



A Community-Based Cross-Sectional Study on Human Papillomavirus (HPV) Vaccination: Knowledge Gaps and Attitudinal Determinants among Women of Reproductive Age in Al-Jafara, Libya

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دراسة مقطعية مجتمعية حول التطعيم ضد فيروس الورم الحليمي البشري: فجوات المعرفة والمحددات السلوكية بين النساء في سن الإنجاب في منطقة الجفارة، ليبيا

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Abstract:

Background: Human Papillomavirus (HPV) is a primary causative agent of cervical cancer, a considerable health concern for women globally. Comprehending knowledge, awareness, and attitudes towards HPV and its vaccination among women of childbearing age is critical for effective prevention approaches. Objective: This study evaluated knowledge, awareness, and attitudes regarding HPV infection and vaccination among women aged 18-35 in Aljafara. Methods: A cross-sectional study was conducted with 140 women using a structured questionnaire to gather data on demographics, knowledge about HPV, and vaccination attitudes. Descriptive statistics and correlation analyses were carried out on the data. Results: Most participants (68.8%) were aged 26-30, married (62.8%), and held a bachelor's degree (50%). While 75% recognized the higher risk of HPV in females, 56.5% were unaware that HPV causes nearly all cervical cancers. Additionally, 81.4% supported male HPV vaccination to protect partners. Healthcare workers had significantly higher knowledge scores ($p < 0.001$). No significant correlations were found between knowledge scores and age, marital status, or education level. Conclusion: Significant knowledge gaps exist among Libyan women of childbearing age regarding HPV, even among healthcare professionals. While attitudes towards vaccination are generally positive, uncertainties about effectiveness and eligibility remain. To enhance Libyans' awareness of HPV and vaccination, comprehensive educational efforts are required.

Keywords: HPV, cervical cancer, vaccination, knowledge, attitudes, public health.

المخلص

الخلفية: يُعد فيروس الورم الحليمي البشري (HPV) العامل المسبب الرئيس لسرطان عنق الرحم، وهو يمثل مشكلة صحية بارزة لدى النساء على مستوى العالم. إن فهم المعرفة والوعي والمواقف تجاه فيروس الورم الحليمي البشري ولقاحه لدى النساء في سن الإنجاب أمر بالغ الأهمية لتطوير استراتيجيات فعالة للوقاية. الهدف: هدفت هذه الدراسة إلى تقييم مستوى المعرفة والوعي والمواقف المتعلقة بعدوى فيروس الورم الحليمي البشري والتطعيم ضده بين النساء اللواتي تتراوح أعمارهن بين 18-35 سنة في منطقة الجفارة. الطرق: أجريت دراسة مقطعية شملت 140 امرأة، باستخدام استبيان مُنظم لجمع البيانات حول الخصائص الديموغرافية والمعرفة بفيروس الورم الحليمي البشري والمواقف تجاه التطعيم. تم تحليل البيانات باستخدام الإحصاء الوصفي واختبارات الارتباط.

النتائج: كان معظم المشاركات (68.8%) في الفئة العمرية 26–30 سنة، ومتزوجات (62.8%)، وحاصلات على درجة البكالوريوس (50%). بينما أدركت 75% من المشاركات أن النساء أكثر عرضة للإصابة بفيروس الورم الحليمي البشري، لم تكن 56.5% منهن على دراية بأن هذا الفيروس يسبب ما يقارب أغلب حالات سرطان عنق الرحم. بالإضافة إلى ذلك، أيدت 81.4% تطعيم الذكور ضد الفيروس لحماية الشريكات. كما سجل العاملون في القطاع الصحي درجات معرفة أعلى بشكل ملحوظ. ($p < 0.001$) ولم تُسجل أي علاقة ذات دلالة إحصائية بين درجات المعرفة والعمر أو الحالة الاجتماعية أو المستوى التعليمي.

الاستنتاج: تُظهر النتائج وجود فجوات معرفية كبيرة بين النساء الليبيات في سن الإنجاب حول فيروس الورم الحليمي البشري، حتى بين العاملين في المجال الصحي. ورغم أن المواقف تجاه التطعيم إيجابية بشكل عام، إلا أن هناك بعض الشكوك المتعلقة بالفعالية والفئات المستهدفة. ومن أجل تعزيز وعي الليبيين بفيروس الورم الحليمي البشري والتطعيم ضده، هناك حاجة إلى جهود توعوية شاملة.

الكلمات المفتاحية: فيروس الورم الحليمي البشري، سرطان عنق الرحم، التطعيم، المعرفة، المواقف، الصحة العامة.

Introduction

Human Papillomavirus (HPV) is a common sexually transmitted infection that can lead to cervical cancer and other diseases. Vaccination against HPV is crucial, especially for sexually active individuals, as the infection often occurs through sexual contact [1]. HPV vaccination is a vital public health measure aimed at lowering the occurrence of HPV-related illnesses, especially cervical cancer [2]. The vaccines, introduced in 2006, have shown high efficacy in preventing infections caused by high-risk HPV types, with the nonavalent vaccine providing the broadest protection. Despite their effectiveness, global vaccination rates remain low due to various barriers, including misinformation and lack of awareness [3]. The vaccination schedule has changed, allowing for a two-dose series for those under 15, while three doses are still recommended for those 15 and older [1]. HPV vaccination has been shown to decrease the incidence of cervical cancer, with studies indicating a protective effect against HPV strains responsible for approximately 70%-90% of cases [4]. Approximately 70% of all occurrences of cervical cancer globally are caused by HPV strains 16 and 18 [5]. There are now three effective preventive vaccinations against HPV infection: Bivalent Vaccine: Which protects against HPV-16 and HPV-18. Quadrivalent Vaccine: Covers HPV-16, HPV-18, HPV-6, and HPV-11. Nonavalent Vaccine: Offers protection against nine HPV types, including the high-risk strains associated with cancer [6]. All vaccinations have been recommended for males and females aged 9 and up [6]. Vaccination programs have led to reduced healthcare costs associated with cervical cancer treatment, enhancing women's health status and social standing. Implementing effective vaccination strategies can improve awareness and access, particularly in developing countries, thereby addressing socioeconomic disparities [7]. Low awareness and misinformation lead to hesitation, which reduces vaccination rates [8]. Community sensitisation and educational efforts are critical for increasing uptake [8].

Material and methods

Ethical approval and consideration: The study was considered minimal risk, but ethical principles were followed. Participation was voluntary and anonymous. Electronic informed consent was obtained from all respondents before the survey started.

Study Design and Data Collection: The current study employed an anonymous, self-report, survey-based, cross-sectional design from January to April 2024. The inclusion criteria were all females of reproductive age (9-52 years) living in Al-Jafara, Libya, who completed the survey. The exclusion criteria included males, females outside the reproductive age range (<9 and >52 years), and incomplete survey responses.

Survey Method:

Questionnaire design: To assess participants' knowledge of cervical cancer risk factors and human papillomavirus (HPV) vaccination, an electronic questionnaire was developed using Google Forms and distributed online via an anonymous format. The instrument was adapted and translated into Arabic based on previously validated surveys [9]; [10]. Subsequently, the questionnaire underwent evaluation for content validity and reliability metrics.

The survey comprised two distinct sections: the first collected baseline socio-demographic data of respondents, while the second assessed knowledge, awareness, and attitudes regarding cervical cancer risk factors and the HPV vaccine. This latter section consisted of twenty items, including ten dichotomous (yes/no) and ten multiple-choice questions, collectively employed to derive composite scores reflecting participants' understanding and perceptions of cervical cancer and HPV vaccination.

Data management and statistical analysis:

Data were analysed using the Statistical Package for Social Sciences (SPSS) software for Windows, version 23. Measurement data were expressed as mean $\pm$ standard deviation ($X \pm S$), and count data were expressed as

frequency and percentage. Factors influencing women's awareness of HPV and the vaccine were analysed using the chi-square test. A p-value less than 0.05 was considered indicative of statistical significance.

Results and discussion

Socio-Demographic Characteristics of the Study Cohort

The study cohort comprised 150 participants, of whom 10 male respondents were excluded, resulting in a final sample of 140 female participants, all of Libyan nationality. Table 1 presents a detailed summary of their socio-demographic attributes. The majority of participants were aged 26–30 years (n = 96, 68.8%), married (n = 88, 62.8%), and held a bachelor's degree as their highest educational qualification (n = 70, 50%). Regarding occupational status, 96 participants (68.5%) were employed within the healthcare sector, 17 (12.3%) were employed outside healthcare, and 27 (19.2%) were students.

Table 1: The socio-demographic characteristics of the surveyed participants (n=140).

Variable	Categories	Frequency	Percent
Age in years (n=140)	18 -25	26	18.5%
	26- 30	96	68.8%
	31 - 35	12	8.5%
	More than 35	6	4.2%
Marital status (n=140)	Single	43	30.7%
	Married	88	62.8%
	Divorced	4	2.9%
	Widowed	5	3.6%
Education (n=140)	Primary	5	3.6%
	High school	35	25.0%
	Bachelor's degree	70	50.0%
	Postgraduate degree	30	21.4%
Occupation (n=140)	Student	27	19.2%
	Healthcare employee	96	68.5%
	Non-healthcare employed	17	12.3%

Knowledge about HPV infection among women of childbearing age:

An evaluation of HPV understanding among reproductive-age women uncovered persistent informational voids despite rudimentary awareness of exposure determinants. Although 75.0% correctly recognized females as owing greater vulnerability to the virus, 43.5% were unaware of its status as one of the most common sexually transmitted infections, and 56.5% did not identify prolonged infection with high-risk HPV types as the leading cause of almost all cervical malignancies. Misbeliefs prevailed: 56.4% inaccurately indicated peak infection rates for women in their thirties, contrasting with 50.0% who correctly predicted that genital HPV often remains asymptomatic. Furthermore, 56.4% remained uncertain about the correlation between wart-inducing and oncogenic HPV strains. Key lacunae in vaccination understanding were evident: 62.1% wrongly insisted that marital HPV clearance must precede immunization, while considerable portions remained indecisive as to vaccine suitability for females aged over 26 years (50.0% uncertain), availability to males and females (44.4% uncertain), and vaccine avoidance for those with existing cervical HPV infection (43.5% uncertain).

Table 2: summarizes the Knowledge about HPV infection among women of childbearing age (n=140).

Question	Yes, n (%)	No, n (%)	I don't know, n (%)
HPV is a relatively uncommon sexually transmitted infection	44(31.4)	35(25.0)	61(43.5)
Females are at a higher risk of HPV infection	105(75.0)	26(18.5)	9(6.5)
HPV infection is the cause of almost all cervical cancers	43(30.7)	18(12.8)	79(56.5)
HPV infection rates are higher in women in their thirties.	79(56.4)	-	61(43.6)
Most patients with genital HPV infection have symptoms.	26(18.6)	70(50.0)	44(31.4)
The HPV types that cause cervical cancer also cause genital warts.	52(37.1)	9(6.5)	79(56.4)
Before getting vaccinated, married couples must ensure that they are free of HPV infection.	87(62.1)	10(7.2)	43(30.7)
The HPV vaccine is not available for girls above the age of 26.	45(32.1)	25(17.9)	70(50.0)
HPV vaccination is available for both males and females.	44(31.4)	34(24.2)	62(44.4)
Women and men who have been diagnosed with HPV should not receive the HPV vaccine.	44(31.4)	35(25.0)	61(43.5)

Awareness and attitudes toward HPV vaccination among women

The study reveals that 81.4% of participants believe males should be vaccinated against HPV to protect their future partners from cervical cancer and other consequences. However, 50% disagree that females are already vaccinated against the virus, making vaccination unnecessary. 68.5% believe females may benefit from HPV vaccinations to avoid vaginal and anal warts. 55.7% believe HPV causes few types of cancers in females, making vaccination unnecessary. 50% disagree that vaccinating females is pointless, and 50% are unsure of their agreement. 42.9% believe the vaccine is new and has not been tested long enough, and 37.2% are uncertain about its effectiveness. 55.6% are not against HPV vaccination for ethical or religious reasons.

Table 3: summarizes awareness and attitudes of HPV vaccination among women.

Question	I agree with that, n (%)	I don't agree with that, n (%)	I don't know, n (%)
Males should be vaccinated against HPV to protect their future partners against cervical cancer and other consequences of the virus.	114(81.4)	-	26(18.6)
We already vaccinate females against the virus, therefore there is no reason to vaccinate males as well.	27(19.2)	70(50.0)	43(30.8)
To avoid vaginal and anal warts, females may benefit from HPV vaccinations.	96(68.5)	9(6.4)	35(25.0)
HPV causes very few types of cancers in females, making vaccination unnecessary.	11(7.8)	78(55.7)	51(36.5)
Vaccinating females is pointless because vaginal and anal warts can be cured using other ways.	-	70(50.0)	70(50.0)
I think the vaccine is new and has not been tested long enough.	27(19.2)	60(42.9)	53(37.9)
I'm concerned about the HPV vaccine's effectiveness.	44(31.4)	44(31.4)	52(37.2)
I'm against HPV vaccination for ethical or religious reasons.	18(12.8)	78(55.6)	44(31.4)
I am not sure if the vaccine is available for both males and females.	70(50.0)	26(18.5)	44(31.5)
I am more comfortable giving the vaccine to women than to men.	80(57.1)	16(11.4)	44(31.5)

Table 4 delineates the associations between participants' socio-demographic characteristics and their comprehension of cervical cancer and the human papillomavirus (HPV) vaccine. No statistically significant differences were observed in knowledge scores across age, marital status, or educational attainment ($p > 0.05$). Conversely, a substantial association was identified between profession and knowledge score ($p < 0.001$), with healthcare personnel and students specializing in health disciplines demonstrating superior knowledge scores significantly superior to those of other cohorts.

Table 4: Comparison of Mean HPV and Cervical Cancer Knowledge Scores Based on Socio-Demographic Characteristics (n=140) Knowledge Score calculated from 20 items; maximum possible score = 20. P-values generated using One-Way ANOVA or Independent Samples t-test. Effect sizes: η^2 (Eta-squared) for ANOVA, d (Cohen's d), for t-test. Post-hoc Tukey HSD tests applied for significant ANOVA results; groups sharing a superscript letter are not significantly different ($p > .05$).

Variable	Categories	n (%)	Mean Knowledge Score (SD)	Statistical Test	p-value	Effect Size
Age group (years)	18 - 25	26 (18.6%)	8.15 (2.45)	One-Way ANOVA	0.104	$\eta^2 = 0.045$
	26 - 30	96 (68.6%)	8.82 (2.18)			
	31 - 35	12 (8.6%)	9.58 (2.02)			
	> 35	6 (4.3%)	9.33 (2.42)			
Marital Status	Married	88 (62.9%)	8.83 (2.24)	t-test	0.227	d = 0.20
	Not Married ^a	52 (37.1%)	8.44 (2.27)			
Education Level	Primary/High School ^b	40 (28.6%)	7.68 (2.32) ^c	One-Way ANOVA	<0.001	$\eta^2 = 0.125$
	Bachelor's degree	70 (50.0%)	8.65 (2.05) ^d			
	Postgraduate degree	30 (21.4%)	10.07 (1.82) ^e			
Occupation	Student	27 (19.3%)	7.41 (2.11) ^f	One-Way ANOVA	<0.001	$\eta^2 = 0.218$
	Healthcare employee	96 (68.6%)	9.35 (1.98) ^{g,f}			
	Non-healthcare employed	17 (12.1%)	6.88 (2.14) ^f			

Notes:

a Not Married: Single, Divorced, and Widowed combined for analysis.

b Primary (n=5) and High School (n=35) categories combined for analysis.

c,d,e,f Superscript letters denote results of Tukey's Honest Significant Difference (HSD) post-hoc tests for the Education and Occupation factors. Groups within a factor that share a common superscript letter are not significantly different from each other ($p > .05$).

Discussion

This research investigates how well women of reproductive age in Aljara, Libya, understand HPV risk and the HPV vaccine. Most women surveyed were young, fully married, and had formal schooling, with many working in health-related jobs. Even so, their HPV knowledge remained incomplete. Three-quarters recognized that women were more likely to carry the virus, yet only 43.5% realized HPV is the leading STI worldwide. Furthermore, 56.5% did not know the virus is the cause of nearly every case of cervical cancer, suggesting that information linking the virus to a serious outcome is still not sufficiently clear. Participants were also unsure about HPV types, the virus's symptoms, and how the infection affects age distribution. Attitudes toward vaccination were mixed. Though 81.4% believed boys should be inoculated to protect their future partners, uncertainties persisted about vaccine access, its protective success, and whether it is warranted for various age and risk cohorts. The study did not show age, marital status, or schooling length to strongly influence knowledge test scores; nevertheless, a clear link appeared between work role and understanding. Health workers scored better, confirming that ongoing training within the health care system is essential to reinforce and disseminate accurate preventive health messages.

Conclusion

This study highlights critical insights into the knowledge, awareness, and attitudes toward HPV infection and vaccination among women of childbearing age in Aljfara, Libya. Despite a generally high level of education and the inclusion of healthcare workers, significant knowledge gaps were found regarding HPV infection, its link to cervical cancer, and vaccination details. Participants showed a positive attitude towards vaccinating males to protect partners, but there were uncertainties about vaccine effectiveness and eligibility, suggesting the need for targeted education. The study found healthcare workers to have better knowledge, emphasising the role of professional education. Misconceptions appeared widespread across various demographics, indicating a need for culturally sensitive educational programs aimed at both the public and healthcare professionals. Public health strategies should address misconceptions about HPV transmission, symptoms, and vaccine eligibility while using evidence-based communication to improve vaccine acceptance.

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