The effectiveness of the HPV vaccine as part of the National Immunization Program for preventing HPV infection in Thai schoolgirls after seven years following immunization

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Introduction

In 2014, Thailand initiated a two-dose of bivalent HPV vaccines for Grade 5 schoolgirls, who are around 11 years old, as a pilot program in Ayutthaya province. The National Immunization Program (NIP) initiated nationwide vaccination for schoolgirls in 2017. The objective of this study was to evaluate the effectiveness of vaccine in schoolgirls 7 years after a two-dose administration.

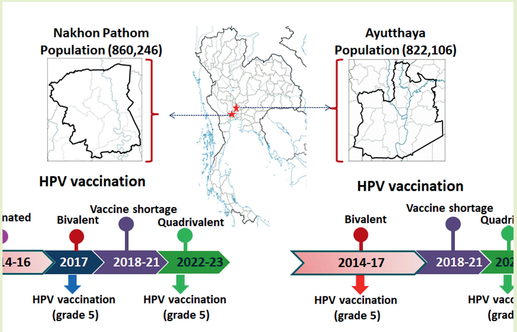

Figure 1. HPV National Immunization Program in Thailand 2014-2023.

Methods

The study was conducted in two provinces, Ayutthaya and Nakhon Pathom, starting in May 2023. Schoolgirls from grade 12 or vocational school (17–19 years old) in each province were randomly selected. Samples of urine were collected using a Colli-Pee device (Novosanis, Belgium) for HPV typing. The urine sample was centrifuged. The supernatant was discarded, and the remaining 1 mL of pellet was resuspended and used for the Cobas®4800 assay. The extracts DNA from Cobas-positive DNA were collected for HPV typing using AnyplexTM HPV28 to individually identify 28 HPV types.

Results

Our study enrolled 211 grade 12 female students from Ayutthaya province, who received the two-dose bivalent HPV vaccine CERVARIX® (HPV types 16 and 18) six months apart, and 376 grade 12 students from Nakhon Pathom province who did not receive the HPV vaccine. The study found that the HPV vaccine was highly effective in long-term prevention, with 100% effectiveness against high-risk HPV (HR-HPV) types included in the vaccine (16, 18) and 32.8% (95% CI [-26.1] to 64.2) effectiveness against other HR-HPV types not included in the vaccine.

	Vaccinated HPV vaccine (Ayutthaya) N = 211	Unvaccinated HPV vaccine (Nakhon Pathom) N = 376	*p*-value
Age in years, mean ± SD	17.2 ± 0.4	17.4 ± 0.7	<0.001[a]
Sexual experience, n (%)	79 (37.4%)	176 (46.8%)	0.028[b]
Sexual debut age in years, mean ± SD	15.8 ± 1.2	16.0 ± 1.1	0.232[a]
Condom usage			
Never used	2 (2.5%)	14 (7.9%)	0.008[b]
Ever used	76 (96.2%)	155 (88.1%)	
HPV detection			
16	0	3 (0.8%)	
18	0	4 (1.1%)	
16 + other HR	0	1 (0.3%)	
18 + other HR	0	4 (1.1%)	
16,18 + other HR	0	1 (0.3%)	
other HR	15 (7.1%)	37 (9.8%)	
Total	15 (7.1%)	50 (13.3%)	

Table 1. Comparison of data on sexual behaviors and HPV detection among HPV-vaccinated and unvaccinated schoolgirls.
[a] Represents the mean difference in age between two groups using the independent samples t-test.
[b] Represents the association in categorical variables between two groups musing the Chi-square test.
[c] The percentage of condom use was determined based on individuals with sexual experience.

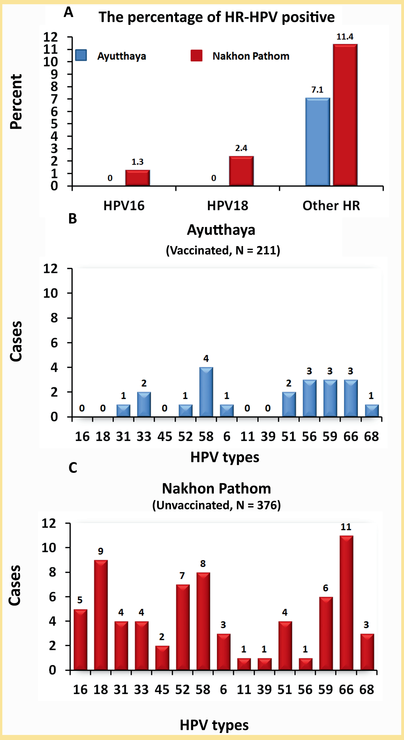

Figure 2. The percentage of HR-HPV-positive samples, in Ayutthaya (vaccinated) and Nakhon Pathom (unvaccinated) (A) . The number of HPV-positive samples in (B) vaccinated and (C) unvaccinated participants.

Conclusions

Prioritizing vaccines with the highest coverage of HR-HPV types, such as the nonavalent HPV vaccine, is crucial to effectively prevent a broader range of HR-HPV infections under the National Immunization Program.

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