



Awareness and Acceptability of the Human Papillomavirus (HPV) Vaccine among Mothers of Adolescent Girls in Nguluni Health Centre, Matungulu, Machakos County, Kenya

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Abstract

Human Papillomavirus (HPV) is the most prevalent sexually transmitted infection and is known as the major cause of cervical cancer. Despite the availability of a relevant vaccine in Kenya since 2006, its acceptability has remained low due to high cost, opposition, myths, and misconceptions. This study assessed awareness and acceptability of the Human Papillomavirus vaccine among mothers of adolescent girls in Machakos County, Kenya. It explored their perceptions regarding barriers and facilitators to vaccine uptake. A mixed-method approach with a convergent design and consecutive sampling was adopted. 220 respondents were recruited for the quantitative study. For the qualitative study, 11 were interviewed after the sampled number reached saturation. Findings reported a higher level of awareness (77.3%) with an acceptability rate of 54.1%. Factors such as ever having heard of the HPV vaccine, vaccine safety and effectiveness, awareness of cervical cancer and their association with HPV vaccine acceptability were assessed. Qualitative data indicated mothers had deep-seated concerns and fears, which influenced their perceptions and beliefs on vaccine acceptance. Barriers included a lack of awareness, fears of side effects, misconceptions, and communication breakdown. Facilitators included education, sensitization, and affirmation of the vaccine's safety and effectiveness to improve vaccine acceptability. A community-based study that included all women in the study area would have minimized bias and improved the dissemination, credibility, validity, uptake, and implementation of our findings. However, this was not possible because of financial and time constraints. A multifaceted approach to address the identified gaps is necessary, along with investing in awareness campaigns to improve knowledge and promote acceptance of HPV vaccination. This study provides valuable insights and will guide efforts to increase the acceptability of HPV vaccination in Kenya and beyond.

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Introduction

Human papillomavirus (HPV) has been identified as the leading cause of cervical cancer (Welby et al., 2022). HPV is the most common sexually transmitted viral infection that affects both women and



men of reproductive age. The HPV infection rate tends to be high immediately after adolescents become sexually active. The recommended time for vaccination, for both boys and girls, is between the ages of 9 and 14 years. It is assumed that those within this age group haven't been involved in any sexual intercourse, hence unlikely to have contracted HPV (Karanja-Chege, 2022). HPV infection being one of the leading causes of cervical cancer, both prophylactic vaccines and HPV assays that detect viral nucleic acids have been developed (Yan, 2025). The goal for HPV vaccination is to minimise the incidence of cervical cancer among women of reproductive age. The HPV vaccine was first certified in 2006, and since then, it has been proven to be safe and effective in preventing HPV infection and its sequelae (Mabeya et al., 2018).

The HPV vaccine is intended for adolescent girls who are minors; hence, its administration requires parental consent. As primary caregivers, mothers play a vital role in healthcare decisions for children and adolescents, including vaccinations (Padhi et al., 2022). Vaccine trust and access to information among the public, clinicians, and policymakers are essential for the success of vaccination programs. This is due to the influence these factors have on vaccine awareness and acceptability. Mothers are especially influential in adolescent girls' healthcare and are therefore likely to impact the acceptability of HPV vaccination (Dapari et al., 2024). Most recent research on vaccine awareness and acceptance focused on stakeholders and parents (Karafillakis et al., 2022). A report from the Ministry of Health (MOH), Matungulu, documented the failure of the targeted cohort to visit facilities for vaccination despite free vaccination (DHS, 2021). It was also reported that those who received the first dose of the vaccine rarely returned for the second dose. Therefore, urgent intervention was required to help understand barriers and facilitators relating to the acceptability of the HPV vaccine, which this study aimed to address.

The Kenyan government introduced the HPV vaccine in 2019 and incorporated it into its routine immunisation schedule for free. This was part of a strategy for the prevention and reduction of cervical cancer burden. Despite these efforts, acceptance of the vaccine remains low due to a lack of awareness, especially among mothers of adolescent girls (Mabeya et al., 2018). Lack of awareness and varied levels of acceptability of the HPV vaccine among mothers of teenage girls present critical challenges in achieving widespread vaccination. Understanding mothers' perspectives, information, and decision-making processes concerning HPV vaccination for their adolescent daughters may help enhance awareness efforts, thus increasing the acceptability of the vaccine. By examining the barriers and factors influencing the acceptability of the HPV vaccine among mothers of teenage girls, this study sought to assess awareness and acceptability of the HPV vaccine and explore perceptions regarding barriers and facilitators among mothers of adolescent girls.

Literature Review

The development of prophylactic HPV vaccines in the mid-2000s primarily aimed to prevent HPV strains 16 and 18, which are believed to be responsible for 70% of cervical cancer cases (Akhatova et al., 2022). The World Health Organisation recommended that girls aged between 9 and 14 years receive HPV vaccination (Bloem, 2017). By 2016, the HPV vaccine was accepted and incorporated into the routine vaccination programs of 86 countries worldwide (Brotherton & Bloem, 2018). This led to a significant increase in vaccine acceptability, as it was offered free, just like other vaccines included in national immunisation programs. This move aimed to provide wider access to the HPV vaccine and protect more people from the risks associated with the virus (LaMontagne et al., 2017).

Recent research has focused on knowledge, attitudes, and practices around the HPV vaccine conducted in Mombasa and Tana River Counties (Njuguna et al., 2021). The study revealed a lack of information and strong opposition to the vaccine as the main impediments to vaccine acceptability. There is a gap in the perception and acceptability of the HPV vaccine among mothers of adolescent



girls. This has significant implications for practice, training and education, as well as policy and advocacy. This study aimed at determining the acceptability and awareness of the HPV vaccine among mothers of adolescent girls in Matungulu Sub-County, Machakos County, Kenya. Study outcomes would help provide a foundation for developing policies and guidelines that raise awareness among mothers with teenage daughters. The outcomes will also help fill existing policy gaps, thereby establishing a basis for further studies exploring HPV vaccine awareness and acceptability.

Method

Study site

This study was conducted at Nguluni Health Centre in Matungulu Sub-County, Machakos County, Kenya. This is a level three facility with a catchment population of 22,944 people. The facility offers comprehensive outpatient services and maternal and child health care.

Study Design and Sampling

This study employed a convergent (parallel) mixed-methods design. The consecutive sampling method was employed, allowing for quick and efficient data collection. Eligible participants were approached, who included mothers seeking services in the facility and had an adolescent daughter aged between 10 and 14 years. Mothers were purposively sampled until the desired sample size was reached.

Sample size

A sample size of 220 mothers for the quantitative part of this study was determined using Fisher's formula with an expected proportion of 50%, with a 95% confidence interval and a 5% margin of error Fisher (1998). The sample size was assumed to be the expected proportion of 50%, with a 95% confidence interval and a 5% margin of error. The choice of the expected proportion was motivated by the fact that no previous study had been conducted within the county or in the study area. The qualitative phase of the study included 11 mothers, with this sample size determined through data saturation.

Data Collection

Structured questionnaires were utilised to collect quantitative data from mothers with adolescent daughters aged 10-14 years. Quantitative questions were administered in English, and interpretation was provided by the researcher, as necessary, in a language preferred by the participants. Data collection occurred between December 2022 and February 2023. On average, four to six mothers were recruited per day over three months. This tool comprised four parts (sections A-D) and assessed demographic characteristics, awareness of HPV, and acceptability of HPV immunisation. The interviews were directed by an interview guide and assessed mothers' perceptions of the HPV vaccine. The interviews were recorded both in Swahili and English. All recorded interviews were transcribed. Those in Kiswahili were translated into English using a back-and-forth translation process to ensure that the meaning was not lost. The interview process was carefully explained to all participants, and they were assured of confidentiality.

Data Analysis and Presentation

Questionnaires were checked for completeness and cleaned for analysis. Quantitative data were exported into the Statistical Package for the Social Sciences (SPSS) version 25 and analysed accordingly. Data were descriptively explored, including frequencies, percentages, measures of central tendency (such as the mean), and measures of dispersion (such as the standard deviation). Research objective number two was analysed using multivariable logistic regression analysis. Variables with a p-value < 0.02 in the univariable analysis or considered clinically relevant in



explaining vaccine acceptability were included in the multivariable logistic regression. P-values < 0.05 were set as a level of significance for quantitative data analysis wherever applicable. The audio files were transcribed verbatim for objective 3, which focused on perception. Research questions and a literature evaluation served as the foundation for the initial list of codes. Using the QRS NVivo 12 Plus software (Australia) to analyse structured qualitative data, the content was evaluated thematically, indexed, and coded inductively for emergent, comparable themes. They were compared for resemblance to group the first open codes into sub-themes.

Ethical Considerations

The departmental research committee reviewed the study protocol for any scientific and ethical errors. Study approval was then obtained from the Aga Khan University Institute of Scientific and Ethics Review Committee (Ref: 2022/ISERC-45 (v3)), and a research permit was obtained from NACOSTI on Ref No: 897647. Further approval for consent to collect data was obtained from the Machakos Research Review Committee and the MOH Matungulu Sub-County on Ref No. MKS/DHES/RSCH/VOLI/286. Study participants were requested to sign an informed consent form without coercion.

Results

The quantitative results were based on the investigation's objectives, specifically determining the awareness and acceptability of HPV vaccination among mothers of adolescent girls. The response rate was 100% with a total of 220 participants.

Socio-Demographic Characteristics

A total of 220 mothers of adolescent girls aged 10-14 years were recruited in the study, and the response rate was 100%. Most participants were from Matungulu sub-county, with only two from other sub-counties.

Age group

Most of the study participants were within the 31-40 years age group, with 138 (62.7%), 49 (22.3%) in the 41-50 years age group, and 33 (15.0%) aged less than 30 years. Of those who had their adolescent girls receive the HPV vaccine, 22 (18.5%) were less than 30 years old, 69 (58.0%) were in the 31-40 age group, and 28 (23.5%) were in the 41-50 age group. There was no significant difference between HPV vaccine acceptance and the age of the mothers of the adolescents (p-value=0.20).

Level of education

Overall, 58 (26.4%) had a primary level of education, 109 (49.5%) had a secondary level of education, and 53 (24.1%) had an above secondary level of education (diploma and colleges). Among the mothers whose daughters had received HPV vaccines, the majority had a secondary level of education (n=58; 48.7%). However, there was no significant difference between the level of education and HPV vaccine acceptance (p-value=0.91)

Marital status

Most of the respondents were married (n=168;76.4%), those in single marriages were 36 (16.4%), while 16 (7.3%) were either divorced or widowed. There was no relationship between HPV vaccine acceptance and marital status (p-value=0.25), though the majority of the parents whose daughters had been vaccinated were married (Table 1).

Religion

Most respondents were Christians, accounting for 205 (93.2%), while 15 (6.8%) were affiliated with the Muslim religion. Religion was not significantly associated with the HPV vaccine acceptance (p-value=0.95) (Table 1).



Occupation

The majority of the respondents were in business (n=99;45.0%), 41 (18.0%) were housewives, 41 (18.6%) were formally employed, 25 (11.4%), and 14 (6.9%) were casual workers and unemployed.

Table 1: Sociodemographic Characteristics of the Adolescents' Mothers in Matungulu Sub-County, N=220

Variable	Overall, N = 220 ¹	Received HPV vaccine		p-value ²
		No, N = 101 ¹	Yes, N = 119 ¹	
Age in years, n (%)				0.20
<30	33 (15.0)	11 (10.9)	22 (18.5)	
31-40	138 (62.7)	69 (68.3)	69 (58.0)	
41-50	49 (22.3)	21 (20.8)	28 (23.5)	
Level of education, n (%)				0.91
Primary	58 (26.4)	27 (26.7)	31 (26.1)	
Secondary	109 (49.5)	51 (50.5)	58 (48.7)	
Above secondary	53 (24.1)	23 (22.8)	30 (25.2)	
Marital status, n (%)				0.25
Single	36 (16.4)	12 (11.9)	24 (20.2)	
Married	168 (76.4)	81 (80.2)	87 (73.1)	
Divorced/widowed	16 (7.3)	8 (7.9)	8 (6.7)	
Religion, n (%)				0.95
Christians	205 (93.2)	94 (93.1)	111 (93.3)	
Muslims	15 (6.8)	7 (6.9)	8 (6.7)	
Occupation, n (%)				0.015
Housewife	41 (18.6)	26 (25.7)	15 (12.6)	
Business lady	99 (45.0)	38 (37.6)	61 (51.3)	
Casual worker	25 (11.4)	7 (6.9)	18 (15.1)	
Formal employment	41 (18.6)	23 (22.8)	18 (15.1)	
Unemployed	14 (6.4)	7 (6.9)	7 (5.9)	
Sub-county of residence, n (%)				0.21
Matungulu subcounty	218 (99.1)	99 (98.0)	119 (100.0)	
Other Subcounty	2 (0.9)	2 (2.0)	0 (0.0)	

¹Frequency (%)

²Pearson's Chi-squared test; Fisher's exact test

HPV Vaccine Awareness and Knowledge

Most participants were aware of the HPV vaccine (n=170; 77.3%). Most (n=133; 95.0%) of those who had accepted the vaccine were aware of the HPV vaccine (p<0.001). The primary sources of information were healthcare providers (n = 92, 54.1%), press or mass media (n = 40, 23.5%), and social media (n = 28, 16.5%). In total, 115 participants (52.3%) were aware that the HPV vaccine is used to prevent HPV infection, 28 (12.7%) knew about vaccination of both boys and girls, and 136 (61.8%) knew the age for vaccination was 9–14 years. In terms of the number of recommended doses, 94 (42.7%) thought there were two recommended doses, 18 (8.2%) thought there were three recommended doses, and three participants thought there was one recommended dose. The remaining 105 participants (47.7%) reported being unaware of the recommended doses for HPV. Most participants indicated the main reason for HPV vaccination was prevention of cancer of the cervix (n=144; 65.5%), three participants reported the reason was prevention of vaginal cancer, and two reported valval cancer. The remaining 71 participants (32.3%) were unaware of the reason for vaccinating their adolescent girls. In addition, 107 (48.6%) participants believed the vaccine was safe and effective in preventing cervical cancer, 152 (69.1%) had previously heard about cancer of the cervix, and only 22 (10.0%) believed the advanced stage of cervical cancer was curable (Table 2).



Table 2: HPV Awareness and Knowledge among Mothers of Adolescent Girls in Matungulu Sub-County, Kenya

Variable	Received HPV vaccine			p-value ¹
	Overall (N = 220), n (%)	No (n = 101), (%)	Yes (n = 119), n (%)	
HPV vaccine awareness	170 (77.3)	57 (56.4)	113 (95.0)	<0.001
Source of information				0.056
Healthcare provider	92 (54.1)	24 (42.1)	68 (60.2)	
Social media	28 (16.5)	12 (21.1)	16 (14.2)	
Press or mass media	40 (23.5)	17 (29.8)	23 (20.4)	
Awareness campaigns	2 (1.2)	2 (3.5)	0 (0.0)	
Other	8 (4.7)	2 (3.5)	6 (5.3)	
HPV vaccine is used to prevent infection from HPV				<0.001
Yes	115 (52.3)	26 (25.7)	89 (74.8)	
No	22 (10.0)	18 (17.8)	4 (3.4)	
Not sure	83 (37.7)	57 (56.4)	26 (21.8)	
Who should be vaccinated				<0.001
Girls	143 (65.0)	38 (37.6)	105 (88.2)	
Boys and girls	28 (12.7)	25 (24.8)	3 (2.5)	
Don't know	49 (22.3)	38 (37.6)	11 (9.2)	
Age of HPV vaccination				<0.001
9-14 years	136 (61.8)	35 (34.7)	101 (84.9)	
Above 15 years	24 (10.9)	15 (14.9)	9 (7.6)	
Don't know	60 (27.3)	51 (50.5)	9 (7.6)	
Number of recommended dosages				<0.001
Once	3 (1.4)	0 (0.0)	3 (2.5)	
Two	94 (42.7)	18 (17.8)	76 (63.9)	
Three	18 (8.2)	14 (13.9)	4 (3.4)	
Don't know	105 (47.7)	69 (68.3)	36 (30.3)	
Reasons for HPV vaccination				<0.001
Prevent cancer of the cervix	144 (65.5)	43 (42.6)	101 (84.9)	
Prevent vaginal cancer	3 (1.4)	1 (1.0)	2 (1.7)	
Prevent valval cancer	2 (0.9)	2 (2.0)	0 (0.0)	
Don't know	71 (32.3)	55 (54.5)	16 (13.4)	
HPV vaccine is safe and effective				<0.001
Yes	107 (48.6)	26 (25.7)	81 (68.1)	
No	16 (7.3)	10 (9.9)	6 (5.0)	
Don't know	97 (44.1)	65 (64.4)	32 (26.9)	
Ever heard about cervical cancer				<0.001
Yes	152 (69.1)	58 (57.4)	94 (79.0)	
No	59 (26.8)	35 (34.7)	24 (20.2)	
Don't know	9 (4.1)	8 (7.9)	1 (0.8)	
Is advanced stage cervical cancer curable				0.75
Yes	22 (10.0)	11 (10.9)	11 (9.2)	
No	189 (85.9)	85 (84.2)	104 (87.4)	
Don't know	9 (4.1)	5 (5.0)	4 (3.4)	

¹Pearson's chi-square test; Fisher's exact test

HPV Acceptance

In total, 119 (54.1%) participants had their adolescent daughters vaccinated. Of these, 55 (46.2%) said their daughters had received one dose, 59 (49.6%) said their daughters had received two doses, and



five did not know the number of doses their daughters had received. Among the participants who had their daughters vaccinated, 67 (56.3%) received vaccinations in a health facility, 51 (42.9%) received vaccinations in schools, and one received vaccinations through an outreach campaign. Of participants whose daughters had not been vaccinated, 41 (40.6%) had intended to have their daughters vaccinated. The main reason for not vaccinating their daughters was lack of information about the HPV vaccine (n=74, 73.3%), followed by fear of HPV-related rumours (n=17, 16.8%). Other reasons included fear of side effects and long distances to the health facility (**Table 3**).

Table 3: HPV Vaccine Acceptance among Mothers in Matungulu Sub-County, Kenya

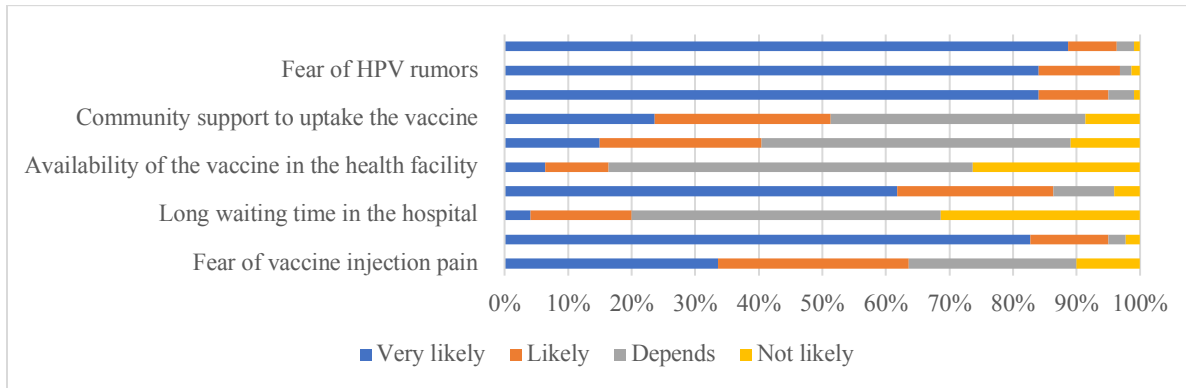
Variable	N = 220, n (%)
Is your daughter eligible for vaccination	220 (100.0)
Has your daughter been vaccinated	119 (54.1)
Number of doses received	
One dose	55 (46.2)
Two doses	59 (49.6)
Don't know	5 (4.2)
Place of vaccination	
In a health facility	67 (56.3)
In school	51 (42.9)
In outreach	1 (0.8)
Intention to get your daughter vaccinated	
Yes	41 (40.6)
No	11 (10.9)
Undecided	49 (48.5)
Reasons for not vaccinating your daughter	
Lack of information about the HPV vaccine	74 (73.3)
Fear of side effects	5 (5.0)
Fear of the HPV rumors	17 (16.8)
Long distance to the facility	2 (2.0)
All of the above	3 (3.0)

Barriers to HPV Vaccine Acceptance

The main barriers to HPV vaccine acceptance were misinformation, negative HPV rumours, safety concerns, associated side effects, and a lack of proper information about the HPV vaccine from the MOH. Less commonly reported barriers included long hospital waiting times, limited vaccine availability at the health facility, distance to the health facility, and religious beliefs regarding the HPV vaccine.



Figure 1: Barriers to HPV Vaccine Acceptability in Nguluni Health Centre, Matungulu Sub-County, Kenya



Determinants of HPV Vaccine Acceptance

In the univariate analysis, awareness of the HPV vaccine, knowledge that the HPV vaccine is used to prevent HPV infection, knowledge that HPV is safe and effective, and ever having heard of cervical cancer were significantly associated with HPV vaccine acceptance. In the multivariate analysis, all of the above-mentioned variables were significant ($p < 0.05$) except ever having heard about cervical cancer ($p = 0.858$). The odds of having been vaccinated were 5.06 times higher among girls whose mothers were aware of the HPV vaccine than those whose mothers were not aware of the HPV vaccine (odds ratio [OR] 5.06, 95% confidence interval [CI]: 1.90–15.35). Participants who knew that the HPV vaccine prevented HPV infection were 3.29 times more likely to have their adolescent daughters vaccinated compared with mothers who did not have that knowledge (OR 3.29, 95% CI: 1.51–7.25). Finally, participants who believed that the HPV vaccine was safe and effective were 2.24 times more likely to have their daughters vaccinated compared with those who thought the HPV vaccine was not safe and effective (OR 2.24, 95% CI: 1.04–4.83).



Table 4: Parameter Estimates of the Determinants of HPV Vaccine Acceptance Reported by Mothers

Variables	HPV vaccination status		Univariate		Multivariate	
	Not vaccinated	Vaccinated	OR (95% CI)	P-value	OR (95% CI)	P-value
	n (%)	n (%)				
Age, years						
<30	11 (33.3)	22 (66.7)	Reference	-	Reference	-
31-40	69 (50.0)	69 (50.0)	0.50 (0.22-1.09)	0.088	0.43 (0.15-1.12)	0.092
41-50	21 (42.9)	28 (57.1)	0.67 (0.26-1.65)	0.387	0.59 (0.19-1.81)	0.359
Level of Education						
Primary	27 (46.6)	31 (53.4)	Reference	-	Reference	-
Secondary	51 (46.8)	58 (53.2)	0.99 (0.52-1.88)	0.977	0.74 (0.33-1.65)	0.466
Above secondary	23 (43.4)	30 (56.6)	1.14 (0.54-2.41)	0.739	0.77 (0.30-1.95)	0.587
Aware of the HPV vaccine						
No/Don't know	44 (88.0)	6 (12.0)	Reference	-	Reference	-
Yes	57 (33.5)	113 (66.5)	14.54 (6.27-39.86)	<0.001	5.06 (1.90-15.35)	0.002
The HPV vaccine is used to prevent infection from HPV						
No/Don't know	75 (71.4)	30 (28.6)	Reference	-	Reference	-
Yes	26 (22.6)	89 (77.4)	8.56 (4.72-15.99)	<0.001	3.29 (1.51-7.25)	0.003
HPV vaccine is safe and effective						
No/Don't know	75 (66.4)	38 (33.6)	Reference	-	Reference	-
Yes	26 (24.3)	81 (75.7)	6.15 (3.45-11.25)	<0.001	2.24 (1.04-4.83)	0.038
Ever heard about cervical cancer						
No/Don't know	43 (63.2)	25 (36.8)	Reference	-	Reference	-
Yes	58 (38.2)	94 (61.8)	2.79 (1.55-5.09)	0.001	1.07 (0.48-2.33)	0.858

Perceptions on Acceptability of the HPV Vaccine Among Mothers of Adolescent Girls: Quantitative Data

Eleven participants were interviewed to explore perceptions regarding the HPV vaccine, and their views, opinions, and perspectives were categorised based on themes. Five themes were captured from the analysis and are discussed below.

Mothers' perception of the HPV vaccine and vaccination

There were mixed reactions among mothers regarding the vaccination of their adolescent daughters, with some participants stating that they were ready to have their daughters vaccinated.

"We were several parents who were ready to board a van to go to the health facility for vaccination." (IDI-006)



However, such intentions were disrupted when a mother stormed a school meeting and said that the vaccine was not suitable for their daughters. This changed the decision and willingness of every mother who was attending that meeting.

"We will never accept it." (IDI-006)

"Apparently, there is a mixed reaction for every mother...every mother...in my circle has a different opinion. Some have already taken their daughters...others have not...others we are still trying to understand...to see whether we will take the step. Still researching more and allowing us to know more about this vaccine before we take this bold step." (IDI-009)

Other participants stated clearly that they were not willing to have their daughters vaccinated and termed the vaccine as "new in healthcare" and chose to wait and see.

"They absolutely did not want it." (IDI-005)

"Personally, I have never decided to take her for the vaccination and also the father...that is my husband declined the vaccine." (IDI-008)

Perceived barriers

Various barriers to HPV vaccination were shared, including a lack of information and misinformation. This was evident as some participants believed the vaccine was a mode of family planning to limit future generations. This was a significant reason why most mothers were hesitant to take their girls for vaccination.

"We have heard a lot of rumours online and on social media revolving around the HPV. Even known organisations that have spoken about some dangers around HPV vaccination, such as when you vaccinate your daughter, she may start maturing early. She might even go through menopause, might not even get children. It's a way of family planning. And even our old mothers told us that there was a certain year when children were given a certain vaccine, and all women and men in that year were sterile and could not have children. So, we've been told that if you give your child this HPV, you are looking at a sterile child." (IDI-001)

Perceived benefits

Many participants indicated that they perceived benefits from HPV vaccination. Even participants who chose to wait and see had an idea about the HPV vaccine and the reason for vaccination.

"Well...after hearing about the vaccine for a couple of years, am yet to decide on that." (IDI-009)

"I know the benefits...I am aware of the benefits." (IDI-003)

Facilitators of HPV vaccine acceptance

A variety of strategies were implemented to overcome vaccine hurdles and unfavourable impressions, including focused health education, raising awareness, sensitisation, and reaffirming the vaccine's efficacy and safety.

"I think the government can recruit some individuals to educate especially mothers so that they can be aware of the virus and the importance of the vaccine." (IDI-002)

"I wish they give us enough affirmation that vaccine is very safe." (IDI-009)

"I am requesting the government to ensure that information has reached all the mothers." (IDI-011)

"I will be glad to get the information." (IDI-005)

Vaccine hesitancy

The issue of vaccine hesitancy was raised, which was coupled with fear about the vaccine.



"...am not sure....whether it's safe...that's why...am yet to take my daughter to take that vaccine. yeah!" (IDI-009)

"So far, I am hesitant(laughs) about aaah...having my daughter vaccinated." (IDI-003)

Furthermore, a lack of autonomy was evident as two participants stated that they could not decide about HPV vaccination.

"Personally, I have never decided to take her for the vaccination and also the father...that is my husband declined the vaccine." (IDI-008)

Discussions

This study aimed to assess the level of awareness and acceptability of the HPV vaccine among mothers of adolescent girls, determine factors associated with acceptance of the HPV vaccine, and explore mothers' perceptions about, as well as barriers and facilitators to, vaccine acceptability. Quantitative findings showed a relatively high level of awareness about the HPV vaccine among mothers (77.3%). However, the vaccine acceptance rate was notably lower at 54.1%. The qualitative data revealed negative perceptions about the HPV vaccine among study participants. These data underscored perceptions and concerns, particularly regarding the vaccine's safety and impact on their daughters, which influenced their decision-making process.

The acceptability of the HPV vaccine was related to perceptions of safety and effectiveness, as well as awareness and low levels of knowledge about the vaccine. Many participants whose daughters weren't vaccinated indicated a lack of knowledge regarding HPV vaccination as the most significant deterrent to immunising their daughters. Those who feared HPV vaccination due to false rumours were (16.8%). This underscored the importance of providing mothers with accurate information about the vaccine, including the vaccination schedule, dosage, and benefits. Knowledge that the vaccine prevented infection caused by HPV, coupled with the belief in its safety in preventing HPV, were previously cited as the main facilitators of HPV vaccine acceptance (Djuric et al., 2020).

The acceptance rate of HPV vaccination in this study (54.1%) was lower than the national rate (80%) and the global targets (90%). In this study, participants whose adolescent daughters had been vaccinated were 46.2%, who had received the first dose of the vaccine and 49.6% who had received the second dose. Significant factors associated with HPV vaccine acceptability in this study were drawn from both the univariate and multivariate analyses. Elements including knowledge of the HPV vaccine, comprehension of the rationale for vaccination, belief in the vaccine's safety and effectiveness, and prior knowledge of cervical cancer were important determinants affecting acceptance. Regression analysis revealed a strong correlation between acceptability and positive perceptions, as well as greater knowledge about HPV vaccination. This showed that mothers who were well-informed and had a thorough understanding of the vaccine were more likely to accept vaccination for their daughters.

Many participants who did not accept vaccination for their daughters had a negative perception of the HPV vaccine, citing unclear understanding of the program and vaccine side effects. Concern among mothers about the vaccine safety and effectiveness was also identified in this study. A study by Wijayanti also established that mothers' views on safety affected the acceptability of vaccines (Wijayanti et al., 2021). Some mothers believed the vaccine could be a form of family planning or might make their daughters sterile. This demonstrated a need for increased awareness. Health education is essential for disseminating accurate information to the public, clarifying and addressing myths and misinformation. Various channels, such as mass media, campaigns, and formal and informal gatherings, can be utilised to increase awareness and acceptance. The MOH's innovative strategies,



which utilise community health promoters, would benefit mothers most by providing health education and early identification of barriers and challenges related to HPV, thereby increasing vaccine acceptance and uptake. Key take-home messages can be crafted for mothers of adolescent girls to help in addressing the myths and misconceptions that hinder HPV vaccination uptake (Kolek et al., 2022).

The interpretation of mixed-methods data revealed interesting findings, with the qualitative data complementing and extending the quantitative data. Furthermore, the qualitative findings provided a rich insight regarding the gap between vaccine awareness and acceptability. These findings suggest that various factors beyond awareness or knowledge contribute to vaccine acceptance. The qualitative data shed light on deep-seated concerns and fears among mothers, indicating that perceptions played a pivotal role in influencing vaccine acceptability.

Conclusions

The study revealed a high level of awareness among mothers about the HPV vaccine but low acceptability, influenced by knowledge of cervical cancer, beliefs about vaccine safety and effectiveness, and prior exposure to HPV vaccine information. Negative perceptions, including fears, myths, and a lack of information, were key barriers. Education, sensitisation, and reassurance about safety were identified as crucial facilitators to improve vaccine acceptability, highlighting a clear gap between awareness and acceptance.

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