Individual Characteristics of Caregivers to the Adolescent Girls. Do they Influence Initiation to Human papillomavirus Vaccination? A Cross-sectional Study.

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Abstract

Background

Initiation to the HPV vaccine is critical in the prevention of cervical cancer and failure to receive vaccines as recommended may aggravate the disease burden on the female population. Unfortunately, evidence indicates that initiation to HPV vaccination is still very low in Mbale district, Uganda, and sub-Saharan Africa at large. Hence this study was conducted to study the Individual characteristics of Caretakers of the adolescent girls under the care and how they influence the initiation of HPV vaccine aged 9 to 17 years in Mbale District, Eastern Uganda.

Methodology:

The study adopted a population-based cross-sectional study design in which questionnaires were used in the data collection process. The data were analyzed in STATA. Data was collected from 4th/01/2021 to 20th/05/2022.

Results:

The Individual factors that had significant association with initiation to HPV were School Category($\chi^2 = 8.27,\ df = 1,\ p-value = 0.016$), gender of caretaker ($\chi^2 = 5.95,\ df = 1,\ p-value = 0.015$), education level of caretaker ($\chi^2 = 11.59,\ df = 3,\ p-value = 0.009$), religion of caretaker ($\chi^2 = 12.74,\ df = 4,\ p-value = 0.013$), caretaker's place of residence($\chi^2 = 12.07,\ df = 1,\ p-value = 0.001$) and employment category of caretaker ($\chi^2 = 19.64,\ df = 3,\ p-value = 0.000$). The rest of the variables did not have a statistically significant association with initiation to HPV. No individual factors influenced the initiation to HPV vaccination after controlling for confounding effects.

Conclusion:

Individual characteristics play a role in influencing caretakers towards initiation to HPV vaccination when assessed in isolation.

Recommendations:

Families with cervical cancer history should be encouraged to initiate their adolescent girls to HPV vaccination at the recommended age of 9 years and ensure all the recommended doses are completed as these girls are highly susceptible to cancer.

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1 Background to the Study

Background to the Study

According to WHO (2019), Human papillomavirus (HPV) is a family of almost 200 virus types, most of them cause highly common viral infection of the female reproductive tract and it's mainly transmitted through sexual contact and most people are infected with HPV shortly after the onset of sexual activity. Weaver (2006) reports that Human papillomavirus (HPV) is a global human pathogen

that causes cervical and other anogenital cancers as well as genital warts and recurrent respiratory papillomatosis. Human papillomavirus infection is most common among young, sexually active individuals, and it is so prevalent that approximately 75% to 80% of sexually active individuals will become infected in their lifetime. Many types of HPV don't cause health complications. However, infections with the high-risk HPV types can persist and progress to cervical cancer; among these high-risk types, HPV16 and HPV18, are responsible for 70% of cervical cancers and precancerous cervical lesions (WHO 2020). Cervical cancer has been a major public health menace to women of all age groups in Sub-Saharan Africa (Oluwatosin, 2020).

In 2018, 570,000 women developed cervical cancer and 311,000 died from it. Nowadays, it is the second most common cancer in women living in developing regions. Approximately 84% of all cervical cancers and 88% of all deaths caused by this cancer occurred in lower-resource countries (Marc, 2019). It is estimated that approximately 75% to 80% of sexually active men and women have been exposed to genital HPV, Weaver (2006).

Globally, cervical cancer is the fourth most common type of cancer with 528,000 new cases annually, after lung cancer (583,100 cases), colorectal cancer (614304 cases), and breast cancer (1,676,633 cases) and it is responsible for 266,000 deaths among women worldwide, most of whom are in limited-resource countries, where almost 70% of the global burden occurs (Isabirye *et al*, 2020). Cervical cancer is the most common cancer among women in 39 of the 184 countries and is the principal cause of cancer mortality among women in 45 countries, including Uganda. These are mainly developing countries (Isabirye *et al*, 2020). Individuals aged 15 to 24 years are at the highest risk for genital HPV infection because sexual debut typically occurs in the mid to late teen years, and HPV exposure generally occurs shortly thereafter Weaver (2006). The 2011–2020 Global Vaccine Action Plan declared a decade of vaccine vision where member states were challenged to ensure 90% and 80% national and district HPV vaccine coverage respectively by 2020 (Isabirye *et al*, 2020).

In Africa, 34 out of every 100 000 women are diagnosed with cervical cancer and 23 out of every 100 000 women die from cervical cancer every year. This study was conducted to study the Individual characteristics of Caretakers of the adolescent girls under the care and how they influence the initiation of HPV vaccine aged 9 to 17 years in Mbale District, Eastern Uganda.

2 Methodology

Methodology

Research Design

This study employed a cross-sectional study design and adopted a quantitative approach to data collection. A cross-sectional design further allowed for an investigation of similar cases at the same time thus, saving time, and costs since data were collected just once using questionnaires. This research design was used by Kisaakye et al. (2018) to conduct a related study in Northern Uganda.

Locale of the Study

This study was done in Mbale District including two city divisions from 4th/01/2021 to 20th/05/2022. Mbale District is a district in Eastern Uganda. It serves as the main administrative and commercial center in the sub-region. Mbale District is bordered by Sironko District to the north, Bududa District to the northeast, Manafwa District to the southeast, Tororo District to the south, Butaleja District to the southwest, and Budaka District to the west. Pallisa District and Kumi District lie to the northwest of Mbale District. Mbale, the largest town in the district and the location of the district headquarters, is located approximately 245 kilometers (152 mi), by road, northeast of Kampala, the capital of Uganda, and the largest city in the country. The coordinates of the district are 00 57N, 34 20E. It has an area of 518.8 square kilometers (200.3 sq. mi). The districts of Bududa, Manafwa, Namisindwa, and Sironko were part of the Mbale District before they were split off as independent districts. This area was chosen because prior related studies indicate a very low initiation to HPV vaccines (14%) as reported in Nabirye et al. 2020, compared to the national average of 17%. (MOH, 2016).

Study Population

A study population is a collection of individual units, informants, or respondents to whom the results of a survey are to be generalized (Dooley, 1995; Best & Khan, 1993 & Cardwell 1999. The study population was the Caregivers (parents or guardians) of adolescent girls in the age bracket of 9 – 17 years. The researcher interviewed parents or guardians, preferably females who had adolescent

girls aged 9 – 17 years under their care in Mbale District to enlist information on personal and adolescent girl characteristics, health systems factors, and community characteristics.

This study also targeted the health workers in health centers where HPV services are given in the catchment area because of their knowledge and positions as regards HPV. Included also were the household heads who offer care to adolescent girls aged 9 – 17 years living in either rural or urban setup in Mbale District. The age of the adolescents was determined through parents' / Guardians' reports. Further to this, the researcher only proceeded to administer the interview if the caregiver consented to participate in the study. Excluded were those caregivers in households who did not have girls within the age bracket of this study and those who refused to consent to participate in the study.

Sample Size

The sample is the part of the population that helps researchers to draw inferences about the population. Isaac and Michael (1995) indicate that larger sample sizes will result in smaller sampling errors, greater reliability, and an increase the power of the statistical test applied to the data. Several mathematical formulae have been proposed for sample size determination.

In this study, one of the objectives was to estimate the proportion of HPV initiation by caregivers of adolescents in the age bracket of 9-17 years, which was a dichotomous outcome variable (yes/no) in a single large population of unknown size.

Cochran (1977) and Sullivan (2020) propose the following formula for determining sample size for unknown large populations ($N > 50,000$).

$$n_0 = \frac{Z^2 * p * (1-p)}{e^2}$$

Where, n_0 is the sample size. Z, is the value from the standard normal distribution reflecting the confidence level that will be used. e; is the acceptable sampling error p; is the estimated proportion of an attribute that is present in the population.

Here the research planned a study to generate a 95% confidence interval for the unknown population proportion, p. The range of p is 0 to 1, and therefore the range of p(1-p) is 0 to 1. From theory, to generate the most conservative, or largest sample size, p(1-p) has to be maximized and this achievable when p = 0.5 (Sullivan, 2020). Z = 1.96 for a 95% confidence level, and the corresponding sampling error (margin of error) = 0.05. Computing these values in the formula yields $n_0 = 385$

The research expects the population of caretakers of adolescents aged 9 – 17 years to be less than 50,000, thus, the finite population correction for proportions was:

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

Where; n_0 - the initial sample size. n - adjusted sample size N - the expected population size. UBOS (2014) Population Projections of Mbale District from 2015-2020, puts the population of adolescent girls aged 9yrs to 17yrs at 46,810 (obtained by summing up specific age populations of the females in the target age bracket) in 2020. This number is a proxy approximation of caretakers since the researcher will consider only one adolescent girl in each household.

Substituting these values in formula 2, yields a sample size $n = 381$. For purposes of improving on the precision of the sample estimates, the research will take n = 400 for interview-administered questionnaires, a number slightly above the calculated value. All in all, 445 respondents (400 adolescents' caretakers, 10 Key Informants (a health facility in charge and his/her assistant in each sub-county) and 50 village health team members for FGDs will be selected to participate in the study (one FGD will consist of 10 village health teams, two (preferably females) out of an average of 3 per selected villages in selected sub counties). VHTs are selected on the background that they are knowledgeable about health services in their communities. All contributions from the participants will be appreciated to encourage free interaction so as to enhance productivity of the FGD. Each FGD session will be expected to last 15 to 30 minutes, giving every participant at least two minutes to contribute.

Sampling Procedure

The sampling technique is the process of selecting a sample from a given population. (Palys & Atchison, 2014; Cochran, 1977). This study employed a multistage sampling technique. Multistage sampling has been recommended because it concentrates the sample around several sample points rather than spread them over the entire area to be surveyed and at the same time gives precise estimates, hence reducing the cost (Cochran, 1977). Specifically, this study used a three-stage sampling procedure. In the first stage, the researcher strati-

Table 1. Sample method, target population and sample size

Category of target population	Target population	Sample size	Sampling Method
Adolescent Girls	46, 810	400	Multistage sampling and Simple Random Sampling
KIs	56	10	Purposive sampling
FGDs	395	50 (5 FGDs x10)	Purpose Sampling
Total	-	**460**	

Source: Researcher's Intuition based on Sullivan (2020) and Cochran (1977)

fied the sub-counties by location (urban and rural) and applied simple random sampling by lottery in each stratum to select five sub-counties/ divisions, the primary sampling units (PSU) out of the 21 in the whole district (i.e., Three rural-based and two urban-based). In the second stage, the researcher used a lottery simple random sampling to select three parishes /wards in each sub-county or division, the secondary sampling units (SSU) from each of the selected sub-counties/divisions.

A sampling frame consisting of a household list of adolescent girl caretakers in the selected parishes was constructed. This list was developed with the help of the village health trainers (VHTs) and local council one (LCIs) in the selected parishes. These moved together with research assistants from house to house enumerating caretaker households in which target adolescent girls existed. After listing, number of respondents per parish was established using probability proportional to size (i.e., a parish with a small number listed contributed small number of caretakers to participate in the study and vice versa) where the probability of selection was $\frac{number\ listed\ in\ a\ parish(m_i)}{Total\ sum\ listed\ in\ all\ the\ parishes\ (m)}$.

The required sample size per parish was determined using the formula; $\frac{number\ listed\ in\ a\ parish(m_i)}{Total\ sum\ listed\ in\ all\ the\ parishes\ (m)} \times n,\ n\ being\ the\ study\ sample\ size\ =\ 400$. This formula was first proposed by Lahili (1951) as cited in Cochran (1977)

In each parish, a caretaker to participate in the study was selected using the listing order of household numbers assigned apriori during the listing and interviewed them until the required sample size for the respective parish was obtained. Information was obtained from the caretaker about only one adolescent girl from each household so that the number of caretakers is a proxy for the number of adolescent girls for whom the caretakers provided the information.

Data Collection Methods and Instruments

In this study, both quantitative and qualitative strategies of data collection were adopted. The study adopted both the questionnaire and interview method as the data collection methods in eliciting data from the respondents.

Research instruments

The researcher developed three data collection instruments; The interviewer-administered questionnaire for collecting quantitative data from caregivers of adolescent girls aged 9-17 years, open-ended questions for key informants and focus group discussions questionnaires to collect qualitative data from the health facility in-charges who were the key informants (Boyce and Neale, 2006) and from the village health trainers (VHTs) who constituted the FGDs. This strategy of adopting both methods of data collection help to prevent the inefficiencies of using just one method.

Validity and Reliability

Reliability

Reliability is a measure of the consistency of scores obtained (Gray, 2004). Amin (2005) emphasizes that reliability is the dependability or trustworthiness of research results or the degree to which a measuring instrument consistently measures what it is supposed to measure.

The reliability of this research tool was assessed through brainstorming on all the question items about initiation to HPV vaccination among adolescent girls under care. The questions that seemed to have contradictions were adjusted to fit the research context based on the research objectives. The Cronbach-alpha standard measure of internal consistency could not be applied as the mixed nature of questionnaire items could not fit the theo-

retical assumptions. That is (1) all the item variable values should be on a continuous or Likert scale (Cronbach, 1951) (2) all the item variables should be dichotomous (Technical Whitepaper #7: KR20 & coefficient alpha, 2007)

Validity

The validity of an instrument refers to the extent to which the instrument measures what it is intended to measure. Amin (2005) and (Gray, 2004) point out that a research instrument is valid if it measures what it is supposed to measure and when the data collected through it accurately represents the respondents' opinion.

To ensure that there is internal validity of the research instruments used in this study, the researcher first discussed the draft questionnaires with the supervisors and two colleagues (MPH candidates) for scrutiny, language clarity, comprehensiveness of content, and length of the questionnaire and removal of ambiguity. Recommendations of the supervisors, lecturers, and colleagues were used in the correction of the instruments before pre-testing. To ensure the content validity of the instruments, the researcher availed the corrected questionnaires to the research supervisors of Bugema University. The content validity index (CVI) was calculated using the formula below.

$$CVI = \frac{number\ of\ question\ items\ considered\ relevant}{Total\ number\ questions\ in\ the\ questionnaire.}$$

$$CVI = \frac{28}{33.} = 0.85$$

The CVI calculated results should be within the accepted range of 0 to 1. The result from the computation of CVI were interpreted according to George and Mallery (2003) scale:

Amin (2005) points out that the researcher should consider the content valid only when the CVI > 0.70.

Thus, a CVI of 0.85 was considered good enough for the tool to be used.

Data Collection Process

This study entirely used primary data that was collected using interviewer administered questionnaire. Primary data will help the researcher to enlist only required information by customising the questionnaire and further to minimise missing data (Institute for Work and Health, 2008). The data was quantitative.

3 Data Analysis:

Quantitative data was analysed using STATA to generate frequency tables at univariate analysis level and tests of association and significance at bivariate. Finally, at multivariate analysis to generate odds ratios (measure of effect) and p- values to assess the factors influencing initiation to HPV vaccine among adolescent girls in Mbale district.

4 Results:

Out of 400 questionnaires that were delivered to respondents 388 (97%) were returned with sufficient responses. The reason why some questionnaires were not filled was due to misplacement by the research assistants and a few with inadequate responses were ignored. The 388(97%) respondents were considered adequate for this analysis.

5 Discussion:

The study examined the individual characteristics of Caretakers of the adolescent girls under the care and how they have influenced the initiation of the HPV vaccine among girls aged 9 to 17 in the Mbale district. There were more females aged 20-39 years who were taking care of the adolescent girls, however, 286 (73.7%) of these caretakers were the heads of the family and the majority 308 (79.4%) were the real parents of these adolescent girls under care. Less than half, 172 (44.3%) of the caretakers had attained secondary level education. The majority 137 (35.3%) of the respondents belonged to the Anglican faith and the least came from the unspecified faiths 16 (4.1%), 208 (53.6%) were residing in the urban areas compared to those in rural areas. There were more married caretakers enrolled in the study, reported at 284 (73.2%) compared to those who were separated at 25 (6.4%). 350 (90.2%) of the caretakers were currently employed and the majority 175 (45%) were in Small Business Ownership. Less than half, 113 (29.1%) reported that their relatives had ever suffered from cervical cancer before.

The factors that had significant association with initiation to HPV were; School Category($\chi^2 = 8.27,\ df = 1,\ p - value = 0.016$), gender of caretaker ($\chi^2 = 5.95,\ df = 1,\ p - value = 0.015$), education level of caretaker ($\chi^2 = 11.59,\ df = 3,\ p - value = 0.009$), religion of caretaker ($\chi^2 = 12.74,\ df = 4,\ p - value = 0.013$), caretaker's place

Table 2. Showing Validity of Instruments

CVI	VALIDITY OF INSTRUMENT
0.90 - 1.00	Excellent
0.80 – 0.89	Good
0.70 – 0.79	Acceptable
0.60 – 0.69	Questionable
0.50 – 0.59	Poor
0.00 – 0.50	Unacceptable

Source: George and Mallery (2003)

of residence($\chi^2 = 12.07,\ df = 1,\ p - value = 0.001$) and employment category of caretaker ($\chi^2 = 19.64,\ df = 3,\ p - value = 0.000$). All these had p-values less than 0.05 level of significance as shown against each.

The rest of the variables did not have a statistically significant association with initiation to HPV as they all had p-values ≥ 0.05

After controlling for confounding effects, individual factors do not uniquely influence initiation to HPV vaccination among adolescents by their caretakers.

6 Conclusion

Individual characteristics play a role in influencing caretakers towards initiation to HPV vaccination when assessed in isolation.

Recommendation

The families with cervical cancer history should be encouraged to initiate their adolescent girls to HPV vaccination at the recommended age of 9 years and ensure all the recommended doses are completed as these girls are highly susceptible to the cancer.

7 Acknowledgement

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Source of funding.

There was no funding allocated for the study.

8 Competing interests

There was no competing interest.

Table 3. Individual Characteristics of Caretaker and Adolescent girl under Care.

Individual Characteristics	Observation(n)	Percentage (%)
Age of Adolescent girl under care	**388**	
9-14 years	263	68.1
15-17 years	123	31.9
Schooling Status of Adolescent girl	**388**	
Yes	382	98.5
No	6	1.5
School category	**388**	
Day	271	69.9
Boarding Not applicable	109 8	28.1 2.0
Education level of adolescent girl	**388**	
Primary	259	66.8
O-level	122	31.4
In vocational school	7	1.8
Gender of Care taker	**388**	
Male	31	8.0
Female	357	92.0
Age of caretaker	**388**	
20-39 years	255	65.7
40- 59 years	120	30.9
60 years and above	13	3.4
Household Head	**382**	
Yes	286	73.7
No	102	26.3
Relationship to adolescent girl	**388**	
Parent	308	79.4
Guardian	80	20.6
Educational level of the care taker	**388**	
No Formal Education	41	10.6
Primary level	109	28.1
Secondary level	172	44.3
Post-Secondary level	66	17.0
Religion of the caretaker	**388**	
Catholic	47	12.1
Anglican	137	35.3
Muslim	93	24.0
Born Again Faith	95	24.5
Other Faith	16	4.1
Place of residence of caretaker	**388**	
Rural	180	46.4
Urban	208	53.6
Marital status	**388**	
Single	47	12.1
Married	284	73.2
Divorced	12	3.1
Widowed	20	5.2
Separated	25	6.4
Employment Status of caretaker	**388**	
Employed	350	90.2
Not employed	38	9.8
Form of employment	**354**	
Farmer	119	30.7
Small Business Owner	175	45.0
Corporate Servant	53	13.7
Civil servant	41	10.6

Table 4. Bivariate Results on Individual Factors Associated with HPV Vaccine Initiation among Adolescent girls aged 9 to 17 years in Mbale District.

Individual Characteristics	HPV Initiation Status		Chi-square Results	
	YesN (%)	No N (%)	χ2 (df)	p-value
Age of Adolescent girl under care				
9-14 years	92(66.1)	171 (69.2)	0.38(1)	0.538
15-17 years	47(33.8)	76 (30.8)		
Schooling Status of Adolescent Girl			0.49(1)	0.483
In school	138 (97.8)	244 (98.8)		
Not in School	3 (2.1)	3 (1.2)		
School Category			8.27(1)	**0.016***
Day	86(61.0)	185 (74.9)		
Boarding	51(36.2)	58 (23.5)		
Not Applicable	4 (2.8)	4 (1.6)		
Education level of Adolescent girl			5.15(2)	0.076
Primary	84 (59.6)	175 (70.9)		
O'level	54(38.3)	68 (27.5)		
In vocation institution	3(2.1)	4 (1.6)		
Gender of Care taker			5.95(1)	**0.015***
Male	5(3.5)	26 (10.5)		
Female	136(96.5)	221 (89.5)		
Age of caretaker			2.57(2)	0.277
20-39 years	95(67.4)	160 (64.8)		
40- 59 years	44(31.2)	76 (30.8)		
60 years and above	2(1.4)	11 (4.5)		
Household Head of the family			0.89(1)	0.346
No	41(29.1)	61 (24.7)		
Yes	100 (70.9)	186 (75.3)		
Educational level of the care taker			11.59(3)	**0.009***
No Formal Education	11(7.8)	30 (12.2)		
Primary level	28 (19.9)	81 (32.8)		
Secondary level	72 (51.1)	100 (40.5)		
Post-Secondary level	30 (21.3)	36 (14.6)		
Religion of the caretaker			12.74(4)	**0.013***
Catholic	15(10.6)	32 (13.0)		
Anglican	42 (29.8)	95 (38.5)		
Muslim	33 (23.4)	60 (24.3)		
Born Again Faith	48 (34.0)	47 (19.0)		
Other Faith	3 (2.1)	13 (5.3)		
Place of residence of caretaker			12.07 (1)	**0.001***
Rural	49 (34.8)	131 (53.0)		
Urban	92 (65.3)	116 (47.0)		
Marital status			1.92 (4)	0.750
Single	14 (9.9)	33 (13.4)		
Married	108 (76.6)	176 (71.3)		
Divorced	5 (3.6)	7 (2.8)		
Widowed	6 (4.3)	14 (5.7)		
Separated	8 (5.7)	17 (6.9)		
Employment Status of Caretaker			1.83 (1)	0.176
In Employment	131 (92.9)	219 (88.7)		
Not in Employment	10 (7.1)	28 (11.3)		
Employment Category			19.64(3)	**0.000***
Farmer	36 (25.5)	83 (33.6)		
Small Business Owner	53 (37.6)	122 (49.4)		
Corporate Servant	28 (19.9)	25 (10.1)		
Civil Servant	24 (17.0)	17 (6.9)		

Table 5. List of Abbreviations.

CBCHS	Cameroon Baptist Convention Health Services
DNA	Deoxyribonucleic acid
FGD	Focus Group Discussions
HBM	Health Belief Model
HPV	Human Papilloma Virus
LC1	Local Council 1
NIPS	National Immunization Programs
WHO CURE	World Health Organization Crippled children rehabilitation effort
IRB	Institutional review board
ID	Identification
UBOS	Uganda bureau of standards
PSU	Primary sampling units
SSU	Secondary sampling Units
TSU	Tertiary Sampling Units
KI	Key Informant
CVI	Content Validity Index

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Table 6. References

1) Isabirye, A., Mbonye, M., Asiimwe, J.B, & Kwagala B. (2020). Factors associated with HPV vaccination initiation in Uganda: a multi-level analysis. BMC Women's Health 20, 145https://doi.org/10.1186/s12905-020-01014-5PMid:32660461 PMCid:PMC7359563

2) Nakisige, C., Schwartz, R., Ndira, A. (2017). Cervical cancer screening and treatment in Ugandahttps://doi.org/10.1016/j.gore.2017.01.009PMid:28275695 PMCid:PMC5331149

3) Nabirye, N., Okwi, L. A., Nuwematsiko, R., Kiwanuka, G., Muneza, F., Kamya, C., & BabiryeJ. N, (2020). Health system factors influencing initiation to Human Papilloma Virus (HPV) vaccine among adolescent girls 9-15 years in Mbale District, Uganda. BMC Public Health 20, 171 (2020). doi.org/10.1186/s12889-020-8302-z https://doi.org/10.1186/s12889-020-8302-zPMid:32019543 PMCid:PMC7001317

4) World Health Organization (2013). Immunization, vaccines and biologicals. Human Papillomavirus (HPV). Geneva: World Health Organization. Available from: Http://www.who.int/immunization/topics/hpv/en/ [accessed 16 June 2013].

www.who.int/immunization/topics/hpv/en/

5) World Health Organization (2020). -papillomavirus-(hpv)-and-cervical-cancer WHO 2020, www.who.int/news-room/fact-sheets/detail/human

6) WHO (2022). Cervical cancer. https://www.who.int/news-room/fact-sheets/detail/cervical-cancer

7) Weaver, Bethany A.. "Epidemiology and Natural History of Genital Human Papillomavirus Infection" Journal of Osteopathic Medicine, vol. 106, no. s1, 2006, pp. 2-8.

8) Oluwatosin E.,A.A.Adegoke M.Adelowo (2020). Drivers of cervical cancer screening uptake in Ibadan, Nigeria. https://www.sciencedirect.com/science/article/pii/S2405844020303509

9) Marc Arbyn., Elisabete Weiderpass., Laia Bruni., Silvia de Sanjosé ., Mona Saraiya,., Jacques Ferlay, Ir., Freddie Bray (2019). Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis.https://doi.org/10.1016/S2214-109X(19)30482-6

10) Isabirye, A., Mbonye, M., Asiimwe, J.B.(2020). Factors associated with HPV vaccination uptake in Uganda: a multi-level analysis. BMC Women's Health 20, 145.https://doi.org/10.1186/s12905-020-01014-5PMid:32660461 PMCid:PMC7359563

11) Amponsah-Dacosta, E., Kagina, B. M., & Olivier, J. (2020). Health systems constraints and facilitators of human papillomavirus immunization programmes in sub-Saharan Africa: a systematic review. Health policy and planning, 35(6), 701-717.https://doi.org/10.1093/heapol/czaa017PMid:32538437 PMCid:PMC7294244

12) Nakisige, C., Schwartz, M., & Ndira, A. O. (2017). Cervical cancer screening and treatment in Uganda. Gynecologic oncology reports, 20, 37-40.https://doi.org/10.1016/j.gore.2017.01.009PMid:28275695 PMCid:PMC5331149