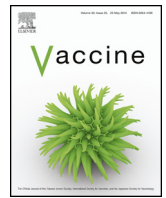




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Human papillomavirus vaccination: Assessing knowledge, attitudes, and intentions of college female students in Lebanon, a developing country

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ABSTRACT

Human papillomavirus (HPV) infection is a common cause for genital warts and cervical cancer. Developing countries in the Middle East such as Lebanon are traditionally considered to be conservative societies with low incidence of sexually transmitted infections. However, nowadays, there is an unexpected increase in the incidence of HPV infections among Middle Eastern females. Thus, the objective of this study is to assess the behavioral perceptions of HPV vaccination among female students attending an academic institution in Lebanon. This cross-sectional study invited 512 students to complete a self-administered questionnaire that assessed the knowledge, attitudes, and intentions towards HPV vaccination. Data analysis included the calculation of knowledge scores ranging from 0 to 100, attitude scores ranging from most positive (1) to most negative (5), and intention scores ranging from lowest intention (0) to highest intention (10). With a response rate of $n = 215$ (42%), 36.5% never heard of the vaccine before, and only 16.5% were already HPV vaccinated. The median knowledge score of $52.7\% \pm 1.71$ reflects poor to moderate knowledge. Still, the median attitude score of 2.47 ± 0.05 shows a general positive attitude towards HPV vaccination where most of the participants agreed that female college students in Lebanon have a good chance of contracting HPV (62.1%) and that all gynecologists should recommend the vaccine (76.0%). Students in graduate programs, health related majors, and those who are vaccinated had significantly higher knowledge scores compared with students in undergraduate programs, non-health related majors, and HPV non-vaccinated students, respectively. Finally, the survey helped in increasing the intention to obtain HPV vaccine as the intention score increased significantly from 5.24 ± 0.27 before the students went through the survey to 6.98 ± 0.22 after the students completed the survey. Our study highlights the importance of offering guidance to female college students about HPV and its vaccination in developing countries where the incidence of sexually transmitted infections is on the rise.

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1. Introduction

Infections with high-risk human papillomaviruses, particularly HPV types 16 and 18, promote the development of genital warts and cervical cancer, a leading cause of death in women [1–3]. HPV is usually transmitted through vaginal and anal sex but may also spread through oral sex and genital to genital contact [4]. HPV infection is a common sexually transmitted disease occurring in 10% of women worldwide with at least 50% of sexually active individuals

contracting the infection during their lifetimes [5]. What is particular about HPV infection is its high incidence among female adolescents and young women (15–24 years) [5–8]. Indeed, female adolescents are at a higher risk of acquiring HPV infection when compared to adult women [9,10].

Two highly immunogenic HPV vaccines are currently available in the market: the quadrivalent Gardasil (HPV 6, 11, 16, 18) by Merk (Whitehouse Station, New Jersey) and the bivalent Cervarix (HPV 16 and 18) by GalaxoSmithKline (GSK, Brentford, Middlesex, UK) [11,12]. The HPV vaccine has been recommended as a series of three injections over a period of 6 months for adolescent females aging 9–26 years but can also be given to older women up to 55 years [13]. In Lebanon, the vaccine is not provided by the government and there is no form of assistance provided for those who cannot afford it. The price of one dose of the vaccine in Lebanon is 80\$

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(120,000 Lebanese Lira) for Cervarix and 173\$ (260,000 Lebanese Lira) for Gardasil.

The Extended Middle East and North Africa (EMENA) region includes societies that share similar cultures and religions and that are considered to have a more conservative sexual behavior compared to western societies. The incidence of cervical cancer is difficult to assess precisely because systematic and national cancer registries are lacking in many countries of the EMENA region. In addition, nationwide programs of cervical cancer screening do not exist or are based on a limited opportunistic cytology-based screening, which often lacks quality assurance [14,15]. Lebanon is traditionally considered to be a conservative society with lower incidence of sexually transmitted infections. However, nowadays, the younger generation is more open and not strongly confined to its sociocultural norms as before. This is reflected in an unexpected high prevalence of HPV infections up to 25% in low risk Middle Eastern women with normal cytology and up to 98% in those with genital warts, pre-invasive, and invasive lesions [16]. Given this unexpected high prevalence of HPV infection, our aim in this study is to assess the knowledge and attitudes towards HPV infection and vaccination as well as the readiness for the uptake of HPV vaccine amongst female students attending an academic institution in Lebanon, a developing country in the Middle East. It is essential to learn about the behavioral perceptions towards HPV vaccination as a first step to develop a health policy that endorses HPV vaccination among females. The findings of this study may highlight the need of launching educational programs in developing countries that offer guidance to adolescents to increase their awareness of the risks associated with HPV infection regardless of whether they come from conservative families or not. This can then be followed by establishing a health policy in the country that requires females to be vaccinated at an early age. Eventually, all these interventions can help in effectively decreasing the incidence of HPV infections and cervical cancer.

2. Methods

2.1. Study design and participants

A cross-sectional survey about HPV and its vaccine was conducted between November 2013 and February 2014. The inclusion criteria consisted of female students above the age of 18 years attending American University of Beirut, an internationally acclaimed academic institution in Lebanon. Male students or female students below the age of 18 years were excluded. A computer based program in the university registrar's office generated a list of student emails that met our criteria ($n=3000$). The same program then generated a random sample of 512 emails from the total number of emails that met our criteria. The sample of $n=512$ was calculated based on a confidence level of 95%, significance level of 0.05, a power of 80%, and an inflation of 50%.

The survey instrument was an online self-administered anonymous questionnaire conducted using LimeSurvey software. LimeSurvey automatically populates and saves digital responses to a secure database protecting participant confidentiality throughout the surveying process. Participants were shown a consent page informing them of the study's aims and objectives as well as the participant's right to refuse or terminate their participation in the study at any time and without penalty.

The questionnaire included 38 items in a total of 4 sections. The first section asked about demographics such as age, smoking and drinking status, sexual experience, and college major. The first section also included a 10 point scale on how much the participant is willing to receive the HPV vaccine before going through the other sections of the survey. The second section included 16

True or False knowledge statements about HPV infection or HPV vaccination. After completing the knowledge section, participants were given information about HPV and its vaccine before they can proceed to the third section which assessed their attitudes using 9 statements with a 5 point Likert scale for each (Strongly agree – Strongly disagree). Finally, the last section was a 10 point scale for the willingness of the participant to get vaccinated after going through all of the sections of the survey.

2.2. Ethical considerations

In complying with the highest standards of ethical considerations, participants were informed that their participation is entirely voluntary and that they can omit questions they prefer not to answer. All data amounted from their participation was kept private and strictly confidential. In addition, an informed consent was obtained after explaining the nature of the study and the possible consequences of it. The study design and questionnaire content was approved by the Institutional Review Board at the American University of Beirut.

2.3. Statistical analysis

Data collected by LimeSurvey was exported to Statistical Package for Social Sciences SPSS 20.0. Data are presented as mean \pm standard deviation for continuous variables and as percentages for categorical variables.

Based on the participants' responses, three scores were calculated:

2.3.1. Knowledge score

The knowledge score reflects the percentage of correct answers the participant had among the 16 knowledge statements. For every knowledge statement, one point was given for answering correctly (True or False) and no points were given for choosing the wrong answer or the "Do not know" option. The total points were added for every participant and a percentage was calculated: (number of points)/16 \times 100. This percentage is the knowledge score. The higher the knowledge score, the more knowledgeable the participant is regarding HPV infection and HPV vaccination.

2.3.2. Attitude score

The attitude score was calculated using the participants' responses to the 9 statements with 5 point Likert scale: 1 point-Strongly Agree, 2 points-Agree, 3 points-Neutral, 4 points-Disagree, 5 points-Strongly Disagree.

The average of the total points was calculated for every participant to end up with an attitude score ranging from 1.0 to 5.0. The closer the attitude score to 1, the more positive the participant's attitude towards HPV vaccination.

2.3.3. Intention score

This score reflects the willingness of each participant to receive the HPV vaccine. Two intention scores were determined: one at the beginning of the survey and one after the participant went over all the sections of the survey including the one that contained information about HPV infection and vaccination. The score is a scale from 1 to 10: 1 reflects the least willingness to receive the vaccine while 10 reflects the highest willingness for HPV vaccine uptake.

Each score is presented as mean \pm standard deviation and compared across several demographic characteristics by using one sample t test or ANOVA analysis of variance. The mean values of intention scores before and after the study were compared using paired sample t test. A p -value less than 0.05 was considered significant throughout the study.

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