

Acceptance of Human Papillomavirus Vaccination and Associated Factors Among Parents of Daughters in Gondar Town, Northwest Ethiopia

This article was published in the following Dove Press journal:
Cancer Management and Research

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Background: Cervical cancer is one of the profound threats to women's lives and the fourth most common cancer among women. Ethiopia launched the human papilloma vaccination for the first time, with the support of the Global Alliance for Vaccine and Immunization (GAVI) in 2018. Therefore, the aim of this study was to assess the acceptability of the human papillomavirus vaccine and associated factors among parents of daughters in Gondar town, Northwest Ethiopia.

Methods: A community-based cross-sectional study with a total sample of 946 study participants was conducted in Gondar town from April to May 2019. The study participants were selected using a multistage sampling technique from parents having a daughter of 9–17 years age. Data were collected using an interviewer-administered questionnaire. The data were entered into EpiData version 4.2 and exported to STATA version 14 for analysis. Variables having a p-value of <0.2 and <0.05 in the bivariable and multivariable logistic regression were considered as a statistically significant factor for the acceptance of HPV vaccination.

Results: A total of 899 study participants with a response rate of 95% were included in the study. Among participants in this study, 81.3% with 95% CI (78.6, 83.7) accepted to vaccinate their daughters for HPV vaccination. The acceptance to vaccinate daughters for HPV vaccination was affected by being from the richest household [AOR= 3.44, 95% CI = (1.97, 6.01)], good knowledge about cervical cancer [AOR=5.49, 95% CI= (2.62, 11.52)], and positive attitude towards HPV vaccination [AOR=21.53, 95% CI= (11.60, 39.96)].

Conclusion: The study revealed that the acceptance to human papillomavirus vaccination is high and was significantly associated with the level of knowledge about cervical cancer, the attitude towards HPV vaccination, and the wealth status of the households. Therefore, community education on cervical cancer and its prevention is crucial to increase awareness and acceptance as well.

Keywords: cervical cancer, HPV, acceptance, Gondar town, daughters

Introduction

Globally, cervical cancer is one of the gravest threats to women's lives and the fourth most common cancer among women. It is estimated that over a million women currently have cervical cancer and up to 70% of the cases are caused by Human Papilloma Virus (HPV) type 16 and 18.^{1,2} Cervical cancer ranks second in incidence and mortality behind breast cancer in developing countries.² The incidence and mortality in sub-Saharan Africa are among the highest in the world and

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account for over 70% of the global cervical cancer burden with 70,000 new cases annually.³ In Ethiopia, the current estimates indicate that every year 6294 women are diagnosed with cervical cancer and more than three-fourth of them dies from the disease.⁴

Most developed countries have well-organized strategies on organized screening, early detection, and successful treatment of precancerous cervical lesions. HPV vaccination provides an opportunity to low-resource settings to reduce the burden of cervical cancer, thus benefits of the vaccine are restricted to the minority of women who have not been infected yet.^{5–7} Ethiopia launched the HPV vaccine for the first time with the support of the Global Alliance for Vaccine and Immunization (GAVI) in 2018. The vaccine is currently being delivered primarily through a school-based approach to reach all eligible girls.⁸

In Ethiopia, misconceptions about the cause and prevention of cervical cancer are common due to a lack of awareness and health-seeking behavior. Therefore, before the nationwide scale-up of cervical cancer prevention programs, assessment of barriers to acceptance and use of the service through appropriate community-level studies are essential.^{7,9,10}

Vaccine hesitancy is complicated and context-specific. Thus hesitancy is caused by individual, group, and discourse influences, yet as any vaccine-specific problems. Every country must take steps to understand the extent and nature of hesitancy at an area level, on an unbroken basis. Consequently, every country ought to develop a strategy to extend acceptance and demand for vaccination, that should embrace current community engagement and trust-building, active hesitancy hindrance, regular national assessments of considerations, and crisis response designing.^{11,12}

Though vaccination is an effective way to reduce cervical cancer, people's acceptance of vaccination remains a big challenge in developing countries.¹³ Empirical evidence with related to the willingness of the public to take the vaccine, associated factors, and its importance is not well assessed in many low and middle-income countries (LMICs) which is worse in Ethiopia. Thus, this study aimed to assess the acceptability of the human papillomavirus vaccine and associated factors among parents of daughters in Gondar town, northwest Ethiopia.

Methods

Study Area and Period

A community-based cross-sectional study was conducted in Gondar town from April to May 2019. Gondar town is

727 km away from Addis Ababa (the capital city of Ethiopia) and it is the capital city of the central Gondar Zone of the Amhara Region. It has six sub-cities with 25 urban and eleven rural kebeles. According to the Gondar town plan commission and Gondar health sector information office total population size was 390,644, two hospitals, one referral and one private hospital, eight health centers, and fourteen health posts.

Population

The source population was all parents who had daughters aged 9–17 years old living in Gondar town whereas the study population was all parents who had daughters age between 9–17 years old living in the selected kebeles for this particular study.

Sample Size Determination

The sample size was calculated by using both single and double population proportion formula. The sample size for the first objective was calculated using a single population proportion formula assuming 95% confidence interval (CI), 5% marginal error (d), and 50% expected acceptance, which yielded the sample size of 384. The sample size for the second objective was determined by using a double population proportion formula using Epi-Info™ 7 software using the following assumptions: 95% CI, power of 80%, Exposed unexposed ratio= 1, and Crude Odds Ratio (COR) of two significantly associated variables ie those parents who always used condoms (OR=1.77) and who perceived vaccination as acceptable (OR=7.91) from a cross-sectional study conducted at North Vietnam,¹⁴ which yields a sample size of 430. Accordingly, the largest sample was obtained from the second objective, and adding a 10% non-response rate and multiplied by a design effect of 2, the final sample size for this particular study was 946.

Sampling Procedure

The study participants were selected using the two-stage sampling technique. At the first stage of sampling, kebeles were stratified by urban and rural with which 5 urban and 3 rural kebeles were selected using a simple random sampling technique. In the second stage, 946 households were selected using a systematic sampling technique. The sample size for each kebele was allocated proportionally to their size.

Data Collection Procedures

An interviewer-administered questionnaire was used to collect the data. The questionnaire consists of questions on socio-demographic, economic, knowledge, attitude, and information related factors on the acceptability of the vaccination adapted from different literature. The questionnaire was initially prepared in English and translated into Amharic (national language) and again back to English to check for any inconsistencies. The pilot-testing was done out of the study area before the actual data collection by taking a sample of 5%. The reliability test for the data collection tool was checked and revealed the Cronbach alpha value of 0.82, 0.78, and 0.92 for knowledge, attitude, and wealth index respectively.

[Supplementary File 1](#)

Measurements

Knowledge of the Participants

Was assessed among the participants about the cervical cancer cause, HPV prevention, and HPV vaccine. It was measured using 16 item knowledge questions and categorized as “Poor knowledge” (0–4 out of 16 items), “Moderate Knowledge” (5–12 out of 16 items), and “good Knowledge” (13–16 out of 16 items).

Attitude

Was assessed among the participants about cervical cancer prevention, HPV vaccine safety, and effectiveness. It was measured using 12 item questions and categorized as negative (0–4 out of 12 items), neutral (5–8 out of 12 items), and positive (9–12 out of 12 items) attitudes.

Acceptability

Was analyzed for all respondents using a question “Are you willing to vaccinate your daughter for HPV vaccination which can protect against HPV infection? (options: Yes, No).

Wealth Index

It was calculated using 30 data items on a household’s ownership of selected assets, types of water access, and sanitation facilities and computed by Principal Component Analysis (PCA) and divided into three equal parts (three tiles) as poor, medium, and rich wealth index.

Data Processing and Analysis

The data were entered into EpiData version 4.2 and exported to STATA version 14 for cleaning, coding, and analysis. It was described using frequencies, percentages, and mean and SD to show the distribution of the outcome

variable and associated factors with the outcome of interest. Bivariable and multivariable logistic regression analysis were used to see the association between acceptance to the HPV vaccination and the explanatory variables. Crude Odds Ratio (COR) and Adjusted Odds Ratio (AOR) with their 95% CIs were used to report the regression analysis outputs.

Results

Socio-Demographic Characteristics of the Respondents

A total of 899 study participants with a response rate of 95% were included in this study. The mean (SD) age of the respondents were 39 (± 0.30) years and the majority 726 (80.7%) were female by sex, 632 (70.3%) were urban by residence, 596 (66.3%) were married by marital status, 430 (47.83%) were unable to read and write by education status, 373 (41.4%) were housewife by occupation and 749 (83.3%) were orthodox christen by religion. The majority of the respondents 239 (26.5%) had three children. [Table 1](#)

Knowledge, Attitude and Acceptability of HPV Vaccination for Their Daughters

Among participants in this study, 731 (81.3%) with 95% CI (78.6, 83.7) were willing to vaccinate their daughters for the HPV vaccine. The majority of participants 496 (55.2%) had information about HPV infection, and only 142 (28.6%) of the participants were informed by health workers. Additionally, 374 (41.6%) of the participants have poor knowledge about cervical cancer and its risk factors and the majority of the participants 538 (59.9%) had positive attitudes towards the HPV vaccination. [Table 2](#)

Factors Associated with Acceptance of HPV Vaccination for Their Daughters

In the multivariate logistic regression analysis wealth status, knowledge about cervical cancer, and attitude towards HPV vaccination were significantly associated with acceptance of HPV vaccination at a P-value of < 0.05 . [Table 3](#)

The study showed that parents from the richest households were 3.44 times more likely to accept HPV vaccination for their daughters as compared with their counterpart’s poorest household [AOR= 3.44, 95% CI = (1.97, 6.01)]. Similarly, parents from the middle wealth status were 2.04 times more likely to accept HPV vaccination for their daughters as compared with those parents

Table 1 Socio-Demographic Characteristics of Parents of Daughters in Gondar Town, Northwest Ethiopia, 2019 (N=899)

Variables		Number (%)
Age in years	21–29 years	103(11.5)
	30–39 years	395(43.9)
	≥40 years	401(44.6)
Sex	Male	173(19.2)
	Female	726(80.2)
Residence	Urban	632 (70.3)
	Rural	267(29.7)
Marital status	Single	57(6.3)
	Married	596(66.3)
	Divorced	112(12.46)
	Widowed	71(7.9)
Religion	Orthodox	749 (83.3)
	Muslim	99(11)
	Protestant	25(2.78)
	Other	26(2.89)
Educational status	Unable to read and write	430 (47.83)
	Primary and secondary education	226(25.14)
	Diploma and above	243 (27.03)
Occupation	Civil servant	156 (17.3)
	Self-employers	115 (12.9)
	Merchant	137(15.2)
	Farmer	62(6.9)
	House wife	373(41.4)
	Other	56(6.2)
Number of children	Less than or equal to five	789 (87.76)
	Greater than five	110 (12.24)
Number of daughters	One	604(67.2)
	More than one	295(32.8)
Wealth status	Poor	293(32.6)
	Medium	305(34.0)
	Rich	301(33.4)

from the poorest households after adjusting for other factors [AOR= 2.04, 95% CI = (1.27, 3.27)].

Pertaining parent's knowledge about cervical cancer, parents who had good knowledge about cervical cancer and its risk factors were 5.49 times more likely to accept the vaccination than those with poor knowledge [AOR=5.49, 95% CI= (2.62, 11.52)]. Similarly, parents who had moderate knowledge about cervical cancer and its risk factors were 2.98 times more likely to accept HPV

Table 2 Knowledge, Attitude and Acceptability of HPV Vaccination for Their Daughters Among Parents of Daughters in Gondar Town, Northwest Ethiopia, 2019 (n=899)

Variables	Description	Number (%)
Information about HPV infection	Yes	496(55.2)
	No	403(44.8)
Source of Information (n=496)	Television/ Radio	250(50.5)
	Health workers	142(28.6)
	Social media	20(4.0)
	Their friend	74(14.9)
	Others	10(2.0)
	Community perceived trusted source of information(n=899)	Health extension worker
Knowledge about cervical cancer and its risk factors	Website	171(19.0)
	Television	272(30.3)
	Relative/ friends/ colleagues	127 (14.1)
	News paper	15 (1.7)
	Radio	37(4.1)
Attitude towards HPV vaccination	Poor	374(41.6)
	Moderate	335(37.3)
	Good	190(21.1)
Acceptability of the HPV vaccination	Negative	83(9.2)
	Neutral	278(30.9)
	Positive	538(59.9)
Acceptability of the HPV vaccination	Yes	731(81.3)
	No	168(18.7)

vaccination than those with poor knowledge [AOR=2.98, 95% CI= (1.78, 4.97)].

Holding other factors constant, parents who had a positive attitude about the HPV vaccination were 21.53 times more likely to accept HPV vaccination for their daughters than those who had negative attitudes [AOR=21.53, 95% CI= (11.60, 39.96)]. Besides, Parents who had a neutral attitude about the HPV vaccination were 4.03 times more likely to accept the vaccination for their daughters than those who had negative attitudes [AOR=4.03, 95% CI= (2.27, 7.16)].

Discussion

The study was conducted to assess the acceptability of human papillomavirus vaccination and associated factors

Table 3 Bivariable and Multivariable Analysis of Factors Associated with the Acceptability of HPV Vaccination Among Parents of Daughters in Gondar Town, Northwest Ethiopia, 2019 (n=899)

Variables	Category	Acceptability of the HPV Vaccination		COR (95% CI)	AOR (95% CI)
		Yes (%)	No (%)		
Age	21–29 years	82(79.61)	21(20.39)	1:00	1:00
	30–39 years	334(84.56)	61(15.44)	1.40(0.80, 2.43)	1.38(0.71, 2.69)
	≥ 40years	315(78.55)	86(21.45)	0.93(0.54, 1.60)	0.84(0.42, 1.68)
Residence	Urban	516(80.50)	125(19.50)	1.21(0.82, 1.77)	1.34(0.76, 2.39)
	Rural	215(83.33)	43(16.67)	1.00	1.00
Marital Status	Single	50(87.72)	7(12.28)	1.00	1:00
	Married	482(80.87)	114(19.13)	0.59(0.26, 1.33)	0.64(0.24, 1.73)
	Divorced	94(83.93)	18(16.07)	0.73(0.28, 1.86)	0.87(0.28, 2.74)
	Widowed	53(74.65)	18(25.35)	0.41(0.15, 1.07)	0.43(0.13, 1.44)
	Separate	52(82.54)	11(17.46)	0.66(0.23, 1.84)	0.64(0.19, 2.21)
Educational Status	Unable to read and write	353(82.09)	77(17.91)	1.00	1:00
	Primary and secondary	182(80.53)	44(19.47)	0.90(0.59, 1.36)	0.66(0.37, 1.15)
	Diploma and above	196(80.66)	47(19.34)	0.90(0.60, 1.36)	0.37(0.20, 0.70)
Number of daughters	One	489(80.96)	115(19.04)	1.00	1:00
	More than one	242(82.03)	53(17.97)	1.07(0.74, 1.53)	0.90(0.57, 1.42)
Wealth status	Poor	203(69.28)	90(30.72)	1.00	1:00
	Medium	254(83.28)	51(16.72)	2.20(1.49, 3.26)*	2.04(1.27, 3.27)*
	Rich	274(91.03)	27(8.97)	4.49(2.82, 7.17)*	3.44(1.97, 6.01)*
Information	Yes	419(84.48)	77(15.52)	1.00	1.00
	No	312(77.42)	91(22.58)	0.63(0.44, 0.88)*	1.10(0.65, 1.88)
Knowledge about cervical cancer	Poor	259(69.25)	115(30.75)	1.00	1.00
	Moderate	294(87.76)	41(12.24)	3.18(2.14, 4.71)*	2.98(1.78, 4.97)*
	Good	178(93.68)	12(6.32)	6.58(3.52, 12.29)*	5.49(2.62, 11.52)*
Attitude towards HPV vaccination	Negative	34(40.96)	49(59.04)	1.00	1.00
	Neutral	193(69.42)	85(30.58)	3.27(1.97, 5.42)*	4.03(2.27, 7.16)*
	Positive	504(93.68)	34(6.32)	21.36(12.22, 37.34)*	21.53(11.60, 39.96)*

Notes: 1, reference category; *Significant at $p < 0.05$ level.

Abbreviations: COR, crude odds ratio; AOR, adjusted odds ratio; CI, confidence interval.

among parents of daughters in Gondar town. The study showed that the majority of the respondents 731 (81.3%) accepted HPV vaccinations for their daughters and to their close families which is consistent with the previous studies in Ethiopia (79.6%),¹⁵ Nigeria (81.8%),¹⁶ and South Africa (80%).¹⁷ However, several studies conducted in different counties like Tanzania (93.0%),¹⁸ Nigeria (88.9%),¹⁹ Malaysia (87.1%),²⁰ and Honduras (91.0%)²¹ have shown higher acceptance level than our finding. The discrepancy could be due to the introduction of a new vaccine program to our study participants which may affect their level of acceptance and information. Moreover, some of the above studies were

conducted after the provision of the vaccine and summary of information to participants which can lead to an increased level of acceptance compared to participants without such kind of information and vaccine. On the other hand, previous studies conducted in Ethiopia (69.3%),¹⁵ United Arab Emirate (76.6%),¹⁷ and Nigeria (67.4%)²² have shown a lower level of acceptance to vaccination. This may be due to the study participant's differences in socio-demographic characteristics and the level of information. The previous studies might have less information about the benefits of vaccines and the disease problem which might also due to the study time discrepancy.

This study also noted that knowledge on cervical cancer was significantly associated with acceptability to the human papillomavirus vaccination. This study finding is consistent with previous studies in Malaysia,^{20,23} Honduras,²¹ UAE,⁷ Europe,²⁴ and Kenya.²⁵ This might also be justified that those who have a better knowledge of cervical cancer risk factors; disease severity and prevention methods will have more attention to know the vaccination and good attitude for the vaccination. Additionally, other findings conducted in Nigeria,^{22,26} Canada²⁷ and United Arab Emirates⁷ revealed that the main reason for unwillingness was insufficient knowledge about the HPV vaccinations and fear of the side effect where the common reasons for the refusal were the side effects of the vaccination and lack of knowledge.

This finding also revealed that respondents who had a positive attitude about the HPV vaccination was significant associated with the acceptability of the HPV vaccine. This finding is similar to most other concepts of different findings.³⁻⁵ This might be due to the fact that the parent acceptability of the HPV vaccine is largely driven by their attitudes and beliefs regarding the vaccine's effectiveness, safety, and ease of access. Additionally, the general beliefs about the HPV vaccine's propensity to cause harm or deliver benefits can determine the parent's routine delay or facilitate their decisions to vaccinate for the vaccine.

The present study indicated that the wealth status of parents had a statistically significant association with the acceptance of the HPV vaccination. This finding is consistent with studies done in Hong Kong²⁸ and Vietnam.^{29,30} As an individual became economically wealthy; they may have additional money to be allocated for the promotion of their health in addition to basic needs. Additionally, those parents who had better wealth might have a probability to get an opportunity of mass media like TV, radio, and other sources of information for the HPV vaccinations.

Limitation

Even though this study lies relatively on a large sample size with a high response rate, due to the cross-sectional nature of the study establishment of a causal relationship could not be possible.

Conclusion

The study has shown that the acceptance to human papillomavirus vaccination is found to be high and willingness to accept was significantly associated with the level of knowledge of cervical cancer, the attitude towards the

vaccination, and the wealth status of the households. Therefore, community education on cervical cancer and its prevention to increase awareness are necessary. Moreover, efforts should be made to enhance the awareness about HPV vaccination through mass media and other health education outlets towards HPV vaccination.

Abbreviations

CC, Cervical cancer; EPI, Expanded Program on Immunization; GAVI, Global Alliance of Vaccination and Immunization; HPV, Human Papilloma Virus; WHO, World Health Organization.

Data Sharing Statement

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Ethics Approval and Consent to Participate

This study was conducted in accordance with the Declaration of Helsinki. An ethical clearance letter (Ref No/IPH/180/2019) was obtained from the Ethical Review Committee of the Institute of Public Health, College of Medicine and Health Sciences, University of Gondar. A permission letter was also sought from Gondar town authority. Written informed consent was obtained from study participants. To obtain participant's consent; the purpose and importance of the study were explained in the consent form, including the right to withdraw from the study if they face any inconvenience. The name of the respondent was not included in the questionnaire and the confidentiality of the data was protected at all levels.

Acknowledgments

We deeply express our gratefulness to the University of Gondar for financial support without which this project would have not been possible. Our special thanks and sincere appreciation also goes to the Gondar town health department staffs, the study participants, data collectors, and other individuals or organizations that have participated directly or indirectly in the study.

Author Contributions

All authors made a significant contribution to the work reported, starting from the conception, study design, execution, acquisition of data, analysis, and interpretation.

All authors took part in drafting, revising, and final approval of the manuscript version to be published. All authors agreed to be accountable for all aspects of this work.

Funding

This study was funded by the University of Gondar. The views presented in this article are the author's and do not necessarily express the views of the funding organization. The University of Gondar was not involved in the design of the study, data collection, analysis, or interpretation.

Disclosure

The authors declare that they have no competing interests for this work.

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