

**Parental Knowledge, Attitudes, Beliefs and Acceptance of Human
Papillomavirus Vaccination Among Their Daughters: A Cross-Sectional
Study in Yerevan, Armenia**

Master of Public Health Integrating Experience Project

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By

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List of abbreviations

AUA – American University of Armenia

CDC – Centers for Disease Control

DNA – Deoxyribonucleic acid

FDA – Food and Drug Administration

HBM – Health Belief Model

HPV – Human Papillomavirus

IRB – Institutional Review Board

KAP – Knowledge-Attitudes-Practice

SPSS – Statistical Package for the Social Sciences

STI – Sexually Transmitted Infection(s)

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Executive Summary

Armenia has the highest cervical cancer mortality rate among countries of Western Asia. Moreover, cervical cancer is the second most frequently diagnosed cancer type among females aged 15 to 44 years old residing in Armenia. Oncogenic Human Papillomavirus (HPV) infections constitute the leading cause for cervical cancer development. The current study aimed to investigate the parental acceptance of the HPV vaccination for their girls aged 11-14 years old who attend public school in Yerevan, Armenia. The study also aimed to uncover participants' level of HPV-related knowledge and HPV-related health consequences; furthermore, the purpose of the present study was to elucidate if the association between HPV vaccine acceptance, HPV and cervical cancer related knowledge, and attitudes towards HPV vaccination exists.

A cross-sectional, quantitative study was implemented by the research team. The study was approved by the Institutional Review Board (IRB) of the American University of Armenia (AUA). Twelve of the largest public schools in Yerevan, Armenia were selected for participant recruitment. After obtaining permission from the Directors of the selected schools, the web-link containing the online study survey was sent to the study population. Online data collection was anonymous—no personal information or contact information for participants was collected. Overall, 190 parents completed the online survey and 173 were included in the final analysis.

The descriptive analysis revealed that the mean HPV vaccine acceptability score was 10.3 (possible score range is from 5 to 20). The mean knowledge score was 3.9 out of 14. While parents of 11-14 year old school girls reported a lack of trust towards HPV vaccination, they did report an unmet need for more comprehensive information regarding this topic. Through linear regression analyses (unadjusted and adjusted) no association was found between parental acceptability, knowledge and attitudes towards the HPV vaccine. To address low knowledge on HPV and poor HPV vaccine acceptability in Yerevan, Armenia, further

HPV-related educational programs and additional research is recommended in order to improve parental knowledge, and also to reveal the underlying factors of HPV vaccine acceptability and coverage.

1. Introduction

Presently, the Human Papillomavirus (HPV) is recognized as the world's most frequently diagnosed sexually transmitted infection (STI).¹ There are approximately 200 known HPV types.² Of these, 40 are transmittable from the skin and mucosa of the person who is infected with HPV to his or her sexual partner(s) during vaginal, oral and anal sex.² However, there is evidence that mere skin-to-skin contact of anogenital niche tissue is enough to transmit HPV infections.³ Those at greatest risk for becoming infected with HPV are youth following sexual debut.³ The estimated probability of a sexually active male or female to acquire at least a single serotype of HPV during their lifespan is 80% and 90%, respectively.² It has been well-established that oncogenic-type HPV infections are the leading causes of cervical cancer.² There are 14 known serotypes of HPV strains that are recognized to be oncogenic.³ Of these, the HPV 16 and 18 strains are considered as the leading high-risk, oncogenic strains, and are causing over 70% of all cervical cancers worldwide. Moreover, oncogenic HPV infections cause approximately 95% and 70% of all anal and oropharyngeal cancers, respectively.² Additionally, HPV is responsible for vaginal, penile and vulvar cancers.²

Furthermore, roughly 90% of all benign genital warts are caused by HPV strains 6 and 11.^{2,4,5} However, the majority of high-risk HPV infections cause no symptoms, and typically disappear spontaneously in one or two years.² Yet, sometimes high-risk HPV infections persists, which can damage the cells of niche host tissues, and may thus result in development of cancer.² This occurs when the cell-damaging oncoproteins E6 and E7 that are encoded in the genome of high-risk HPV infections harm the cells of the host's niche tissue. Consequentially, apoptosis is disrupted as tumor-suppressor genes, namely p53 and pRB, become inactivated in the infected niche tissue.² Moreover, the HPV genome also has E1, E2, E3, E4 and E5 genes that contribute to the persistence of the HPV genome, its replication and

transcription.⁶ This process can lead to unfettered cellular growth of damaged nice tissue, resulting in cervical dysplasia.⁷ However, abnormal cells are usually eliminated by the immune system of the host.² Nevertheless, abnormal cellular replication on the cervix uteri attributed to high-risk HPV infections may persist and lead to cancer.⁷ Factors such as smoking, early sexual debut, suppressed immunity, being simultaneously infected with other sexually transmitted infections, and being sexually non-monogamous increases one's probability of acquiring oncogenic HPV infections, and thus cervical cancer.³

In 2018, cervical cancer represented over 6.6% of all cancers that occurred among women, with 570,000 newly diagnosed cases worldwide.^{8,9} Additionally, it ranks as the second most prevalent cancer types amongst women between the ages of 15-49 years old, and the fourth among women of all ages globally.⁴ Each year, roughly 311,000 deaths worldwide occur due to cervical cancer³; this equated to 7.5% of all cancer deaths recorded in 2018.⁸ Of those deaths, approximately 90% occurred in countries with low- and middle-income economies.⁹

1.1 Prevention of Cervical Cancer

The development of cancer may take years, or even decades and may be prevented by primary (e.g. vaccinations against HPV) and secondary (e.g. early detection of HPV infection(s), and/or (pre)cancers during routine screening programs) prevention techniques.⁵ The tertiary prevention of cervical cancer consists of the treatment of precancerous neoplasms and cancer of cervix uteri.¹¹

1.1.1 Primary Prevention

The primary prevention strategies of cervical cancer aim to minimize the risk of acquiring HPV by vaccine implementation, and educational programs regarding safe sexual behaviors.¹¹

HPV Vaccination

Globally, vaccines that are offered for school-aged children and adolescents are known as “school-based immunizations”.¹² These are linked to a decrease in the incidence of vaccine preventable illnesses, and improve the overall health of a society.¹² As such, the administration of the HPV vaccine, called Gardasil®, as school-based inoculation may coincide with educational interventions regarding HPV transmission, prevention, health behaviors and potential health consequences.¹²

HPV-associated cancers have become easily preventable after the discovery of the vaccine. Several rigorous randomized clinical trials tested the safety and effectiveness of Gardasil®, and it was approved for use among females aged 9-26 by the United States Food and Drug Administration (FDA) in 2006.¹³ A decade after the onset of HPV vaccine utilization, about 270 million doses of the vaccine had been administered to both males and females worldwide.¹⁴ The safety and effectiveness of the HPV vaccine has been continuously monitored by the United States Centers for Disease Control and Prevention (CDC) and Food and Drug Administration (FDA).¹³ Furthermore, clinical trials have demonstrated that the advantages of receiving the vaccine outweigh potential risks.¹³ Thus, it has been well-established globally that the HPV vaccine improves the health of populations.¹⁵ This is due to decreased incidence of HPV-related genital warts, cellular abnormalities and other HPV-associated health conditions.¹⁵

The newly developed nonavalent HPV vaccine (HPV9) prevents infections from nine different HPV strains responsible for warts and cancers that are caused by strains 6, 11, 16, 18, 31, 33, 45, 52, and 58. Consequentially, HPV9 is estimated to prevent 90% of all HPV-associated cancers.¹⁵ Whereas, the quadrivalent HPV vaccine (HPV4) prevents infection from four different HPV strains responsible for warts and cancers caused by strains 6, 11, 16, and 18, which is estimated to prevent 70% of all HPV-associated cancers.¹⁵ According to previous studies, HPV vaccination offers long-term, ubiquitous protection that does not weakening over time.⁶ However, the vaccine is not effective in the prevention of HPV related diseases

for those who have already been exposed to one or more types of that virus.⁶ Also, it is not effective in the treatment of the HPV-associated diseases, and should only be used for the primary prevention of HPV infection—preferably prior to sexual debut and exposure.¹⁵

The list of adverse effects of the HPV vaccines include short syncope, fever, tiredness, pain, and other non-specific conditions that are probable to exist after other vaccinations of various types.¹⁶

HPV vaccine inoculation recommendations before October 2018 include: ^{17, 18, 19}

- Children aged 11-12 years old (can be administered from the age of nine).
- Females aged 13-26 years old, who did not receive the vaccine before.
- Males aged 13-21 years old, who did not receive the vaccine before.

The CDC has recently changed the recommended age range for HPV vaccine inoculation following a rigorous multi-national study amongst 3,819 females aged 24-45 years old, which demonstrated the efficacy and cost-effectiveness of the vaccine in older adults. ¹⁹

Therefore, HPV vaccine inoculation recommendations after October 2018 include: ¹⁹

- Females aged 9-45 years old.
- Males aged 9-45 years old.

Children who receive the nonavalent vaccine before the age of 15 should receive the second dose 6-12 months after administration of the first dose.¹⁶ The third vaccine dose is required for those who have been vaccinated first after the age of 15, and for those with suppressed immune systems.¹⁸ Also, the time-sensitive three-dose schedule is suggested for individuals who will get the quadrivalent vaccine.²⁰ The scheduling guidelines for those who require three HPV vaccine doses are as follows: the first dose should be administered at months 0, the second dose is to be delivered after 4 weeks of the first dose, and the concluding third dose at month 5.¹⁸ The schedule mentioned above indicates the minimum intervals between vaccine inoculations.¹⁸ The maximum interval between doses in not exist

and the patient may get his or her next dose of the vaccine at any time even if months of years have been passed since the last inoculation. ¹⁸

Though HPV vaccination during pregnancy has no reported or known health risks for a newborn or his or her mother, it is recommended that mothers avoid vaccination during gestation. ¹⁷

Safe Sex Practices

Correct condom use only partially protects a person from being infected with HPV. ⁶ This is due to the fact that condoms do not cover all of one's anogenital skin; the parts of the anogenital region that are not covered with a condom can still come into contact with the anogenital skin of a sexual partner, and thus transmit the infection. ⁶ Research indicates that condom use by an infected male decreases the risk of a healthy female getting HPV by roughly 70%. ²¹ Having a mutually monogamous relationship with a sexual partner may also decrease the risk of getting HPV. ⁵

1.1.2 Secondary Prevention

The secondary prevention strategies for cervical cancer prevention include the detection and routine monitoring of abnormal cervical cellular growth. Cervical cancer screenings include HPV tests, cytological tests (Pap test) and others. ¹¹ According to World Health Organization (WHO), such screenings are recommended for women aged 30 and above. ³

Moreover, HPV tests are available that make it possible to detect whether or not a person is infected with high-risk HPV types. ² These tests indicate the presence of high-risk HPV deoxyribonucleic acid (DNA) in niche tissue cell samples. ² Such testing may be done alone, or in combination with a Papanicolaou smear (Pap-smear) test. ² Pap-smear testing detects abnormal cervical cellular growth, whereas HPV testing detects the presence of high-risk HPV DNA and oncoproteins. ²

Pap-smear testing is a gold standard screening tool for cervical cancer.²¹ The effectiveness of Pap-smear screening has been well-established.²² However, the sensitivity of Pap-smear testing is merely 51%, which contributes to approximately 35.5% false negative results.²²

According to The Bethesda System (TBS) of the cytological classification, the Pap smear test results include the following categories of epithelial cell abnormalities in the tested sample of cells:^{7,23}

- *Normal* - the test did not detect any abnormalities.
- *ASCUS (Atypical Squamous Cells of Undetermined Significance)* - there are anomalous cells, but the test could not define the specific abnormality.
- *LSIL (Low-grade Squamous Intra-epithelial Lesion)* - there are severe cellular abnormalities that should be monitored. The persistence of such severe abnormalities for 2-3 visits may be considered as potential cancerous growth.
- *HSIL (High-grade Squamous Intra-epithelial Lesion)* - Advanced dysplasia.
- *AGC (Atypical Glandular Cells)* - these cells are the predictors of twenty percent of cervical cancers.

1.1.3 Tertiary Prevention

The first tertiary prevention interventions comprise killing and/or taking a sample of pre-cancerous cervical tissue. This is achieved through procedures such as cryotherapy, which destroys precancerous cervical cells by freezing them; and also through cold knife conization—a biopsy technique used to detect precancerous cervical tissue.¹¹ The second prevention group consists of surgical, radiotherapeutic, and chemotherapeutic interventions delivered to remove and cure cervical cancer in a combined or separate manner.¹¹

1.2 Situation in Armenia

Cervical cancer is the seventh leading cancer type affecting women of all ages, and the second among woman of reproductive ages residing in Armenia.²³ In 2018, some 196 newly

diagnosed cervical cancers and 136 deaths result from cervical cancer in Armenia.²⁴ Cervical cancer is the seventh leading cause of cancer deaths among women residing in Armenia.²⁴

In the Western Asian region, Armenia has the second highest incidence rate of cervical cancer, trailing Georgia, and ranks as the leading country for cervical cancer mortality.²⁴ Unfortunately, there is no available data describing the burden of HPV-related vaginal, anal, oropharyngeal and vulvar cancers in Armenia.²⁴ The quadrivalent HPV vaccine (HPV4), Gardasil®, has been scheduled in the Armenian National Immunization Program since December 2017.¹³ Prior to February 2019, the vaccination was free of charge and was offered as a school-type vaccine with a three-dose administration schedule (0, 1-2, 6 months) only to girls residing in Armenia, aged 13-14 years old.²⁴ However, since February 2019, the eligibility criteria for the HPV vaccine was updated, whereby the vaccine became available free of charge for both males and females that reside in Armenia aged 13-45 years old (Andronis Gharibyan, Clinical Sexologist at the Center of Medical Genetics and Primary Health Care, email communication, February 26, 2019).

The overall immunization coverage estimates in Armenia are 94% and higher (diphtheria-tetanus-pertussis [DTP3]-94%; third dose of poliomyelitis vaccine-96%; Measles, Mumps, Rubella [MMR]-97%).^{20, 21} However, HPV immunization coverage in Armenia is estimated to be at 6% (Gayane Sahakyan, National Immunization Programme Manager, phone call, December 4, 2018). This rate is significantly lower than that of other vaccine types, and is also lower than the HPV vaccine coverage rate for girls in the US, which is at 60%.^{25, 26}

Cervical cancer screening is available as a routine screening program in Armenia, and is recommended for females aged 30-60 years old.²⁴ In 2010, 5,922 women participated in the Armenian cervical cancer screening program.²⁴ These participants were both from urban and rural areas of the country with 3,641 and 2,281 women, respectively, representing an overall coverage rate of merely 9.3% for those who were eligible.²⁴

2. Methods

2.1 Theoretical Framework

HPV vaccine delay and refusal has been recognized as a worldwide public health problem.^{27, 28} Various global studies have been conducted in order to ascertain the reasons that contribute to people formulating negative vaccine attitudes.^{21, 27, 29} According such studies, there is a significant association between HPV immunization coverage (preventive health behavior) and an individual's beliefs and/or knowledge about HPV, HPV transmission, HPV-related health consequences and prevention mechanisms.^{10, 27, 28} Information regarding the underlying factors that contribute to immunization coverage is an important part of the primary prevention of cervical cancer.^{9, 26}

The present study is structured upon theoretical framework called the Health Belief Model (HBM), which was first developed in the 1950's, and is one of the most widely applied behavioral health theories in existence.³¹ This model states that the health behavior of an individual may be explained by his or her beliefs about a particular health behavior.³¹ Moreover, one's beliefs may be modified by other variables such as cues to action (internal or external prompts that evoke changing one's behavior) and socio-demographic characteristics.³¹ Resultingly, HBM has been identified as a classic theory for understanding and predicting one's likelihood of engaging in specific health behaviors in order to prevent negative health conditions and consequences.³¹ According to HBM, factors that shape one's health behaviors include the following:³¹

- **Perceived susceptibility** – one's evaluation of their likelihood for developing an undesirable health outcome.
- **Perceived severity** – one's evaluation of the seriousness of potential health consequences.

- **Perceived benefits** – the advantages that one thinks they will receive by adhering to a specific health behavior (prevention of consequences, improvement of health, and etc.).
- **Perceived barriers** – the impediments that one feels will thwart their engagement in a particular health behavior.
- **Cues to action** – factors that instigate and remind a person to follow a specific health behavior (i.e. social media, society, inconveniences experienced as a result of deleterious health conditions).
- **Self-efficacy** – one’s confidence in their ability to successfully change their health behaviors.

The relationship between HBM constructs and other factors that shape the individual’s health behavior are presented in Figure 1.

Figure 1. Health Belief Model Components and Linkages.³²

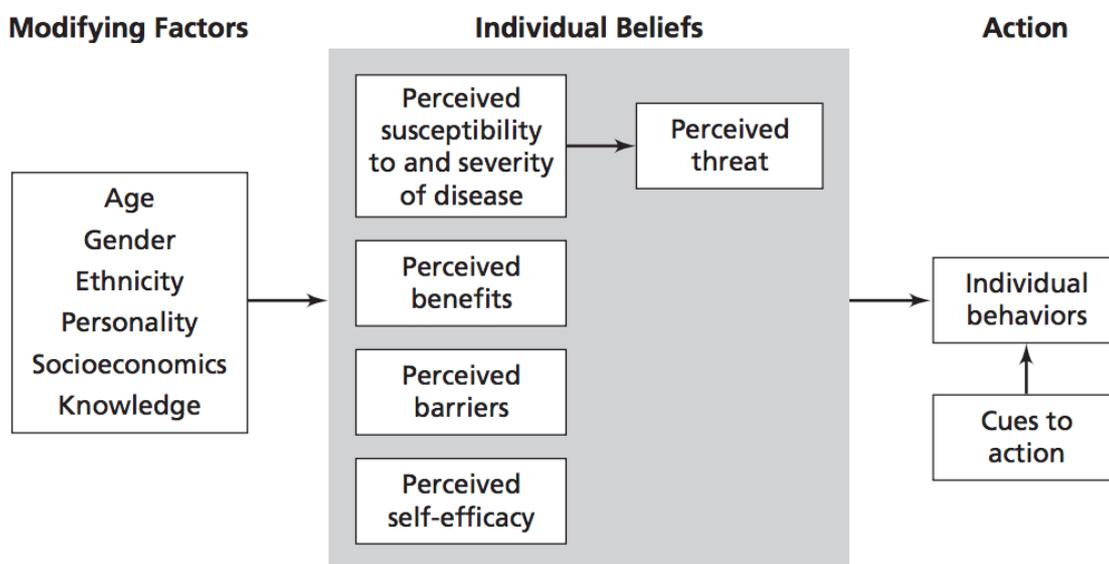


FIGURE 3.1. Health Belief Model Components and Linkages.

2.2 Study Objectives and Hypothesis

This study aimed to ascertain parental acceptability of the HPV vaccination for their daughters aged 11-14-year-old in Yerevan, Armenia. The secondary aim of the study was to evaluate parental knowledge of HPV risks and consequences, routes of transmission, and

prevention. Finally, this study aimed to uncover whether parental HPV knowledge, attitudes, beliefs and vaccine endorsement for their daughters is correlated, and whether socio-demographic characteristics, other lifestyle and health behaviors (including Pap smear screening), modify any such correlation(s).

Based on a review of available literature, it was hypothesized that:

- 1. There is no association between the acceptance of the HPV vaccine and knowledge about HPV and cervical cancer among parents of daughters aged 11-14 years old, residing in Yerevan, Armenia.*
- 2. There is no association between the acceptance of the HPV vaccine and beliefs regarding HPV and the HPV vaccine among parents of daughters aged 11-14 years old, residing in Yerevan, Armenia.*

2.3 Study Design and Sampling

This study utilized the cross-sectional design, which made it possible to collect data within short period of time without the need of further follow-ups. In order to collect the needed data, an online Qualtrics® survey was designed and implemented amongst the study population. The data collection took place in April, 2019.

In order for children in Armenia to receive vaccinations, parental consent is required. Therefore, parents who have daughters aged 11-14 years old who attend public schools in Yerevan were selected as the target study population. Moreover, parents are decision-makers for their children's healthcare; thus, it is important to understand parental knowledge, attitudes and beliefs regarding the vaccination of their daughters with Gardasil®. The sampling frame included the list of the municipal schools of Yerevan. The study population was derived from the target population.

The inclusion criteria for the sample population was the following:

- The participant self-reports to be a parent of a 11-14 years old female child who attends a public school in Yerevan

- The participant agrees to take this survey by him/herself without the assistance of someone else
- The participant self-reports to have access to the Internet in order to complete the survey Online
- The participant agrees not to share the survey link with anyone else, as specific schools are selected for this study

The estimated sample size of the study was calculated with the following formula.

$$n = Z^2 \sigma^2 / E^2$$

Where:

- **n** is the estimated sample size number
- **Z** is a constant number that depends on confidence interval
- **σ** is the standard deviation
- **E** is the margin of error (precision)

Based on the previously conducted studies, the estimated sample size for the current study was equal to: ¹⁰

Z= 1.96 for two-tailed, 95% Confidence Interval analysis

σ = standard deviation of the acceptance score =0.66

E= margin of error = 8%

$$n = 3.84 * 0.43 / 0.0064 = \mathbf{258}$$

Yerevan has twelve districts namely, “Kentron, Arabkir, Avan, Achapnyak, Nor-Nork, Nork-Marash, Malatia-Sebastia, Nubarashen, Shengavit, Qanaqer-Zeytun, Erebuni, and Davtashen”.³³ In each district the largest school by student population was selected for inclusion in this study. There are 155 state schools located in Yerevan, with unequal distribution between districts.³⁴ All the high schools were excluded from the sampling frame due to the older age of high school girls who were no longer considered eligible for free HPV

school-type vaccination (i.e. older than 14 years old) prior to the February, 2019 eligibility criteria policy shift.

2.4 Data Collection

After obtaining approval from the Institutional Review Board (IRB) of AUA to conduct this study, the research team contacted the Head of the Yerevan Municipality Department of General Education, who subsequently granted their permission to carry out the proposed research.

Directors of participating schools were notified in advance about the current study, its purpose and potential impact. If the school director didn't provide permission for conducting the study, then the second largest school by population was approached for participation; out of the 12 selected schools, 11 agreed to be included in the study. Since the Director of one of the schools was late in replying to the invitation to participate in this study, and ultimately declined participation, the research team was consequentially unable to engage another school from that district due to time constraints.

The online version of the questionnaire was generated and delivered via the Qualtrics® Online survey platform. In order to obtain the needed sample size, the web link of the survey was sent to all eligible participants from the 11 schools that agreed to participate in this research. A message that included information on study purpose and ethical considerations was sent along with the study survey web-link. The link was sent to the parents by school administrators. Prior to initiating the study questionnaire, participants provided their informed consent electronically by checking the “agree” button at the end of consent form (Appendix 1.). The IP addresses of the participants were not collected in order to ensure their confidentiality.

The online survey link was active from April 4th, 2019, until April 20th, 2019, in which data collection took place.

2.5 Instrument

The data collection instrument of the study was the study questionnaire (Appendix 2), which was adopted and adapted from a similar study.¹⁰ This validated tool was adapted to fit within the Armenian cultural and health policy context. Furthermore, the questionnaire was translated into the Armenian language and back-translated into English to ensure accuracy prior to its use in this study (Appendix 3). Those questions regarding financial acceptability of the vaccine were removed because the HPV vaccine is free of charge for all Armenians aged 13-45 years old.

The questionnaire includes sections measuring parents' knowledge about cervical cancer, HPV, and the Gardasil® vaccine. Also, questions related to socio-demographic characteristics of participants, their health behaviors and attitudes towards HPV vaccination were included. The final version of the questionnaire includes 60 items. The questionnaire was designed to correspond with the main constructs of the HBM theoretical framework, and also includes a scale for measuring parental-daughter acceptability of the HPV vaccine.

The questionnaire was pre-tested amongst 5 parents of 11-14 years old girls before its utilization in the study. Feedback from the pre-testing was addressed in order to improve the questionnaire.

2.6 Variables and Measures

The variables and the analysis of this study were based on a similar previous study, from which the questionnaire of the present study has been adopted (Appendix 4).¹⁰ The dependent variable in this analysis includes parental “acceptability of the HPV vaccination”, and was captured through four questions.¹⁰ One of the main independent variables of the analysis included parental “knowledge” regarding HPV and cervical cancer; which is a continuous variable that was captured through 14 questions.¹⁰ Knowledge-based questions have response alternatives such as “true”, “false”, and “don't know”. Knowledge questions

answered correctly received a value of one (1); whereas wrong answers and selection of the “don’t know” option were assigned a value of zero (0).

The questionnaire captured four HBM constructs, namely: (1) susceptibility, (2) severity, (3) benefit, and (4) barriers regarding HPV and the HPV vaccine; these were obtained in 16 study questions, which comprise the second independent variable named “beliefs about HPV and HPV vaccine”. All of abovementioned variables, excluding knowledge score, are continuous and were measured by options provided in a Likert-scale. This scale has five options—each option has maximum or minimum points for the answers “strongly agree” and “strongly disagree” based on the question itself.¹⁰

The intervening variables included: age, number of daughters and education level. They were measured as a nominal variables with four levels for age, three for number of daughters and six levels for education respectively. Participant’s relationship to an 11-14 year old child (mother or father) was treated as a binary variable. Participant’s monthly family spending was measured as an ordinal variable. Moreover, participant’s marital status and their current occupation was measured as nominal variables with four and six levels, respectively. Whether or not a participant’s daughter had been previously vaccinated with other vaccines included in the Armenian National Immunization Program was measured as a binary variable, whereby the options “yes all” or “yes some” were placed in the group of “yes”, and “no” or “unsure” options were placed in the group of “no”.¹⁰ Health behaviors such as alcohol consumption and smoking were measured as ordinal variables with five levels each.

The answers for parental level of background knowledge regarding HPV and the HPV vaccine were dichotomized, whereby those participants who gave negative answers for all the questions were placed into the “no” category; those who gave one or more positive answer, were placed into the “yes” category.¹⁰

2.7 Data Analysis

Data collected from the online survey was downloaded from Qualtrics.com into “Statistical Package for the Social Sciences” (SPSS®) V21.0 software. Subsequently, data cleaning with random 10% data check and analysis was performed.

In order to answer to identify the acceptability and knowledge scores of participants, a descriptive analysis of frequencies was performed.

Then, a simple linear regression analysis was performed in order to elucidate any associations between current HPV knowledge, HPV background knowledge, attitudes and acceptability of the HPV vaccine. Also, a multivariate linear regression analysis was performed in order to control for existing intervening variables.

2.8 Ethical Consideration

Participation in this study was voluntary. Prior providing their informed consent to take part in the study the participants were made aware that they could withdraw at any time, for any reason. The study survey was anonymous—the researchers did not directly communicate with, or meet any of the participants, and did not obtain any contact information from them. This ensured that participants’ confidentiality was strictly maintained. Thus, no study incentive was provided to participants. The study survey instrument took approximately 15-20 minutes to complete, and thus represented a minimal burden of time for participants.

3. Results

3.1 Descriptive Statistics

The web-link for an online survey was sent to 1,480 parents. Overall, 190 parents initiated the online survey. However, a total of 17 participants were excluded from the final analysis. Of those excluded, six parents did not agree to participate in the study by selecting the “disagree” button at the end of the electronic informed consent form. Moreover, nine participants were excluded as they provided only their informed consent to participate, but answered none of the study questions. The remaining two participants were excluded after

providing their informed consent since they answered only a question asking about their age and none of the other study questions. Therefore, 173 people were included in the final data analysis procedure.

The majority of participants 97.1% (n = 166) were mothers of 11-14 years old girls (Table 1). Out of 173 participants, 91.9% (n = 159) were married and 44.5% (n = 77) had a university degree (Table 1). There was no statistically significant difference regarding the amounts of monthly spending amongst participants' families. The majority of participants 95.2% (n = 158) self-reported that they are non-smokers, and 62.5% (n = 105) of the participants claimed that they do not ever consume any alcohol beverages (Table 1). Amongst mothers, 89.0% (n = 97) reported not having an abnormal Pap smear test result in the past; and 94.2% (n = 147) reported having no history of cervical cancer (Table 1). For health check frequency, 72.9% (n = 124) of the participants chose the 1-2 year interval option (Table 1). The majority of parents 78.5% (n = 135) reported that their daughters had previously received all other vaccines included in the Armenian National Immunization program (Table 1). Lastly, those who reported having some background knowledge regarding HPV and the HPV vaccine included 82.1% (n = 142) of parents.

Table 1. Characteristics of Study Participants

Characteristics	N	n	%
Parent	171		
Mother		166	97.1
Father		5	2.9
Age in years	172		
Less than 26		5	2.9
26-30		7	4.1
31-35		57	33.1
More than 35		103	59.9
Employment status	170		
Unemployed		71	41.8
Governmental officer		31	18.2
Owner of a business or merchant		27	15.9
Employee		31	18.2
Labor		2	1.2
Other		8	4.7

Marital status	173	
Married	159	91.9
Divorced	7	4.0
Single	3	1.7
Widowed	4	2.3
Educational status	173	
School (less than 10 years)	5	2.9
School (10-12 years)	27	15.6
Professional technical education (10-13 years)	60	34.7
Institute/University	77	44.5
Postgraduate	4	2.3
Other		
Monthly spending	171	
Less than 50,000 AMD	8	4.7
From 51,000 to 100,000 AMD	22	12.9
From 101,000 to 200,000 AMD	32	18.8
From 201,000 to 300,000 AMD	39	22.8
Above 301,000 AMD	27	15.8
Refuse to answer	43	7.6
Other vaccines uptake	172	
Yes all	135	78.5
Yes some	28	16.3
No	6	3.5
Not sure	3	1.7
Smoking status	166	
Zero	158	95.2
1-5 cigarettes per day	2	1.2
6-10 cigarettes per day	2	1.2
11-20 cigarettes per day	2	1.2
More than 20 cigarettes per day	2	1.2
Alcohol uptake	168	
Never	105	62.5
Less than once a week	53	31.5
One to three times a week	9	5.4
Four to six times a week	1	0.6
Daily	0	0.0
Health check frequency	170	
Never	18	10.6
Less than 1-2 year interval	124	72.9
2-5 year interval	21	12.4
More than 5 year interval	7	4.1
Pap smear test frequency	146	
Never (Skip to question 16)	49	33.6
More than 5 years interval	26	17.8
3-5 years interval	38	26.0
Less than 3 years interval	33	22.6
History of abnormal Pap smear result	109	
Yes	6	5.5
No	97	89.0
Don't know	6	5.5
History of cervical cancer	156	
Yes	7	4.9

No	147	94.2
Don't know	2	1.3
Background knowledge on HPV and HPV vaccine	173	
Yes	142	82.1
No	31	17.9

3.2 Scores of HPV Vaccine Acceptability, Knowledge on HPV and Cervical Cancer, and Attitudes Towards HPV and the HPV Vaccine.

The information regarding parental acceptability of the HPV vaccine, knowledge of HPV and cervical cancer, and attitudes towards the HPV vaccine is presented in Table 2. The mean score of HPV vaccine acceptability is 10.3, whereby scores range from 5 to 20. The median is 10 and the standard deviation is 2.7. The mean knowledge score of the participants is 3.9, whereby scores range from 0 to 14. A total of 20.2% (35) participants provide zero (0) correct answers; the median score and standard deviation among participants was 3.0 and 3.5 respectively. Also, 84.4% (146) of the participants did not know that HPV cannot be treated with antibiotics. Similarly, 74% (128) participants were not aware that HPV is transmitted sexually, and 81% (140) of parents did not know that HPV causes genital warts. Finally, for parental attitudes towards the HPV vaccine, the mean score is 50.1, whereby the possible score range is from 16 to 80, the median score was 50.0, and the standard deviation was 4.1 (Table 2).

Table 2. Acceptability, Knowledge and Attitude scores

Variable	Mean	Standard Deviation	Median	Minimum	Maximum
Acceptability of HPV vaccine*	10.3	2.7	10	5	20
Attitude towards HPV and HPV vaccine**	50.1	4.1	50	38	64
Knowledge of HPV and Cervical cancer***	3.9	3.5	3	0	14

* Scores 5-20

** Scores 16-80

3.3 Unadjusted regression analysis for finding association between parental acceptability, knowledge and attitude scores.

To explore the association between HPV vaccine acceptability, attitudes towards the HPV vaccine and knowledge regarding HPV and cervical cancer, a simple linear regression was performed. This analysis did not find any association between HPV vaccine acceptability and HPV and cervical cancer knowledge scores ($\beta = -0.044$, $p = 0.586$). Furthermore, no association was found between HPV vaccine acceptability and parental attitudes towards the HPV vaccine ($\beta = 0.150$, $p = 0.75$). Table 3, shows the results of the linear regression.

Table 3. Simple Linear Regression: Association between Acceptability and (Knowledge on HPV and cervical cancer and Attitude towards HPV and HPV vaccine

Variable	β	p-value	95% CI
Knowledge Score	-0.044	0.586	(-0.158, 0.089)
Attitude Score	0.150	0.075	(-0.100, 0.208)

3.4 Testing for confounders

In order to test for confounders, a multiple linear regression analysis was performed. No association between HPV vaccine acceptability and any intervening variables was found (Table 4). For each categorical variable, the answer option with the lowest value was selected as the referent group. For the bivariate variables with the answer options—yes and no, “no” was selected as a referent group.

Table 4. Simple Linear Regression: Association between acceptability score and covariates

Variables	p-value	95% CI
Parent		
Mother	1(ref)	
Father	0.454	(-1.523, 3387)
Age in years		
Less than 26	1(ref)	(9.328, 14.672)
26-30	0.872	(-4.414, 3.748)

31-35	0.391	(-3.978, 1.563)
More than 35	0.133	(-4.807, 0.644)
Employment status		
Unemployed	1(ref)	(9.942, 11.209)
Governmental officer	0.580	(-1.522, 0.854)
Owner of a business or merchant	0.568	(-1.572, 0.866)
Employee	0.113	(-2.202, 0.237)
Labor	0.638	(-2.955, 4.805)
Marital status		
Married	1(ref)	(9.915, 10.811)
Divorced	0.543	(-2.952, 1.559)
Single	0.228	(-6.218, 1.492)
Widowed	0.794	(-3.107, 2.381)
Educational status		
School (less than 10 years)	1(ref)	(-5.553, 0.917)
School (10-12 years)	0.159	(-5.187, 1.044)
Professional technical education (10-13 years)	0.191	(-6.535, -0.342)
Institute/University	0.030	(-6.265, 1.765)
Postgraduate	0.270	
Monthly spending		
Less than 50,000 AMD	1(ref)	(9.570, 11.138)
From 51,000 to 100,000 AMD	0.302	(-1.247, 1.697)
From 101,000 to 200,000 AMD	0.408	(-0.993, 1.510)
From 201,000 to 300,000 AMD	-0.206	(-1.333, 1.082)
Above 301,000 AMD	-0.994	(-2.014, 0.666)
Other vaccines uptake		
Yes all	0.666	(-1.463, 2.282)
Yes some	0.606	(-1.558, 2.660)
No	1(ref)	
Smoking status		
Zero	1(ref)	
1-5 cigarettes per day	0.701	(-3.117, 4.624)
6-10 cigarettes per day	0.701	(-3.117, 4.624)
11-20 cigarettes per day	0.252	(-1.617, 6.124)
More than 20 cigarettes per day	0.897	(-3.617, 4.124)
Alcohol uptake		
Never	1(ref)	
Less than once a week	0.946	(-0.913, 0.979)
One to three times a week	0.199	(-0.654, 3.118)
Four to six times a week	0.775	(-4.656, 6.232)
Health check frequency		
Never	1(ref)	
Less than 1-2 year interval	0.438	(-2.137, 0.929)
2-5 year interval	0.239	(-2.990, 0.752)
More than 5 year interval	0.489	(-3.574, 1.717)
Pap smear test frequency		
Never (Skip to question 16)	1(ref)	
More than 5 years interval	0.145	(-2.183, 0.325)
3-5 years interval	0.608	(-0.838, 1.428)
Less than 3 years interval	0.963	(-1.182, 1.128)
History of abnormal Pap smear result		

Yes	0.193	(-4.428, 0.907)
No	1(ref)	
History of cervical cancer		
Yes	0.787	(-.805, 2.379)
No	1(ref)	
Background knowledge on HPV and HPV vaccine		
Yes	0.831	(-1.035, 1.287)
No	1(ref)	

3.5 Results of the Open-ended Questions

There were two open-ended questions at the end of the study survey, one question asked parents who do not agree with providing their daughter the active HPV vaccination to report their reasons why, while the second question invited parents to provide any written comment on the topic of HPV and HPV vaccination if they wished to do so. These two open-ended questions were very informative, as 60% (n = 104) and 18.5% (n = 32) of participants answered to the first and second question respectively. The most prevalent reasons provided for not vaccinating their daughter(s) included a lack of trust towards vaccine itself, fear of vaccine side effects, and having a lack of information regarding the HPV vaccine. However, there were also answers provided such as: “my daughter does not practice sexual life”; and “you just need to educate your daughter to have only one sexual partner, which will be her husband”. Additionally, some parents indicated that their doctors do not recommend the HPV vaccination, and that they believe the vaccine itself may cause cancer.

4 Discussion

4.1 Main Findings

The current study was conducted among parents of 11-14 years old girls who attend public schools in Yerevan, Armenia. The aim of the study was to investigate parental acceptability, knowledge and attitudes regarding HPV and the HPV vaccine. This study population was chosen as parents serve as decision makers for their children regarding

immunization and other health related aspects.¹⁰ A descriptive analysis of the data answered questions regarding parental acceptability, knowledge and attitudes scores, which reveals a mean score of HPV vaccine acceptability of 10.3 (score range 5-20). This is lower than the acceptability score of parents from a similar previously conducted study from which the questionnaire of the current study was adopted, where the acceptability score was 3.52 when the possible score range was from 1 to 5. The researchers from the previous study divided their overall acceptability score by the number of the questions in each of the survey sections, equating to a comparable acceptability score of 14.08 ($3.52 * 4$) for their participants, which they deemed a high acceptability score.¹⁰ For the second research question, the majority of parents (59.5%, n = 103) reported that they either disagreed or strongly disagreed that they would accept active HPV vaccination for their daughters. These findings differ significantly from a similar study conducted among parents residing in Poland, which indicated a high willingness towards vaccination among the majority (85.1%, n = 383) of those participants.³⁰

The main finding from this study is that the participants possess an extremely low mean HPV and cervical cancer knowledge score (3.9). This finding is consistent with other similar studies.^{10, 28} Consequentially, more than 20,2% (35) of the participants from the present study did not provide any correct HPV related knowledge answers. However, this finding is inconsistent with other similar research—a study conducted in Weihai, Shandong, China revealed that less of their participants (14.75%, n = 45) compared to the present study did not possess any HPV-related knowledge.²⁸ Moreover, the majority of participants (75%, n = ?) from the current study did not know that HPV is transmitted sexually. This is similar to the findings from a comparable study conducted in Poland, whereby 68.7% (n = 309) of the parents who took part in that study also were not aware that HPV is an STI.³⁰

Several studies worldwide have established a correlation between knowledge, attitude, beliefs and acceptability of the HPV vaccine.^{10, 28, 30} However, the data analysis from the current study shows that there is no such association between parental acceptability and any

of the dependent study variables, namely knowledge regarding HPV and cervical cancer, and parental attitudes towards the HPV vaccine. Moreover, the present study found no association between HPV vaccine acceptability and various intervening variables such as socio-demographic characteristics, health related behaviors, background knowledge regarding HPV and the HPV vaccine, and uptake of other vaccines, etc.

Open-ended questions at the end of the study survey helped to ascertain some of the factors that affect parental HPV vaccine acceptability. Responses to these questions indicate that parents lack trust towards the HPV vaccine. The reported underlying reason for this is that participants lack exposure to information regarding HPV and the HPV vaccination. Moreover, responses such as “my daughter does not engage in sexual acts” demonstrates the existence of misconceptions amongst study participants, as evidence shows that the HPV vaccine is most efficacious when administered prior to sexual debut.¹⁵ Other additional misconceptions persist amongst the participants, as some parents reported that the underlying factor contributing to their HPV vaccine hesitancy is that the vaccine was made to cause infertility, and would thus sterilize their daughters. Also, study participants reported that doctors actively persuade them against seeking HPV vaccination for their daughters, which may alter parental acceptability because parents usually rely on the opinions of their physician when it comes to making health-related decisions.¹⁰ Moreover, study participants clearly lack knowledge regarding the safety and efficacy of the HPV vaccine, as illustrated by one parent who reported that they believe that the HPV vaccine itself causes cancer, which is clearly negated in various meta-analyses that have concluded the opposite to be true. Through these open-ended responses, many participants in this study demonstrated a lack of understanding regarding the risk factors for HPV infection, and the efficacy and safety of the HPV vaccination.

4.2 Strengths

The current study took place in Armenia, which has the highest cervical cancer mortality rate in Western Asia. Cervical cancer related issues, especially those that pertain to

prevention mechanisms, represents a major public health problem in the country. Moreover, the HPV vaccine was recently introduced in Armenia in 2017, which indicates the timeliness of the current study. Understanding HPV and HPV vaccine knowledge, attitudes, beliefs and vaccine acceptability is essential since HPV vaccine coverage in Armenia is critically low.

Thought, this investigation established no association between any of the study's dependent and independent variables, two open-ended question at the end of the survey provide content-rich narrative data that assists in better understanding some of the underlying factors that contribute to HPV vaccine misconceptions and hesitancy amongst Armenian parents.

The study was anonymous, and the contact information for participants was not collected. Thus, social desirability bias in participant's responses to study questions was minimized. Finally, the Online study questionnaire was convenient and easy to use as no special skills or knowledge was required in order for participants to complete it.

4.3 Limitations

The current study was conducted online. This may have limited prospective participant's ability to take part in the study, particularly if they lacked access to the Internet, and/or did not have a smartphone, computer or other such Internet compatible device. This limitation was minimized because the Directors of the schools included in this study agreed to give participants access to school computers and Internet connection for those parents who demonstrated the willingness to participate, but who lacked an appropriate device or Internet access. Furthermore, another limitation is that only public schools took part in this study. Throughout Yerevan City, there are also several private schools, and inclusion of participants who have daughters that attend these schools could alter the results of this study. Also, data collection was not performed in one of the twelve districts, since the Director of the school declined to participate, and the research team was not able to approach another school for inclusion in this study from that district due to time constraints. Additionally, the current

study had only 190 participants. However, the estimated sample size was 258. Nevertheless, the recalculated margin of error increased by only by 1%, moving from 8% to 9% with the obtained study sample size. During the data collection procedure, no IP address were collected, which could have resulted in someone taking the survey more than once without the investigator's knowledge. However, since participating schools had multiple parents taking the survey with the same IP address, it was not beneficial to collect IP addresses. Moreover, during the first three days of the data collection period, a technical problem with the online study survey persisted, in which participants were required to push the questionnaire "submit" button twice in order to complete the survey and submit their answers. This issue may have resulted in participant attrition, by which participants who actually took part in the study were not included in the study analysis as their data might not have been captured if they clicked the submit button only once prior to closing their Internet browser. However, this problem was resolved relatively shortly after data collection ensued, when it was brought to the attention of the study investigators. Finally, almost all of the participants were mothers, which may alter the generalizability of the study findings. However, a mothers represents the parental unit that usually takes responsibility for health related issues of children.¹⁰

4.4 Recommendations

According to study results, the HPV and cervical cancer knowledge score was extremely low (mean = 3.9 out of 14). For this reason, is recommended that active educational campaigns be developed in order to target Armenia parents, since they are the decision makers for their children's health related issues. Moreover, Armenian healthcare providers who recommend and/or provide vaccinations should be targeted with culturally competent educational interventions to improve their HPV related knowledge, attitudes, beliefs, vaccine acceptability, endorsement and practices. However, since there was no association found between parental HPV vaccine acceptability and knowledge scores, it is also recommended that this health problem be investigated more thoroughly with a mixed-

methods approach in order to elucidate the underlying factors that contribute to low HPV vaccination acceptability, knowledge and actual vaccine rates. Moreover, a country-level study regarding this topic should be conducted in order to understand the overall situation in Armenia.

The study survey revealed a lack of parental trust regarding the HPV vaccine. However, the majority of parents reported that their daughters were inoculated with all other routine vaccines. This should be taken into consideration by both governmental and non-governmental health organizations, as the HPV vaccine represents an anomaly in vaccine acceptability amongst Armenian parents.

Finally, developing a validated region-specific HPV vaccine acceptability and KAP questionnaire is of importance, and should capture regional health policy and cultural norms from both Armenia, and perhaps the entire Caucasus region.

4.5 Conclusion

The current study revealed that the HPV vaccine acceptability score among parents who have daughters aged 11-14 years old who attend public schools in Yerevan, Armenia was low at 10.3 (possible score range was from 5 to 20). Also, this study did not find any association between parental acceptability of the HPV vaccine for their daughter, knowledge regarding HPV and cervical cancer, attitudes towards the HPV vaccine, and any of the study's intervening variables. However, this research did find that there is a lack of parental HPV-related knowledge, as well as a lack available information for parents regarding HPV and the HPV vaccine. Moreover, the majority of participants simply did not trust administering the HPV vaccine to their daughters, and are afraid of possible deleterious side effects. In order to address those problems and increase HPV vaccine coverage in Armenia, future social marketing campaigns and school-based programs need to be implemented that include multiple factors from the Socioecological Model. Finally, further long-term research is needed in order to understand core factors that contribute to parental vaccine hesitancy.

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Appendix

Appendix 1. The informed consent form for the study participants

Informed Consent Form

You are being invited to take part in a research study consisting of a survey that takes approximately 20 minutes to complete. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will entail. Please read the following information carefully.

The purpose of this study is to assess the acceptability of Human Papillomavirus (HPV) vaccine among parents who have daughters aged 11-14 years old living in Yerevan, Armenia. Also, the study aims to capture parental knowledge, attitudes and beliefs regarding HPV and the HPV vaccine, Gardasil®.

You are invited to participate in this study because you have a daughter aged 11-14 years old who attends a school in Yerevan city that has been randomly selected for inclusion in study; and your school director has agreed to invite you to provide your input in this study. However, your participation is completely confidential, nobody will know whether or not you choose to take part in this study as no identifying and/or contact information for you, or your daughter(s) will be recorded. All of the parents with daughters currently studying in the school that your daughter attends, ages 11-14, will also be invited to participate in this study.

If you choose to complete the study survey, you will be provided with a link to complete an online questionnaire that captures information about your socio-demographic characteristics (e.g. age, gender, education, and etc.), knowledge, beliefs and attitude towards HPV and the HPV vaccine, Gardasil®. Again, this survey will take roughly 20 minutes to complete. You do not have to answer to any questions that you feel uncomfortable to answer, and can thus skip any question that you wish without giving any reason and without any penalty.

The study poses no known direct risks or benefits. However, your participation will contribute to improved understanding of parental knowledge, attitudes and beliefs of HPV, vaccination, and factors associated with HPV vaccination acceptability. Your responses to this survey will be confidential. They will be used only for the study, and will be available only for the research team. Your name, contact information and other identifiable information will not be collected. Your participation in this study is voluntary. It is up to you to decide whether or not to take part in this study. If you decide to take part in this study, you will be asked to check the “Agree” option at the end of this consent form. After you check the “Agree” option, you are still free to withdraw at any time, without any penalty and without giving any reason. If you withdraw from the study before data collection is completed, your data will be destroyed. If you choose the “Disagree” option, you will be automatically withdrawn from consideration for participation in this study and will not be contacted further. It is important to note that you are eligible to participate in this study only if:

1. You are the parent a daughter between the ages of 11-14 who attends a Yerevan City Public School;
2. Read and write in the Armenian language;
3. Agree to take this survey by yourself without the assistance of someone else;
4. Have access to the internet to complete the survey online;

5. Agree not to share the survey link with anyone else as specific schools are selected for this study.

If you feel that you have not been treated fairly and/or think that you have been harmed in any way (i.e. psychological disturbance) by joining the study you should contact Varduhi Hayrumyan, the Human Protections Administrator of the American University of Armenia (37460) 61 25 61.

If you have additional questions regarding study, please contact the investigators: Yeva Margaryan (37491) 61 97 57; Dr. Brett Burnham (37460) 61 25 60; or Dr. Arusyak Harutyunyan (37460) 61 26 21

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I voluntarily agree to take part in this study.

- Agree
- Disagree

2. The original version of the survey questionnaire
<https://doi.org/10.1371/journal.pone.0193054.s002>

3. The adopted version of the survey questionnaire

Appendix 2. Study instrument (English)

Parental Knowledge, Attitudes, Beliefs and Acceptance of HPV Vaccination among their Eligible Daughters: A Cross-Sectional Study in Yerevan, Armenia

This questionnaire is aimed at investigating maternal knowledge, belief and acceptance among parents in Yerevan, Armenia to Human Papillomavirus Vaccination of their daughters. Please choose your answer of each questions of the questionnaire.

1. You are the girl's

1 Mother

2 Father

2. How old are you?

1 Less than 26

2 26-30

3 31-35

4 More than 35

3. How much education have you completed?

1 School (less than 10 years)

2 School (10 years)

3 Professional technical education (10-13 years)

4 Institute/University

5 Postgraduate

6 Other 6.1. Please specify

4. What is your current occupation?

1 Unemployed

2 Governmental officer

3 Owner of a business or merchant

4 Employee

5 Labor

6 Other, please specify

5. What is your current marital status? (Select one)

- 1 Married
- 2 Divorced
- 3 Separated
- 4 Widowed

6. In average, how much money does your family spend monthly? Monthly household income (bath)

- 1 Less than 50,000 AMD
- 2 From 51,000 to 100,000 AMD
- 3 From 101,000 to 200,000 AMD
- 4 From 201,000 to 300,000 AMD
- 5 Above 301,000 AMD
- 88 Refuse to answer

7. How many daughters do you have?

- 1
- 2
- 3 or more

8. What is the age/ages of your daughter/daughters?

Age of daughter No 1 (who is studying in this class)

Age of daughter No 2.....

Age of daughter No 3.....

9. Did your daughter receive other recommended childhood vaccines?

- 1 Yes all
- 2 Yes some
- 3 No

4 Unsure

10. Did your daughter/daughters receive HPV vaccine?

- 1 Yes all doses
- 2 Yes first dose only
- 3 Yes first and second doses
- 4 No
- 5 Unsure

11. On average, how often do you drink alcoholic beverages?

- 1 Never
- 2 Less than once a week
- 3 One to three times a week
- 4 Four or more times a week
- 5 Daily

12. During the past 30 days (one month), how many cigarettes did you usually smoke?

- 1 Never
- 2 1-5 cigarettes per day
- 3 5-10 cigarettes per day
- 4 10-20 cigarettes per day
- 5 More than 20 cigarettes per day

13. How often do you complete a health check?

- 1 Never
- 2 Less than 1-2 year interval
- 3 2-5 year interval
- 4 More than 5 year interval

14. If you are the mother of the girl, please answer this question. (If you are the father of the girl, skip to question 14)

How often do you give a Pap smear test?

- 1 Never (Skip to question 13)

- 2 Less than 3 years interval
- 3 3-5 years interval
- 4 More than 5 years interval

15. Have you ever had an abnormal Pap smear?

- 1 Yes
- 2 No
- 99 Don't know

16. Have you ever had a history of cervical cancer?

- 1 Yes
- 2 No
- 99 Don't know

17. Background knowledge about HPV and HPV vaccine

	1. Yes	2. No
a) Have you ever heard about HPV?	<input type="checkbox"/>	<input type="checkbox"/>
b) Have you ever asked for information about HPV?	<input type="checkbox"/>	<input type="checkbox"/>
c) Have you ever been informed about HPV by physician/nurse?	<input type="checkbox"/>	<input type="checkbox"/>
d) From where have you heard about HPV?		
- Friends	<input type="checkbox"/>	<input type="checkbox"/>
- Family/relatives	<input type="checkbox"/>	<input type="checkbox"/>
- Advertisement	<input type="checkbox"/>	<input type="checkbox"/>
- Internet	<input type="checkbox"/>	<input type="checkbox"/>
- Mass media (TV, radio, newspaper)	<input type="checkbox"/>	<input type="checkbox"/>
e) Have you ever heard about HPV vaccine?	<input type="checkbox"/>	<input type="checkbox"/>
f) Have you ever asked for information about HPV vaccine?	<input type="checkbox"/>	<input type="checkbox"/>
g) Have you ever been informed about HPV vaccine by physician/nurse?	<input type="checkbox"/>	<input type="checkbox"/>
h) From where have you ever heard about HPV vaccine?		
- Friends	<input type="checkbox"/>	<input type="checkbox"/>
- Family/relatives	<input type="checkbox"/>	<input type="checkbox"/>
- Advertisement	<input type="checkbox"/>	<input type="checkbox"/>
- Internet	<input type="checkbox"/>	<input type="checkbox"/>
- Mass media (TV, radio, newspaper)	<input type="checkbox"/>	<input type="checkbox"/>

18. Knowledge about HPV and cervical cancer

	1.True	2.False	3.Don't know
a) HPV infection is contracted by sexual contact.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) People can transmit HPV to their partner(s) even if they have no symptoms of HPV infection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Having multiple sexual partners' increases risk of HPV infection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Sex at early age increases risk of HPV infection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Genital warts are caused by HPV infection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Most people with genital HPV have no visible signs or symptoms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) HPV infection can be prevented by vaginal douching after intercourse.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) HPV infection can be treated by antibiotics.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Smoking increases risk of cervical cancer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) HPV infection can cause cervical cancer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k) Cervical cancer symptoms commonly present with vaginal discharge or bleeding even in the early stages of disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l) Cervical cancer can possibly cause bleeding after sex.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m) A Pap smear is only indicated in women with vaginal discharge or bleeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n) Unmarried women are not supposed to have a Pap smear.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Beliefs about HPV and HPV vaccine

	1.Strongly disagree	2.Disagree	3.Unsure	4Agree	5.Strongly agree
a) There is a risk for young women to contract HPV	<input type="checkbox"/>				
b) There is a risk for young women to contract cervical cancer	<input type="checkbox"/>				
c) HPV infection is a serious health concern	<input type="checkbox"/>				

d)	Cervical cancer is a serious disease	<input type="checkbox"/>				
e)	The HPV vaccine is effective in preventing condyloma	<input type="checkbox"/>				
f)	The HPV vaccine is effective in preventing cervical cancer	<input type="checkbox"/>				
g)	I have trust in the HPV vaccination	<input type="checkbox"/>				
h)	The HPV vaccine can cause adverse effects	<input type="checkbox"/>				
i)	It is problematic that HPV vaccination requires three injections	<input type="checkbox"/>				
j)	The efficiency of HPV vaccine is unclear	<input type="checkbox"/>				
k)	The HPV vaccine is harmful	<input type="checkbox"/>				
l)	Women who have been HPV vaccinated should have Pap smear annually	<input type="checkbox"/>				
m)	HPV vaccination increases c condom use	<input type="checkbox"/>				
n)	HPV vaccination causes my daughter to be sexually active early	<input type="checkbox"/>				
o)	HPV vaccination increases number of sexual partners	<input type="checkbox"/>				
p)	HPV vaccination increases awareness of sexually transmitted diseases	<input type="checkbox"/>				

20. Acceptability of HPV vaccination

1.Strongly disagree 2.Disagree 3.Unsure 4.Agree 5.Strongly agree

a) Do you agree with the policy of giving vaccination to every girl aged 13-14 years old?	<input type="checkbox"/>				
b) Will you accept active HPV vaccination of your daughter?	<input type="checkbox"/>				
c) I don't have enough information about HPV vaccine to decide whether to give it to my daughter	<input type="checkbox"/>				
d) HPV vaccine is so new that I want to wait a while before deciding if my daughter should get it	<input type="checkbox"/>				

21. If you will not accept active HPV vaccination for your daughter, please tell us the reason.

.....

22. If you have any comments please write it down to us.

.....

Thank you for your answer!

Appendix 3. Study instrument (Armenian)

Մարդու Պապիլոմավիրուսի Պատվաստանյունի Վերաբերյալ
 Ցնողների նեցած գիտելիքները, համոզմունքներն ու
 իրենց աղջիկներին համարընդունելիությունը : Միանվագ
 հետազոտությունը Երևան, Հայաստան :

Այս հարցաթերթիկը նպատակաւ դրված է ուսումնասիրելու
 Երևանում բնակվող Ցնողների նեցած գիտելիքները և
 համոզմունքները Մարդու Պապիլոմավիրուսի

պատվաստանյութի վերաբերյալ „ինչպես նաև
պատվաստանյութի ընդունունումը իրենց աղջիկներին համար :

Խնդրում եմք պատասխանել ստորև նշված հարցերին :

1. Դուք աղջկա..

1 Մայրն եք

2 Հայրն եք

2. Քանի՞ տարեկան եք

1 _26-ից ցածր

2 _26-30

3 _31-35

4 _35-ից քարձր

3. Ո՞րն է ձեր սացած կրթությունը

1 Դպրոց (10 տարուց քիչ)

2 Դպրոց (10-ից 12 տարի)

3 Միջնակարգ մասնագիտական

4 Ինստիտուտ/Համալսարան

5 Հետդիպլոմային

6 Այլ 6.1. Խնդրում եմք նշել

4. Ո՞րն է ձեր ներկայիս գրաված ությունը

1 Գործազուրկ

2 Պետական աշխատող

3 Անհատ ձեռնարկամատուցական

4 Աշխատող

5 Բանվոր

6 Այլ 6.1. Խնդրում եմք նշել

5. Ո՞րն է ձեր ներկայիս ընտանեկան կարգավիճակը

1 Ամուսնացած

2□ Ամուսնական ծված

3□ Միայնակ

4□ Այրի/Ամուսնի

6. Միջինը, որքան է կազմում ձեր նստանիքի ամսական ծախսը

1□ _50,000 դրամ-ից քիչ

2□ _51,000-100,000 դրամ

3□ _101,000-200,000 դրամ

4□ _201,000-300,000 դրամ

5□ _301,000 դրամ-ից 2 աստ

88□ Հրաժարվում եմ պատասխանել

7. Քանի՞ անգամ եք խանութ

1□ Մեկ

2□ Երկու

3□ Երեք կամ ավելի

8. Քանի՞ տարեկան է ձեր անգամը (անգամը)

Առաջին անգամ տարիքը (այս դպրուցում սովորող).....

Երկրորդ անգամ տարիքը

Երրորդ անգամ տարիքը

9. Արդյո՞ք ձեր անգամը ստացել է մնացած առաջարկվող պատվաստումները

1□ Այո, բոլորը

2□ Այո, որոշները

3□ Ոչ

4□ Վստահ չեմ

10. Արդյո՞ք ձեր անգամը/անգամը ստացել են Մարդու Պայիլի ընկերությունից պատվաստումը

- 1 Այն, բնական դեղաչափերը
- 2 Այն, միայն առաջին դեղաչափը
- 3 Այն, առաջին և երկրորդ դեղաչափերը
- 4 Ոչ
- 5 Վստահ չեմ

11. Միջին հաշվով, որքան՞ և հաճախեք օգտագործում ավանդակային խմիչքներ

- 1 Երբեք
- 2 Շաբաթը մեկ անգամից քիչ
- 3 Շաբաթը մեկից երեք անգամ
- 4 Շաբաթը չորսից վեց անգամ
- 5 Ամեն օր

12. Վերջին երեսուն օրվա (մեկամս) ընթացքում, միջին հաշվով, ծխախոտի քանի գլանակ եք ծխել

- 1 Չորո
- 2 Օրական 1-5 գլանակ
- 3 Օրական 6-10 գլանակ
- 4 Օրական 11-20 գլանակ
- 5 Օրական 20 գլանակից ավել

13. Միջին հաշվով, որքան՞ և հաճախեք բուժզննում անցնում

- 1 Երբեք
- 2 Տարեկան 1-2 անգամից քիչ
- 3 Տարեկան 2-5 անգամ
- 4 Տարեկան 5 անգամից շատ

14. Եթե դուք աղջկամայրն եք, ինդրում ենք պատասխանել՞ և հետևյալ հարցին (եթե ոչ՝ անցեք 17-երորդ հարցին) Որքան՞ և հաճախեք հանձնում ՊԱՊ քսուքի թեստ

- 1 Երբեք (անցեք 16-երորդ հարցին)
- 2 Ավելի քան 5 տարին մեկ

3 3-5 տարի նմեկ

4 Ավելի քիչ քան 3 տարի նմեկ

15. Ունեցե՞լ եք արդյոք ՊԱՊ քսուքի ոչ նորմալ պատասխան

1 Այո

2 Ոչ

3 Չգիտեմ

16. Ունե՞ք արդյոք արգանդի վզիկի քաղցկեղի պատմություն

1 Այո

2 Ոչ

3 Չգիտեմ

17. Բազային գիտելիքներ Մարդու Պապիլոմավիրուսի և Մարդու Պապիլոմավիրուսի պատվաստանյութի վերաբերյալ

1. Այո 2. Ոչ

ա) Երբ նեղակետք Մարդու Պապիլոմավիրուսի մասին:	<input type="checkbox"/>	<input type="checkbox"/>
բ) Երբ նեղակետք Մարդու Պապիլոմավիրուսի մասին տեղեկատվություն:	<input type="checkbox"/>	<input type="checkbox"/>
գ) Երբ նեղակետք Մարդու Պապիլոմավիրուսի մասին բժշկի/բուժքույրի կողմից:	<input type="checkbox"/>	<input type="checkbox"/>
դ) Որտեղից եք լսել Մարդու Պապիլոմավիրուսի մասին: - Ընկերներ - Ընտանիքի անդամներ/բարեկամներ - Գովազդ - Համացանց - Զանգվածային լրատվամիջոց (հեռուստատեսություն, թերթ)	<input type="checkbox"/>	<input type="checkbox"/>
ե) Երբ նեղակետք Մարդու Պապիլոմավիրուսի պատվաստանյութի մասին:	<input type="checkbox"/>	<input type="checkbox"/>
զ) Երբ նեղակետք Մարդու Պապիլոմավիրուսի պատվաստանյութի մասին տեղեկատվություն:	<input type="checkbox"/>	<input type="checkbox"/>
է) Երբ նեղակետք Մարդու Պապիլոմավիրուսի պատվաստանյութի մասին բժշկի/բուժքույրի կողմից:	<input type="checkbox"/>	<input type="checkbox"/>
ը) Որտեղից եք լսել Մարդու Պապիլոմավիրուսի պատվաստանյութի մասին: - Ընկերներ - Ընտանիքի անդամներ/բարեկամներ - Գովազդ - Համացանց	<input type="checkbox"/>	<input type="checkbox"/>

- Զանգվածային լրատվամիջոց (հենուստատենու թյուն, թերթ)	<input type="checkbox"/>	<input type="checkbox"/>
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15. Մարդու Պապիլևումավիրուսի և Արգանդի վզիկի քաղցկեղի մասին գիտելիքներ

	1.Ճիշտ է	2.Միայն է	3.Չգիտեմ
ա) Մարդու Պապիլևումավիրուսը տարածվում է սեռական ճանապարհով:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
բ) Մարդիկ կարող են փոխանցել Մարդու Պապիլևումավիրուսը իրենց գուրգռնկերոջն անգամ թե չունեն Մարդու Պապիլևումավիրուսի ախտանիշներ:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
գ) Բազմաթիվ գուրգռնկերներ ունենալը մեծացնում է Մարդու Պապիլևումավիրուսով վարակվելու ռիսկը:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
դ) Վաղաժամ սեռական հարաբերություններ ունենալը բարձրացնում է Մարդու Պապիլևումավիրուսով վարակվելու ռիսկը:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ե) Սեռական գորտնուկները առաջանում են Մարդու Պապիլևումավիրուսից:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
զ) Սեռական օրգանների Մարդու Պապիլևումավիրուս ունեցող մարկանց մեծամասնությամբ չունեն տեսանելի ախտանիշներ կամ նշաններ:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
է) Մարդու Պապիլևումավիրուսով վարակումը կարող է կանխարգելվել սեռական հարաբերությունից հետո իրականացված հեշտոցային վացումով:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ը) Մարդու Պապիլևումավիրուսի վարակը կարող է բուժվել հակաբիոտիկներով:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
թ) Ծխելը բարձրացնում է արգանդի վզիկի քաղցկեղի հավանականությունը:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ժ) Մարդու Պապիլևումավիրուսը կարող է արգանդի վզիկի քաղցկեղ առաջացնել:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ի) Արգանդի վզիկի քաղցկեղի ախտանիշները սովորաբար ուղեկցվում են հեշտոցային արտադրությունների անսովորական քանակությամբ, նույնիսկ հիվանդության սկզբնական փուլերում:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
լ) Արգանդի վզիկի քաղցկեղը կարող է սեռական հարաբերությունից հետո արյունահոսության պատճառով հանդիսանալ:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

խ) ՊԱՊ քսուքի հետագոտու թյունը ցուցված է միայն այն կանանց, ովքեր ունեն հեշտոցային արտադրութուն կամ արյունահոսութուն:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ծ) Չամուսնացած կանայք կարող են չկատարել ՊԱՊ քսուքի հետագոտու թյուն:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Մարդու Պապիլլոմավիրուսի և Մարդու Պապիլլոմավիրուսի պատվաստանյութի վերաբերյալ համոզմունքներ

1.Միանշանակ համաձայն չեմ

2.Համաձայն չեմ

3.Վստահ չեմ

4.Համաձայն եմ

5.Միանշանակ համաձայն եմ

ա) Երիտասարդ կանանց շրջանում առկա է Մարդու Պապիլլոմավիրուսով (ՄՊՎ) վարակվելու ռիսկ	<input type="checkbox"/>				
բ) Երիտասարդ կանանց շրջանում առկա է արգանդի վզիկի քաղցկեղ ձեռքբերելու ռիսկ	<input type="checkbox"/>				
գ) Մարդու Պապիլլոմավիրուսը լուրջ առողջական խնդիր է	<input type="checkbox"/>				
դ) Արգանդի վզիկի քաղցկեղը լուրջ հիվանդութուն է	<input type="checkbox"/>				
ե) ՄՊՎ-ի պատվաստանյութ է ֆֆեկտիվ կանխարգելիչ միջոց է կոնդոմաները համար	<input type="checkbox"/>				
զ) ՄՊՎ-ի պատվաստանյութ է ֆֆեկտիվ կանխարգելիչ	<input type="checkbox"/>				

	միջոց է արգանդի վզիկի քաղցկեղի համար					
է)	Ես ՄՊՎ-ի պատվաստանյութի հանդեպ վստահ չեմ թյուններում	<input type="checkbox"/>				
ը)	ՄՊՎ-ի պատվաստանյութը կարող է ներկայացնել անհարմարացուցիչ ազդեցություններ	<input type="checkbox"/>				
թ)	Խնդիր է առաջացնում այն փաստը, որ ՄՊՎ-ի դեմ պատվաստանյութը համար անհրաժեշտ է 3 դեղաչափի ներարկում	<input type="checkbox"/>				
ժ)	ՄՊՎ-ի պատվաստանյութի էֆֆեկտիվությունը պարզորոշ է	<input type="checkbox"/>				
ի)	ՄՊՎ-ի պատվաստանյութը վնասակար է	<input type="checkbox"/>				
լ)	Այն կանայք որոնք ստացել են ՄՊՎ-ի պատվաստանյութ պետք է ամեն տարի կատարեն ՊԱՊ քսուրի հետազոտություն	<input type="checkbox"/>				
խ)	ՄՊՎ-ի դեմ պատվաստումը նվազեցնում է պահպանակի օգտագործումը	<input type="checkbox"/>				
ծ)	ՄՊՎ-ի դեմ պատվաստումը կնպաստի աղջկա վաղսեռական կյանքի վարելուն	<input type="checkbox"/>				
կ)	ՄՊՎ-ի դեմ պատվաստումը կնպաստի ավելի շատ սեռական	<input type="checkbox"/>				

զ ու գ ը ն կ ե ր ն ե ր ն ու ն ե ն ալ ու ն						
հ)	ՄՊՎ-ի դեմ պատվաստումը մեծացնում է սեռավարակներին մասին իրագրված թյա նաստիճանը	<input type="checkbox"/>				

17. Մարդու Պապիլ լ լ ո մ ալ ի ր ու ս ի պատվաստանյութի ը ն դ ու ն ու մ

	1.Մի ան շանակ համաձայն չեմ	2.Համա ձայն չեմ	3.Վստա հչեմ	4.Համ աձայ նեմ	5.Մի ան շանակ համաձայ նեմ
ա)	Համաձայնեք րոնք 13-14 տարեկան աղջիկները պետք է պատվաստվեն ՄՊՎ- ի դեմ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
բ)	Համաձայնե՞ք պատվաստել ձեր աղջկան ՄՊՎ-ի դեմ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
գ)	Ես քաղաքացի տեղեկություն չունեմ ՄՊՎ-ի պատվաստանյութի մասին որպեսզի աղջկաս պատվաստելու մասին որոշում կայացնեմ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
դ)	ՄՊՎ-ի պատվաստանյութը այնքան նոր է որ ես կցանկանայի որոշ ժամանակ սպասել մինչ աղջկաս պատվաստելու մասին որոշում կայացնելը	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Եթե համաձայնեք պատվաստել ձեր աղջկան ՄՊՎ-ի դեմ անցեք
19-րդ հարցին՝ եթե ոչ ոչ եք չհամաձայնվելու պատճառը :

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.....
19. Մեկն արան ու թյ ու ն ն եր ու ն ե ն ալ ու դ ե պք ու մ , ին դր ու մ ե ն ք
ն շ ե լ :

.....
.....
Շ ն ո թ հ ա կ ալ ե ն ք պ ա տ ա ս ի ա ն ե լ ու հ ա մ ար :

Appendix 4. List of variables.

Variable	Type	Measure	Source
Dependent: HPV vaccine acceptability	Continuous	Acceptability score (5-20)	Online Survey
Primary Independent: Knowledge on HPV, its prevention and health consequences	Continuous	Knowledge score (0-13)	Online Survey
Secondary Independent: Attitude towards HPV and its vaccine	Continuous	Attitude score (16-80)	Online Survey
Intervening Variables:			Online Survey
Parent	Nominal		
Educational status	Ordinal		
Employment status	Nominal		
Marital status	Nominal		
Age	Ordinal	Years	
Monthly spending	Ordinal	AMD	
Other vaccines uptake	Nominal		
Smoking status	Ordinal	Number of cigarettes	
Alcohol uptake	Ordinal	Days in a week	
Health check frequency	Ordinal	Years	
Pap smear test frequency	Ordinal	Years	
History of abnormal Pap smear result	Nominal		
History of cervical cancer	Nominal		
Background knowledge on HPV and HPV vaccine	Dichotomous	Awareness of HPV and its vaccine	