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RESEARCH ARTICLE

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Human papillomavirus (HPV) vaccination in a privately funded program in Ghana: A qualitative case study

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ABSTRACT
HPV vaccination is one of the safest and most effective interventions against HPV-related cancers. From 2013 to 2018, HPV vaccination was piloted in Ghana in preparation for a national program. Yet, at the time of this study, there was no publicly funded HPV vaccination program in Ghana. We explored an existing privately funded HPV vaccination program in Ghana to identify challenges and gaps and to gather insights to inform vaccination practice and national policy. This study used a qualitative case study research design. We conducted semi-structured interviews on experiences, barriers, and challenges in HPV vaccination at the Greater-Accra Regional Hospital between October 1 and November 26, 2023. Participants ($N = 16$) included HPV vaccinators ($n = 8$) and program/policy leaders ($n = 8$). Our thematic analysis focused on HPV vaccination processes, practice challenges, and policy interests. Four main themes emerged from our analyses. Our findings revealed many challenges faced by the HPV vaccination program. These include a lack of guiding policy/framework for the HPV vaccination program, an emphasis on sexual history, cervical screening, and HPV DNA test in determining vaccination eligibility by vaccinators, and a lack of formal provider and recipient HPV education programs. Although many vaccinators advocated for a universal HPV program, some policy/program leaders were reluctant to prioritize HPV vaccination advocacy due to their focus on acute health concerns. A vaccination program without a policy can be limited in quality and efficiency, as there will be no accountability and sustainability measures. We recommend the need to develop standardized guidelines to support evidence-based HPV vaccination practice.

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Privately-funded HPV vaccination program; HPV vaccination practice recommendations; HPV vaccination policy and advocacy; Ghana

Introduction

Research shows that human papillomavirus (HPV) vaccination is one of the safest and most effective preventive interventions against HPV-related diseases, including cancers of the cervix, mouth, throat, and genitals.[1–3] In 2013, the Global Alliance for Vaccination and Immunization (Gavi)introduced an HPV vaccination pilot project in Ghana.[4,5] The project aimed to prepare stakeholders with the prerequisite knowledge and skill sets required for a national program on HPV vaccination. Although the demonstration project ended in 2018, scaling up to the national level is pending (see Figure 1).[6]

Currently, there is no publicly funded HPV vaccination program in Ghana and HPV vaccination is only accessible through privately funded programs in a few government and private clinics in urban areas, rendering it inaccessible to a large population of intended beneficiaries.[7] Immunization is among the many essential health services excluded from Ghana's National Health Insurance Scheme.[8] Through individual initiatives, some public and private hospitals have incorporated private HPV vaccination services in their reproductive health programs. These hospitals independently manage all aspects of the HPV vaccination program, including procurement, administration, and follow-up. These programs are funded through out-of-pocket charges, locally called "cash and carry", with services and vaccine costs paid by patients. Like neighboring Nigeria, which recently introduced a publicly funded HPV vaccination program,[9] there may be a national HPV vaccination program in Ghana soon. Specifically, the Ghana Health Service announced plans for a publicly funded HPV vaccination program for pre-adolescent and adolescent girls by the end of 2024.[10] However, details of the program (e.g., vaccination delivery, awareness, doses) are yet unknown.

Previous HPV vaccination studies in Ghana have focused mainly on knowledge, awareness, acceptance, intentions, and willingness to receive HPV vaccination.[11–19] There remains a gap in understanding about HPV vaccination processes and barriers in the Ghanaian context. Additionally, there is a paucity of studies that explored privately funded HPV vaccination programs in low- and middle-income countries, including Ghana. These knowledge gaps justify further research to inform HPV vaccination policy and practice in Ghana.

In anticipation of a publicly funded HPV vaccination program in Ghana, we aimed to explore a current privately funded HPV vaccination program to identify practice challenges and gaps, and to gather insights to inform practice and national policy. We asked the following research questions: (a) How is the HPV vaccination program at the Greater-Accra Regional Hospital functioning, and (b) What practice and policy

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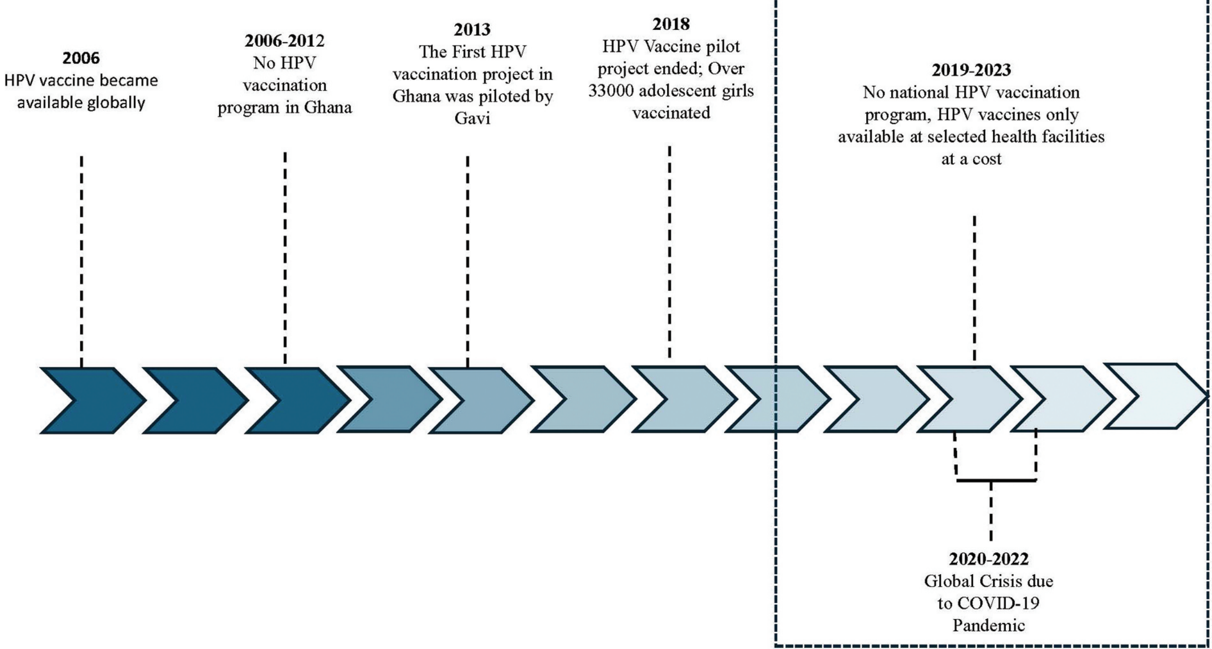

Figure 1. Evolution of HPV vaccination programs in Ghana.

challenges exist in the HPV vaccination program? Findings from this study will contribute to informing HPV vaccination practices and future policy in Ghana. Furthermore, this study will offer insights into strengthening privately funded programs for populations who may not meet the eligibility criteria of the national program but will benefit from HPV vaccination. Last, lessons from this study may be adopted and adapted for HPV vaccination decision-making and policy in neighboring sub-Saharan African countries.

Materials and methods

Research design and theoretical approach

This study is part of a larger project which used a qualitative case study research design to explore a privately funded HPV vaccination program in Ghana. Qualitative case study design assists in answering questions about *how* and *why* a contemporary event occurs in a specific real-life context.[20] We used this design because it offers an in-depth multi-perspectival approach (e.g., triangulation of methods and data sources) to explore the current HPV vaccination program.[20] The 'case' in this project was the Greater-Accra Regional Hospital, and the unit of analysis for the project was the privately funded HPV vaccination program between 2019 and 2023. To explore the unit of analysis, we included HPV vaccinators (i.e., clinic staff who provide HPV vaccines), program/policy leaders (i.e., hospital administrative staff, directors of health involved in policy making at the national level, and private HPV vaccine suppliers), and HPV vaccine recipients (i.e., individuals who received HPV vaccines from the clinic) at the hospital. Using an interpretivist approach, which focuses on the subjective experiences of stakeholders and how that is shaped by the clinic's social context to understand the HPV vaccination program,[21] this study reports on vaccinators' and program/policy leaders' perspectives and experiences in the current HPV vaccination program at the hospital.

The study was guided by intersectionality theory, which posits that multiple social identities and locations interact at individual levels to produce and sustain inequalities and power differentials at both individual and structural levels.[22,23] Previous studies showed that individual identities (i.e., gender/sex, age, education, and class) and structural factors (e.g., policy, politics, and social norms) are relevant modifiers that shape HPV vaccination and its acceptance,[24–26] justifying its suitability to this study. Our use of intersectionality granted analytical insights into identifying how individual and structural systems intersect to shape the HPV vaccination program in this context.

Researcher characteristics and reflexivity

The project team included four researchers, three from Canada and one from Ghana, who identified with diverse gender/sex, race, and ethnicity. The team comprised research experts in HPV vaccination research and health policy, case study research design, intersectionality theory, and sexually transmitted and blood-borne infection research within the Ghanaian context, which facilitated a multi-perspective approach to conceptualizing and conducting this study through ongoing consultations

Study setting

The setting for the study was the Greater-Accra Regional Hospital, located at the Osu-Klottey Sub-Metro of the Accra Metropolitan Assembly in the Greater-Accra Region of Ghana. Established in 1928, the hospital is the second largest hospital

in the Greater-Accra Region, serving over 4,671,363 people in its catchment area. We selected this hospital for the study because it is among the few in Ghana with established cervical cancer prevention programs, including a privately funded HPV vaccination program. The HPV vaccination program is offered at the Family Planning Unit of the hospital. The Family Planning Unit is run by eight nurses (vaccinators) who refer advanced clinical cases to physicians at the Obstetrics and Gynecology Department of the hospital.

Sampling strategy

We recruited vaccinators and program/policy leaders involved in the hospital's HPV vaccination program, using purposeful sampling. Purposeful sampling allowed us to identify and include participants with experiences in the HPV vaccination program.[27] Criteria for inclusion were participants with a minimum of 3 months of involvement in the HPV vaccination service delivery or decision-making between 2018 and the time of data collection, as we were interested in perspectives after the Gavi-funded pilot project ended. No interested participants were excluded based on any identity such as gender, sex, age, or professional rank. We aimed to recruit as many possible participants who were interested in participating in the study. We purposefully invited all vaccinators at the clinic ($n = 8$), vaccination program leaders at the hospital ($n = 10$), and national health directors involved in vaccination policymaking ($n = 2$) through recruitment letters. During data collection, we recognized a relevant stakeholder (i.e., a private HPV vaccine supplier), who we invited ($n = 1$) to participate in the study to provide a comprehensive understanding of the program. One national health director did not respond to the invitation and four policy/program leaders did not participate in the interviews citing unavailability due to professional duties and vacation. The lead author provided information letters to potential participants and obtained written informed consent before interviews. After the sixteenth interview, the research team determined through discussion of interviews and consensus that we have obtained enough rich data to answer our research questions, and thus concluded interviews.[28,29]

Ethics approval

The research team obtained approval from the University of Alberta Ethics Review Board (#Pro00124946) and the Ghana Health Service Ethics Review Committee (Protocol ID NO: GHS-ERC 003/09/23). The Greater-Accra Regional Directorate of Health also provided permission for this study.

Data collection methods and tools

The lead author observed the HPV vaccination clinic for 3 weeks before conducting any semi-structured interviews to capture the events, social interactions, and processes that occurred at the clinic. Clinic observations were documented in field notes.

To ensure consistency in data collection, we developed separate interview guides for each participant category (i.e., vaccinators and program/policy leaders) informed by relevant HPV vaccination literature and reviewed by the research team, which included experts in HPV vaccination, qualitative research, and health research with the Ghanaian population and context. The interview guides were piloted with two nurses working in the reproductive health unit and a physician in a different hospital in Accra and incorporated feedback for improvement. The interview questions explored demographics; vaccination practices; practice guidelines; perceptions about the HPV vaccination program and clients; and policy directions (see Supplementary File 1 for interview guides). The lead author conducted all interviews in English (the official language in Ghana). All interviews were in person, and the average interview duration was 34 min. In all, 16 participants, including vaccinators ($n = 8$) and program/policy leaders ($n = 8$), completed interviews between October 1 and November 26, 2023. Participants received incentives for participation and those whose participation involved traveling received reimbursement for the travel cost. Interviews were audio-recorded with participants' consent and transcribed verbatim by a research assistant.

Data analysis and rigour

The HPV vaccination literature and the semi-structured interview guide aided our deductive thematic analysis in NVivo software version 12 (QSR International, Burlington, MA) using the framework method.[20,30–32] The lead author deductively coded all transcripts separately and a research assistant independently coded four transcripts in duplicate.[33,34] Coding validation occurred between the lead author and the research assistant to discuss and compare codes, identify aligned codes, and reconcile the final analytical framework for iterative coding.[35] Our coding focused on identifying evidence illustrating vaccination processes, practice challenges, policy interests and participant perspectives about HPV vaccination in the clinic. Throughout the coding process, the lead author consulted and discussed the emerging categories and themes with sample quotes through regular meetings with the project supervisor (S.E.M) for input and feedback and shared emerging themes with the team members via e-mail communications for further insights. We compared emerging codes from the transcripts to identify categories and patterns and organized them into themes. Our analysis benefitted from a team of researchers, which included registered nurses and researchers with expertise in HPV vaccination research, qualitative research practices, and experiences working with the Ghanaian population. The lead author recorded personal reflections in memos, discussed them with the project supervisor during regular meetings, and shared emerging themes with the team members via e-mail communications for further insights. We ensured trustworthiness through member-checking by sharing password protected transcripts with five randomly selected participants to assess data accuracy[36] and presented the findings of this study using the Standard for Reporting Qualitative Research guideline[37] (see Supplementary File 2). Additionally, we maintained trustworthiness by ensuring dependability (i.e., a precise description of study methods), credibility (i.e., prolonged data engagement, iterative coding, and member-checking),

confirmability (i.e., provision of steps in data analysis), and transferability (i.e., a detailed description of study context and participants)"

Results

Participant characteristics

Interview participants ($N = 16$) included vaccinators ($n = 8$) and program/policy leaders ($n = 8$). The program/policy leaders included administrative and relevant department heads within the Greater-Accra Regional Hospital ($n = 6$), National Director of the Family Health Division of Ghana Health Service ($n = 1$), and a private vaccine supplier ($n = 1$). All vaccinators were females with clinic experiences ranging from 3 months to 22 years and with post-secondary education. Most of the program/policy leaders were males ($n = 5$) and held a graduate degree ($n = 6$) (see Table 1: Participants' Characteristics).

Overview of interview findings

Four themes about HPV vaccination at the clinic emerged: 1) clinic operations and vaccination processes, 2) attitudes toward vaccination program and scale-up 3) clinic operational barriers and 4) institutional challenges with HPV vaccination (see Table 2: descriptions of codes, codes, categories/sub-themes, and themes). We present a detailed report of the themes and their respective sub-themes below. All participants' names are pseudonyms.

Theme 1: Current clinic operations and vaccinationprocesses

Participants discussed routine operations and functions that guide HPV vaccination in the clinic. There were uncertainties about whether there was an existing policy for the HPV vaccination program. Education and awareness about the availability of HPV vaccination are opportunistic and contingent on family planning unit visits. Vaccinators devised culturally aligned strategies to convince parents to vaccinate their adolescent children against HPV.

Uncertainty about existing policy for HPV vaccination

Participants were uncertain about an existing policy for the HPV vaccination program. Salamatu (a vaccinator) explained: "*We have handouts on that [HPV Vaccination] and then [. . .] we have [an] atlas on that as well.*" In contrast, Cordelia (the unit manager) indicated: "*We don't have any . . . not any rigid algorithms*", and there is "*no, not that I know of [policy]*" for the vaccination program. Similarly, a policymaker at the national level mentioned that there is no national policy specific to HPV vaccination. Dr Asaya (Director of Family Health Division, Ghana Health Services), explained:

> What happens is that it's [HPV vaccination] captured as part of policies for immunization against vaccine-preventable diseases in general whether they are for reproductive health purposes or diseases so you find out [in] policy, they say well these [HPV vaccination] are candidates for future inclusion.

Strategies for HPV vaccine recipient education

Vaccinators utilize opportunistic family planning unit visits, outpatient department (OPD)-talks, and cervical cancer awareness month to educate vaccine recipients and clinic visitors on HPV prevention and vaccination. Omaama (a vaccinator), described their teaching approaches for HPV prevention and vaccination:

> It [education]'s a daily thing when it comes to this particular unit [Family Planning]. Because clients who come for family planning services and other services, we take the opportunity to educate them on the HPV and then suggest that there is a vaccine . . .

Some vaccinators described the cervical cancer awareness month as a period for maximizing HPV vaccination education on a larger scale. Cordelia elaborated: "*. . . we do the larger one when the national and international awareness creation comes in. It's January, February . . . and then we try, through that, we do a lot of education.*"

The vaccinators reported using culturally aligned strategies to encourage parents to vaccinate their adolescent children.

Table 1. Participants' characteristics.

Pseudonym	Sex	Practice duration in the unit (years)	Educational level
HPV vaccinators			
Akwene	F	5	Diploma
Alison	F	3	Bachelor's
Asantewaa	F	13	Bachelor's
Cordelia	F	22	Master's
Korley	F	0.25	Diploma
Omaama	F	~2	Diploma
Salamatu	F	5	Diploma
Vanessa	F	2	Bachelor's
Program/policy leaders		Roles	
In hospital			
Alex	M	Hospital Administrator	Master's
Dr. Anokyewaa	F	Acting Head, Public Head Department	Medical degree and MPH
Dr. Dominics	F	Head, Adolescent Health Center	Medical degree and MPH
Grace	F	Head, Nursing	Master's
Dr. Kwaa-Appiah	M	Head, Obstetrics & Gynae Team A	Medical degree and MPH
Zen	M	Head, Department of Pharmacy	Bachelor's
Out hospital			
Dr. Asayah	M	Director, Family Health Division (Ghana Health Service)	Medical degree and MPH
Oti	M	Private HPV vaccine supplier	Bachelor's

Table 2. Themes, illustrative quotes, code description, codes, categories/sub-themes.

Sample illustrative quotes	Code description	Codes	Categories/Sub-themes
Theme 1: Current clinic operations and vaccination processes			
- *I know there's a policy by the Ghana Health Service which has been adopted by the Greater Accra Regional Hospital-* Zen - *So, I can't really talk to that particular this thing. But I know there's a policy, and when It's being reviewed, I don't know the exact this thing. So, I have to be frank about that particular one-* Zen - *There are so many, we have so many. We have the one that deals with the transformational zones and . . . then we also have the ones that deals with client's HIV* – Alison - *Please, not any rigid algorithm . . . No, not that I know of* – Cordelia - *I haven't come across any [policy]* – Korley - *No, we don't have policy . . . just no, we don't because as I said we don't have immunization schedules . . .* -Dr. Dominics - *There might be, but the last time I saw it was, I think, we're in October, right? I saw it in July* – Omaama	Formal HPV vaccination practice documents	Guiding Policy, guidelines, protocols, algorithms	Uncertain policy for HPV vaccination
- *So, if the person walks in for family planning, you talk to her about the cancer screening. Even though she didn't walk in because of that, like to give the opportunity to tell her or let know that there is something like that. And after that, you still have a vaccine for them* – Asantewaa - *Most often, when they . . . they parents come around, we do tell them and if they have their daughters, who are yet to give birth* – Korley - *It [education]'s a daily thing when it comes to this particular unit [Family Planning]. Because clients who come for family planning services and other services, we take the opportunity to educate them on the HPV and then suggest that there is a vaccine . . .* Omaama - *Whenever we get the opportunity* Salamatu - *Sometimes when they come, I tell them, you should keep it [receipt] and when your in-law comes in to pay the dowry, you add the receipt to it, then he pays because you have presented the service for him* – Asantewaa - *I also told them [parents] that you can give the vaccine even as a birthday gift to that child* – Alison	Staff activities to educate or teach clinic visitors or the public about HPV vaccination.	Education programs, awareness strategies	Strategies for educating target HPV vaccine recipients
We make sure you do the test and the test has to be negative before we proceed with it [HPV vaccination] – Vanessa - *we want to find out if you're sexually active, if you are, you are supposed to go through the testing that is the HPV test* – Alisson - *'let's say she's 25 years and sexually active, we need to screen that woman. And if she's negative, then she qualifies to take the vaccine. If positive, then you need to do some test and its part of some of the requirements"* – Cordelia - *Ahaa, so when they [adolescents] come, per counselling, most of them are virgins, so we capture them when they have not initiated sex. So, they will take the vaccine without the screening* – Asantewaa	Prior investigations before HPV vaccination administration	HPV test, screening, sexual activity	Emphasis on sexuality, screening, and treatment before HPV vaccination
Theme 2: Attitudes Towards HPV Vaccination Program and Scale up			
- *I have received the training at this unit or facility, I am able to or I am allowed* – Omaama - *I have knowledge on that already, so I'm always prepared* – Akwene - *In school, [. . .] we were taught about this obstetric and medicine. We deal with women, [the] pelvis, and then the vulva, we were taught [. . .] how the vulva looks and all those things . . . so, like [. . .] from the knowledge I have, I think the human papillomavirus is usually hidden around the columnar epithelia junction [. . .]. So, with that, I'm able to use that to get more information . . . when you apply the acetic acid and . . . if it is negative too, you're able to tell . . . based on that you can encourage the person to go in for the vaccine if she can?* – Salamatu	Vaccinators' views about readiness to administer HPV vaccination	Practice scope, previous training	Perceived preparedness for HPV vaccination

(*Continued*)

Table 2. (Continued).

Sample illustrative quotes	Code description	Codes	Categories/Sub-themes
- *I think the hospital's focus was on the family planning* – Asantewaa - *I would prioritize hepatitis B* – Akwene - *I'm right now taking care of [. . .] young people living with Type 1 Diabetes and for example, they need insulin to live and I'm trying to even get that to be taken care of by the NHIS . . . So it's sort of yes, we do need immunizations for adolescents, [. . .] but for right now, I would say it is not my priority right now as pushing because even the insulin that is needed to live hasn't been done"* – Dr. Dominics - *But then the whole this thing is that you will then prioritize and you look for very acute issues"*-Dr. Asayah - *But you find that health insurance is much more on curative. You fall sick then you get to . . . you-you go to hospital, then when you do this, then-then they will pay . . .* Dr. Asayah - *Yeah, so it [cervical cancer] doesn't fall into the sphere of things where you define as maternal mortality . . . Here I'm dealing with two indicators, maternal mortality. So, if a woman dies of cervical cancer, it's not maternal mortality . . . It's just a woman who has died"* – Dr. Asayah	Health intervention priorities by policy/program leaders	Healthcare priorities	Focus on acute health concerns
- *the Ministry of Health and the Women and Gender, if they can all come together so that we can do something about it for the cost to be subsidized, it will help* – Korley - *So, if the government should come in and we get a subsidized vaccine, it will help. We can recall when COVID-19 came and when the vaccines were made readily available, though a lot of people didn't understand because of [a] knowledge deficit, [. . .] but the larger Ghanaian went for the vaccine. So, I'm sure that if the HPV vaccine is made available like the COVID-19 vaccine, people will come and vaccine* – Naa - *the various hospitals that do the screenings are to inform higher authorities that these are the things wee are encountering . . . so Minister why don't you bring the government to reduce the vaccines so that the younger ones can start taking the vaccines* – Vanessa - *I don't make policies, so it's difficult to speak to that [they] will tell you that there no money*- Dr. Kwaa Appiah - *So, obviously, there are more higher powers in there that would have to take care of the costs . . . So I don't think I have a voice when it comes it's concerning getting it into the EPI* – Dr. Anokyewaa *I'm at the Ghana Health Services, an implementing agency. So, once it's implemented why not as a facility-level public health physician? I will definitely be glad and follow guidelines and do as I'm told so again, I hit it again that I am not the policy formulator, I'm sure they know what they are doing up there, I am just under an implementing agency* – Dr. Anokyewaa - *If they can give it for free, oh yes, we can have a whole, you know, we go out there, go for campaigns, you know, away there, talk about, you know, just, erm yeah, we would be able to, and; and it's available, you can come for it* – Dr. Dominics	Participant expresses active support and recommendation for a universal HPV vaccination program.	Subsidize cost, free access	Advocacy for a publicly-funded HPV program
Theme 3: Clinic Operational Barriers			
- *There is nothing you can do. Because at the end of the day, the shortage sometimes is not only coming from this units, but it's like from nationwide*- Alison - *There was a shortage sometime, so we had to rely on elsewhere* – Akwene - *I would say a lot people at the time they walked in to come for the vaccination, they actually had the money with them. However, due to delay or if the vaccine is not in stock, sometimes some of them don't come back* – Omaama - *It's like the vaccine is not available, so what happens is somebody can start and then maybe is due for the second shot and then the people walk in and then we don't have some in stock* – Salamatu - *I wish it could be accessible in terms of cost availability* – Dr. Dominics	Participant discusses supplies for HPV vaccination	Vaccine supply	HPV vaccine unavailability and shortage

(*Continued*)

Table 2. (Continued).

Sample illustrative quotes	Code description	Codes	Categories/Sub-themes
You know our system now, there is no training that's going on much – Asantewaa - *We do personal reading*- Cordelia - *the workshop so far has been on family planning, I still go to the net*- Korley - *. . . There is no program that has been organized on that [HPV vaccination]. We do most of the things on our own because the truth is, we've never had any workshop that strictly talked about this HPV vaccine* – Salamatu	Participant talks about educational activities to improve HPV vaccination knowledge and skill.	Staff education, staff training	Lack of formal Staff educational and training programs tailored to HPV vaccination
Theme 4: Institutional challenges with HPV vaccination decision-making			
- *I think we need to do a lot more to bring out our data*- Cordelia - *We do monthly report. So, they have the data. I don't really know what they use it for. I don't know"*-Vanessa - *It will be difficult because the administration, I don't think they will help, let me speak the truth, because what benefits is it to the hospital? Ahaa, so when we're talking about vaccination, [. . .], normally they use the CWC [Child Welfare Clinics] vaccination for their reports . . . This one [HPV vaccination], normally, we don't use it for our report because the hospital is not providing the vaccine* – Asantewaa - *Officially, we don't know about it [HPV vaccination program at the Greater-Accra Regional Hospital], they will then have to reach a point and simply say, we think we have generated enough evidence, we think have generated enough to be able to make sure that . . . it [HPV vaccination] needs to be scaled-up*- Dr. Asayah	Participant discusses use of evidence to inform HPV vaccination program	Data, report	Lack and disuse of HPV vaccination data
- *. . . the existing Gavi program, we pay [a] counterpart, and we are supposed to by a certain time [. . .] be on our own, so what happens? So, this one [current EPI] you [Ghana] are still struggling to be on your own [and] you are bringing another one* – Dr. Asayah - *..If there's a disease which is causing 30% of your mortality and somebody who causes 2% of mortality, where would you put your money? You would definitely put your money on the 30% [. . .]. But if you go in and deal with the 2%, you still have many more people dying or getting sick [. . .]. That's why you find malaria gets more attention than anything else . . .* – Dr. Asayah - *cervical cancer is not the only cancer. There are other erm cancers; childhood cancers are there, male cancers are there, and all those things. Why are you supporting cervical cancer? Why are you not supporting, you understand? So, there are a lot of controversies and policy biases when it comes to some of these things* – Dr. Kwaah Appiah - *because in the Western world, they have programs for where they have programs for all the other children cancer, they have programs for cervical cancer, they even have programs for endometrial cancers . . . right Colorectal cancers and all that. When you are 50 years you go . . . you need to go through errhmm colonoscopy and all those things. We don't have all those programs here. Why are you starting with cervical cancer? Why are you not starting with this? So, it's a lot of policy work here . . .* Dr. Kwaah Appiah - *So now, as a country, where do you put your money for the greatest impact, like I said in the beginning . . . So definitely you would have to put it saving the mothers and not for chronic disease. Chronic diseases are quite a different thing altogether* – Dr. Asayah - *Even if you come and whatever it is, surgery, chemotherapy and all those, so they manage to promote the quality of life. But right now, we have – we have not reached there yet. We are still dealing with the fundamentals. The issues which are for our very existence. Because if you really have many infants dying, very high infant mortality rates, then you tell people to put your money in there . . . You see, whatever it is. Yes, academia, research, everything then comes the policy space . . . And that is that is the whole kind of juggling around and the intricacies of policy*. – Dr. Asayah - *But we are also concerned with the resources because we cannot provide the vaccines on our own, using our own resources to buy and make it financially accessible. We are limited by our own budget constraints* – Alex	Participant responses about a national HPV vaccination policy interest	Policy interest, decision-making	Ethical dilemmas about HPV vaccination policy-making

Asantewaa explained: "*Sometimes when they come, I tell them, you should keep it [receipt] and when your in-law comes in to pay the dowry, you add the receipt to it, then he pays because you have presented the service for him*." Similarly, Alison discussed that "*I also told them [parents] that you can give the vaccine even as a birthday gift to that child*."

Emphasis on sexuality, screening, and treatment before HPV vaccination

The sexual history and outcome of HPV screening tests shape HPV vaccine administration in the clinic. The vaccinators delay sexually active adolescents until testing negative for HPV screening before vaccination. Omaama explained:

> [. . .] if this adolescent has confirmed that she has had sex [. . .] then the person has to wait until the age of 21 . . . and then the test will be carried out on this person. And if the person is tested negative, then the vaccine will be given to them.

Youth or older people with a history of sexual practices require negative HPV test results before initiating the HPV vaccine series. Cordelia explained with an example that "*let's say she's 25 and she's sexually active, we need to screen that woman. And if she's negative, then she qualifies to take the vaccine*," suggesting positive results exclude those individuals from receiving HPV vaccination. Alison (vaccinator) expounded:

> If you are above [the] age [of] 20, 21 upwards and you are sexually active, you have to be tested. [. . .] We will test your HPV. We want to test your HPV but then when it's negative, you can take the vaccine. When you are positive [for] any of them, we don't advise you to take the vaccine.

Theme 2: Attitudes towards HPV vaccination program and scale up

Some vaccinators indicated that they were adequately prepared to provide HPV vaccination. Some program/policy leaders reported prioritizing acute care and infant and maternal mortality issues. Generally, some participants advocated for improving HPV vaccination, while some program/policy leaders indicated that HPV vaccination advocacy was not part of their job roles.

Perceived preparedness for HPV vaccination

Most vaccinators perceived they were adequately prepared in knowledge and scope to provide HPV vaccination in the clinic. Omaama explained: "*So, you have to have all this knowledge about the vaccine before you would be allowed to [vaccinate]. So, I can say that [. . .], because I have received the training at this unit or facility, I am able to or I am allowed*." Yet, in explaining HPV vaccination preparedness, some vaccinators talked about cervical screening instead. Salamatu expounded:

> In school, [. . .] we were taught about this obstetric and medicine. We deal with women, [the] pelvis, and then the vulva, we were taught [. . .] how the vulva looks and all those things . . . so, like [. . .] from the knowledge I have, I think the human papillomavirus is usually hidden around the columnar epithelia junction [. . .]. So, with that, I'm able to use that to get more information . . . when you apply the acetic acid and . . . if it is negative too, you're able to tell . . . based on that you can encourage the person to go in for the vaccine if she can.

Focus on acute health concerns

Some program/policy leaders acknowledged the benefits of HPV vaccination but indicated their current focus on acute health problems because of the perceived chronic nature of the HPV disease process. Dr Asaya explained:

> The burden of disease, as far as cervical cancer is concerned, is huge, the cost on households is huge . . . but it doesn't come out very openly because [. . .] it doesn't fall into the sphere of things [that] you define as maternal mortality . . . So, if a woman dies of cervical cancer, it's not maternal mortality . . . It's just a woman who has died . . . we have quite a whole number of reproductive health cancers and [. . .] HPV falls within that and these are chronic issues . . . So, now, as a country, where do you put your money for the greatest impact [. . .]? So, definitely, you would have to put it [to save] the mothers and not for chronic disease . . .

Similarly, Dr Dominics discussed the rationale behind not prioritizing HPV vaccination for adolescent health programs. She explained:

> I'm right now taking care of [. . .] young people living with Type 1 Diabetes and for example, they need insulin to live and I'm trying to even get that to be taken care of by the NHIS . . . So it's sort of yes, we do need immunizations for adolescents, [. . .] but for right now, I would say it is not my priority right now as pushing because even the insulin that is needed to live hasn't been done.

Advocacy for a publicly funded HPV program

Most vaccinators advocated for interventions from the government and non-governmental organizations to cover or subsidize the vaccine cost to enhance accessibility. For instance, Salamatu suggested that "*they should pass a law that every child must be vaccinated at the age of nine*". Other vaccinators reflected on a neighboring country's approach and advocated the same for Ghana. Alison explained:

> . . . I feel that the question should have been the government coming to either help them with the HPV vaccine or give them for free [. . .] like what Nigeria is doing now. Nigeria just started giving HPV vaccines for free.

Other vaccinators advocated for a publicly funded HPV vaccination program using the approach for the COVID-19 vaccination roll-out. Akwene explained:

> So, if the government should come in and we get a subsidized vaccine, it will help. We can recall when COVID-19 came and when the vaccines were made readily available, though a lot of people didn't understand because of [a] knowledge deficit, [. . .] but the larger Ghanaian went for the vaccine. So, I'm sure that if the HPV vaccine is made available like the COVID-19 vaccine, people will come and vaccine.

However, some program/policy leaders from the hospital reported that HPV vaccination advocacy was not part of their job roles. For instance, Dr Kwaa-Appiah indicated "*I don't make policies, so it's difficult to speak to that [they] will tell you that there's no money*" whereas Dr Anokyewaa similarly described her job roles when

asked about how to incorporate HPV vaccination into the national immunization program:

> I'm at the Ghana Health Services, an implementing agency. So, once it's implemented why not as a facility-level public health physician? I will definitely be glad and follow guidelines and do as I'm told so again, I hit it again that I am not the policy formulator, I'm sure they know what they are doing up there, I am just under an implementing agency.

Theme 3: Clinic operational barriers

Identified HPV clinic operational barriers include vaccine unavailability and shortages. Vaccinators indicated they are challenged to rely on personal learning initiatives and resources to update themselves on HPV vaccination, as there are no formal educational programs for ongoing vaccination knowledge development.

HPV vaccine shortage and unavailability

Vaccinators discussed vaccine unavailability and intermittent vaccine shortages as a key obstacle to HPV vaccination in the clinic. According to Cordelia, "*It got to a point, we couldn't get anything in the whole country*". These vaccine shortages contribute to a delay in vaccine uptake or hesitancy among some individuals financially capable of paying for their vaccination. Omaama recounted:

> I would say that a lot of people at the time they walked in to come and take the vaccination, [...] actually had the money with them. However, due to maybe [a] delay or if the vaccine is not in stock, sometimes, some of them don't come back again ...

Furthermore, the HPV vaccine shortages contribute to incomplete vaccine series among some recipients. Salamatu explained that "*Somebody can even start and they may not get the vaccine supplied, and so as a result cannot complete the series.*" Vaccinators reported that the hospital does not supply HPV vaccines for the program anymore. Akwene indicated that: "*the vaccine directly doesn't come from the hospital*" while other vaccinators spoke about the HPV vaccination program being the clinic's initiative to support their clients. Asantewaa elaborated, "*It's not the hospital who is funding it [HPV vaccination] or the source is not from the hospital. It's just a unit that is trying to help our clients out.*" As a result, the vaccinators rely on third parties or private individuals to get HPV vaccines supplied to the clinic. However, other vaccinators perceived that the vaccine cost may be affordable if the hospital procures and supplies it. Akwene explained:

> ... it is better [if] it's home and then I think the price might come down [...] because there was a shortage sometime because of the COVID [...] so we had to rely on elsewhere ... and it was like three times the price that we were giving to our clients [...] so, I assumed that if the hospital was to be providing it, there may be some subsidy on it and a lot of our clients can afford it.

However, challenges with procuring the vaccines were reported to be the reasons behind the hospital's inability to supply the vaccines to the clinic. Zen (Head of Pharmacy) explained that "*there are certain times where you even tender and no one will even bid for it. So, it becomes a bit of a challenge even in terms of drug [vaccine] accessibility and availability to our client.*"

Lack of formal staff educational and training programs tailored to HPV vaccination

Vaccinators indicated there are no formal or scheduled educational programs for updating their knowledge of HPV vaccination. Salamatu explained:

> Not that I know of ... there is not any program that has been organized on that [HPV vaccination]. We do most of the things [education] on our own ... because the truth is we've never had any workshop that strictly talked about this HPV vaccine.

Vaccinators highlighted they relied on several print and online resources for updates on current evidence for HPV vaccination. Alison explained: "*We make sure we go to the internet, books, journals ... and WHO has its own internet ... when you go to the internet, WHO website, you should be able to get the information concerning cervical cancer*" whereas Salamatu mentioned, "*I go online, I read, I read more because there is always something new ... sometimes I use Google and then YouTube as well.*"

Theme 4: Institutional challenges with HPV vaccination

Institutional challenges include administrative and national health system barriers to HPV vaccination. The identified institutional challenges hindering HPV vaccination were a lack/disinterest in using HPV vaccination data for decision-making and ethical dilemmas about HPV vaccination policy-making.

Lack and disuse of HPV vaccination data

Some key vaccinators and program/policy leaders reported a lack of evidence on the benefits of the HPV vaccination program at the hospital. Dr Asaya indicated:

> Officially, we don't know about it [HPV vaccination program at the Greater-Accra Regional Hospital], they will then have to reach a point and simply say, we think we have generated enough evidence, we think have generated enough to be able to make sure that ... it [HPV vaccination] needs to be scaled-up.

Dr Asaya further requested that the "*facilities which are piloting or still carrying [out HPV vaccination] like Ridge [Greater-Accra Regional Hospital] then have to come out to simply say; what is the cost-effective way of doing it? What are the facilities involved?.*" Yet, some vaccinators highlighted the lack of reporting on HPV vaccination data in the hospital. Asantewaa explained that "*When we're talking about vaccination [...], normally they use the CWC [Child Welfare Clinics] vaccination for their reports ... This one [HPV vaccination], normally, we don't use it for our report because the hospital is not providing the vaccine.*"

Ethical dilemmas about HPV vaccination policy-making

Some program/policy leaders discussed ethical challenges surrounding HPV vaccination in the context of limited resources and competing health priorities. Dr Asayah discussed that "*as a country, definitely, our resources are very limited. And once you are drawing your national health policy, we would [...] have to simply focus on what normally has [a] greater impact for the greater part of the population.*" They further argued:

> …If there's a disease which is causing 30% of your mortality and somebody who causes 2% of mortality, where would you put your money? You would definitely put your money on the 30% […]. But if you go in and deal with the 2%, you still have many more people dying or getting sick […]. That's why you find malaria gets more attention than anything else …

A perceived threat to existing childhood immunization programs was indicated as one of the hindrances to HPV vaccination in Ghana. Dr Asayah discussed:

> … the existing Gavi program, we pay [a] counterpart, and we are supposed to by a certain time […] be on our own, so what happens? So, this one [current EPI] you [Ghana] are still struggling to be on your own [and] you are bringing another one.

Discussion

In this study, we explored the current privately funded HPV vaccination program at the Greater-Accra Regional Hospital to identify program gaps, and to inform practice and national policy. This study relays crucial insights into several practice and policy challenges that shape the HPV vaccination program at the hospital. According to study participants, the current HPV vaccination program is operating without an established HPV vaccination policy, leading to reliance on convenient sources of information to guide practice. Despite collective advocacy for a publicly funded or subsidized HPV vaccination program among most vaccinators, there was reluctance in prioritizing and advocating for a publicly funded HPV vaccination among some program/policy leaders due to threatened existing immunization programs, competing priorities with acute health problems, and ethical dilemmas with decision-making on HPV vaccination. We discuss our findings in more detail below, within the context of the literature.

There were uncertainties whether a guiding policy existed. It may be that those vaccinators were unfamiliar with what an HPV vaccination policy is or wanted to shield the hospital out of fear of punitive consequences from superiors. Yet, a confirmatory interview with a national policymaker revealed the lack of an HPV vaccination policy, suggesting the need for one. A vaccination program without a policy can be limited in quality and efficiency, as there will be no accountability and sustainability measures.[38] There is a need for consultation with key parties involved in HPV vaccination at all levels to meticulously develop an all-encompassing national and culturally aligned HPV vaccination policy that spells out awareness creation and sensitization mechanisms, provider education and accreditation strategies, eligibility criteria, appropriate delivery sites, and sustainability measures to ensure equitable access and vaccine delivery. In Ghana's three-tier healthcare system, where preventive care and treatment of minor ailments occur at health centers and Community Health Planning and Services (CHPS) compounds,[39] it would be ideal for healthcare providers in those settings to be involved in providing awareness and education about HPV vaccination, even if not engaged in vaccination delivery. Furthermore, given how negotiation around HPV vaccination engagement is shaped by culture, agency, and structural influence, future research may investigate HPV vaccination perceptions and dynamics using the Culture-Centered Approach meta-theoretical framework.[40]

This study revealed that there are no routine educational programs to equip vaccinators with emerging evidence on HPV vaccination practice. Vaccinators mostly rely on self-led learning initiatives to support their HPV vaccination practices. These learning practices can lead to using non-credible information or outdated evidence to inform vaccination practices, which may result in stagnant vaccination knowledge and practice skills. For instance, despite current evidence recommending that no HPV testing or screening is required before HPV vaccination,[41] vaccinators reported rigid emphasis on having no history of sexual activity (i.e., the person has not been sexually active) or testing negative for HPV before HPV vaccination. This corresponds with findings from past studies about gaps in HPV vaccination knowledge among Ghanaian healthcare providers.[7,14] Consequently, the clinic's emphasis on sexual history and HPV vaccination screening contradicts current evidence,[41,42] and mirrors the HPV-FASTER approach proposed specifically for Central and Eastern Europe, Latin America, Asia, and developed parts of Africa.[43] Having HPV screening as a prerequisite for vaccination presents many practical challenges, particularly in terms of logistics and cost. For instance, the invasiveness of cervical examination and the additional cost or extra time in waiting for screening results before vaccination may discourage or delay the uptake of HPV vaccines by intended recipients. Given that HPV vaccination does not alter HPV disease treatment or follow-ups[43] and individuals with HPV-positive results or cervical neoplasia may still benefit from vaccination protection against other HPV strains,[44] we encourage that HPV vaccination is not delayed or refused for screening and treatment purposes among individuals seeking the vaccine.

Similar to the vaccinators, HPV vaccination education and awareness programs for intended vaccine recipients are mostly opportunistic except for an annual cervical cancer awareness month program in January, where education and sensitization is maximized. These restricted educational approaches limit access to HPV vaccination information for individuals, most of whom may not have the privilege and intellectual abilities to search, identify, and interpret HPV vaccination information. Evidence shows adequate knowledge about HPV and HPV vaccination can maximize positive attitudes and intentions to receive HPV vaccination.[45,46] In Ghana, where conservative cultural norms and perceived beliefs about sexuality and sexual health shape discussions and health-seeking behaviors about preventive health practices like HPV vaccination,[7,13,47] there is a need for a concerted educational program tailored to maximizing awareness and benefits of HPV vaccines while demystifying fallacies surrounding HPV vaccination to all stakeholders, including adolescents, parents, religious and community leaders, and teachers.

Some program/policy leaders pointed out ethical dilemmas regarding HPV vaccination decision-making in the context of competing health priorities, a national focus on minimizing maternal and infant mortality, and perceived threats to existing immunization programs due to international funding cuts. For instance, a national policymaker questioned the population benefits of prioritizing HPV

vaccination over causes of maternal and infant mortality. Although this utilitarian ethical approach to policymaking may serve the interest of much of the population,[48] its applicability leaves many practical questions. For example, one may argue about the value of saving a child under 5 years, only to have them die from a vaccine-preventable HPV-related cancer in adulthood. Hence, relying solely on utilitarian ethical principles to make decisions about HPV vaccination may impede a holistic assessment of HPV-related cancer problems and the appreciation of HPV vaccination programs' benefits. There is compelling evidence on the cost-effectiveness of HPV vaccination in Ghana[6] and similar contexts[49–51] to be considered in addition to ethics and equity principles for HPV vaccination decision-making.

Finally, most vaccinators felt adequately prepared to provide HPV vaccination and advocated for the involvement of government and non-governmental agencies to revamp the HPV vaccination program. They suggested that Ghana learns from neighboring Nigeria's "one dose at a time" HPV vaccination program[52] or replicate the approaches for the successful COVID-19 vaccination roll-out, corresponding with findings by the International Vaccine Access Center.[53] Sadly, some program/policy leaders were reluctant to advocate for HPV vaccination program investment, which is consistent with a Chinese study which found no advocates for HPV vaccination at the local level.[54] A salient step toward an HPV vaccination policy is creating awareness of the vaccination benefits.[53] This requires a collective effort by all stakeholders and agencies, including policymakers, clinicians, health professional associations and colleges, and researchers, to create a political will to obtain the government's commitment.[54]

Strengths and limitations

A strength of this study is being the first to explore the challenges in a privately funded HPV vaccination program in Ghana to inform practice and policy for the pending publicly funded program. The conceptualization of the study using an intersectionality theory, a North American Black Feminist scholarship, expanded the understanding of how system and structural factors shape HPV vaccination in limited-resource countries, like Ghana. The lessons from this study are transferable to similar countries preparing to introduce publicly funded HPV vaccination programs. In terms of limitations, the sample size for this study was small due to the temporal and spatial boundaries of the case and the unavailability of some program/policy leaders. However, we recruited all HPV vaccinators at the hospital. As a qualitative study, we did not aspire to generalize findings. However, the study contributes evidence that may be transferable to similar contexts through adoption and adaption, given the description of the program context and participants' demographics.[55]

Conclusion and recommendations

This qualitative case study explored the Greater-Accra Regional Hospital's HPV vaccination program to understand the gaps and challenges and gather lessons to inform practice and policy. According to study participants, the HPV vaccination program at the hospital has no policy, and vaccinators rely on convenient sources of information to guide their practice. In contrast with current evidence, there is a common practice for HPV testing and cervical cancer screening for sexually active individuals before receiving HPV vaccination. Some program/policy leaders demonstrated reluctance in advocating for the program, describing advocacy as not part of their job roles, and citing ethical dilemmas in decision-making and competing health priorities as reasons. Based on these findings, we recommend that the hospital and other contexts with similar HPV vaccination programs adopt and adapt standardized guidelines to support evidence-based vaccination practice. There is a need for a collective effort in HPV vaccination advocacy to stimulate political and government interests toward policy and decision-making.

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Author contributions

EAM was involved in conceptualization, investigation, formal analysis, interpretation of findings and writing (original drafting, review, and editing).

OOS, CAA, and SEM were involved in conceptualization, supervision and writing (review and editing).

Code availability

Codes and code descriptions are available in Table 2.

Data availability statement

To protect participants' confidentiality and privacy, data and study materials are not deposited in any public or research repository.

Consent to participate

All participants provided written informed consent before participating in the study.

Consent to publish

All study participants were informed that research findings will be shared with the scientific community through peer-review journal publication.

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