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Barriers to the assessment and recommendation of HPV vaccination among healthcare providers in Texas

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ABSTRACT

Background: Healthcare providers (HCPs) recommendations for HPV vaccination plays a critical role in increasing vaccination uptake. This study assesses the prevalence of reported barriers to HPV vaccination assessment and recommendation among HCPs in Texas.
Methods: Study data were obtained from a population-based survey of HCPs currently practicing in Texas. Participants were asked about their HPV vaccination assessment and recommendation practices and the reasons for not assessing or recommending the vaccine. Barriers were stratified by HCP characteristics including age, sex, race/ethnicity, location of practice, provider type, and type of facility.
Results: Among the 826 HCPs included in this study, 47.3 % never, 49.6 % sometimes, and 3.0 % often/always assessed a patient's HPV vaccination status. Similarly, 36.0 % never, 36.2 % sometimes, and 27.9 % often/always recommended HPV vaccination. The most frequently reported barriers to assessment and recommendation of HPV vaccination were time constraints (22.9 %), delegating the task to others (15.0 %), lack of effective tools and information to give patients (12.0 %), and requiring additional training (9.2 %). HCPs who were female, less than 35 years old, non-Hispanic black, and nonphysician HCPs (Physician Assistant, Nurse Practitioner) most frequently reported lacking effective tools and information and a need for additional training.
Conclusion: The assessment and recommendation for HPV vaccination among HCPs in Texas is suboptimal. Barriers reported varied based on the provider's characteristics. Addressing these barriers, such as by providing more effective tools and information and offering additional training to HCPs, could potentially increase HPV vaccination rates in Texas. The findings also suggest that interventions should be tailored to specific demographic groups.

Introduction

The Human papillomavirus (HPV) is highly effective in preventing HPV infection and reducing the risk of HPV-related cancers [1]. Despite the availability of the vaccine and its proven efficacy, HPV vaccination rates remain suboptimal in the US [2]. One of the strongest predictors of HPV vaccination is a recommendation from a healthcare provider (HCP) [3,4]. Studies have consistently demonstrated that individuals who receive a recommendation for the HPV vaccine from their healthcare provider are more likely to be vaccinated than those who do not receive a recommendation [3,4]. More so, provider recommendation has been shown to have a strong impact on boosting population-level HPV vaccination coverage rates over time. A study showed that among female teens with a provider recommendation, HPV vaccination initiation trended from 57.5 % to 74.3 % between 2008 and 2018, compared to those who did not (18.1 % to 49.8 %), and among male teens with a provider recommendation, trended from 17.2 % to 75.1 % between 2010 and 2018 compared to those without (0.5 % to 44.7 %) [5].

However, despite the importance of HCP recommendations, research has shown that many HCPs do not routinely assess the HPV vaccination

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status of their patients or provide recommendations for vaccination [6–8], more so disparities in Healthcare Providers' Recommendation of HPV Vaccination are documented [9,10]. A study of US adults evaluated providers' HPV vaccination recommendation trends from 2012 to 2018 and noted rates of provider recommendations have stagnated, and in 2018 only 23.0 % of eligible adults reported having received a provider recommendation [8].

Several barriers prevent HCPs from effectively assessing the HPV vaccination status of their patients and recommending the vaccine. These barriers have been documented in the literature and include a lack of knowledge about HPV vaccination or its benefits for cancer prevention, time constraints, concerns about vaccine safety and effectiveness, and communication challenges with patients and parents [11–16]. For example, HCPs may lack knowledge about the benefits of the HPV vaccine, and the appropriate age ranges for vaccination [14]. Furthermore, some HCPs may not be aware of the changing recommendations regarding the HPV vaccine, such as the recent change to a two-dose schedule for individuals under the age of 15. These knowledge deficits may ultimately result in ineffective recommendations, as quality and strength of recommendations have been shown to be associated with significantly higher likelihood of vaccination [4,17]. Additionally, HCPs may face time constraints in their busy schedules, making it difficult to fully assess the vaccination status of all patients and provide appropriate recommendations [11,12]. Concerns about vaccine safety and effectiveness may also impact HCPs' willingness to recommend the vaccine to their patients [18–20].

Addressing the barriers that healthcare providers face in assessing and recommending HPV vaccination is crucial to increasing vaccination uptake and reducing the burden of HPV-related cancers. As the patient-physician communication landscape rapidly evolves, including the expansion of electronic medical records and telemedicine particularly during the COVID-19 era, it is possible that these barriers may have shifted or changed since previous studies were conducted. The state of Texas is one of the lowest-ranking states in the US for HPV vaccination [21]. To date, no studies have been conducted at the state level specifically examining the barriers that HCPs in Texas face in assessing and recommending HPV vaccination. Thus, the aim of this study is to identify and describe the barriers that HCPs in Texas encounter in assessing and recommending HPV vaccination and to propose potential strategies for addressing these barriers. By doing so, this study seeks to provide insights into the challenges faced by HCPs in promoting HPV vaccination in Texas and offer practical recommendations for overcoming these barriers in Texas and other similar contexts.

Methods

Study population

Study data was derived from a statewide population-based cross-sectional survey of HCPs actively practicing in the state of Texas. Survey materials were developed at the University of Texas MD Anderson Cancer Center. Study participants which constituted Texas HCPs were recruited through LexisNexis Master Provider Referential Database (https://risk.lexisnexis.com/). The survey was implemented between January and April 2021. The study population of actively practicing Texas HCPs included physicians with an MD or equivalent degree in the specialties of internal medicine, family medicine, obstetrics/gynecology, and pediatrics, as well as physician assistants and nurse practitioners. The study was approved by the MD Anderson Cancer Center Ethical Review Board and followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Measures

Barriers to assessment and recommendation of HPV vaccination: This was measured based on a sequence of questions. First, HCPs were asked, *"At every patient encounter, do you assess HPV vaccination status?"* Also, they were asked, *"For the unvaccinated, or incompletely vaccinated for HPV, do you recommend HPV vaccination?"* Possible responses to both questions were "Never," "Sometimes," and "Often/Always." Then, HCPs who responded "Never" or "Sometimes" to both questions were asked, *"Which of the following explains why you as an individual provider DO NOT OFTEN/ALWAYS assess, or recommend HPV vaccination? (Select all that apply)."* Possible responses were, (a) Not needed because we "bundle" vaccination, (b) I delegate these activities to other staff in my practice, (c) Additional training would be needed to perform some of these activities, (d) Not enough time, (e) Inadequate reimbursement, (f) Lack of effective tools and information to give to patients, (g) Patient can't afford the cost of the HPV vaccine, and (h) I chose not to perform these activities.

Covariates: The following covariates were selected based on their potential influence on HCPs assessment and recommendation of HPV vaccination as well as the current literature, HCP's age (<35 years, 35–54 years, and ≥ 55 years), sex (male vs. female), race/ethnicity (Non-Hispanic White, Non-Hispanic Black, Hispanic, and Non-Hispanic Other), location of practice (rural vs. Urban), provider type was categorized as physicians (family physician, pediatrician, gynecologist, internist)and non-physician (Physician Assistant, Nurse Practitioner/Advanced Nurse Practitioner), and type of facility (University/teaching hospital, solo practice, group practice, FQHC/public facility, and other).

In order to characterize the "rural" and "urban" practice settings, we collected the primary work zip codes of healthcare providers (HCPs). Subsequently, we associated the Federal Information Processing Standard (FIPS) Codes with the 2013 Rural-Urban Continuum Code (RUCC) developed by the U.S. Department of Agriculture [22]. The RUCC codes, which range from one to nine, were categorized into two groups: codes one to three were designated as urban, while codes four to nine were designated as rural.

Data analysis

Baseline descriptive statistics for HCPs included in our study were provided using frequencies and proportions. The prevalence of each barrier to assessment and recommendation of HPV vaccination was estimated with corresponding 95 % confidence intervals for the overall population of HCPs in our analytic sample. Furthermore, we estimated the prevalence of reported barriers to the assessment and recommendation of HPV vaccination stratified by HCP's age, gender, race/ethnicity, practice location, provider type, and type of facility. All analyses were conducted using Stata/IC Version 15.1.

Results

This study included 826 healthcare providers, of whom 64.2 % were aged between 35 and 54 years, 76.3 % were female, 53.3 % were non-Hispanic White, 96.5 % lived in urban areas, 26.4 % were physicians, and 73.6 % were non-physician HCPs. Approximately, 37.2 % of study participants worked at University/Teaching hospitals (Table 1). Among HCPs, 47.3 % never, 49.6 % sometimes, and 3.0 % often/always assessed a patient's HPV vaccination status. Similarly, 36.0 % never, 36.2 % sometimes, and 27.9 % often/always recommended HPV vaccination.

When assessed for the reason for not often/always assessing or recommending HPV vaccination, 22.9 % (95 % CI: 20.1–25.9) of providers reported that they did not have enough time, 15.0 % (95 % CI: 12.7–17.6) delegated the task to others, 12.0 % (95 % CI: 9.9–14.4) lacked effective tools and information to give to patients, and 9.2 % (95 % CI: 7.4–11.4) required additional training to perform HPV vaccination-related activities (Fig. 1).

The sex-stratified analysis revealed that male healthcare providers chose not to perform (12.4 % vs. 6.1 %) and delegated vaccination-related activities more frequently (17.6 % vs. 14.0 %) than females'

Table 1
Baseline Descriptive statistics of healthcare providers.

Characteristics	Overall (N = 826)
Provider age, years, n (%)	
< 35	123 (15.22)
35–54	519 (64.23)
≥ 55	166 (20.54)
Gender, n (%)	
Female	620 (76.26)
Male	193 (23.74)
Race/Ethnicity, n (%)	
Non-Hispanic White	456 (53.3)
Non-Hispanic Black	72 (8.89)
Hispanic	84 (10.37)
Non-Hispanic Other	198 (24.44)
Practice location, n (%)	
Rural	29 (3.51)
Urban	797 (96.49)
Provider type, n (%)	
Non-Physician	608 (73.61)
Physician	218 (26.39)
Type of facility, n (%)	
University/Teaching hospital	307 (37.17)
Solo practice	86 (10.41)
Group practice	230 (27.85)
FQHC/Public facility	66 (7.99)
Other	137 (16.59)
No of patients seen (per week), n (%)	
≤ 50	471 (58.58)
51–100	248 (30.85)
> 100	85 (10.57)
Provider assessment of HPV vaccination status, n (%)	
Never	391 (47.34)
Sometimes	410 (49.64)
Often/Always	25 (3.03)
Provider recommendation of HPV vaccination, n (%)	
Never	297 (35.96)
Sometimes	299 (36.20)
Often/Always	230 (27.85)

18 observations missing for age, 13 observations missing for gender, 16 observations missing for race/ethnicity, and 22 observations missing for the number of patients seen per week.

healthcare providers. In contrast, female providers reported needing additional training (9.8 % vs. 7.8 %) and lacking effective tools and information to give patients (12.1 % vs. 11.4 %) more frequently than male providers (Fig. 2a). Compared to other age groups, HCPs aged less than 35 years most frequently reported lacking effective tools and information to give patients (19.5 %), delegating activities (22.0 %), and requiring additional training (12.2 %). Compared to other age categories, HCPs aged over 55 years most frequently reported choosing not to perform activities (11.5 %), citing the patient's inability to afford the vaccine (10.8 %), or inadequate reimbursement (6.0 %) (Fig. 2b).

When compared to other race/ethnic groups Non-Hispanic Black HCPs most frequently reported lacking effective tools and information to give patients (19.4 %), and Hispanic HCPs most frequently reported that patients could not afford the vaccine (13.1 %) and delegating activities to other staff (19.1 %) (Fig. 2c). Providers in urban regions most frequently reported not having enough time (23.2 % vs. 13.8 %), lacking effective tools/information (12.1 % vs. 10.3 %), needing additional training (9.4 % vs. 3.5 %), and receiving inadequate reimbursement (3.9 % vs. 0.0 %), compared to rural dwellers. Providers in rural regions most frequently reported delegating activities (20.7 % vs. 14.8 %), choosing not to perform activities (10.3 % vs. 7.4 %), or administering bundle vaccinations (3.5 % vs. 2.1 %), compared to urban dwellers (Fig. 3a).

Compared to physicians, non-physicians HCPs, most frequently reported lacking effective tools/information (12.2 % vs. 11.5 %) and requiring additional training (10.4 % vs. 6.0 %), while physicians most frequently reported not having enough time (35.3 % vs. 18.4 %) and delegating tasks more frequently (17.9 % vs. 14.0 %), compared to non-physician HCPs (Fig. 3b). Providers working in solo practice settings frequently reported not having enough time (31.4 %), while those in university-based hospitals frequently reported needing additional training (12.4 %) (Fig. 3c). Please see supplemental table for additional information.

Discussion

This study assessed the barriers to assessing and recommending HPV vaccine to their patients, among HCPs in Texas including physicians, Physician Assistant, Nurse Practitioners/Advanced Nurse Practitioners. Overall, the results of the study indicate that a significant proportion of healthcare providers face various barriers when recommending the HPV vaccine to their patients. Specifically, providers reported not having enough time, lacking effective tools and information, delegating vaccination-related activities to others, and requiring additional training. These findings are consistent with previous systematic reviews and studies conducted in other US states, that have identified similar barriers to HPV vaccination [11–15,23]. However barriers have not been previously described for HCPs practicing in Texas, the state with one of the lowest HPV vaccination coverage. In 2021, only 51.5 % of adolescents 13–17 years old were up to date with HPV vaccination [24]. Among barriers identified in our study, time constraint was the most commonly cited barrier to HPV vaccination assessment and recommendation among healthcare providers in Texas. This is consistent with prior research where time constraints has similarly been identified as a significant barrier to preventive care services, including vaccination, among HCPs [12,23,25].

Interestingly, our study found that the type of barrier reported varied based on the provider's characteristics, which was consistent with other studies [11,26]. The time constraint burden was frequently reported among HCPs who are male, physicians, those working in solo practice, and urban residents. Similarly, HCPs who are physicians, urban residents and over 50 years of age reported inadequate reimbursement as a barrier to assessing and recommending HPV vaccination. Inadequate reimbursement has also been identified as a barrier to HPV vaccination assessment and recommendation, particularly among physician providers [12,27]. Providers may be less likely to recommend vaccines if they believe that the time and effort required to discuss and administer the vaccine is not adequately reimbursed by insurance plans or Medicaid. This highlights the importance of payment reform and policy changes to incentivize and support preventive care services, including vaccination.

A particularly interesting finding was that HCPs who were female, younger (less than 35 years old), non-Hispanic black and non-physician HCPs most frequently reported lacking effective tools and information and needing additional training as a barrier to assessing and recommending HPV vaccination. A lack of knowledge or resources, particularly among young and non-physician HCPs and racial/ethnic minority providers, has also been identified as a barrier to HPV vaccination assessment and recommendation [13]. This underscores the importance of provider education and training on the latest vaccine recommendations and effective communication strategies with patients and parents, as well as access to vaccine information resources [28,29].

The findings of this study have several implications for healthcare practice and policy. First, healthcare providers need adequate training and tools to effectively recommend and administer the HPV vaccine to their patients. It is important to identify and address gaps in provider knowledge and training related to the HPV vaccine. A recent study showed that provider education was associated with the assessment and recommendation of HPV vaccination among HCPs [16]. Similarly, provider education was associated perception of self-efficacy in counseling HPV vaccine-hesitant patients [28]. Ultimately previous research that has demonstrated the effectiveness of provider education and training in improving vaccination rates [13,16,29]. Second, healthcare providers need to have sufficient time and resources to engage in

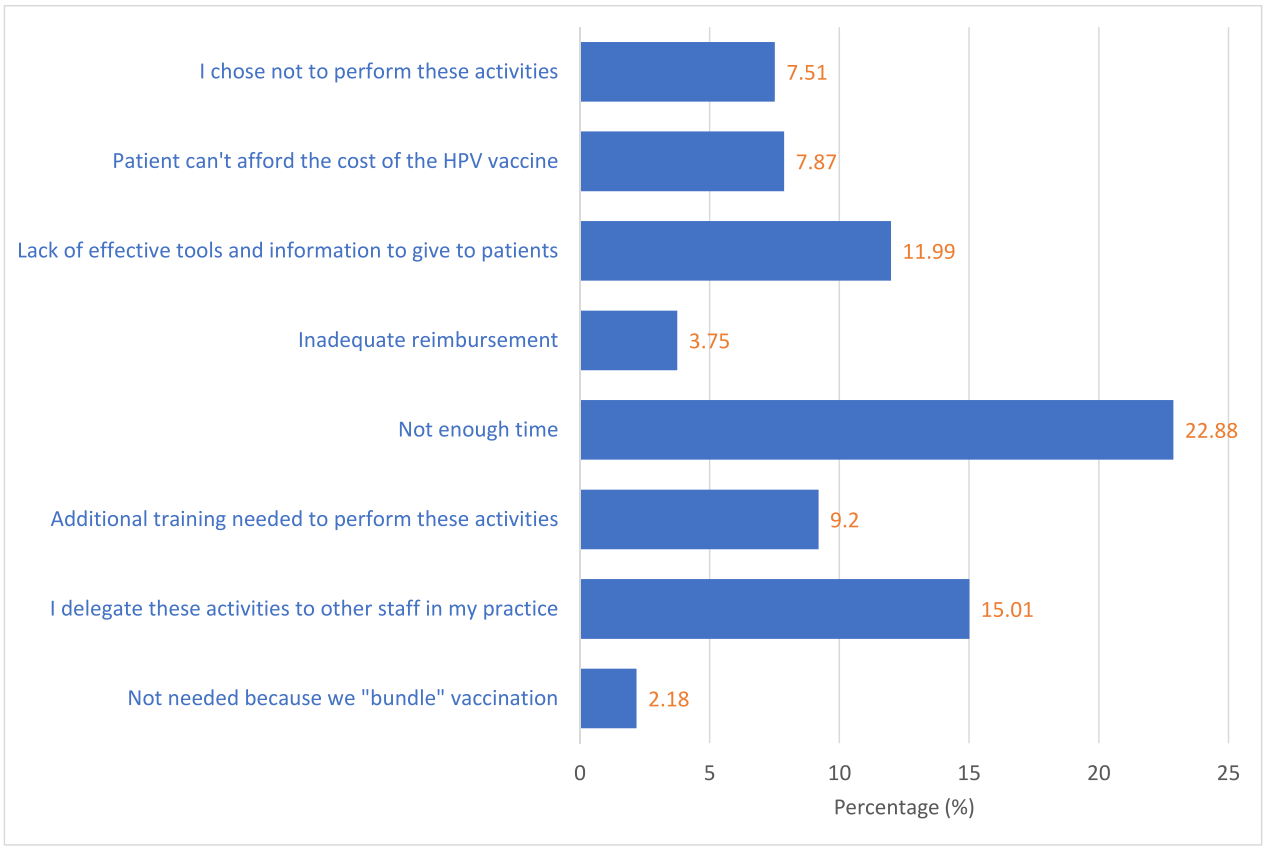

Fig. 1. Reason providers do not often/always assess, or recommend HPV vaccination in the overall population (N = 826).

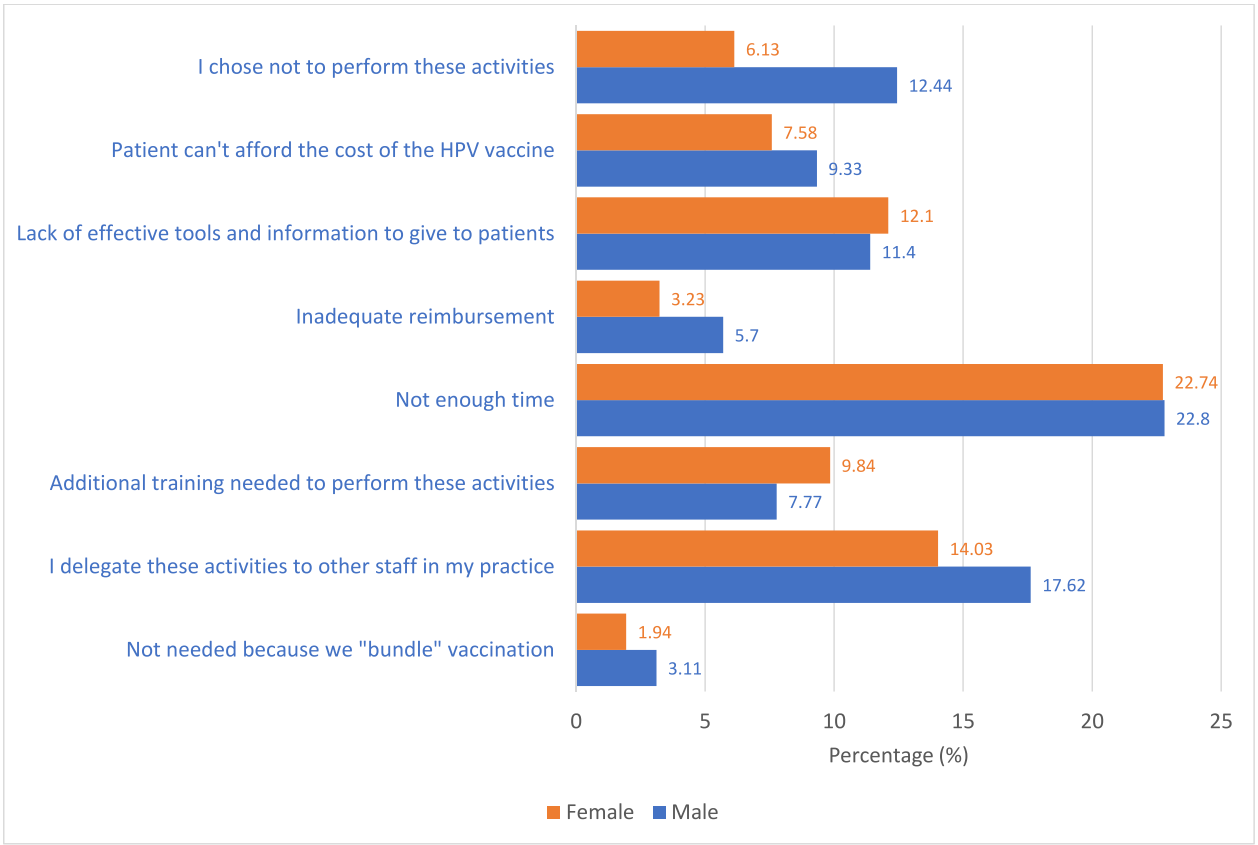

Fig. 2a. Reason providers do not often/always assess, or recommend HPV vaccination stratified by gender (N = 826).

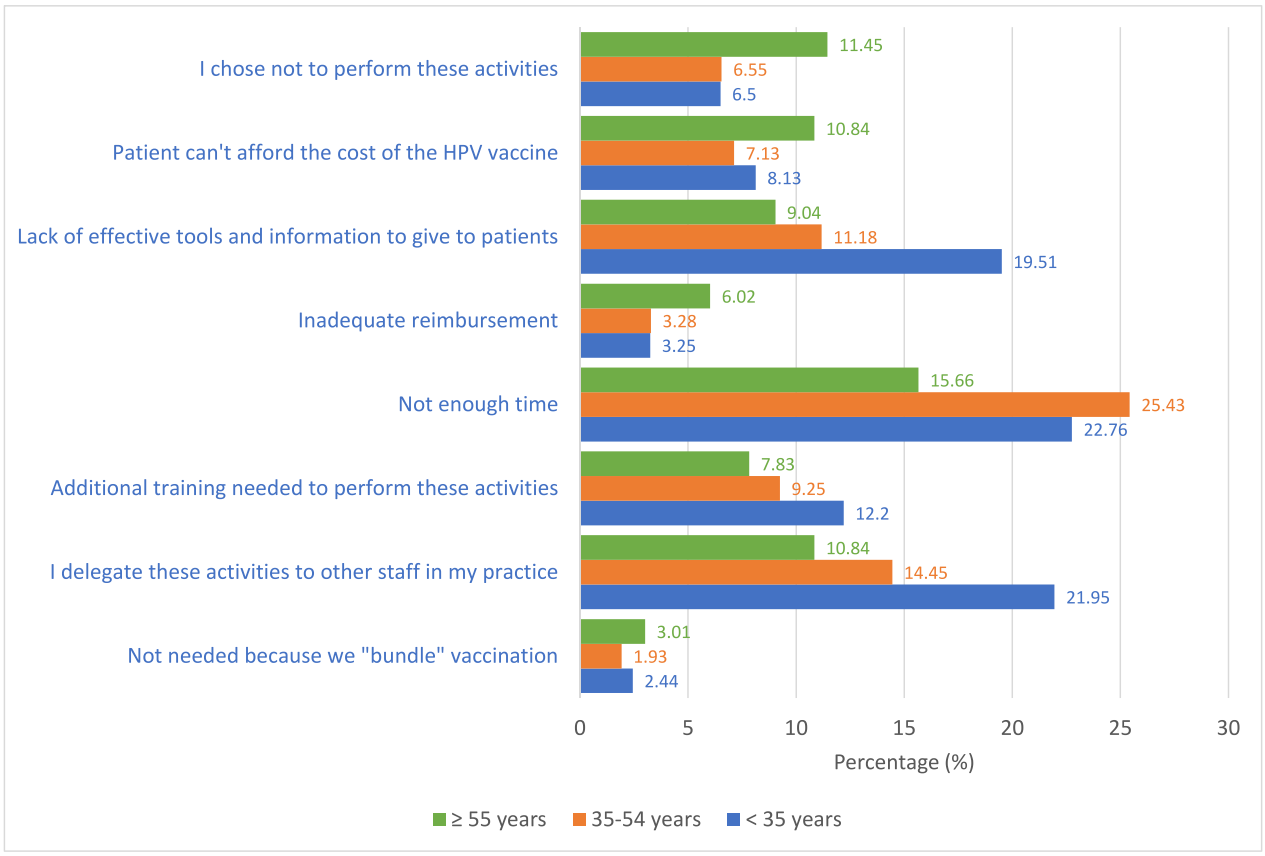

Fig. 2b. Reason providers do not often/always assess, or recommend HPV vaccination stratified by age (N = 826).

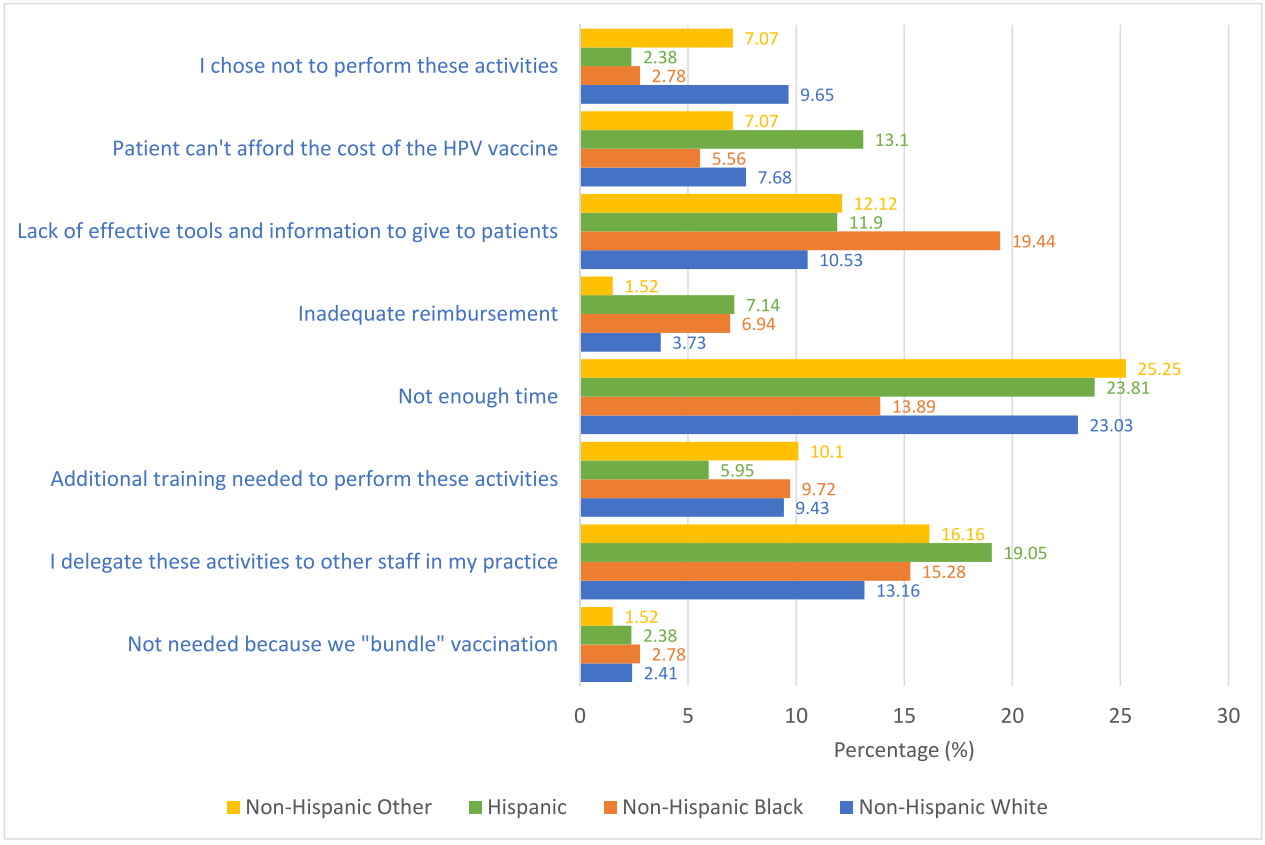

Fig. 2c. Reason providers do not often/always assess, or recommend HPV vaccination stratified by race/ethnicity (N = 826).

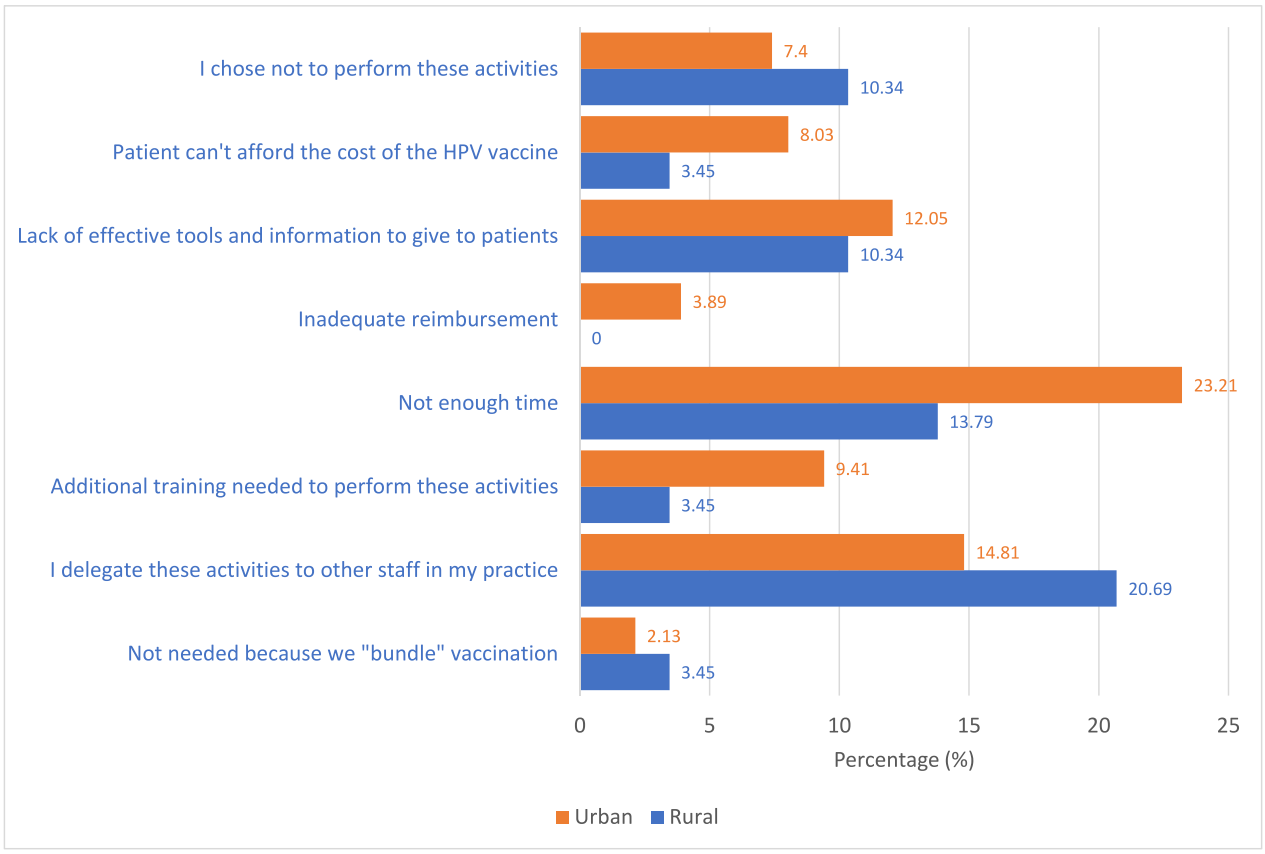

Fig. 3a. Reason providers do not often/always assess, or recommend HPV vaccination stratified by provider location (N = 826).

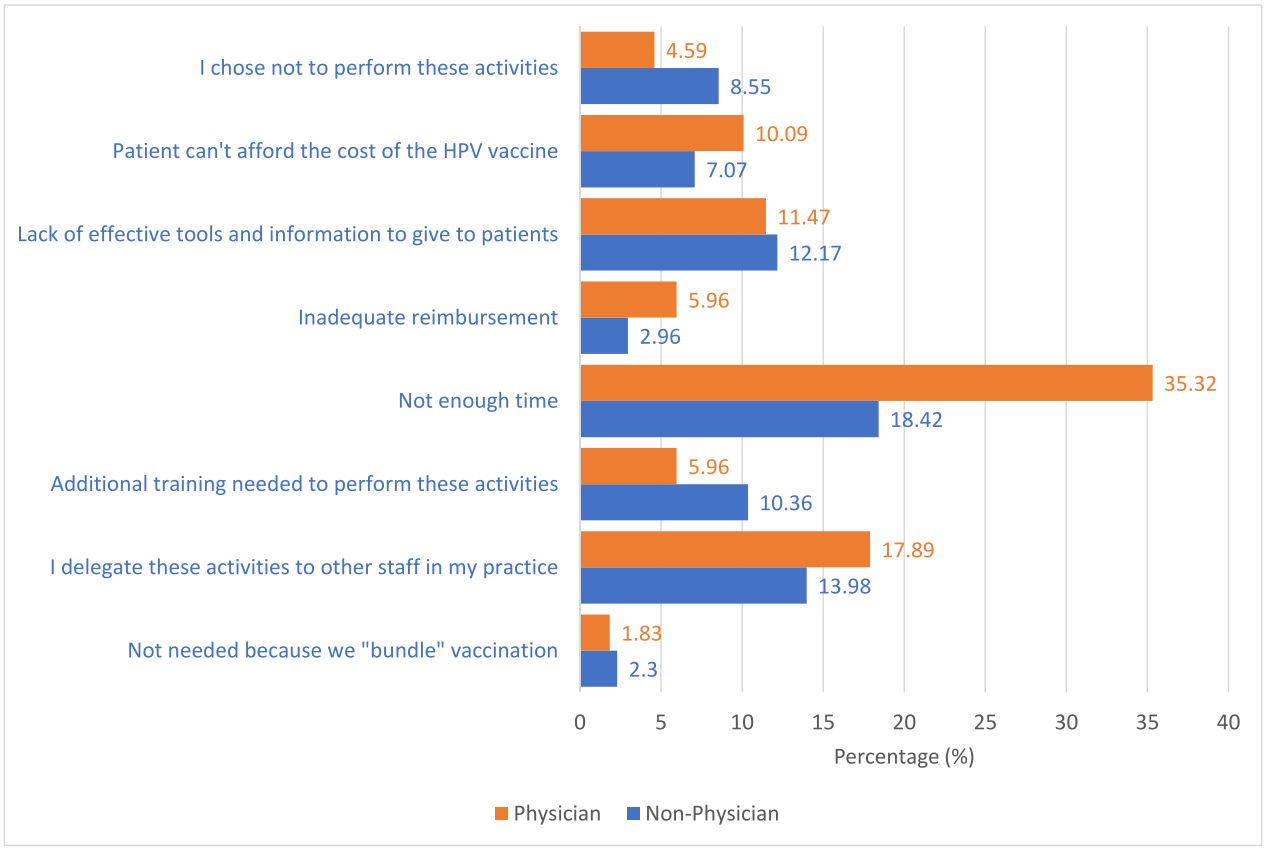

Fig. 3b. Reason providers do not often/always assess, or recommend HPV vaccination stratified by provider role (N = 826).

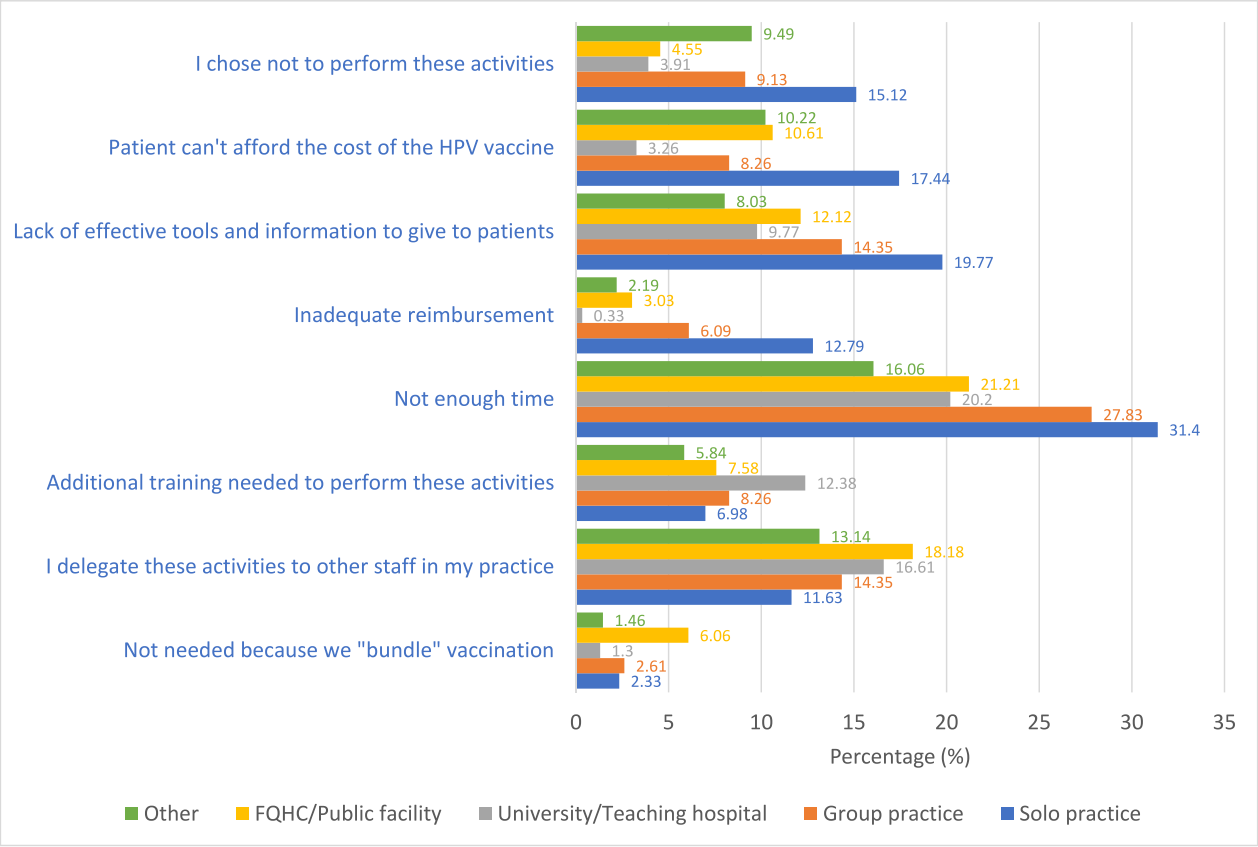

Fig. 3c. Reason providers do not often/always assess, or recommend HPV vaccination stratified by facility type (N = 826).

vaccination-related activities, such as counseling patients and administering vaccines. Policymakers need to prioritize efforts to reduce administrative and logistical burdens on healthcare providers to ensure they have the time and resources necessary to engage in preventive care activities, such as vaccination. Similarly, interventions that address the competing demands on healthcare providers' time are needed, such as reminder systems or standing orders, as well as education and training on time-efficient vaccine counseling practices [13]. More so, telehealth and electronic medical records systems have several built-in features to help cut time burden and optimize efficiency of providers. Finally, the findings of this study suggest that healthcare providers' characteristics, such as gender, age, and race/ethnicity, can influence the barriers they face when recommending the HPV vaccine. Therefore, interventions aimed at addressing these barriers need to be tailored to the specific needs of different provider groups.

This study provides valuable information on the multilayered and multi-contextual barriers that healthcare providers (HCPs) face when assessing and recommending the HPV vaccine to their patients in Texas. However, it is important to interpret the findings with the following limitations in mind. First, the study was conducted in a single US state, and the results may not be generalizable to other US regions with different healthcare systems, insurance plans, and reimbursement models. Second, a predominant proportion of our study population practiced in urban settings. Additionally, the survey did not explore provider attitudes towards HPV vaccination and their personal beliefs, which could be an important factor in assessing the barriers to vaccination [30]. Our study also has the potential for recall bias since HCPs had to recollect barriers to HPV vaccination assessment and recommendations from their experiences in the past. Nonetheless, our findings add to current evidence on barriers impeding HPV vaccination assessments and recommendations from the perspective of frontline HCPs that could guide future studies and interventions to increase HPV vaccination uptake.

In conclusion, this study highlights the significant barriers that healthcare providers face when recommending the HPV vaccine to their patients. Given the substantial potential of HCP recommendations to improve vaccination rates, it is critical to address these barriers through targeted interventions aimed at improving provider training and resources, reducing administrative and logistical burdens, ensuring appropriate reimbursement, and tailoring interventions to the specific needs of different provider groups.

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Role of the funder

The funders were not involved in the study design, analysis, interpretation of data, or manuscript writing.

Disclosure

The authors have no financial relationships relevant to this article to disclose and assume responsibility for all aspects of the study.

CRediT authorship contribution statement

Onyema G. Chido-Amajuoyi: Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Ikponmwosa Osaghae:** Formal analysis, Methodology, Writing –

review & editing. **Henry K. Onyeaka:** Methodology, Writing – review & editing. **Sanjay Shete:** Conceptualization, Data curation, Funding acquisition, Methodology, Project administration, Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Sanjay Shete reports financial support was provided by National Cancer Institute. Sanjay Shete reports financial support was provided by Betty B. Marcus Chair professorship. Sanjay Shete reports financial support was provided by The University of Texas MD Anderson Cancer Center Duncan Family Institute for Cancer Prevention and Risk Assessment.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jvacx.2024.100471.

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