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EFFECT OF EDUCATIONAL INTERVENTION ON PERCEPTIONS OF HPV VACCINATION AMONG UNDERGRADUATE FEMALE STUDENTS

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ABSTRACT

Introduction: India leads the world in terms of the prevalence of cervical cancer. If the HPV vaccine is administered before to first sexual contact, the potential degree of protection is approximately 70%. **Aims**: To investigate the impact of an educational intervention on perception among undergraduate female students. **Methodology:** Quasi-experimental design without control groups -One group pretest and post-test study was conducted in a tertiary health care center, among undergraduate female students of Medical, Nursing and Physiotherapy colleges. The study comprised 427 students. Perception of cervical cancer and practice of HPV Vaccination was assessed using a semi-structured questionnaire before giving educational intervention. After a gap of 4 weeks of educational intervention, a post-test was done. **Results:** data was collected using a semi structured questionnaire before and after intervention and it was found that 93% of the study population who had not had the HPV vaccination (406) were willing to do so in the future, and 90.4% of the entire study population (427) were willing to advise others to obtain the cervical cancer vaccine. Following an educational intervention, 2.8% of pupils received vaccinations in 4 weeks. **Conclusion:** In this study, medical and paramedical college students who received an educational intervention showed increased knowledge and a shift in behavior, including a willingness to get immunized. Thus, these initiatives can be promoted among female undergraduate students at all colleges, which will enhance their use of the HPV vaccine to prevent cervical cancer.

Keywords: HPV Vaccination, Educational intervention, Cervical cancer.

INTRODUCTION

One of the most prevalent infections transmitted through sexual contact (STIs) in the world, the human papillomavirus (HPV), affects both men and women. (Dos Santos et al). However human papillomavirus related infections are found to be linked with occurrence of intra epithelial lesions and carcinoma of cervix. (Li X et al., 2023 & Szymonowicz KA et al., 2020) Genital warts and specific cancers, such as cervical, rectal, and oropharyngeal carcinomas, are among the negative health effects that HPV can cause (Soheili, Maryam et al., 2021). The majority of HPV infections resolve on their own within two years, but ongoing infections can cause genital warts and some cancers (Soheili, Maryam et al.,, 2021 & Klosky JL et al., 2017). One of the commonest carcinoma's that can occur in women is carcinoma cervix. (Kong, Zong et al., 2019) Even after knowledge of Human Papilloma virus and its vaccination has improved, carcinoma of cervix is still diagnosed in around half a million people globally every year. (Chang, Huang et al., 2013) In terms of prevalence of cervical cancer, India comes first worldwide. Carcinoma cervix has been found to be the second commonest cancer occurring in females in India.(Bobdey, Sathwara et al., 2016) For the development of invasive carcinoma of cervix human papillomavirus infection that is sexually transmitted as been found to be the key risk factor.(Okunade 2020) Studies have shown that around 3/4th of carcinoma cervix cases have been found to be

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linked with human papillomavirus sero types 16 and 18
. (Wang, Xuelian et al, 2018) When compared to a person who is not infected, those with HPV 16 and 18 have a greater risk of getting cervical cancer.(Ahmed, Bensumaidea et al., 2017) Studies have documented that before the first sexual encounter immunization is responsible for prevention of more than 90% of illnesses related to human papilloma viruses and also immunization after exposure to human papillomavirus has been found to be protective against 50 to 60% of infections (Lehtinen, Paavonen et al., 2012 & Castle, Maza 2016) The high risk strains that is sero type 16 and 18 that are found to be responsible for cervical intra epithelial neoplasia can be prevented up to the tune of 90 to 99% by immunization according to a number of clinical studies and systematic reviews conducted globally .(Apter, Wheeler et al., 2015, Kumar, Rai et al. 2015, Bruni, Diaz et al. 2016, Nakalembe, Makanga et al. 2020) The purpose of vaccines is to protect against HPV strains 16 and 18 (Bloem & Ogbuanu 2017). According to the World Health Organisation (WHO) the target group for preventive HPV vaccination are students of middle schools. (Saslow, Andrews et al. 2016) According to the Centers for Disease Control (CDC), the HPV vaccine is advised for girls between the ages of 9 and 26 and it is found to act the most when administered before the first sexual contact by a female (Petrosky, Emiko Y et al 2017). Three doses of these vaccinations are given at 0, 1-2, and 6 months (Johnson Jones et al, 2020). It has been demonstrated that regular HPV vaccination minimizes the occurrence of diseases associated with HPV (Patel, Cyra et al, 2018). However, vaccination rates are still below ideal levels, particularly among young adults, even though the HPV vaccine is readily available and is advised by health professionals (Muthukrishnan, Meera et al. 2022). Some research has been conducted to examine the efficacy of HPV vaccine provided as only one dose in order to prevent irregularities in the administration of multiple doses and positive results have been seen in some studies where in a individual dose of HPV vaccine has been found to be immunogenic against the strains 16 and 18 (Sankaranarayanan R et al, 2018, Basu P et al, 2021, Baisley K et al, 2022, Waheed DE et al 2023, Prem K et al 2023 & Gelanew T et al 2023).

The majority of people contract HPV soon after they commence experiencing sexual behavior because the virus is primarily spread through sexual contact. There are two ways that HPV infection can spread during sexual activity: penetration through the skin and direct genital contact. (Zhiyue Liu et al., 2016). Early HPV infection can generally result in low-grade cervical cell abnormalities that are clinically evident. But these normally go away on their own in a year or two. (Okunade KS. 2020) Recurring infection with HPV genotypes that are found to be oncogenic raises the chance of development of high-grade cervical cell abnormalities, which, if ignored, can progress to cancer within 10–15 years. (Venkatas J, & Singh M. 2020) Other cofactors linked to cervical cancer include early onset of sexual activity, multiple partners, high-risk partners, prior exposure to STDs, a history of precancerous and malignant lesions in the vulval or vaginal region, tobacco usage, birth control pill use, and immunocompromised state. (Akinyemiju T et al 2016 & Gravitt PE et al 2017) The degree of awareness and understanding regarding multiple elements of the condition and the vaccine is a major determinant of the efficacy and beneficial effects of cervical cancer control and prevention. Targeting immunization-eligible young adult males and girls who are attending college is crucial because they are both susceptible to HPV infection and an element

of the chain of infection due to their increasingly independent behaviors. However, they also have the option to receive vaccination with parental consent and fall within the age range where vaccinations are effective. (Rashid, Shazia et al, 2016). In order to prevent HPV infection, HPV vaccinations are thought to be effective as well as safe (Santos, A.C.d., Silva, 2020). The disparity in HPV and HPV vaccine awareness could be brought about by variations in national vaccination initiatives, places of residence, and social and economic levels of growth across countries and geographic areas. Furthermore, it should be mentioned that compared to earlier studies, parents' awareness and knowledge of HPV and HPV vaccinations have increased substantially due to the majority of mothers, who are more interested in learning about and spreading awareness about prevention of cervical cancer (Hu et al.,, 2021 & Xie et al.,, 2021). According to research conducted all across the world, adolescent groups have very little understanding of HPV and its immunizations. Only 11 respondents (about 3%) to a research conducted in Nigeria had a good awareness of HPV and its vaccination. (Oluwole, Idowu et al., 2019) 13.5% of participants in a different study in Ibadan were aware of HPV and 30.1% were aware of HPV immunizations.(Oluwasola, Bello et al., 2019) A survey carried out in India found that 34% of teenagers had never heard of the human papillomavirus.(Ramesh, Krishnamurthy et al., 2021). A different survey conducted on teenagers in the Indian city of Mangalore found that Forty percent did not know about the HPV vaccine. (Shetty, Prabhu et al., 2019). Even though there is widespread knowledge of the connection between HPV and cervical cancer and the effectiveness of HPV-based screening and vaccination as primary preventive interventions, the acceptability of these therapies is typically low in many developing nations, including India. (Mehrotra & Yadav 2022) Precise statistics on the disease burden are crucial in substantiating the necessity of HPV vaccination and ultimately evaluating the efficacy of the vaccine.(Zheng Quan Toh et al 2017). The development of the HPV vaccine has made major strides in the battle against diseases associated with HPV. As of this moment, Gardasil, Gardasil 9, and Cervarix are the three HPV vaccines that are readily available.(Illah, Ojone, & Adeola Olaitan, 2023) These vaccinations are mostly preventative in nature, and they work best when given prior to viral exposure. A quadrivalent vaccine (Gardasil, Merck, USA, targeting HPV types 6, 11, 16, and 18) as well as a bivalent vaccine (Cervarix, GSK Biologicals, Belgium, targeting HPV types 16 and 18) are both available in India. (Sankaranarayanan R, et al 2016) The nonavalent HPV vaccination (Gardasil, Merck, USA), which is effective against an additional five HPV genotypes and was licensed by the U.S. Food and Drug Administration (U.S. FDA) in 2014, is not yet available in India (Sharma C et al, 2020).

Numerous studies have determined that among the most important reasons influencing the low uptake of these therapies are a lack of adequate information and a negative attitude about HPV vaccination and screening.(Fernandes, Potter et al., 2018, Oluwole, Idowu et al., 2019, Khatiwada, Kartasasmita et al., 2021, & Lakneh, Mersha et al., 2022). Studies have shown that the knowledge and perspectives of healthcare providers have a s ignificant impact on their intention to recom mend particular therapies.(Giuliani, Vescio et al., 2016, Baldovin & Bertoncello 2019, & Jeannot, Viviano et al., 2019)

Additional information can have a significant role in influencing how people perceive and accept the HPV vaccine, which will reduce the risk that women will develop cervical cancer in the future.(Thomas 2016). Ever since the HPV vaccine was introduced, the prevalence of diseases associated with

HPV has dramatically declined. Nonetheless, Young adults still don't fully understand the vaccine, and this includes female undergraduate students. This study's objective is to evaluate how an educational intervention affects female undergraduate students' knowledge and attitudes regarding the HPV vaccine. It is believed that the educational intervention will help these individuals embrace and apply vaccinations in greater numbers by dispelling myths and dealing with issues related to misinformation and misconceptions.Hence, The purpose of this study was to compare attitudes toward and usage of HPV vaccination.before and after an educational intervention among female undergraduate medical and paramedical college students.

METHODS

Quasi-experimental design without control groups (One group pretest and post-test study) was conducted in a tertiary health care centre, among undergraduate female students of Medical, Nursing and Physiotherapy colleges. The sample size was calculated based on the pilot study conducted where the prevalence of positive attitude towards cervical cancer vaccine after an educational intervention was found to be 50%. we used the Israel's formula for calculating the sample size where $n = 4pq/d^2$, taking into account 50% as p with a 95% confidence interval, a permitted error of 5%, and a non-response rate of 10%, the sample size (n) that is determined is 427.(Israel, G.D., 2003) The study employed a stratified random sampling technique to pick female students studying health care from diverse strata, including medical, physiotherapy, and nursing colleges. From each strata number of students to be included was derived as per population proportion to size. Individual student on each stratum was selected by simple random sampling technique using a random number table.

Before providing an educational intervention, perceptions of cervical cancer and the use of HPV vaccination were evaluated using a semi-structured questionnaire. After a gap of 4 weeks of educational intervention, a post-test was done. One-hour group lecture by a medical college faculty of the rank of Associate Professor from the Department of Community Medicine was delivered batchwise over a period of ten days. The topics covered included the prevalence of cervical cancer in India, its risk factors and clinical features, survival rates, and the effectiveness of HPV vaccination in preventing cervical cancer. Other topics included the vaccination's indications, side effects, and contraindications, as well as its schedule, cost, and proximity to medical facilities where it can be administered. The research was conducted between August 2020 and October 2020. Version 27 of the SPSS software was used to analyze the data. To ascertain whether there was a significant difference in the proportions of categories in two related groups, the McNemar test was employed. A 5% level of significance ($p < 0.05$) was used to determine statistical significance. This study received approval from the Kanachur Institute of Medical Sciences Institutional Ethics Committee and was registered in the National Medical Research Registry (KIMS/IEC/A002/2020).

RESULTS

Out of the total 427 female undergraduate students, 222 students were from Medical, 61 were from Physiotherapy and 144 were from Nursing college. Before receiving educational intervention, 88.5% of the 427 female undergraduate students recognized that cervical cancer was a disease,

but only 39.8% knew that there was a vaccination to prevent it.

Table 1. Perception among the study population before and after an educational intervention (n=427)

	Before intervention (%)	**After intervention (%)**	**p value**
Agree that Cervical cancer is a terminal illness	245 (57.4)	323 (75.6)	<0.001
Agree that cervical cancer affects one's future	376 (88.1)	387 (90.6)	0.22
Agree that multiple sexual partners are a risk for cervical cancer	246 (57.6)	388 (90.9)	<0.001
Agree that cervical cancer can be associated with oral contraceptive pill usage	282 (66)	358 (83.8)	<0.001
Agree that smoking and alcohol are risk factors for cervical cancer	270 (63.2)	358 (83.8)	<0.001
Agree that cervical cancer can affect one's menstrual cycle	389 (91.1)	404 (94.6)	0.04
Agree that the cervical cancer vaccine gives protection	31 (7.3%)	323 (75.6)	<0.001
Agree that HPV infection is associated with cervical cancer	199 (46.6)	370 (86.65)	<0.001

p-value analyzed by **McNemar Test**

Cervical cancer is a life-threatening illness, according to 57.4% of the study population before the intervention, and 75.6% of the population after the intervention.[Table 1] The research population believed that having several partners increased the risk of acquiring cervical cancer, according to 57.6% of participants before to the intervention. Following the intervention, this opinion improved to 90.9%. The impression of oral contraceptive pill use and cervical cancer increased from 66% to 83.8%, respectively. Additionally, after the intervention, there was an increase in perception of smoking and alcoholism as risk factors for cervical cancer from 63.2% to 83.8%. The above results showed that a statistically significant improvement was seen in the knowledge regarding cervical cancer and its risk factors after the educational intervention.

Table 2. Willingness to accept cervical cancer vaccine among the study population after an educational intervention.

	Frequency	**Percentage**
Willing to take cervical cancer vaccine against cervical cancer in future (n= 406)*	378	93
Willing to recommend cervical cancer vaccine to friends and relatives (n=427)	386	90.4

Out of the 21 students who were excluded from the analysis, 9 were vaccinated before an educational intervention and 12 students (2.8 %) got vaccinated in the period time of 4 weeks after an educational intervention. After the educational intervention, 90.4% of the study population (427) and 93% of the study population (406), who had not yet received the HPV vaccine, were willing to recommend the cervical cancer vaccine to friends and family. [Table 2].

The majority of study participants (71.4%) failed to provide a justifiable justification for their refusal to receive the vaccination, demonstrating that they were still unconcerned with the risk that cervical cancer may cause to their life and the potential benefits of the vaccine.Due to the cost of the vaccinations, 13.8% of the trial participants skipped them during the four-week period.

DISCUSSION

The implementation of educational interventions is imperative in raising the degree of knowledge, understanding, and compliance to accept the HPV vaccine. Numerous research studies have exhibited the effectiveness of educational programs in enhancing knowledge and intention regarding the HPV vaccine across various demographic groups (Nguyen Minh, Duc et al, 2020, Zomordi, Golchehreh et al, 2022 & Bocquier, A et al, 2023).

93% of the students in our study said they have thought about getting vaccinated in the future. Xue, L. et al. (2018) found that 66.9% of Chinese students aged 13 to 19 expressed an openness to receiving the HPV vaccine in the future.(Xue, Hu et al., 2018) Improvements were shown in posttest answers to questions on symptom awareness (60%) and prevention (88%). in the study by Swain D et al (2018), which was conducted in Bhubaneswar and used a quasi-experimental pretest and posttest approach.(Swain & Parida 2018)

In our study, 88.5% of participants recognized cervical cancer as a disease, but only 39.8% were aware that, prior to receiving educational intervention, there is a vaccination to prevent it. Only 41.2% of women in the study by Nelson et al., (2018) in South Tamil Nadu, which included a sample of 100 women aged 25 to 50, were aware that cervical cancer existed. Only 11.76% of people were aware that a vaccine existed to prevent cervical cancer.(Nelson, Viswanathan et al., 2018) In the study conducted by Ramavath et al., (2013), 72% of the participants had no knowledge of HPV, which is the virus that causes cervix cancer, or cervical cancer. On the other hand, prior to educational intervention, 53.3% of the study population in our study was unaware of the connection between HPV infection and cervical cancer.(Ramavath & Olyai 2013)

Knowledge regarding the vaccine's protective efficacy increased significantly after the educational intervention, rising from 7.3% to 75.6%. Ninety-three percent of the study population who have not received the HPV vaccine were willing to do so in the future, and 90.4% of all study participants were willing to advise friends and family to obtain the vaccine against cervical cancer. Within four weeks of the educational intervention, 2.8% of the students had received the HPV vaccine, indicating a significant improvement in their knowledge and use of HPV vaccination.

Additionally, it was seen that some students had misconceptions about the HPV vaccine. This suggests that there is still a barrier to students accepting the vaccine, but it may be removed with consistent counseling and teaching about the vaccine and the role of vaccine in the prevention of HPV vaccine. The information about the

dangers of HPV infection and its subsequent prevention can be incorporated in the school curriculum when the students enter the middle school, which is the average period in which the girls begin to understand the role of infections, especially sexually transmitted infections.

CONCLUSIONS

The HPV vaccine is crucial for public health because it helps prevent cervical cancer. According to this study, students studying medicine and paramedicine who got educational intervention showed improvements in their knowledge, altered behaviors, and increased willingness to get immunizations. As a result, programs of this nature can be encouraged among female undergraduate students in educational institutions, enhancing the routine delivery of the HPV vaccination to avoid cervical cancer. It is also advised that women of reproductive age who request the vaccine receive it from the government at a reduced cost.

REFERENCES

Ahmed, H. G., Bensumaidea, S. H., Alshammari, F. D., Alenazi, F. S. H., ALmutlaq, B. A., Alturkstani, M. Z., & Aladani, I. A. (2017). Prevalence of Human Papillomavirus subtypes 16 and 18 among Yemeni Patients with Cervical Cancer. Asian Pacific Journal of Cancer Prevention, 18(6), 1543–1548. https://doi.org/10.22034/APJCP.2017.18.6.1543

Akinyemiju, T., Ogunsina, K., Sakhuja, S., Ogbhodo, V., & Braithwaite, D. (2016). Life-course socioeconomic status and breast and cervical cancer screening: analysis of the WHO's Study on Global Ageing and Adult Health (SAGE). *BMJ Open*, *6*(11), e012753. https://doi.org/10.1136/bmjopen-2016-012753

Almegewly, W., Hawamdah, S., Moussa, F., Dator, W. L., Alonezi, A., & Aleissa, M. (2022). Measuring Nurses' and Physicians' Attitudes and Perceptions of the Appropriate Interventions towards Intimate Partner Violence in Saudi Arabia. Healthcare, 10, 1430. https://doi.org/10.3390/healthcare10081430

Apter, D., Wheeler, C. M., Paavonen, J., Castellsagué, X., Garland, S. M., Skinner, S. R., Naud, P., Salmerón, J., Chow, S.-N., Kitchener, H. C., Teixeira, J. C., Jaisamrarn, U., Limson, G., Szarewski, A., Romanowski, B., Aoki, F. Y., Schwarz, T. F., Poppe, W. A. J., Bosch, F. X., … Dubin, G. (2015). Efficacy of Human Papillomavirus 16 and 18 (HPV-16/18) AS04-Adjuvanted Vaccine against Cervical Infection and Precancer in Young Women: Final Event-Driven Analysis of the Randomized, Double-Blind PATRICIA Trial. Clinical and Vaccine Immunology, 22(4), 361–373. https://doi.org/10.1128/CVI.00591-14

Baisley, K., Kemp, T. J., Kreimer, A. R., Basu, P., Changalucha, J., Hildesheim, A., Porras, C., Whitworth, H., Herrero, R., Lacey, C. J., Schiller, J. T., Lucas, E., Mutani, P., Dillner, J., Indangasi, J., Muwonge, R., Hayes, R. J., Pinto, L. A., & Watson-Jones, D. (2022). Comparing one dose of HPV vaccine in girls aged 9–14 years in Tanzania (DoRIS) with one dose of HPV vaccine in historical cohorts: an immunobridging analysis of a randomised controlled trial. The

Lancet Global Health, 10(10), e1485–e1493. https://doi.org/10.1016/S2214-109X(22)00306-0

Baldovin, T., Bertoncello, C., Cocchio, S., Fonzo, M., Gazzani, D., Buja, A., Majori, S., & Baldo, V. (2019). Perception and knowledge of HPV-related and vaccine-related conditions among a large cohort of university students in Italy. Human Vaccines & Immunotherapeutics, 15(7–8), 1641–1649. https://doi.org/10.1080/21645515.2018.1564432

Bello, O. O., Oluwasola, T. A. O., & Odukogbe, A. A. (2016). Awareness and attitude towards HPV and its vaccines among market women in Bodija Market, Ibadan. Nigerian Journal of Medicine : Journal of the National Association of Resident Doctors of Nigeria, 25(1), 12–17

Bloem, P., & Ogbuanu, I. (2017). Vaccination to prevent human papillomavirus infections: From promise to practice. PLOS Medicine, 14(6), e1002325. https://doi.org/10.1371/journal.pmed.1002325

Bobdey, S., Sathwara, J., Jain, A., & Balasubramaniam, G. (2016). Burden of cervical cancer and role of screening in India. Indian Journal of Medical and Paediatric Oncology, 37(04), 278–285. https://doi.org/10.4103/0971-5851.195751

Bocquier, A., Branchereau, M., Gauchet, A., Bonnay, S., Simon, M., Ecollan, M., Chevreul, K., Mueller, J. E., Gagneux-Brunon, A., & Thilly, N. (2023). Promoting HPV vaccination at school: a mixed methods study exploring knowledge, beliefs and attitudes of French school staff. BMC Public Health, 23(1), 486. https://doi.org/10.1186/s12889-023-15342-2

Bruni, L., Diaz, M., Barrionuevo-Rosas, L., Herrero, R., Bray, F., Bosch, F. X., de Sanjosé, S., & Castellsagué, X. (2016). Global estimates of human papillomavirus vaccination coverage by region and income level: a pooled analysis. The Lancet Global Health, 4(7), e453–e463. https://doi.org/10.1016/S2214-109X(16)30099-7

Castle, P. E., & Maza, M. (2016). Prophylactic HPV vaccination: past, present, and future. Epidemiology and Infection, 144(3), 449–468. https://doi.org/10.1017/S0950268815002198

Chang, I. J., Huang, R., He, W., Zhang, S.-K., Wang, S.-M., Zhao, F.-H., Smith, J. S., & Qiao, Y.-L. (2013). Effect of an educational intervention on HPV knowledge and vaccine attitudes among urban employed women and female undergraduate students in China: a cross-sectional study. BMC Public Health, 13(1), 916. https://doi.org/10.1186/1471-2458-13-916

Dos Santos, L. M., de Souza, J. D., Mbakwa, H. A., Nobre, A. F. S., Vieira, R. C., Ferrari, S. F., Rodrigues, A. R., Ishikawa, E. A. Y., Guerreiro, J. F., & de Sousa, M. S. (2022). High prevalence of sexual infection by human papillomavirus and Chlamydia trachomatis in sexually-active women from a large city in the Amazon region of Brazil. PLOS ONE, 17(7), e0270874. https://doi.org/10.1371/journal.pone.0270874

Fernandes, R., Potter, B. K., & Little, J. (2018). Attitudes of undergraduate university women towards HPV

vaccination: a cross-sectional study in Ottawa, Canada. BMC Women's Health, 18(1), 134. https://doi.org/10.1186/s12905-018-0622-0

Gelanew, T., Wondwossen, L., Mihret, A., & Mulu, A. (2023). A call for switching to a 1-dose 9vHPV national vaccination program in Ethiopia. Frontiers in Public Health, 11. https://doi.org/10.3389/fpubh.2023.1211894

Giuliani, M., Vescio, M. F., Donà, M. G., Latini, A., Frasca, M., Colafigli, M., Farinella, M., Rezza, G., & Cristaudo, A. (2016). Perceptions of Human Papillomavirus (HPV) infection and acceptability of HPV vaccine among men attending a sexual health clinic differ according to sexual orientation. Human Vaccines & Immunotherapeutics, 12(6), 1542–1550. https://doi.org/10.1080/21645515.2015.1115935

Gravitt, P., & Winer, R. (2017). Natural History of HPV Infection across the Lifespan: Role of Viral Latency. Viruses, 9(10), 267. https://doi.org/10.3390/v9100267

Hofstetter, A. M., Stockwell, M. S., Al-Husayni, N., Ompad, D., Natarajan, K., Rosenthal, S. L., & Soren, K. (2014). HPV vaccination: Are we initiating too late? Vaccine, 32(17), 1939–1945. https://doi.org/10.1016/j.vaccine.2014.01.084

Hu, S., Xu, X., Zhang, Y., Liu, Y., Yang, C., Wang, Y., Wang, Y., Yu, Y., Hong, Y., Zhang, X., Bian, R., Cao, X., Xu, L., & Zhao, F. (2021). A nationwide post-marketing survey of knowledge, attitude and practice toward human papillomavirus vaccine in general population: Implications for vaccine roll-out in mainland China. Vaccine, 39(1), 35–44. https://doi.org/https://doi.org/10.1016/j.vaccine.2020.11.029

Illah, O., & Olaitan, A. (2023). Updates on HPV Vaccination. Diagnostics, 13(2), 243. https://doi.org/10.3390/diagnostics13020243

Israel, G.D., 2003. Determining sample size (Tech. Rep. No. PEOD-6). Florida: University of Florida, Institute of Food and Agricultural Sciences.

Jeannot, E., Viviano, M., Follonier, M.-C., Kaech, C., Oberhauser, N., Mpinga, E. K., Vassilakos, P., Kaiser, B., & Petignat, P. (2019). Human Papillomavirus Infection and Vaccination: Knowledge, Attitude and Perception among Undergraduate Men and Women Healthcare University Students in Switzerland. Vaccines, 7(4). https://doi.org/10.3390/vaccines7040130

Johnson Jones, M. L., Gargano, J. W., Powell, M., Park, I. U., Niccolai, L. M., Bennett, N. M., Griffin, M. R., Querec, T., Unger, E. R., Markowitz, L. E., & HPV-IMPACT Working Group. (2020). Effectiveness of 1, 2, and 3 Doses of Human Papillomavirus Vaccine Against High-Grade Cervical Lesions Positive for Human Papillomavirus 16 or 18. American Journal of Epidemiology, 189(4), 265–276. https://doi.org/10.1093/aje/kwz253

Khatiwada, M., Kartasasmita, C., Mediani, H. S., Delprat, C., van Hal, G., & Dochez, C. (2021). Knowledge, Attitude and Acceptability of the Human Papilloma Virus Vaccine and Vaccination Among University Students in Indonesia. Frontiers in Public Health, 9, 616456. https://doi.org/10.3389/fpubh.2021.616456

Klosky, J. L., Hudson, M. M., Chen, Y., Connelly, J. A., Wasilewski-Masker, K., Sun, C.-L., Francisco, L., Gustafson, L., Russell, K. M., Sabbatini, G., Flynn, J. S., York, J. M., Giuliano, A. R., Robison, L. L., Wong, F. L., Bhatia, S., & Landier, W. (2017). Human Papillomavirus Vaccination Rates in Young Cancer Survivors. Journal of Clinical Oncology, 35(31), 3582–3590. https://doi.org/10.1200/JCO.2017.74.1843

Kong, Y., Zong, L., Yang, J., Wu, M., & Xiang, Y. (2019). Cervical cancer in women aged 25 years or younger: a retrospective study. Cancer Management and Research, Volume 11, 2051–2058. https://doi.org/10.2147/CMAR.S195098

Kumar, R., Rai, A. K., Das, D., Das, R., Kumar, R. S., Sarma, A., Sharma, S., Kataki, A. C., & Ramteke, A. (2015). Alcohol and Tobacco Increases Risk of High Risk HPV Infection in Head and Neck Cancer Patients: Study from North-East Region of India. PLOS ONE, 10(10), e0140700. https://doi.org/10.1371/journal.pone.0140700

Lakneh, E. A., Mersha, E. A., Asresie, M. B., & Belay, H. G. (2022). Knowledge, attitude, and uptake of human papilloma virus vaccine and associated factors among female preparatory school students in Bahir Dar City, Amhara Region, Ethiopia. PloS One, 17(11), e0276465. https://doi.org/10.1371/journal.pone.0276465

Lehtinen, M., Lagheden, C., Luostarinen, T., Eriksson, T., Apter, D., Bly, A., Gray, P., Harjula, K., Heikkilä, K., Hokkanen, M., Karttunen, H., Kuortti, M., Nieminen, P., Nummela, M., Paavonen, J., Palmroth, J., Petäjä, T., Pukkala, E., Soderlund-Strand, A., … Dillner, J. (2021). Human papillomavirus vaccine efficacy against invasive, HPV-positive cancers: population-based follow-up of a cluster-randomised trial. BMJ Open, 11(12), e050669. https://doi.org/10.1136/bmjopen-2021-050669

Li, X., Xiang, F., Zhao, Y., Li, Q., Gu, Q., Zhang, X., Chen, Z., Zhang, M., Wang, J., Liu, R., Kang, X., & Wu, R. (2023). Detection of cervical high-grade squamous intraepithelial lesions and assessing diagnostic performance of colposcopy among women with oncogenic HPV. BMC Women's Health, 23(1), 411. https://doi.org/10.1186/s12905-023-02538-2

Liu, Z., Rashid, T., & Nyitray, A. G. (2016). Penises not required: a systematic review of the potential for human papillomavirus horizontal transmission that is non-sexual or does not include penile penetration. Sexual Health, 13(1), 10. https://doi.org/10.1071/SH15089

Liu, C.-R., Liang, H., Zhang, X., Pu, C., Li, Q., Li, Q.-L., Ren, F.-Y., & Li, J. (2019). Effect of an educational intervention on HPV knowledge and attitudes towards HPV and its vaccines among junior middle school students in Chengdu, China. BMC Public Health, 19(1), 488. https://doi.org/10.1186/s12889-019-6823-0

Mehrotra, R., & Yadav, K. (2022). Cervical Cancer: Formulation and Implementation of Govt of India Guidelines for Screening and Management. Indian Journal of Gynecologic Oncology, 20(1), 4.

https://doi.org/10.1007/s40944-021-00602-z

Muthukrishnan, M., Loux, T., Shacham, E., Tiro, J. A., & Arnold, L. D. (2022). Barriers to human papillomavirus (HPV) vaccination among young adults, aged 18–35. Preventive Medicine Reports, 29, 101942. https://doi.org/10.1016/j.pmedr.2022.101942

Nakalembe, M., Makanga, P., Kambugu, A., Laker-Oketta, M., Huchko, M. J., & Martin, J. (2020). A public health approach to cervical cancer screening in Africa through community-based self-administered HPV testing and mobile treatment provision. Cancer Medicine, 9(22), 8701–8712. https://doi.org/10.1002/cam4.3468

Nelson, S. B., Viswanathan, N., Jenifer, N. A., & B., P. (2018). A cross sectional study on cervical cancer and its prevention among women of age group 25- 50 years in a rural area of south Tamilnadu, India. International Journal Of Community Medicine And Public Health, 5(6), 2536. https://doi.org/10.18203/2394-6040.ijcmph20182191

Nguyen Minh, D., Taneepanichskul, N., & Hajek, R. (2020). Effectiveness of a Health Talk Education Program on Human Papillomavirus (HPV) Knowledge, Attitudes, and Intentions to Vaccinate Children Among Mothers of Secondary School Boys in Thua Thien Hue Province, Vietnam. Risk Management and Healthcare Policy, Volume 13, 1207–1214. https://doi.org/10.2147/RMHP.S259097

Okunade, K. S. (2020). Human papillomavirus and cervical cancer. Journal of Obstetrics and Gynaecology, 40(5), 602–608. https://doi.org/10.1080/01443615.2019.1634030

Oluwole, E., Idowu, O., Adejimi, A., Balogun, M., & Osanyin, G. (2019). Knowledge, attitude and uptake of human papillomavirus vaccination among female undergraduates in Lagos State, Nigeria. Journal of Family Medicine and Primary Care, 8(11), 3627. https://doi.org/10.4103/jfmpc.jfmpc_520_19

Patel, C., Brotherton, J. M., Pillsbury, A., Jayasinghe, S., Donovan, B., Macartney, K., & Marshall, H. (2018). The impact of 10 years of human papillomavirus (HPV) vaccination in Australia: what additional disease burden will a nonavalent vaccine prevent? Eurosurveillance, 23(41). https://doi.org/10.2807/1560-7917.ES.2018.23.41.1700737

Petrosky, E. Y., Liu, G., Hariri, S., & Markowitz, L. E. (2017). Human Papillomavirus Vaccination and Age at First Sexual Activity, National Health and Nutrition Examination Survey. Clinical Pediatrics, 56(4), 363–370. https://doi.org/10.1177/0009922816660541

Prem, K., Choi, Y. H., Bénard, É., Burger, E. A., Hadley, L., Laprise, J.-F., Regan, M. C., Drolet, M., Sy, S., Abbas, K., Portnoy, A., Kim, J. J., Brisson, M., & Jit, M. (2023). Global impact and cost-effectiveness of one-dose versus two-dose human papillomavirus vaccination schedules: a comparative modelling analysis. BMC Medicine, 21(1), 313. https://doi.org/10.1186/s12916-023-02988-3

Ramavath, K. K., & Olyai, R. (2013). Knowledge and Awareness of HPV Infection and Vaccination Among

Urban Adolescents in India: A Cross-Sectional Study. The Journal of Obstetrics and Gynecology of India, 63(6), 399–404. https://doi.org/10.1007/s13224-013-0413-3

Ramesh, P. S., Krishnamurthy, S., Shrestha, S., Nataraj, S. M., & Devegowda, D. (2021). Knowledge, awareness and prevalence of Human Papillomavirus among local University students and Healthcare workers in South India: A cross-sectional study. Clinical Epidemiology and Global Health, 12, 100839. https://doi.org/10.1016/j.cegh.2021.100839

Rashid, Shazia et al. "Knowledge, Awareness and Attitude on HPV, HPV Vaccine and Cervical Cancer among the College Students in India." PloS one vol. 11,11 e0166713. 18 Nov. 2016, https://doi.org/10.1371/journal.pone.0166713

Sankaranarayanan, R., Bhatla, N., & Basu, P. (2016). Current global status & impact of human papillomavirus vaccination: Implications for India. Indian Journal of Medical Research, 144(2), 169. https://doi.org/10.4103/0971-5916.195023

Sankaranarayanan, R., Joshi, S., Muwonge, R., Esmy, P. O., Basu, P., Prabhu, P., Bhatla, N., Nene, B. M., Shaw, J., Poli, U. R. R., Verma, Y., Zomawia, E., Pimple, S., Tommasino, M., Pawlita, M., Gheit, T., Waterboer, T., Sehr, P., & Pillai, M. R. (2018). Can a single dose of human papillomavirus (HPV) vaccine prevent cervical cancer? Early findings from an Indian study. Vaccine, 36(32), 4783–4791. https://doi.org/10.1016/j.vaccine.2018.02.087

Santos, A. C. da S., Silva, N. N. T., Carneiro, C. M., Coura-Vital, W., & Lima, A. A. (2020). Knowledge about cervical cancer and HPV immunization dropout rate among Brazilian adolescent girls and their guardians. BMC Public Health, 20(1), 301. https://doi.org/10.1186/s12889-020-8410-9

Saslow, D., Andrews, K. S., Manassaram-Baptiste, D., Loomer, L., Lam, K. E., Fisher-Borne, M., Smith, R. A., & Fontham, E. T. H. (2016). Human papillomavirus vaccination guideline update: American Cancer Society guideline endorsement. CA: A Cancer Journal for Clinicians, 66(5), 375–385. https://doi.org/10.3322/caac.21355

Sharma, C., Singh, P., Arora, I., Bhardwaj, A., Saini, A., Gothwal, M., & Jhirwal, M. (2020). Assessment of understanding about human papilloma virus vaccination among undergraduate medical students in a developing country: Perspective from India. Journal of Family Medicine and Primary Care, 9(8), 4311. https://doi.org/10.4103/jfmpc.jfmpc_893_20

Shetty, S., Prabhu, S., Shetty, V., & Shetty, A. K. (2019). Knowledge, attitudes and factors associated with acceptability of human papillomavirus vaccination among undergraduate medical, dental and nursing students in South India. Human Vaccines & Immunotherapeutics, 15(7–8), 1656–1665. https://doi.org/10.1080/21645515.2019.1565260

Soheili, M., Keyvani, H., Soheili, M., & Nasseri, S. (2021). Human papilloma

virus: A review study of epidemiology, carcinogenesis, diagnostic methods, and treatment of all HPV-related cancers. Medical Journal of The Islamic Republic of Iran. https://doi.org/10.47176/mjiri.35.65

Swain, D., & Parida, S. P. (2018). Preparedness of Young Girls for Prevention of Cervical Cancer and Strategy to introduce the HPV Vaccine. Indian Journal of Community Medicine : Official Publication of Indian Association of Preventive & Social Medicine, 43(Suppl 1), S38–S41. https://doi.org/10.4103/ijcm.IJCM_14_18

Szymonowicz, K. A., & Chen, J. (2020). Biological and clinical aspects of HPV-related cancers. Cancer Biology & Medicine, 17(4), 864–878. https://doi.org/10.20892/j.issn.2095-3941.2020.0370

Thomas, T. L. (2016). Cancer Prevention: HPV Vaccination. Seminars in Oncology Nursing, 32(3), 273–280. https://doi.org/10.1016/j.soncn.2016.05.007

Toh, Z. Q., Licciardi, P. v, Russell, F. M., Garland, S. M., Batmunkh, T., & Mulholland, E. K. (2017). Cervical Cancer Prevention Through HPV Vaccination in Low- and Middle-Income Countries in Asia. Asian Pacific Journal of Cancer Prevention : APJCP, 18(9), 2339–2343. https://doi.org/10.22034/APJCP.2017.18.9.2339

Venketas, J., & Singh, M. (2020). Cervical cancer: a meta-analysis, therapy and future of nanomedicine. Ecancermedicalscience, 14. https://doi.org/10.3332/ecancer.2020.1111

Waheed, D.-N., Burdier, F. R., Eklund, C., Baussano, I., Mariz, F. C., Téblick, L., Mugo, N., Watson-Jones, D., Stanley, M., Baay, M., & Vorsters, A. (2023). An update on one-dose HPV vaccine studies, immunobridging and humoral immune responses – A meeting report. Preventive Medicine Reports, 35, 102368. https://doi.org/10.1016/j.pmedr.2023.102368

Wang, X., Huang, X., & Zhang, Y. (2018). Involvement of Human Papillomaviruses in Cervical Cancer. Frontiers in Microbiology, 9, 2896. https://doi.org/10.3389/fmicb.2018.02896

Xie, H., Zhu, H.-Y., Jiang, N.-J., & Yin, Y.-N. (2023). Awareness of HPV and HPV vaccines, acceptance to vaccination and its influence factors among parents of adolescents 9 to 18 years of age in China: A cross-sectional study. Journal of Pediatric Nursing, 71, 73–78. https://doi.org/10.1016/j.pedn.2023.03.007

Xu, X., Wang, Y., Liu, Y., Yu, Y., Yang, C., Zhang, Y., Hong, Y., Wang, Y., Zhang, X., Bian, R., Cao, X., Xu, L., Hu, S., & Zhao, F. (2021). A nationwide post-marketing survey of knowledge, attitudes and recommendations towards human papillomavirus vaccines among healthcare providers in China. Preventive Medicine, 146, 106484. https://doi.org/10.1016/j.ypmed.2021.106484

Xue, L., Hu, W., Zhang, H., Xie, Z., Zhang, X., Zhao, F., Qiao, Y., Gao, L., & Ma, W. (2018). Awareness of and willingness to be vaccinated by human papillomavirus vaccine among junior middle school students in Jinan, China. Human Vaccines & Immunotherapeutics, 14(2), 404–

411. https://doi.org/10.1080/21645515.2017.1393132

Zomordi, G., Moradi, M., Hasanzadeh, M., & Ghavami, V. (2022). The effect of education based on the theory of planned behavior on the intention of vaccination against human papillomavirus in female students: A controlled educational trial. Journal of Education and Health Promotion, 11(1), 237. https://doi.org/10.4103/jehp.jehp_1145_21