2022 and its actual implementation at the grassroots level, including weak communication strategies and low healthcare worker engagement. The paper proposes three actionable solutions for LMICs: integrating community-led education, leveraging media platforms for awareness, and expanding vaccination beyond schools to reach older adolescents and rural populations.

2 Methods

2.1. Study design and population: Using a standard survey designed by the author, 13 comprehensive questions aimed to evaluate people of Jalal-Abad city of Kyrgyzstan for knowledge and awareness of HPV and vaccination, were distributed in 2023.

2.2. Inclusion and exclusion criteria: The study's inclusion criteria were residents of Jalal-Abad who were at least 11 years old. Individuals from outside the Jalal-Abad region, such as follow-up or visiting patients from nearby regions, were not included. Basic literacy abilities were essential for participants to comprehend and complete the questionnaire. Parents assisted in filling out the questionnaire for children under the age of eighteen. In order to prevent bias in responds, exclusion criteria included anyone under the age of eleven, those who refused to provide consent, and people who had prior professional knowledge of HPV such as healthcare professionals, clinicians, and medical students to avoid bias.

2.3. Questionnaire: To provide a wide representation of the population, the participants were chosen from several academic and professional backgrounds. The questionnaire aimed on assessing their knowledge of HPV transmission, related risks to their health, and the need of vaccination as a preventive action. To respect the respondents' privacy and confidence, data collecting took place under anonymity. The findings were examined and presented as a total percentage to provide a whole picture of the degree of population awareness

2.4. Ethical considerations: The objective of the research was explained to the participants, and their participation was completely voluntary. As no personally identifiable information was collected, the data were completely confidential and anonymous. Informed and oral consent was obtained from all participants prior to data collection, ensuring their voluntary participation and understanding of the study's purpose. Ethical approval was waived from the Ethical Committee of XX (hidden for the review purpose) as the survey was conducted anonymously, ensuring the confidentiality and privacy of participants. The study adhered to the ethical principles outlined in the Declaration of Helsinki [11].

2.5. Statistical analysis: Descriptive statistics were used to examine the data and provide an overview of the demographics of the participants and their responses. In order to determine the degree of awareness and knowledge about HPV and vaccination, frequencies and percentages were calculated. To evaluate correlations between awareness levels and demographic factors, chi-square tests were applied. The Microsoft Excel Package was used for data input and initial analysis.

3 Results

Assessing public knowledge and opinions on HPV and its vaccination depends on knowing the demographic breakdown of the studied community. 106 people all over from different socioeconomic and professional backgrounds took part in this survey to provide an accurate description of the Jalal-Abad community. While males accounted for 23.6% (n=25), women

made the majority of the responders—76.4% (n=81). The participants were arranged into many age groups to provide a whole picture: The biggest section, 42.5% (n=45), fell between the ages of 22–28; 1.9% (n=2) were aged 11–16 years; 15.1% (n=16) belonged to the 16–22 year range. 18.9% (n=20) were between 28 and 35 years old; 16% (n=17) were between 35 and 46 years old; and 5.7% (n=6) were above 46 year old. Table 1 shows a complete set of the survey questions along with the answers collected from 106 people. Initially received in the regional Russian language, the responses were subsequently translated into English for purposes of the study. This translating ensured consistency in data interpretation and analysis. The response file can be accessed from the supplementary material provided with the study.

Table 1. Summary of survey questions and responses from 106 participants assessing HPV knowledge and vaccination awareness in Jalal-Abad region of Kyrgyzstan

	Survey Question	Responses
1	What is your gender?	Male: 23.6% Female: 76.4%
2	What is your age?	11-16 Years: 2% 16-22 Years: 15.1% 22-28 Years: 42.5% 28-35 Years: 18.9% 35-46 Years: 16% Over 46 Years: 5.5%
3	Are you sexually active? If so, since what age?	Yes from 16-20 Years age: 14.2% Yes from 20-25 Years age: 36.8% Yes from 25-30 Years age: 17% Yes from 30 and older: 5.6% No, I don't have sexual partners: 26.4%
4	Do you know about the human papilloma virus?	Yes, I know: 60.4% No: 19.8% I heard about it: 19.8
5	Did you know that since 2022, HPV vaccination has been introduced into the national immunization calendar of the Kyrgyz Republic?	Yes, I heard it on TV (news), Internet (WhatsApp, Instagram, Telegram, Odnoklassniki, etc): 55.7% No, I don't know: 33% Yes, they said at the child's school meeting: 11.3%
6	What clinical manifestations of HPV do you know?	Genital Warts: 40.6% Cervical Dysplasia: 26.4% Haemorrhoids: 13.2% Penile Cancer: 20.8% Cervical Cancer: 47.2% Genital Herpes: 22.6% Uterine Fibroids: 24.5% Cervical Ectopia: 9.4% Don't Know: 30.2%
7	Is HPV Curable?	Yes: 38.7% No: 24.5% Don't know: 36.8%
8	HPV Treatment?	Antiviral therapy: 45.3% Antibacterial therapy: 11.3% In douching with antiseptic means: 3.2% Surgical treatment: 10% Cannot be treated: 30.2%
9	Have you been vaccinated against HPV?	Yes: 14.2% No: 85.8%
10	Do you know who is vaccinated against HPV	Boys and girls from 9 to 14 years old For girls from 12 to 15 years old For girls and boys from 15 years old and older

		Don't know
11	Should I be tested for HPV or not before vaccination?	Yes: 39.6% No: 60.4%
12	Should sexually active people be vaccinated?	Yes: 34.9% No: 65.1%
13	Can patients with cervical cancer be vaccinated?	Yes: 58.5 No: 41.5

Given that HPV can affect anyone who has had physical contact, Question 2 (Table 1) response offers insight into the patterns of intimacy among the group under examination. Participants were questioned about their level of intimacy and the age at which they first started to be sexually active. According to the statistics, respondents' average age for their first sexual experience ranges between 20 and 25 years old. Furthermore, a substantial number of the respondents—28 people (26.4%) said they had no sexual relationships at all. These results underline the variation in population sexual activity patterns and the necessity of focused awareness campaigns aiming at HPV prevention. Response of Question 3 (Table 1) shows the respondents' knowledge of the human papillomavirus (HPV) and their awareness of the inclusion of HPV vaccine in the "National Calendar of Preventive Vaccinations of the Kyrgyz Republic" from 2022. Participants were asked if they knew HPV was a common virus and whether they knew it had just been included into the national immunization program. The results underline the crucial requirement of thorough public health education about HPV, its modes of transmission, and the significance of vaccination in reducing its spread within the population as people may unintentionally carry the virus and might therefore transmit it to others.

Question 4 (Table 1) response shows how awareness of HPV and vaccination is distributed across the respondents. According to the statistics, most participants—60.4%—know about HPV; around 40% of respondents lack knowledge of the virus and the related vaccination. This awareness difference emphasizes the need of focused public health campaigns to solve knowledge gaps and advance population education on HPV prevention and vaccination.

Response of Question 5 (Table 1) indicates how informed respondents are of the HPV vaccination's showing up in Kyrgyzstan, therefore underscoring the inadequate media-based teaching campaign. Although the immunization program—which targets girls beginning at the age of 9—was carried out in schools—only 11.3% of respondents claimed having heard about it during school meetings. This implies that either parents could not be interested and skip these sessions or that schools and healthcare facilities are not making sufficient instructional efforts to increase awareness. These results highlight the necessity of better communication techniques to guarantee that parents and pupils know the immunization program and its advantages. Question 6 (Table 1) response give overview on how well responders comprehend the clinical HPV symptoms. Participants had many choices, and the findings show an evenly divided response. In line with the most appropriate choices from the given selection, almost 80% of respondents correctly recognized cervical cancer and condylomas as the main clinical manifestations connected with HPV. This indicates a small amount of knowledge about the potential risks connected to HPV, even if more education might be required to handle fewer known symptoms and the wider spectrum of possible HPV-related diseases. Responses from Question 7 (Table 1) and Question 8 (Table 1) show the opinions of the respondents on the treatment of HPV; most of them believe that antiviral treatment is the most efficient method as the virus may be cured.

4. Discussion

It is important, nevertheless, that particular antiviral medications or vaccinations aimed against HPV are still under development. Current medical knowledge underlines that the virus cannot be totally eliminated from the body. Rather, treatment interventions concentrate on eradicating clinical and subclinical HPV infection. Although many techniques for eradicating anogenital warts are available, their efficacy varies from 30% to 90%; none can ensure permanent remission as recurrence rates remain high across all treatment modalities. Treatment has

to be tailored to the particular situation of every client, considering their preferences sometimes as well. The fact that relapses are usually connected with the reactivation of the virus instead than reinfection from a sexual partner emphasizes the difficulty of controlling HPV infections.

Without treatment, there are three different ways that warts brought on by the human papillomavirus (HPV) develop. First, the warts may simply subside as the immune system fights off the infection; the warts may clear naturally, sometimes [12]. The second type of warts may not improve or even decrease in size; they may remain unchanged. Furthermore, warts may multiply, grow, or cause other serious issues. Since the viral infection, HPV, can persist in the body with or without symptoms, it is significant to appreciate the possibility of ongoing viral presence, including when there are no clinical signs [13] [14]. This makes it crucial to remain vigilant and adopt sensible measures of control. Most commonly considered for excision are benign HPV-induced lesions such as condylomas (genital warts), which can be painful, offer means of transmission, and cause psychological distress.

4.1 Comparative approaches to lesion removal

There are many ways of eliminating these lesions, and each has its advantages and disadvantages

4.1.1 Cryodestruction: *Under this technique, the wart is subjected to very low temperatures that cause the tissue to freeze and finally come out. Though several sessions might be needed, the process is really easy [15].*

4.1.2 Electrocoagulation: *High-frequency electrical current in electrocoagulation heats and kills the tissue. For minor lesions, it is successful; yet, depending on the treated region, it might cause scarring [16].*

4.1.3 Laser removal: *Laser removal is a more exact method wherein the wart layer is vaporised layer by layer using concentrated light till a scab results. For bigger or more challenging-to-remove lesions especially it is helpful [17].*

4.1.4 Chemical Destruction: *Special chemical solutions are sprayed straight to the warts, therefore chemically destroying the tissue. Usually used for minor lesions, this method could call for many treatments [18].*

Previous study by C. Kabaca et. al (2021) has shown that HPV types 16, 18, and other high-risk strains are more likely to cause cervical and other cancers [19]. New study suggests that these strains might possibly create health concerns. Which makes These tests are critical for not just monitoring cancer's normal viral load, but also for treating the illness as a whole [20] [21]. In around 30% of instances, the body may eradicate HPV infection, symptomatic or not, within one to 1.5 years. However, the pharmaceutical industry aims to emulate this natural resolution process; most medicines aim to assist control symptoms while also promoting recovery [22].

Medical professionals should evaluate every case separately and choose the most suitable course of action as the truth is that the virus may still disappear spontaneously or remain in spite of treatment. Although technological developments have given several treatment choices, total eradication of the virus is still elusive and care mostly concentrates on symptom control and lowering of the risk of transmission.

While examining the responses from Question 9 (Table 1) and Question 10 (Table 1), it shows that the percentage of vaccinated people is still rather low. The main concentration on vaccinating younger girls aged 9–11, who were aggressively invited to healthcare facilities to get the HPV vaccination, might help to explain this limited coverage. On the other hand, while qualified for immunization, older teenage girls and sexually active women might have lower vaccine efficiency because of possible past viral exposure. When questioned about the age limits for the HPV vaccine, the answers showed a clear ignorance. Most people knew nothing about boys and girls between the ages of 9 and 14 qualify for immunization. This information gap is alarming as both men and women may develop and spread HPV, usually without showing any symptoms, therefore unintentionally helping the virus to proliferate.

4.2 Current HPV immunoprophylactic techniques

The research claims that three HPV vaccinations are now licensed worldwide for main prevention of HPV-related diseases:

4.2.1 ***Bivalent vaccine (Cervarix):*** Targeting HPV strains 16 and 18, which account for most incidences of cervical cancer, the bivalent vaccination (Cervarix) was developed by GlaxoSmithKline Biologicals S.A., Belgium [23].

4.2.2.*Quadrivalent vaccine (Gardasil):* Made by Merck Sharp & Dohme B.V., Netherlands, the quadrivalent vaccination (Gardasil) provides protection against HPV types 6, 11, 16, and 18, therefore covering both oncogenic and non-oncogenic strains liable for genital warts and malignancies [24].

4.2.3.*Nonavalent vaccine (Gardasil 9):* Also developed by Merck Sharp & Dohme B.V.,

Netherlands, the nonavalent vaccination (Gardasil 9) offers more general protection against nine HPV strains, including those most usually associated to cervical and other anogenital malignancies [25].

Following Order No. 1131 published by the Ministry of Health on December 23, 2019, the HPV vaccine was formally included into the National Calendar of Preventive Vaccinations of the Kyrgyz Republic on November 14, 2022 [26]. At first, the immunization campaign focused mostly on 11-year-old females. The National Technical Expert Group on Immunization (NTGEI) advised widening the target group for the first year of implementation to include females aged 12–14 years, while, realizing more coverage is needed [27]. Targeting the high incidence of HPV-related illnesses and in line with world vaccination best practices, this strategic expansion sought to optimize vaccine acceptance and provide protection to a broader age range [28].

Analyzing the Question 11 (Table 1) and Question 12 (Table 1) show that regular testing—including co-testing or Pap testing—for HPV infection before immunization is not required. Two main factors guide this strategy. First of all, those who have not yet participated in sexual activity are unlikely to have come into contact with the virus and so are HPV-negative. Second, the existence of any HPV type does not contradict vaccination for those who have active sexual lives. Particularly HPV types 16 and 18, which are known to be most risk-inducing for cervical cancer and other HPV-associated malignancies, immunization may still provide protection against other high-risk oncogenic strains. The present evidence-based guidelines provide wide vaccination coverage first priority without regard to pre-screening, therefore guaranteeing that people get best protection regardless of their HPV status [28].

While previous research has identified HPV types 16, 18, and other highrisk strains as having an increased probability of cervical and other cancers, new research indicates the potential risk of non-oncogenic HPV variants as well. These types are not normally associated with cancer, but they may produce significant health issues, which means that viral load monitoring and holistic illness control are important [29]. The great majority of HPV infections whether they have symptoms or not can be selfcleared by the body within one to one and a half years for about 30 percent of the cases. But this is where the pharmaceutical industry steps in to help control the symptoms and promote recovery.

The study shows that there is the need for more public education and awareness campaigns to increase public of knowledge HPV, how it is transmitted and the benefits of vaccination. Although the great majority of the population is aware of HPV-related infections, a substantial proportion of respondents were ignorant of preventive measures such as usual screening recommendations and vaccine programs. The findings support the importance of fusion among the media, educational systems, and clinical practice in ensuring the accurate dissemination of information and in increasing the vaccination coverage. Additionally, targeted treatments for specific population groups may assist in reducing the knowledge gap and fostering a culture of universal health interventionism.

5. Conclusions

The importance of HPV prevention by vaccination cannot be emphasized, since it greatly reduces the burden of HPV-related illnesses, including cervical cancer. However, the results of this research done in Jalal-Abad suggest a significant gap in public understanding of the HPV vaccination, namely the advantages and safety of the quadrivalent Gardasil vaccine for children. The low level of knowledge among the community has a direct impact on vaccination uptake and the overall efficiency of preventative efforts. To overcome these issues,

volunteer-led cultural and educational activities are required to assist healthcare facilities in educating the public about the need of HPV vaccination. Expanding outreach efforts to include more lectures and informative sessions in schools and other educational settings, as well as focused contact with parents, may greatly raise vaccination knowledge and acceptability. Furthermore, further study is required to evaluate and improve current regulations, assuring the creation of a strong regulatory framework that allows for the uniform and successful application of HPV monoprophylaxis across Kyrgyzstan. Strengthening these efforts will help to increase vaccine coverage, eventually leading to a decrease in HPV-related morbidity and death in the community.

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