

Human papilloma virus vaccine hesitancy among female undergraduates at a medical college, Kathmandu

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ABSTRACT

Introduction: About 70% of cervical cancer occurrences globally are caused by Human Papilloma Virus strains 16 and 18. The prevalence of cervical cancer can be decreased by Human papilloma virus vaccines that protect against Human papilloma virus 16 and 18 infections. The World Health Organization had identified vaccine hesitancy as one of the top 10 threats to global health in 2019. A study conducted in China shows that 62.36% medical students reported having Human papilloma virus vaccine hesitancy.

Objectives: To assess the Human papilloma virus vaccine hesitancy among female undergraduate students in a medical college of Kathmandu, Nepal.

Methodology: A descriptive cross-sectional study was conducted among 428 female undergraduate students studying at a Medical College, Kathmandu. Data was collected by self-administered questionnaire using google form and analyzed by using Statistical Package for Social Science version 27.

Results: Out of 428 respondents, 377 (88.1%) had Human papilloma vaccination hesitancy. Convenience was pointed out as the major domain with highest hesitancy against the Human Papilloma vaccine. Among all the reasons, the expensive cost of Human Papilloma vaccine was the main reasons for respondent's hesitancy against Human Papilloma vaccine.

Conclusion: The findings of the study showed very high hesitancy regarding Human papilloma virus vaccine. Educating students about the advantages of the Human Papilloma vaccine and making it more affordable will help lower vaccine hesitancy and increase Human Papilloma vaccine vaccination rates, eventually reduce the prevalence of cervical cancer.

Key words: Hesitancy; Human Papilloma Virus vaccine; Undergraduates

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INTRODUCTION

Human papilloma virus (HPV) is a virus that is a sexually transmitted infection of the reproductive tract and is the most prevalent sexually transmitted infection in the world.¹ About 70% of cervical cancer occurrences globally are caused by HPV strains 16 and 18.² HPV vaccine is beneficial in lowering the prevalence of HPV-related illnesses, particularly when administered before HPV exposure. All girls between the ages of 11 and 12 are advised to get the vaccine, and women up to the age of 26 can get a catch-up shot.³

Vaccine hesitancy is the delay or refusal of vaccination despite the availability of immunization services. The WHO had identified vaccine hesitancy as one of the top 10 threats to global health in 2019.⁴ It varies by time, region, and vaccination type, based on complicated and specific circumstance.⁵ Three categories: complacency, convenience, and confidence are highlighted by the "3 Cs" model.⁶ The HPV vaccine has been proven to be a cost-effective measure to prevent cervical cancer, but the

vaccination rate remained low to date among university students.⁷ In China, 62.36% medical students reported having vaccine hesitancy.⁸

Cervical cancer is the commonest cancer among women in Nepal and HPV vaccination has been recommended as a prophylactic therapy.⁹ In Nepal, study about Human papilloma virus vaccination and hesitancy has not been found yet. Therefore, with an interest to assess the hesitancy level of university students in Nepal, we conducted a study on HPV vaccine hesitancy among female undergraduate students at a medical college of Kathmandu.

METHODOLOGY

A descriptive, cross-sectional study design was used for this study to assess HPV vaccine hesitancy among female undergraduates studying in a Medical College. The female students studying bachelor's in medicine (MBBS), Physiotherapy (BPT), Dentistry (BDS) and Nursing (BNS, B.Sc.) were included in the study and the foreign students were excluded from the study. Total number of Nepalese female students were 473 (BDS: 161, Nursing: 146, MBBS: 124 and BPT: 42). Among them, 45 students did not respond to our questionnaire even after the third reminder, so, the final sample size was 428. A structured questionnaire was developed on the basis of research objectives with the help of WHO 3C' model of HPV vaccine hesitancy after extensive literature review, part one consisting of socio-demographic information of participants and part two consisting of 15 items related to HPV vaccine hesitancy. The vaccine hesitancy level was categorized as yes (hesitancy) and no (no hesitancy). Score 1-15 indicates hesitancy whereas 0 indicates no hesitancy. The questionnaire was prepared in English language. Pretesting of the questionnaire was done in 10% of the sample size among undergraduate students at Kathmandu University School of Medical Science. The calculated Cronbach's alpha was 0.77. Necessary modifications to the questionnaire were made after the pretest.

Ethical approval for the study was obtained from the Institutional Review Committee of the same medical college where the data was collected (Ref. 15102023/33). Data collection was done in November 2023. The e-mail address of the respondents was collected with the help of class representatives from each academic year of each stream. A clear explanation of the objectives of the study was provided to each respondent along

with an informed consent form. Voluntary participation and the respondents' right to refuse was respected. Confidentiality was maintained properly. Their e-mail address was not disclosed anywhere. The information provided by the respondents was only used for the purpose of study. Data was collected by self-administered questionnaire method using Google form. Follow-up to fill questionnaire was done every three days for three times. Data was entered, edited, organized and coded using statistical package for social sciences (SPSS) Version 27. The data was analyzed by using descriptive statistics (frequency, percentage, mean, median, standard deviation) for socio-demographic information and level of HPV vaccine hesitancy and inferential statistics (chi-square test and fisher exact test) to find out the association between dependent and independent variables. The p value of <0.05 was considered as statistically significant.

RESULTS

The mean age of the respondents was 21.66 ± 1.90 years. Most of the respondents, 426 (99.5%) were unmarried, among whom 420 (98.6%) were not in a live-in relationship. The majority of the respondents, 376 (87.9%) were Hindus. More than one third of respondents, 152 (35.5%) were from BDS stream. Nearly one fourth of the respondents, 95 (22.2%) had a family history of cancer. Most of the respondents, 417 (97.4%) were not vaccinated against HPV (Table 1).

Majority of the respondents, 377 (88.1%) had Human papilloma virus vaccination hesitancy (Table 2). According to the domains of vaccine hesitancy model given by WHO, majority of the respondent's, 371 (86.7%) reasons for HPV vaccine hesitancy was corresponded to convenience domain (Table 3)

The top five reasons for HPV vaccination hesitancy among the participants are displayed in table 4. Among those "the expensive cost of HPV vaccine" was the first and foremost reason, 307 (71.7%), whereas "no awareness of appropriate age for HPV vaccination" was the fifth reason, 199 (46.5%) resulting in respondent's hesitancy against HPV vaccine.

Chi-square test was applied to find out the association of HPV vaccine hesitancy with selected socio-demographic variables (Table 5). HPV vaccine hesitancy was significantly associated with family history of cancer ($p=0.01$) and history of HPV vaccination ($p<0.03$).

Table 1: Socio-demographic information of the respondents

Variables	Frequency (n)	Percentage (%)
Age (in years)		
Mean $\pm$ SD: 21.66 $\pm$ 1.90		
Religion		
Hindu	376	87.9
Buddha	47	11.0
Others	5	1.2
Marital status		
Married	2	0.5
Unmarried	426	99.5
Live-in relationship status (n=426)		
Yes	6	1.4
No	420	98.6
Stream		
BDS	152	35.5
Nursing	137	32.0
MBBS	102	23.8
BPT	37	8.6
Family history of cancer		
Yes	95	22.2
No	333	78.8
History of HPV vaccination		
Yes	11	2.6
No	417	97.4

Table 2: HPV vaccine hesitancy

Hesitancy	Frequency (n)	Percentage (%)
Yes	377	88.1
No	51	11.9

Table 3: Hesitancy according to domains of vaccine hesitancy model*

Domain	Frequency (n)	Percentage (%)
Complacency	48	11.2
Convenience	371	86.7
Confidence	303	70.8

*Multiple response

Table 4: Top five reasons for HPV vaccine hesitancy*

S. N.	Reasons	Hesitancy	
		Frequency (n)	Percentage (%)
1.	I think HPV vaccination is expensive.	307	71.7
2.	I am worried about vaccine safety or side effects of HPV.	236	55.1
3.	I don't know where to get good/reliable information about the HPV vaccine.	230	54.0
4.	I don't know where to get vaccinated for HPV.	226	52.8
5.	I don't know which is appropriate age for HPV vaccination	199	46.5

* Multiple response

Table 5: Association between HPV vaccine hesitancy and socio-demographic variables

Variables	Hesitancy	No hesitancy	p-value
Age (in years)			
≤21	194	19	0.057
>21	183	32	
Stream			
MBBS	90	12	0.34
BDS	132	20	
Nursing	119	18	
BPT	36	1	
Family history of cancer			
Yes	77	18	0.01*
No	300	33	
History of HPV vaccination			
Yes	7	4	0.03*
No	347	47	

p- value significant at <0.05, *=Chi-square test

DISCUSSION

This study is an attempt to assess the prevalence of human papilloma virus vaccine hesitancy among 428 female undergraduates studying at a medical college. The prevalence of HPV vaccine hesitancy was 88.1% which is in line with a study in China published on February 2022 where prevalence of HPV vaccine hesitancy was found to be 62.36%.⁹ However, the finding is in contrast with another study done in China, published in October 2022 where prevalence of HPV vaccine hesitancy was 8.9%⁵, among catch-up generations in Japan where the prevalence of HPV vaccine hesitancy was 20.1%.¹⁰ and in university students of Kuwait where the prevalence of HPV vaccine hesitancy was 20.1%.¹¹ Since the study was done in different setting among female students only having different cultural and social background and perspective, the result may vary from other studies conducted on similar topics.

This study showed HPV vaccine hesitancy had significant association with family history of cancer of respondents ($p < 0.01$) which is in line with the study done in China published in October 2022 in which HPV vaccine hesitancy was significantly associated with, family history of cancer of the respondents.⁸ There was no significant association of HPV vaccine hesitancy with the age of the respondents which is in line with a study conducted in China published in February 2022⁸ and study conducted in China published in October 2022 which shows no significant association of HPV vaccine hesitancy with age.⁷ This finding is in contrast with the study done in Japan which shows significant association HPV vaccine hesitancy with age.¹⁰ The difference in findings might

be due to age within small range and different cultural background that significantly influence the behavior, attitude and responses, along with that Nepal differ significantly in socio-economic status and resources.

Data collection for this study was conducted in November 2023 which was before Nepal's nationwide HPV vaccination campaign. Till that time, a pilot program on HPV vaccination had been running in two districts, Chitwan and Kaski which was continued since 2016. During the pilot, all girls aged between 11 and 13 years were given two doses of the vaccine. Additionally, in September 2023, the government of Nepal purchased 20,000 doses of the HPV vaccine and administered them to approximately 9,000 girls aged 14-15 in all seven provinces.¹⁰ Nepal's nationwide HPV vaccination campaign was held recently (in February 2025) with the help of the Global Alliance for Vaccine and Immunization (GAVI). Around 1.5 million girls aged 10-14 years have received HPV vaccine through the campaign. Nepal introduced HPV vaccination into its National Immunization Programme in February 2025, with the nationwide vaccination campaign launched on 4 February 2025 and subsequent integration of the vaccine into routine immunization.^{12, 13} Nepal's inclusion of the HPV vaccine in its routine immunization program has fundamentally shifted the public health landscape.

CONCLUSION

The Human Papilloma virus hesitancy was high among the female undergraduate students studying at a medical college, Kathmandu. Among all the reasons,

the expensive cost of HPV vaccine, worry about vaccine safety or side effects of HPV vaccine were the main reasons in respondent's hesitancy against HPV vaccine. Awareness programs regarding the benefits of HPV vaccine are recommended. HPV vaccine should be

available at affordable cost to all. There is good news that recently, Nepal has decided to include HPV vaccine in its national immunization programme.

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