Health Care Provider Perceptions of Facilitators and Barriers to Human Papillomavirus Vaccination Delivery in Five Countries

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ABSTRACT

Background: National human papillomavirus (HPV) vaccination programs could reduce global cervical cancer morbidity and mortality with support from health care providers. We assessed providers' perceptions of HPV vaccination in 5 countries.

Methods: We identified providers from 5 countries where national HPV vaccination programs were at various stages of implementation: Argentina, Malaysia, South Africa, South Korea, and Spain. Providers authorized to administer adolescent vaccines completed an in-depth survey, reporting perceptions of barriers and facilitators to initiating and completing HPV vaccination, and logistical challenges to HPV vaccination.

Results: Among 151 providers, common barriers to HPV vaccination initiation across all countries were parents' lack of awareness (39%), concerns about vaccine safety or efficacy (33%), and cost to patients (30%). Vaccination education campaign (70%) was the most commonly cited facilitator of HPV vaccination initiation. Common barriers to series completion included no reminder system or dosing schedule (37%), loss to follow-up or forgetting appointment (29%), and cost to patients (25%). Cited facilitators to completing the vaccine series were education campaigns (45%), affordable vaccination (32%), and reminder/recall systems (22%). Among all countries, high cost of vaccination was the most common logistical challenge to offering vaccination to adolescents (33%).

Conclusions: Incorporating provider insights into future HPV vaccination programs could accelerate vaccine delivery to increase HPV vaccination rates globally.

Administration of human papillomavirus (HPV) vaccination among adolescents can reduce the incidence of cervical precancerous lesions, invasive cervical cancer, and other HPV-associated diseases.[1] As of October 2018, HPV vaccination have been licensed in more than 100 countries and integrated into more than 90 national vaccination programs.[2] However, coverage of HPV vaccination among adolescents aged 9 to 13 years varies notably across global regions.[3] By the end of 2014, worldwide coverage of HPV vaccination among women aged 10 to 20 differed notably between high-income (33.6%) and low- and middle-income countries (LMICs; 2.7%).[4] To improve HPV vaccination uptake among adolescents globally, context-specific strategies are needed.

The World Health Organization has emphasized the significant role of health care providers in implementing HPV vaccination programs.[5] Indeed, prior studies have found that receiving a strong, timely, and prevention-focused provider recommendation for HPV vaccination is the strongest positive predictor of initiating the HPV vaccination series among adolescents.[6] However, prelicensure research on HPV vaccination suggests that providers may have concerns that prevent them from recommending HPV vaccination to their adolescent patients, including potential vaccine adverse effects, handling parents' negative perceptions of vaccination, discomfort in talking to parents about sexual activity and prevention of a sexually transmitted infection, and the relatively high cost of HPV vaccination.[7–10] Furthermore, completion of the multidose HPV vaccination series is essential to confer long-lasting HPV immunity. A combination of provider- and practice-based factors, such as record keeping and dose monitoring, are needed to ensure completion of the series and maximum benefit of HPV vaccination.[11–14] For the global implementation of HPV vaccination

programs, further research is needed to understand the perceived challenges and lessons learned by providers of HPV vaccination to address barriers to complete and timely adolescent HPV vaccination.

This study aimed to improve understanding of adolescent vaccine providers' perspectives on HPV vaccination to understand contextual factors that facilitate or hinder HPV vaccination programs in 5 countries: Argentina, Malaysia, South Africa, South Korea, and Spain. These countries are from distinct geographical regions for which data on national-HPV vaccination delivery are limited, and at different stages of national HPV vaccination program implementation. Furthermore, research on HPV vaccine acceptability after the implementation of national recommendations for adolescent HPV vaccination from these countries had not previously been published. Insights from providers in these countries will be critical in guiding and improving the implementation of national HPV vaccination programs.

MATERIALS AND METHODS

Study Participants

We conducted a cross-sectional quantitative survey of health care providers who administer any vaccines to adolescents in the aforementioned countries between October 2013 and April 2014. At the time of the survey, South Africa and South Korea did not have a national recommendation for adolescent HPV vaccination; recommendations in Spain were implemented in 2008 but varied by administrative region; and Malaysia and Argentina made national recommendations for adolescent HPV vaccination in 2010 and 2011, respectively. Providers practicing in these countries were considered eligible if they had ever-administered or overseen provision of adolescent vaccinations, including but not limited to HPV vaccine, and if they were authorized to administer adolescent vaccinations according to each country's medical regulations. To recruit providers, we used nonprobability convenience sampling. Study staff in each country contacted eligible providers through mailings, mass e-mails, publicly available online databases of physicians, and public announcements on physician list serves and in clinics. Providers were also recruited through snowball sampling. Further site-specific details on recruitment of providers have been previously published[15] and are tabulated in Appendix 1 (https://links.lww.com/OLQ/A628).

Measures

Development of the survey instrument and quantitative response options was informed by a review of the literature to understand provider- and facility-level factors associated with high HPV vaccination coverage, as well as commonly cited barriers to initiating and completing adolescent HPV vaccination.[6,16–21] At the time of the study, global HPV vaccination recommendations were largely restricted to adolescent girls, and thus, our survey focused on HPV vaccination among girls. Specifically, the survey captured data on (1) provider characteristics, including the type of practice in which the provider worked and length of time that the provider had been an adolescent vaccine provider; (2) perceived barriers and facilitators to initiating and to completing the HPV vaccination series, including systemic, logistical, and personal factors; and (3) systems for improving vaccination coverage among age-eligible patients. In addition, we included questions to elicit lessons learned on completing the multidose HPV vaccination series from providers who have experience administering HPV vaccines to adolescents. Among providers who did not routinely

administer HPV vaccine, the survey asked for their perceptions of potential barriers and facilitators to adolescent HPV vaccination, based on their experiences with other adolescent health services and characteristics of the facilities in which they worked. Surveys were administered in-person or by telephone to providers. A trained interviewer collected information on providers' demographic information and experiences administering HPV vaccination to adolescent girls within the age guidelines for each country.

Data Analyses

Surveys were administered in each provider's preferred language and translated into English as necessary by study staff in each country. Data were double-entered independently in English into EpiData forms (EpiData Association, Odense, Denmark) by in-country staff, and discrepancies were resolved in consultation with each site's primary investigator. A deidentified data set was provided to the authors for final cleaning and analysis. Provider characteristics and insights into HPV vaccination practices were frequency tabulated, stratified by country, using Stata/SE 12.0 software (StataCorp LP, College Station, TX).

Ethical Considerations

This study was approved by each of the following collaborating institution's respective office of human ethics and institutional review boards: Centro de Estudios de Estado Y Sociedad, Perdana University, The Catholic University of Korea College of Medicine, University of Pretoria, and Institut Catala d'Oncologia. The University of North Carolina at Chapel Hill study staff received institutional review board approval for the analysis of deidentified secondary data.

RESULTS

Provider Characteristics

We invited 353 providers to participate in the survey, and 151 accepted to participate and provided informed consent (response rate, 43%). Among 151 adolescent vaccine providers, 57% were male, and most were physicians practicing family medicine or general practice (30%), obstetrics and gynecology (25%), or pediatrics (22%; Table 1). Eighty percent of providers in all countries provided care in clinics and in a variety of public, private, and school-based settings across countries. The median number of adolescent girls seen per month by provider ranged from 3 (interquartile range, 2–4) in Malaysia to 50 (interquartile range, 10–200) in South Korea. Overall, the median years of practice reported by providers ranged from 10 years of practice in respondents from South Africa to 24 years in respondents from Spain. In Argentina, 100% of providers reporting having ever-administered HPV vaccination to adolescents aged 9 to 14 years, whereas this proportion ranged between 35% and 90% among providers in the other countries (Table 1).

TABLE 1 - Characteristics of 151 Adolescent Health Care Providers in 5 Countries

	Argentina (n = 30)	Malaysia (n = 30)	South Africa (n = 31)	South Korea (n = 30)	Spain (n = 30)	Total (n = 151)
Provider gender, %						
Male	63	33	73	43	71	57
Provider type*, %						
Family medicine/general practice	17	90	7	13	26	30
Obstetrics and gynecology	40	3	20	40	22	25
Pediatrician	43	3	23	40	0	22
Nurse practitioner	0	10	13	0	29	11
Midwife	0	0	23	0	6	6
Other†	0	0	13	7	16	7
Location of vaccine provision*						
Clinic	83	93	80	93	52	80
Hospital	40	3	27	7	49	25
School	0	3	10	0	16	6
Health sector of vaccine provision‡						
Clinic/hospital only, public	13	0	39	0	63	23
Clinic/hospital only, private	37	93	39	100	3	54
Clinic/hospital, public and private	50	3	10	0	23	17
Clinic/hospital and school	0	0	10	0	10	4
School only	0	0	3	0	0	1

No. adolescent girls (age 9–14 y) seen per month						
Median (interquartile range)	23 (15–50)	3 (2–4)	44 (15–90)	50 (10–200)	15 (7–60)	20 (6–65)
Years in practice						
Median (range)	20 (12–24)	17 (12–26)	10 (5–23)	14 (10–18)	24 (14–30)	17 (10–25)
Ever-administered HPV vaccine to adolescent girls (9–14 y), %	100	77	90	50	35	70

*Totals may add up to more than 100% because of multiple responses.
†Other = Spain, preventive medicine physician (n = 4); South Korea, internal medicine physician (n = 2); South Africa, health promotion practitioner (n = 1), caregiver (n = 1), school nurse pharmacist (n = 2).
‡One response missing.

Providers' Use of Vaccination Monitoring Systems

Twenty-five percent of providers used a system to identify female patients who were eligible to initiate recommended adolescent vaccines, including HPV vaccination. The most common method used across the 5 countries overall was an office reminder or records system (12%), which was most common among respondents from South Africa (48%; Table 2). More than a quarter (27%) of respondents from Malaysia reported using physical identifiers, such as stickers, on charts to identify girls ready for their first dose. Only 7% of providers reported always using a system to identify girls ready to receive HPV vaccination. However, approximately 30% of providers reported using a system to identify female patients ready for their second or third dose of the HPV vaccination, most commonly by using a record system for girls in the recommended age group (11%) or using stickers or physical identifiers on charts of eligible girls (10%).

Twenty-eight percent of providers reported having experienced problems with girls returning for their second or third dose of HPV vaccination. In Argentina, most respondents (83%) reported experiencing problems with girls not returning for subsequent vaccine doses. Most respondents from Argentina (80%) perceived that parents forgot or were unaware of a need to return, and 83% cited lack of recall or reminder systems. Parental forgetfulness or lack of awareness was cited as a perceived barrier for completing the vaccination series by nearly one-third of all respondents (Table 2). As a reminder to return for subsequent doses, providers used various methods including calling (Malaysia: 33%) and text messaging parents (South Korea: 43%; Table 2).

Perceived Logistical Challenges to Implementing HPV Vaccination Programs

Providers perceived that the high cost of vaccination was the most common logistical challenge to providing HPV vaccination to adolescents among respondents in South Korea (53%), Spain (53%), and Argentina (43%; Table 2). Concern regarding public availability of HPV vaccination (i.e., lack of national HPV vaccination programs) was the most frequently noted challenge among respondents from Argentina (40%) and Spain (33%; Table 2). Argentina was the only country to report substantial problems with determining insurance coverage or delayed or inadequate reimbursement for the vaccination (33%). Of note, 90% of providers in Malaysia indicated having no organizational or logistical concerns with offering HPV vaccination (Table 2).

Perceived Barriers and Facilitators to HPV Vaccination Initiation

The most common perceived barriers to HPV vaccination initiation across all countries were parents' lack of knowledge about HPV vaccination (39%), parental concerns about vaccine safety or efficacy (33%), and financial burden of vaccination (30%; Fig. 1). However, there was variation between countries in the relative importance of these barriers. Lack of knowledge was most commonly cited by providers in South Korea (50%) and least commonly cited by providers in Malaysia (3%); concerns about vaccine safety or efficacy was most commonly cited by providers in Spain (67%) and least commonly cited by providers in Malaysia; and financial burden was most commonly cited by providers in South Korea (70%) and least commonly cited by providers in South Africa (3%). Only in Spain was opposition from religious leaders commonly cited as a perceived barrier (53%; Fig. 1).

TABLE 2 - Provider Practices and Multidose Adolescent Vaccination Systems in 5 Countries

	Argentina (n = 30), %	**Malaysia (n = 30), %**	**South Africa (n = 31), %**	**South Korea (n = 30), %**	**Spain (n = 30), %**	**Total (n = 151), %**
Organizational or logistical problems of offering HPV vaccination						
Cost too high for patients	43	3	16	53	53	33
Vaccine not publicly available	40	0	7	0	33	16
Upfront costs of ordering, stocking, and storing HPV vaccination is too high/refrigerator space unavailable	0	3	23	10	33	14
Unable to determine insurance coverage for HPV vaccination/inadequate or delayed reimbursement	33	0	7	0	0	8
Threat of power outages	7	3	3	0	0	3
Other*	13	0	10	3	3	5
No concerns	0	90	13	47	13	33
System used to identify girls ready for their first dose of a recommended adolescent vaccination						
Created office reminder system or use records system for girls in recommended age group	0	10	48	0	0	12
Use stickers or other physical identifiers on charts of recommended age group	0	27	7	0	0	7
Other†	3	3	7	0	7	5
Not applicable/does not have a system	97	63	32	100	93	75
Frequency providers use system to identify girls ready for their first dose of HPV vaccination						
Always	3	7	16	0	7	7
Sometimes	0	17	3	0	0	4
Never	0	0	6	0	0	1
Not applicable/does not have a system	97	63	10	100	93	88
System used to identify girls ready for their 2nd and 3rd doses of a recommended adolescent vaccination						
Reminder system/use records system for girls in recommended age group	0	13	29	13	0	11
Use stickers or other physical identifiers on charts of recommended age group	0	27	6	17	0	10

Book follow-up appointment in advance	7	3	16	0	0	5
Other‡	3	3	7	0	7	5
Not applicable/does not have a system	87	57	23	70	93	69
Frequency providers remind girls and their parents to return for 2nd/3rd dose of HPV vaccination						
Always	13	7	23	20	3	13
Sometimes	0	17	0	0	0	3
Never/do not know	0	17	39	10	3	12
Not applicable/does not have a system	87	57	23	70	93	69
Methods used to remind girls and their parents to return for 2nd/3rd dose of HPV vaccination						
Remind them during 1st vaccination office visit	93	3	19	10	3	26
Call parents of adolescent girls	0	33	10	7	3	11
Text message parents	0	0	7	43	0	9
E-mail parents/mail letters to parents	0	0	23	0	0	5
Other§	7	0	3	0	0	2
Provider experiences problems with girls not coming back for their 2nd and 3rd doses						
Yes, 2nd or 3rd dose	83	13	13	13	17	28
No	3	57	16	37	63	35
Do not know/not applicable	13	30	71	50	20	36
Provider perspective of reasons adolescent girls do not come back for 2nd and 3rd doses						
Parent forgets/parent did not know daughter should return for additional dose	80	3	19	7	47	31
No recall or reminder system	83	0	0	0	3	17
Cost of vaccine	3	17	10	3	30	13
Pain or other adverse event with first vaccination dose	0	10	23	0	17	10
Transportation/patient moves	0	3	7	7	13	6
Parents or girls are in school/work during vaccination hours	0	7	0	7	0	3
Parents do not want daughters to be vaccinated	0	0	0	0	3	1

*Other: Argentina, commercial interests (n = 1), medical professional does not recommend (n = 1), cannot provide vaccine to those >11 years old (n = 1), nurse opposition to the HPV vaccine (n = 1); South Africa, lack of provider time (n = 3); South Korea, too much competition between vaccination performing sites (n = 1).
†Other: Argentina, go directly to nurse (n = 1); Malaysia, call patients (n = 1); South Africa, use school lists (n = 2); Spain, use school lists (n = 2).
‡Other: Argentina, control vaccine registers (n = 1); Malaysia, call patient (n = 1); South Africa, use school lists (n = 2); Spain, use school lists (n = 2).
§Other: Argentina, nurse follows-up (n = 1), 6-month appointment (n = 1); South Africa, social mobilization (n = 1).

Among providers in our study, vaccination education campaigns were perceived as potential facilitators by more than half of respondents from Argentina (70%), South Korea (93%), and Spain (100%). Free or low-cost vaccination was perceived as a facilitator by half or more of respondents from Argentina (50%), Malaysia (50%), and South Korea (67%; Fig. 1).

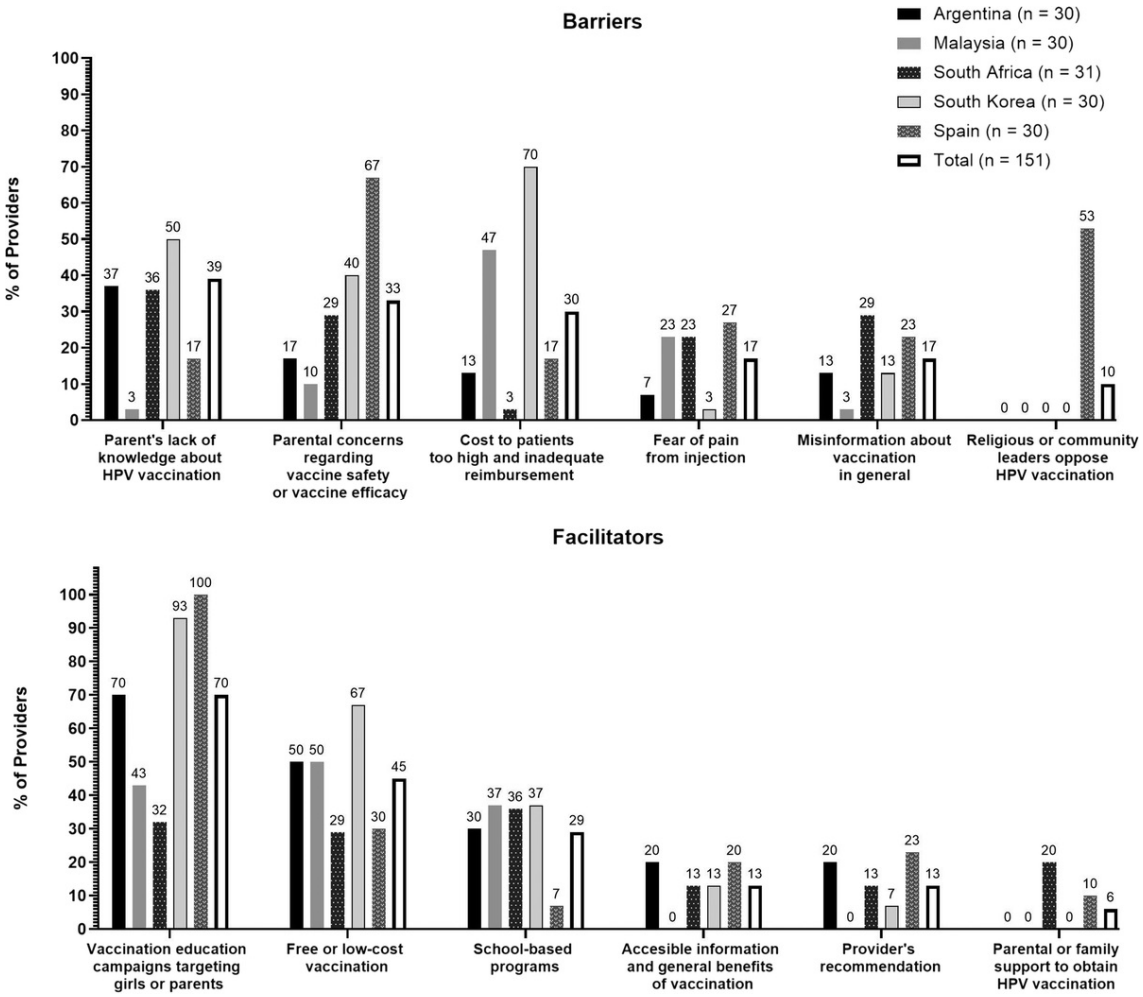

Figure 1: Barriers and facilitators to initiating HPV vaccination among adolescent girls from provider perspective (n = 151).

Perceived Barriers and Facilitators to HPV Vaccination Series Completion

Among respondents who provided HPV vaccination (n = 106), 28% reported no perceived barriers to vaccine series completion, which included 57% of respondents from Malaysia and 47% of respondents from South Korea (Fig. 2). Common perceived barriers to HPV vaccination series completion were no reminder system or dosing schedule (37%), loss to follow-up or parent forgets (29%), and financial burden (25%; Fig. 2). Having no reminder system was of major concern in Argentina (83%).

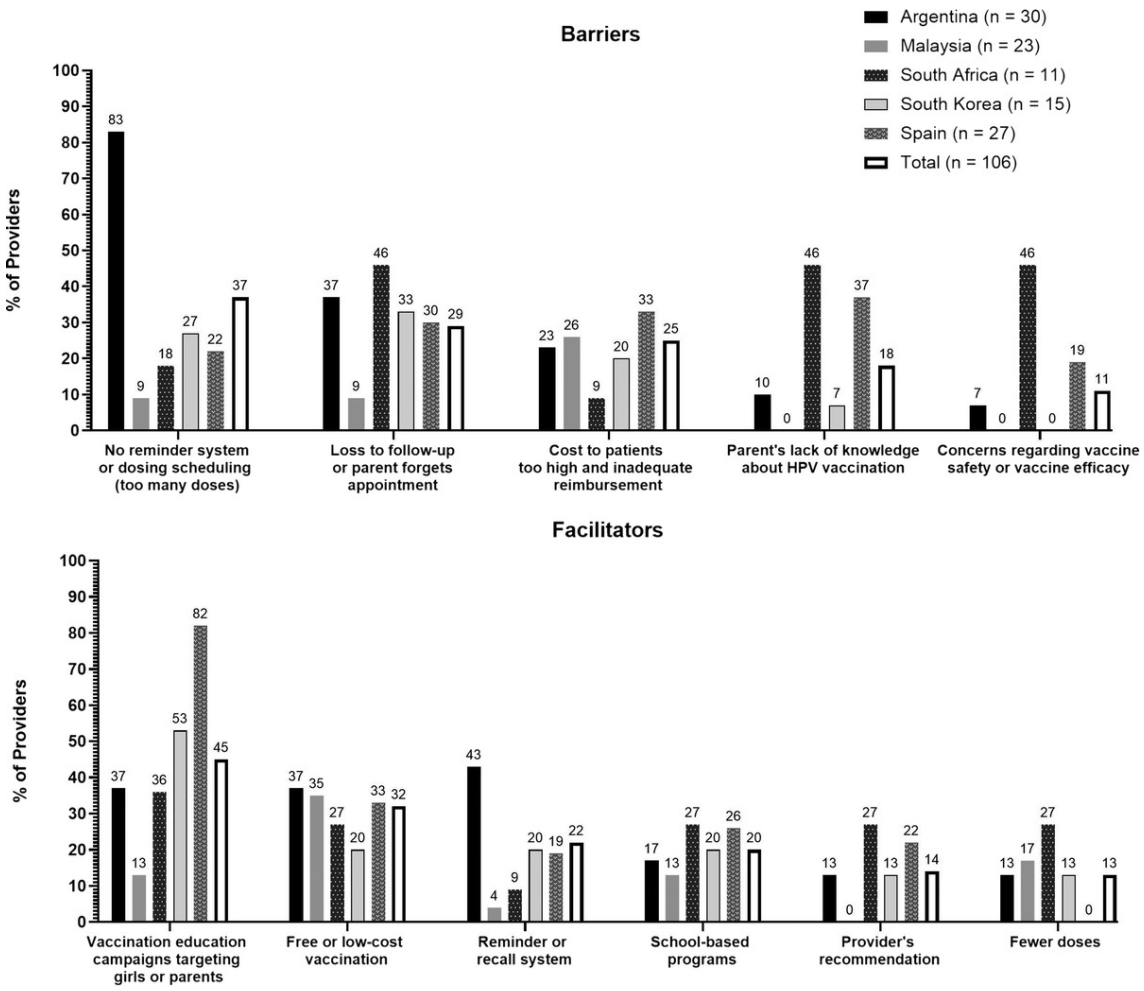

Figure 2: Barriers and facilitators to completing HPV vaccination among adolescent girls from HPV vaccination provider perspective (n = 106).

The most common perceived facilitators to HPV vaccination series completion were vaccine education campaigns targeting girls or parents (45%), including 82% of providers in Argentina; free or low-cost vaccine (32%); and reminder/recall systems (22%). Education campaigns were noted by most respondents in Spain (82%) and South Korea (53%; Fig. 2).

Perceived Barriers and Facilitators to National HPV Vaccination Programs

When asked about insights into national-level HPV vaccination program success, providers cited similar perceived facilitators and barriers as identified for HPV vaccination initiation and completion. Notably, at least 20% of providers in each country cited cost of the vaccine as a barrier to the success of a national HPV vaccination program, and providers in all countries cited free or low-cost HPV vaccination as a facilitator to the success of a national program.

DISCUSSION

In this study of adolescent vaccine providers from 5 countries, the most common perceived barriers to initiating HPV vaccination across all 5 countries were lack of parental knowledge

of HPV vaccines, concerns about vaccine safety and efficacy, and cost of the vaccine. Consequently, educational campaigns and low-cost vaccination were cited as perceived facilitators to initiating adolescent HPV vaccination. Lack of recall and reminder systems was cited as the most common perceived barrier to completing the multidose vaccination series across all countries, although fewer providers perceived such a system as a facilitator. There is an opportunity for providers to implement such systems to improve their HPV vaccination completion rates.

Funding made available through GAVI, The Vaccine Alliance, has accelerated progress toward HPV vaccination program implementation in low-income countries.[22] However, none of the 5 countries included in this analysis meet the low-income requirement for GAVI support, placing the full burden of HPV vaccination programming and payment on the countries themselves or on individual vaccine recipients. Although the 5 countries included in our study include upper-middle and high-income countries, large economic disparities within countries can make HIV vaccination inaccessible to large segments of the population. At the time of this study, only Argentina, Malaysia, and Spain included HPV vaccination in their national and local government immunization programs, meaning that it was available free of charge to eligible adolescents according to governmental recommendations. In South Africa and South Korea, however, HPV vaccination might have been available but for a prohibitive fee, which may partially account for perceptions of high out-of-pocket costs. In Malaysia, for example, before its introduction into the national immunization program, HPV vaccine cost US$360 for the full series. South Africa started providing school-based vaccination free of cost to 9-year-old girls in 2014, and South Korea integrated HPV vaccination for 12-year-old girls into its national immunization program in June 2016.[23,24] At the time of the study, Spain's national immunization program covered girls aged 11 to 14 years in schools and public health centers, as determined by regional governments. Since 2014, several regions have lowered the target age group to 11 to 12 years, and others have implemented catch-up programs for older adolescents.[25] The national immunization programs in Argentina and Malaysia remain largely unchanged since the time of this study; however, all countries have begun to implement the World Health Organization–recommended 2-dose series since 2014.[25] Future research will be needed to determine whether cost concerns have been alleviated by these changes to national policies, resulting in higher HPV vaccine uptake. The most recent estimates of HPV vaccine coverage include the following: Argentina, 50% as of 2014 (full course, 2000 birth cohort); Malaysia, 87.1% as of 2014 (full course, 1998 birth cohort); South Africa, 87.0% as of 2014 (first dose, 2004 birth cohort); South Korea, 12% among female university students as of 2011; and Spain, between 51.4% in Andalucía (full course, 1998 birth cohort) and 96.1% in La Rioja (full course, 1996 birth cohort) as of 2014.[4,26]

Parents' lack of knowledge of HPV vaccination and concerns about safety and effectiveness provide a framework for national programs to develop educational campaigns, elucidating the evidence-based benefits of vaccination for preventing HPV and associated cancers; local recommendations for adolescent vaccination; and availability of HPV vaccination through public sector channels. In our study, providers from Spain were more likely than providers from other countries to perceive concerns about safety and efficacy and opposition from community and religious leaders as barriers to initiating HPV vaccination. Negative messages in the media during implementation of the HPV vaccination program may have contributed to misinformation and negative attitudes among adolescent girls and their parents, and thus low vaccination coverage in parts of Spain.[27] To improve uptake of HPV vaccination, Spain implemented province-specific strategies and used endorsement of the vaccine from

community members to implement health care center–based or school-based HPV vaccination and educational programs tailored to each area's needs.[27]

Providers reported that parents frequently were unaware or forgot that their daughter should return to the clinic to complete the HPV vaccination dose series. Moreover, most providers reported not having systems in place to identify girls who were eligible to initiate HPV vaccination or who were due for subsequent doses. Although resource-limited health systems may be unable to implement national immunization registries, electronic health records, and automated reminder systems, low-tech methods using existing resources can greatly improve dose tracking. For instance, clinic staff can review medical records to identify adolescents who are due for a first or subsequent dose of HPV vaccine. Physically flagging the records of eligible adolescents can enable clinic staff to contact parents with reminders to set vaccination appointments. In high-income settings, the infrastructure necessary to develop an immunization registry would require governmental investment to the public sector.[28]

The main limitation of this study is that providers' reports of barriers and facilitators to administration of HPV vaccines, including those related to parents' knowledge and attitudes regarding HPV vaccination, reflected their individual perceptions and were not supported by equivalent survey data among parents. Furthermore, not all providers had experience administering HPV vaccines, and their perceptions of HPV vaccine delivery may be biased. However, this study also included focus groups among mothers of adolescent girls in each country,[15,29] and mothers' perceptions of HPV vaccination include concerns about vaccine safety and effectiveness, cost, and overall lack of knowledge about HPV and its prevention. At the time of data collection, national guidelines of surveyed countries focused on vaccination of girls, and our study is limited to provider's insights into vaccinating adolescent girls only. However, certain facilitators to HPV vaccination, such as parental education and the use of medical records to monitor HPV vaccine eligibility and series completion, are likely generalizable to gender-neutral vaccine programs. Because of the small sample size of participants, we were unable to conduct statistical tests to assess differences across countries. In addition, the small sample size and convenience sampling of providers may be subject to selection bias and may limit the generalizability of the findings within and across countries. However, recruitment of providers from 5 countries in distinct geographical regions, with various socioeconomic levels, cultural contexts, and at various stages in the implementation of national HPV vaccination policies, provides context-specific perceptions of HPV vaccination that can help develop tailored solutions to challenges in HPV vaccination delivery.

Lessons learned from this study may be useful to countries conducting formative work to incorporate HPV vaccination national immunization programs, as these data were collected either before implementation or in the early years of national HPV vaccination implementation. Future research into provider perspectives of HPV vaccination after the expansion of national HPV vaccination programs is warranted, and health promotion efforts should focus on developing educational campaigns to provide information on the risk of HPV-associated cancers and the safety and benefits of HPV vaccination. Finally, as a provider's recommendation for HPV vaccination is one of the strongest predictors of uptake, implementation research efforts should develop culturally competent messages for providers to counsel parents of adolescents from varying backgrounds on the importance of HPV vaccination.

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