

## Evaluation of The Factors Affecting HPV Vaccination Awareness and Acceptance Among Young Females: A Literature Review

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## Abstract

Cervical cancer has evoked concern in the healthcare sector worldwide. Efforts to eradicate the disease have pointed to human papillomavirus (HPV) as a significant cause of cervical cancer, with an estimated 70% of cases of the disease being caused by HPV. HPV prevention and control efforts result in a decrease in the number of pre-cancerous cells in the cervixes of teenage girls and women. Informed by the positive effects of the HPV vaccine in alleviating the disease, a national school-based human papillomavirus (HPV) vaccination programme targeting girls mainly 12 to 13 years of age was launched in 2008 in the UK. Since September 2019, boys have been included in the vaccination programme owing to the success of the vaccination in girls. The efficacy of vaccination programs has been shown to depend on attitude, which is affected by the awareness and education level of the population. Accordingly, in this narrative review, an evaluation of the factors that affect the efficacy of this school-based vaccination programme is conducted. HPV vaccine uptake was noted to be significantly lower in minority groups, with moral, social, and cultural concerns being noted as reasons. This paper identifies the target populations for sensitisation efforts regarding the vaccine; moreover, the role of the media in influencing attitudes towards the HPV vaccine is also evaluated. Healthcare providers have been shown to be significant influencers of HPV awareness and vaccine acceptance. The acceptance of vaccine doses by girls is evaluated in this paper by reviewing studies related to HPV awareness and vaccination. The paper also discusses the efforts and initiatives currently in place to sponsor HPV awareness and integration furtherance. A review of outcomes and limitations conducted, and recommendations are offered that are aimed at improving the current state of HPV awareness and integration.

**Keywords:** *Human Papillomavirus; Vaccination; Cervical cancer*

## Introduction

The human papillomavirus (HPV) is a causative agent of cervical cancer. It is the most common sexually transmitted infection around the world, although it usually causes no symptoms and clears up without treatment (McSherry et al., 2012). HPV is related to all the known types of cervical cancers, and population-based studies indicate that about 75% of sexually active individuals get infected with HPV in their lifetime (Loke et al., 2017). Notably, there are many subtypes of HPV; types 6 and 11 cause 90% of genital warts, whereas types 16 and 18 are high-risk viruses that are associated with the development of cervical cancer in 70% of global cases. The subtypes 31, 33, 45, 52, and 58 are responsible for 20% of cervical cancer cases. Notably, persistent infections with some strains of HPV cause cervical cancers and oropharyngeal cancers (Hendry et al., 2016). Cervical cancer is a common form of carcinoma occurring in women between the ages of 15 and 44 across the globe, and it creates a significant burden on healthcare systems worldwide. In the UK, about 3,200 new cervical cancer cases are diagnosed annually, where it is the 14<sup>th</sup>-most-common form of cancer overall (Gov.uk, 2019b). It is also the third-most-common form of gynaecological cancer in the UK, where its incidence is highest among women between 30 and 34 years of age (Sherman et al., 2018). However, the incidence rates of cervical cancer have fallen since the early 1990s; this has been attributed to the use of the prophylactic HPV vaccine, which increases the immunity of an individual to these infections.

The HPV vaccine was approved and licensed for use in girls 12 to 13 years of age, and in the UK, schoolgirls and boys in that age range are given their first dose of the vaccine. However, the vaccination of boys in the UK only began in September 2019, while girls were vaccinated from 2008, which was when the publicly funded HPV immunisation programme was initiated. When the programme started, the first routine cohort achieved a success level of 94.2% of girls receiving the vaccine (Gov.uk, 2019b). The specific vaccine that is administered confers protection against the high-risk HPV subtypes 16 and 18. Six to twelve months after the first injection, a second dose is offered (NHS 2019). The guidelines for the vaccination indicate that children who miss the first dose in Year 8 of school can opt into the vaccine programme anytime up to their 25th birthday. However, before the eligible individuals are immunised, they receive information leaflets from the department of health. These leaflets contain information about the HPV vaccine, its association with cervical cancer, the dosage requirement of the vaccine, and the need for cervical cancer screening in the future (Gov.uk, 2019b). However, the distribution of these leaflets does not

necessarily indicate that awareness of the HPV vaccine in the general public has increased, as the recipients may not always attentively read them to understand the link between HPV and cervical cancers. Also, parents, teachers, and religious leaders who are not eligible to receive the vaccine and do not receive the leaflets may not have adequate knowledge of its importance.

The vaccine that is currently used in the UK's national programme is Gardasil. It is a quadrivalent, broad-scope vaccine that targets four subtypes of HPV: 6, 11, 16, and 18. It has proved effective in the prevention of HPV in different countries where it has been used (Guo et al., 2018). According to the NHS (2019), studies that have compared infection rates before and after the introduction of the HPV vaccine for both teens and young adults showed that the HPV 16 and 18 subtype infections fell by 83% for teenage girls and 66% for young women five to eight years after the introduction of the vaccine. Moreover, the prevalence of genital warts among teenage girls and boys decreased over the same period. Indeed, the study by Guo et al., (2018) that compared the incidence of cervical cancer among young women before and after the HPV vaccine was introduced showed that the four-year average annual incidence rates for cervical cancer in 2011–2014 were 29% lower than that registered in 2003–2006. The cross-sectional study used data from the National Programme for Cancer Registries and Surveillance and compared the four-year annual average in the four years before and four years after the vaccine was approved for use. Further, Joinpoint analyses indicated a reduction in the incidence of squamous and non-squamous cell carcinoma. Notably, Guo et al. showed that there were no significant reductions in the incidence of cervical cancer among females in the 25–34 age range at the time as a large percentage of this population did not receive the HPV vaccine due to ineligibility (2018). Nonetheless, this study provided early evidence of the efficacy of the HPV vaccine in reducing the incidence of cervical cancers. The implication is that by preventing HPV, cancer of the cervix and other cancers caused by the listed strains of HPV are prevented within a population.

Another study, this one sponsored by the World Health Organization (WHO), investigated the effectiveness of the HPV vaccine. The study used data that was collected from 14 countries, including the UK (NHS, 2019b). The research compared the infection rates for cervical cancer before and after the introduction of the vaccine. The findings showed that HPV 16 and 18 fell by 83% for teenage girls and 66% for young women five to eight years after the introduction of the vaccine (NHS, 2019b). The study also established that diagnoses of genital warts decreased among boys, girls, men, and women. Also, it was documented that the number of pre-cancerous cells in the cervixes of teenage girls and women were found

to have decreased five to nine years after the vaccine was introduced. These statistics are an indication of the crucial impact of the vaccine on the reduction of cervical cancer and other HPV-related cancers. According to the findings of the NHS study (2019b), the greatest benefit of the HPV vaccination is achieved when more than 50% of the targeted population is vaccinated and in cases when it is given to populations comprised of individuals of multiple ages. The reason is that these factors increase herd immunity in a population as the vaccinated individuals provide immunity to the unvaccinated. Despite the importance of the HPV vaccine, the levels of knowledge and awareness among the residents of the UK are inconsistent.

The national school-based HPV vaccination programme has immensely increased the uptake of the vaccine compared to when it was first introduced, along with the respective awareness and acceptance levels in the UK. Moreover, the NHS Cervical Screening Programme, which targets women from ages 25 to 64, has further increased awareness of cervical cancer and its relationship to the HPV. In 2013, Bowyer and a group of colleagues affiliated with the Cancer Research UK Health Behaviour Research Centre conducted a cross-sectional study among 1,033 young girls who had received the HPV vaccine three years before selected from 13 schools within London. The participants completed questionnaires that evaluated their level of awareness of the HPV vaccine, their demographic characteristics, and their vaccine status. The results obtained by the study showed that the programme significantly increased the levels of awareness and acceptance of the vaccine in the UK among adults. However, the level of knowledge among young girls who had received the vaccine was shown to be low (Bowyer et al., 2013). The results indicated that 20% of the participants were not aware of the importance of the HPV vaccine and its association with cervical cancer infections. Furthermore, 80% of the participants who reported being aware of the vaccine and HPV infections lacked knowledge of its effectiveness. Nonetheless, these results cannot be generalised to young girls in the UK as the study population was sampled from the London district only. Moreover, the study population was small, although the results obtained can be used to inform policies and practices that aim to increase awareness of the vaccine among eligible boys and girls before and after their vaccination.

Similarly, studies by Hilton and Smith (2011) and Henderson et al. (2011), all affiliated with the Cancer Research UK Primary Care Education Research Group at the University of Oxford, indicated low levels of awareness of the HPV vaccine among young girls who had received the vaccine. Also, follow-up studies highlighted the need to raise awareness of the HPV vaccine. A qualitative study by Henderson et al. (2011) used qualitative interviews to examine the levels of awareness of the HPV vaccine among 26 parents and nine girls in the 12–13 age range who had been vaccinated through a primary care trust in the South

East of England. The study participants were sampled from 39 schools and four general practices. The results showed low levels of awareness of the HPV vaccine and its importance in preventing cervical cancer. Also, there were uncertainties about the level of protection that the vaccine conferred. The low levels of awareness among the parents impacted the uptake of the vaccine, as parents who were not aware of the vaccine were unlikely to have their children vaccinated (Henderson et al., 2011). However, the small study population reduces the generalisability and transferability of these results to other populations; moreover, the study did not evaluate whether the level of acceptance of the study participants was influenced by education about the importance of the HPV vaccine. The focus group study by Hilton and Smith (2011) investigated the levels of awareness of the HPV vaccine among 87 adolescent girls in the UK. The researchers, affiliated with the MRC Social & Public Health Science Unit in Glasgow, noted very low levels of awareness among the study participants. The participants were also concerned about the anticipated pain they would experience during injection, as well as the levels of protection it conferred against cervical cancer (Hilton and Smith, 2011). Nevertheless, the small study population is not representative of the population in the UK, and these results cannot be generalised. Also, the researchers did not examine how education on the importance of the vaccine influenced its acceptance. Nonetheless, the results obtained in these qualitative studies can be used to inform policies and practices regarding increasing the levels of awareness and acceptance of the vaccine in the UK, as the high levels of coverage among school-going girls does not indicate high levels of awareness. Various follow-up studies that were conducted to examine the levels of awareness of the HPV vaccine among different populations in the UK also highlighted the need for the implementation of more measures that seek to raise awareness in the nation. For example, the 2016 study by Hendry et al. revealed limited knowledge of the vaccine and its association with cervical cancer.

Various measures might be implemented to heighten awareness of the HPV vaccine among the UK population. For instance, the systematic review by Hendry et al. (2012), affiliated with the North Wales Centre for Primary Care Research, evaluated how the use of educational materials can promote awareness and informed choices and reduce anxiety among individuals who had several concerns over the effectiveness of the vaccine. Hendry et al. gleaned studies from 12 bibliographic databases, and two independent reviewers screened and evaluated their quality and use in the review. The results they obtained showed that women had low levels of awareness of the vaccine and that educational materials significantly



promoted their awareness, acceptance, and ability to make informed choices, while reducing their anxiety (Hendry et al., 2012).

The acceptance and awareness of healthcare practitioners regarding the importance of the HPV vaccine have been found to influence the uptake of the vaccine as a majority of individuals seek information from this population. Therefore, enhancing the knowledge levels of healthcare practitioners are extremely likely to impact the levels of awareness, acceptance, and uptake of the vaccine to a significant extent. McSherry et al. (2012), in a study affiliated with the National Cancer Registry in Ireland, carried out semi-structured in-depth telephone interviews with registered nurses and general practitioners to determine their understanding of HPV infections and their link to cervical cancer, as well as their clinical behaviours concerning HPV. Nineteen general practitioners and 14 nurses were interviewed, and their responses were coded into themes. The themes of their responses included the initiation of discussions with their female patients, recommendations of the vaccination, and HPV testing (McSherry et al., 2012). Although the study population was small, which limits the generalisability and transferability of the results obtained, their findings confirm the need for the implementation of interventions that seek to enhance the knowledge level of primary care practitioners regarding the HPV vaccine.

Similarly, Sherman et al. (2018), affiliated with the School of Psychology at Keele University and the departments of Gynaecology at the University Hospital of Leicester and Massey University in New Zealand, carried out a qualitative review that explored the level of knowledge and awareness among 230 healthcare practitioners. The questionnaires that were used explored their levels of experience, knowledge of HPV and the vaccine, and the self-perceived adequacy of the vaccine. The results obtained showed an adequate level of knowledge. Nonetheless, the researchers recommended the implementation of more measures to increase the awareness level of the healthcare practitioners, as a majority of them indicated that patients were seeking information on the vaccine from them. Also, Patel et al. (2017), associated with the University Hospital of Leicester, Kettering General Hospital, and Keele University, conducted a web-based survey to examine the levels of HPV awareness among healthcare practitioners in the Leicester, Rutland, and Leicestershire regions. They also assessed the HPV training offered to practice nurses. The results from the 94 completed responses showed an adequate level of knowledge on HPV, although 9.6% failed to identify the link between HPV and cervical cancer (Patel et al., 2017). Practice nurses play a role in enhancing awareness of the healthcare programmes in any system as they make direct contact with the patients. Therefore, increasing their awareness levels regarding HPV, its relationship with cervical cancer,

and the need for continued HPV screening will impact the knowledge of their patients. However, the study population was small, and there is a need for more studies that examine the level of HPV awareness among healthcare practitioners.

Although the UK government offers free cervical cancer screening and HPV vaccination, there are various barriers to HPV self-sampling and screening for infections. Williams et al. (2017), affiliated with the School of Medicine at Cardiff University, Bangor University, the Royal College of Obstetricians and Gynaecologists, and Public Health Wales, conducted a cross-sectional study to identify the potential barriers to the uptake of the vaccine and HPV screening. The survey participants were 194 women aged 20 to 64, who were purposively sampled, and logistic regression analyses were used to establish their determinants of self-sampling intentions (Williams et al., 2017). The results showed that poor perceptions of the importance of HPV as a potential cause of cervical cancer led to weak intention to undergo HPV screening and low levels of acceptance of the HPV vaccine. In particular, the lack of knowledge about the effects of the vaccine and the association of HPV with cervical cancer, as well as low levels of confidence in the vaccine reducing the risk of cervical cancer, impacted the need for HPV screening and the acceptance of the vaccine. However, the study participants were not eligible to receive the HPV vaccine, although their knowledge and perceptions could significantly affect their children's uptake and acceptance. Nonetheless, the results of this study can be used to inform future policies and practices that seek to increase the rates of HPV screening and awareness and the uptake of the HPV vaccine. For instance, personal and system-related barriers, such as poor perceptions of the effectiveness of the vaccine, can be addressed to increase awareness and acceptance of the vaccine.

To sum up, HPV infections can be prevented through the vaccination of individuals before they become sexually active. The HPV vaccine has been noted to be effective in reducing cervical cancers caused by the HPV 16 and 18 subtypes. In the UK, the vaccination programmes target school-aged teens, and these have led to increased uptake of the vaccine since 2008. Most individuals are not aware that HPV is the leading cause of cervical cancer, and persons diagnosed with HPV during cancer screening often suffer distress (Bowyer et al., 2013). An understanding of the relationship between HPV and cervical cancer is therefore crucial in formulating policies aimed at increasing HPV vaccination acceptance in the UK. As such, there is a need for more studies to evaluate the awareness levels among different populations in the UK and examine the various measures that can be employed to increase the awareness and acceptance of the vaccine. This narrative review will, therefore, evaluate not only the approaches/interventions that have



been and can be used in the UK to increase the uptake of the vaccine but also the overall challenges that hinder the provision of the vaccine in the UK context. Further, the role of education in increasing awareness and acceptance of the vaccine will be identified.

## Methodology

The widespread implementation of human papillomavirus (HPV) vaccination represents a strategic and comprehensive approach to controlling and preventing cervical cancer. However, its extensive introduction and targeted long-term provision in communities are not without issues and challenges. The World Health Organization (2016) suggests that a fundamental approach to addressing this situation is the implementation of effective communication plans. Through strategic communication and engagement initiatives, public awareness can be improved regarding the consideration and adoption of interventions, which would help in the promotion and acceptance of HPV vaccination in communities. As the struggle to create a social norm of HPV awareness and vaccine acceptance continues, the demand for improved communication and engagement strategies increases; however, despite continuous development and adaptations to the existing need, misinformation, mistrust, misunderstanding, and resistance still persist in many communities.

Since the introduction of the HPV vaccine, there have been numerous studies examining the related levels of awareness and acceptance among individuals worldwide. Such studies are useful not only in understanding and evaluating the vaccine's ratification at the community level but also in the advancement of relevant methods of communication and integration. Accordingly, the resources and research materials of the present study were selected and designed to focus on the enumeration and qualitative analysis of the methods and approaches used to further the uptake of the vaccine in the UK through a narrative review of literature relevant to the subject matter.

The exploration strategies employed in gleaning research studies and articles for this narrative review were designed to find resources pertaining to the uptake of, influences on, and knowledge regarding the HPV vaccination programs in the UK. The manually selected materials were then stored and analysed using Mendeley reference-management software for further filtering and thematic categorisation. The resources that made it through this narrative review, although representing various subject standpoints and investigation objectives, reveal the ultimate theme of this study, which is concerned with HPV awareness and vaccine acceptance in the UK.

### **HPV vaccine uptake throughout the years**

In the UK, the uptake of the HPV vaccine has significantly increased since the implementation of the national publicly funded HPV immunisation programme in 2008, following the advice and recommendations of the Joint Committee on Vaccination and Immunisation (JCVI) to the Secretary of State for Health. The programme, commissioned by the National Health Service (NHS) under Public Health England's (PHE) guidance and through school-aged vaccination (SAV) delivery, aimed to reduce the morbidity of cervical cancer in women by providing immunity during their teenage years and beyond or, pre-emptively, before they become sexually active. The programme initially offered three doses of routine HPV vaccine to all Grade 8 girls aged 12 to 13 years old, with a limited catch-up vaccination given to girls aged 13 to 17. Upon further investigation, it was recognised that while the vaccination of women over 18 years old, pregnant women, boys, and other risk groups, such as men who have sex with other men, are beneficial, they are not cost-effective; thus, implementation for these groups was not recommended (JCVI, 2008). Nevertheless, it is one of the major programs geared towards cervical cancer prevention in the UK that has continuously contributed to overall HPV awareness and vaccine acceptance. This programme, in conjunction with other research initiatives and programmes directed at different focal groups, has significantly impacted the extent of HPV integration and uptake in the UK throughout the years since its introduction.

One of the first studies in the UK on the uptake of the HPV vaccine was conducted by Brabin et al. (2008). This prospective cohort study aimed to assess the feasibility and acceptance of the first two doses of the HPV vaccine administered to schoolgirls. A group of 2,817 schoolgirls aged 12 to 13 were sampled from 36 secondary schools in two primary care trusts (PCTs) in Greater Manchester in the UK. The participants were offered three doses of the vaccine, which were administered at 0, 1, and 6 months over the course of the school year. The parents of the participants were fully informed about the study and received educational fliers and parental slips for consent or refusal. A follow-up research questionnaire on their knowledge about the vaccine was also administered. The PCTs hosted informational evenings and facilitated appointments, the main objective of which was to educate the parents. Logistic regression was employed to explore the relationship between school characteristics as continuous variables and the calculated uptake, where the totality or denominator of the calculations was the number of participants offered the vaccine. The results were significant as a trend was observed, particularly in the uptake: 71% received the first dose of the vaccine, and 69% received the second dose; 20% of the parents did not respond,

and 8% refused to vaccinate their children. However, the NHS Knowledge Service (2008) noted that the study was limited to the bivalent vaccine only and only covered two areas of Greater Manchester. Nevertheless, it contributes to existing knowledge of HPV vaccination uptake, which can be established as a basis for the further improvement of HPV vaccination programmes in the UK.

Since the successful implementation of the national HPV immunisation programme, Public Health England (PHE) has been conducting annual surveillance and evaluation of the uptake of the HPV vaccine by adolescent females in England, which has been carried out through the collation of data collected through the ImmForm website, which is carried out by PCTs/area teams at the completion of every academic year. In the review of the first full six years from 2008/09 through 2013/14 of the routine HPV vaccine triage conducted by PHE (2015), the algorithms revealed that in the first year of the programme in 2008/09, the uptake levels of the first, second, and third doses stood at 88.1%, 86.0%, and 80.1%, respectively. The same trend was observed in the following years until 2013/4, but with increasing magnitude, except in 2009/10, which exhibited a minor drop. Additionally, since September 2014, a shift from the three-dose to a two-dose schedule has been implemented per the recommendation of the JCVI. The reason for the change is that it has been proven, based on immunological evidence, that the efficacy and duration of the protection of the two-dose schedule are significantly similar and more cost-effective. A review of the 2016/17 data report by PHE (2017) revealed that the two-dose uptake has decreased to 83.1% from 85.1% in 2015/16 and 86.7% in 2014/15. These findings primarily reflect local variation in delivery as, in the year 2016/17, other vaccination programs, such as the childhood flu, tetanus/diphtheria/polio, and Men ACWY were also implemented, which limited the capacity of school immunisation providers. A review of the year 2018/19 conducted by PHE (2019) revealed that the two-dose uptake had increased to 83.9% compared to 83.8% in the previous year (2017/18). Since the localisation of vaccine delivery in the year 2016/17, which resulted in a considerable decrease in comparison to GP delivery, the uptake incrementally increased over the course of the following three years.

In summary, the annual PHE surveillance data revealed that while the availability of the HPV vaccine has increased and coverage has expanded since its introduction in 2008, especially since the shift from the three-dose to the two-dose schedule, the uptake was also considerably affected by the delivery-method shift from GP to local delivery, while decisive factors such as lack of education and inclusiveness have continued to negatively impact the efficacy of the HPV vaccine in the UK over the years since it was introduced.

## Factors that contribute to uptake

With the goal of furthering the analysis and development efforts aimed at the maintenance and constant improvement of HPV vaccine integration, it is critical that the factors contributing to its uptake be evaluated. Understanding the different prevalent perspectives and attitudes towards the HPV vaccine of different focal groups, along with technical factors, should provide the basis for a better understanding of the uptake trends.

The World Health Organization (2016) suggests that the low rates of uptake of the HPV vaccination in communities are primarily caused by poor education and integration, parental concerns, and health and/or religious contraindications. Lack of knowledge on this relatively new preventive approach against cervical cancer contributes to the mistrust of the public. Parents are concerned about the inferred implicit consent to their daughters engaging in sexual activity, and they are worried that the vaccine might elicit risky sexual behaviours. Religious leaders and even medical practitioners such as paediatricians and gynaecologists might misunderstand the purpose and value of the vaccine as well. All these, among others, ultimately contribute to the resistance to the HPV vaccination and low community coverage; hence, the consistent need to develop better communication strategies.

When the national HPV immunisation programme against cervical cancer started in 2008, it was initially introduced with data collation, for which participants were required to complete awareness questionnaires on HPV vaccination and their vaccine status. The purpose of the collection of these data from the girls enrolled in the programme was to gather helpful information for the benchmarking of HPV-related knowledge and to contribute to this body of knowledge to further the development of comprehensive communication and integration approaches and strategies. The initial approaches employed in the implementation of the programme proved to be significantly beneficial as the results revealed that around 20% of the target population was unaware of HPV infection, while 50% were unaware that HPV causes cervical cancer. These findings conclusively suggested that the HPV awareness and knowledge of girls aged 12 to 13 years were relatively poor. Consequently, these survey findings were set as the basis for extending the programme initiatives to education (Bowyer et al., 2012).

Furthermore, a later study conducted by Jo's Cervical Cancer Trust, based in the UK, revealed that only one in seven adult women thought that it was a common virus; three in five did not care if they acquired cervical cancer; 95% were not aware that it can be passed on through protected sexual intercourse; and 1/3

were not aware that HPV causes cervical cancer. These findings are especially alarming indications of disregard, misinformation, and stigma around HPV, especially considering that statistics indicate that around 80% of the global population acquires HPV at some point in their lives (Music, 2019). Throughout the years since the introduction of the HPV vaccine, a lack of education, among other factors, has ultimately been a contributing factor that exacerbates the constant challenges and struggles to its integration in communities, as presented in these studies.

There have been several studies that focused on the parents' perspectives as well, as they are the ones who must provide consent and, thus, greatly influence who is subject to HPV screening and vaccination. One of the first exploratory qualitative studies in this area was conducted by Marlow et al. (2009), who investigated the attitudes of ethnic minority mothers in the UK towards HPV vaccination. The study was comprised of two focus groups with varied religious and ethnic backgrounds but with children that were born in the UK. One focus group was comprised of ten black women, of whom six were Caribbean and African. Also, in the group of black women, seven were Christians, one was a Muslim, and two did not belong to any religion. The other focus group was comprised of ten Asian women, of whom three were Indians, one was a Bangladeshi, and three had various Asian backgrounds. Also, in the group of Asian women, four were Hindu, one was a Muslim, and one was a Christian. With the aim to further existing understanding of the factors that influence the attitudes of mothers from different ethnic and religious backgrounds towards HPV vaccination, five themes were developed. The mothers' perceptions of the HPV vaccination were categorised and summarised according to the experience of vaccination, awareness regarding HPV vaccination and reactions to the information, reasons for being vaccinated, concerns about vaccination, and the social influences of vaccination. A similar study was later conducted by Mupandawa and Cross (2016), which specifically investigated the low HPV vaccine uptake of girls from ethnic minority groups. The study sampled five African couples from North England with at least one daughter between the ages of 8 and 14 through purposive sampling and snowballing. Face-to-face, semi-structured interviews were carried out in accordance with the descriptive qualitative design, which aimed to identify and define the other factors affecting the parents' attitudes towards HPV vaccination. Ultimately, the results of the two studies, which focused on parental perspectives, coincide with each other: the major factors that influenced their consent to the HPV vaccination of their daughters were moral, social, and cultural concerns.

Moreover, in an effort to comprehensively and systematically evaluate HPV vaccine uptake factors, programme technicalities, such as the delivery of the HPV vaccine, have also proved to be significant. A focus group study on the NHS school-aged vaccination (SAV) teams in London was carried out by Rockliffe et al. (2018), in which 28 participants from four London-based NHS SAV teams comprised of six to nine members from different areas of London were sampled to ensure a relatively diverse variety of viewpoints and experiences. There were nurses (17), project officers (2), team assistants (2), administrators (2), a clinical lead (1), an operations manager (1), a project manager (1), a clinical director (1), and a team leader (1), all of whom were mostly female had been working in the NHS for three years. The researchers carried out thematic analysis by means of the qualitative data analysis software NVivo 11. The interpretations of the delivery challenges were summarised and categorised according to seven main themes, which include the lack of school engagement and support, limited school and team resources as barriers to delivery, the lack of understanding and education about the vaccine, the fear of vaccination, the poor consent return and response, the inability to complete the vaccination series, and the differences and specificity of issues and concerns. Hence, a conclusive need for a more individualised but holistic approach to effective communication and integration was identified; the results were summarised into a call for increased school engagement and SAV team allocation to enhance awareness and acceptance.

Moreover, a study conducted by Paterson et al. (2019) in May–August 2017 also contributed to the growing understanding of the efforts required to strengthen HPV vaccine delivery through a qualitative service evaluation of the national HPV immunisation programme. In this study, semi-structured interviews were employed with 39 participants responsible for the delivery of the programme in six local authorities in the South West, North Central Midlands, and South Central Midlands of England. The results revealed the consistent need for effective planning and overall data management; to this end, close collaborations, pro-active engagements, and experienced staff and service providers were found to contribute significantly to the improvement of the programme delivery. Ultimately, the effect of the HPV immunisation programme delivery system at an organisation level proved to be significant for the constant improvement of the uptake and, thus, in the furtherance of HPV awareness and vaccine acceptance in the UK.



## **Continuing efforts and initiatives to further HPV vaccine integration**

Despite the constant challenges to HPV awareness and vaccine acceptance, there have been significant improvements nevertheless as the constant efforts and initiatives of the government and private organisations continue to pave the way to the further HPV vaccine integration in the UK.

One example of these initiatives is Jo's Cervical Cancer Trust, a charitable foundation with a portable clinic that aims to raise awareness and obtain assistance for cervical cancer prevention, treatment, and screening. It is especially instrumental in the fight against cervical cancer as it not only serves as an accessible and open source of educational, technical, and psychological support but is also one of the biggest fundraisers for cervical cancer in the UK. It is interactive and appealing as it provides personal stories, blogs, information, and updates on people and events in abundance. Ultimately, its purpose is directed to helping women that are struggling with the disease in any way applicable (Jo's Cervical Cancer Trust, 2020).

The continuing national efforts in the fight against cervical cancer by means of the HPV immunisation programme has included the extension of its overall scope in terms of resources and time. Since September 2019, the programme has extended the routine HPV vaccine to boys aged 12 to 13, although without the catch-up programme, in an effort to provide indirect protection and, thus, elaborate upon existing measures of prevention. Also, with this goal in mind, 10 or more years of immunity to HPV have been guaranteed upon completion of the vaccine, which is further reassured by cervical screening, especially of sexually active individuals (NHS.uk, 2019). Moreover, in their monitoring and surveillance of HPV infections among young women, HPV infections among men who have sex with other men, genital warts diagnoses, and cervical cancer morbidity rates, the PHE routinely collects data on sexually transmitted infections (STIs) from genitourinary medicine (GUM) clinics for correlative evaluation. Furthermore, in an effort to support the local authorities and public health leads in monitoring the sexual and reproductive health (SRH) of the population, interactive maps, charts, and tables are employed in SRH profiling for systematic information dissemination and implementation and evaluation by programmes (Gov.uk, 2016). Furthermore, the PHE also monitors cervical screening coverage in the UK by collecting routine data for the annual key performance indicator (KPI) data reports in the measurement of NHS screening programme performance and in the presentation of programmes' quality overview (Gov.uk, 2020).

These efforts and initiatives have been significant to the development of communication and integration methods of the HPV immunisation/vaccination programmes in the UK. It is through continued dedication to these undertakings that great success in raising awareness and enhancing acceptance of the HPV vaccine might eventually be achieved.

## **Review outcomes, limitations, and recommendations**

The resources and research materials covered by this narrative review are a source of significant information on the present context of HPV vaccine integration in the UK. Evaluating the uptake trends and analysing the contributing factors simultaneously are essential to developing a critical understanding that reveals the gaps in theory and practice and possibilities for constant improvement.

The resources reviewed are beneficial to understanding the HPV uptake trends and influences over time, since the introduction of the HPV immunisation programme in 2008 to the present. The studies revealed that while the uptake has considerably increased and/or been maintained as the HPV vaccine has become widely accessible, challenges still arise and persist; among these are the change from the three-dose to the two-dose schedule, the shift from the GP to local delivery methods, and, ultimately, the lack of education of parents and participants.

While the review only considered a selection of early and recent studies that were subjectively and thematically chosen to present the trend of HPV awareness and vaccine acceptance in the UK, the scope of the studies that are directed at different focal groups and, especially, the data reports proved to be useful in the evaluation of the subject matter. Although the focus groups include minorities and detailed observations, the findings still contribute to the basis of an overarching understanding. This was collectively reflected in the annual uptake reports and signified singly in the persistence of minor challenges to which parental influences and organisational efficiency still continue to address as major factors that affect the integration of the HPV immunisation/vaccination programme.

Ultimately, this narrative review of research studies and articles should serve as a comprehensive overview to further a critical evaluation of methods to advance HPV awareness and vaccine acceptance; these methods are fundamentally aimed at the communication and integration levels. It should be noted that while the objective is concerned with the UK as a whole, it is also critical that the factors and strategies relevant to HPV vaccine integration be considered as the failures and successes with minorities could

significantly reflect the majority. Hence, there is a need to continuously investigate and analyse the wide array of possibilities and opportunities for research into HPV vaccine integration in the UK. Moreover, while the NHS (2008) has pursued optimistic goals for the success of the HPV vaccine to the present, an approach which could ultimately lead to the eradication of cervical cancer, it is crucial that constant and thorough efforts also be applied to developing effective communicative and integration strategies that contribute to the success of vaccination programs over time.

## Discussion

This narrative review, which evaluated the approaches to the uptake of the HPV vaccine in the UK, revealed that the uptake of the vaccine has significantly increased since the implementation of the first publicly funded national HPV immunisation programme in 2008. The increased uptake of the vaccine indicates a reduced risk of cervical cancer for women in the UK. However, the uptake is dependent on the delivery methods that are used. This review showed that the two-dose schedule had higher uptake rates than did the three-dose schedule. Moreover, the uptake of the vaccine was found to be reduced by a lack of awareness and education about its importance in the prevention of cervical cancer; parental concerns; moral, social, and cultural reasons; and health and religious contraindications. Nonetheless, the national school-based HPV vaccination programme that was started in 2008, making the vaccine available to girls aged 12 to 13 years old, has increased the uptake of the vaccine. The eligible girls are always given information/educated on the importance of the vaccine and the risk of the development of cervical cancer if they are not immunised (Gov.uk, 2019b). Bowyer et al. showed that the programme significantly increased the awareness levels and acceptance of the vaccine in the UK. The results obtained in this study are consistent with earlier studies that have been conducted in different populations that indicate initially low levels of uptake of the HPV vaccine with an increasing trend, as well as the factors that affect its uptake. For instance, the systematic review study by Loke et al. (2017) that evaluated the rates of uptake of the HPV vaccine among different countries showed that the uptake in the UK had increased over the years since 2008. This increase in vaccine uptake was attributed to the programme that was started in 2008 and made the vaccine available to all girls between the ages of 12 and 13. The results of this narrative review, which indicate low levels of awareness of the importance of the HPV vaccine affect its uptake, were also arrived at by Marlow (2011), whose systematic review on the levels of awareness and attitudes of ethnic

minorities in the UK regarding the HPV vaccine revealed that their low levels of awareness impacted their level of uptake, noting that these minority groups had the lowest uptake rates. Also, the study by Rockliffe et al. (2018), affiliated with the Research Department of Behavioural Science and Health in London and the NHS England, showed that the lack of awareness and education on the importance of the HPV vaccine among schoolgirls in England led to reduced uptake of the vaccine and negative attitudes towards it.

### **Overall challenges to vaccine provision in England**

In 2013, the delivery system of vaccinations in England underwent radical changes that have increased the uptake of various vaccines in the region; these changes followed the implementation of the Health and Social Care Act. The new system entails the provision of vaccination services at the primary care levels. However, the organisations involved in the provision of schedules for the vaccines, their commissioning and funding, and the collection and analysis of epidemiological data have changed. These services are now handled by new organisations, such as the NHSE, PHE, and NHS Digital, according to Crocker-Buque and Mounier-Jack (2018), who were affiliated with the Faculty of Public Health and Policy in the London School of Hygiene and Tropical Medicine. These scholars state that these changes, along with the creation of awareness and education programmes, have led to significant improvements. Moreover, the constant efforts and initiatives of the government and private organisations continue to pave the way for the integration of the vaccine in the UK. These initiatives have led to improvements in the communication and integration methods of the core child immunisation programs. However, the uptake of vaccines for diseases such as measles, mumps, and rubella (at two years) and the pentavalent vaccine containing diphtheria, tetanus, pertussis, polio, and haemophilus influenzae has decreased (Crocker-Buque and Mounier-Jack, 2018).

Crocker-Buque and Mounier-Jack (2018) conducted a qualitative review study to produce a logic model of the UK healthcare system that would indicate the interventions that can be adopted to enhance the uptake and coverage of the various vaccines in the UK, including the HPV vaccine. They noted that modifications to the current healthcare system involving the use of incentives and the contracting of healthcare workers could enhance the levels of uptake. However, the researchers did not evaluate the effect of these interventions on other programme inputs, such as capital or human resources. Nonetheless, measures such as the use of reminder or recall systems and incentives provided to the adolescents who

receive HPV vaccines may improve their coverage (Crocker-Buque and Mounier-Jack, 2018). In the case of the administration of the HPV vaccine, the shift from a three-dose to a two-dose schedule improved its uptake. This is an indication that the delivery methods and the dosages of vaccines influence their uptake, although the lack of education and awareness continue to impact their uptake negatively as well, regardless of the dosage schedule.

This narrative review also highlighted factors that continue to affect the uptake of the vaccine in the UK. These include the lack of education and awareness of its importance; parental concerns and moral, social, and cultural reasons; and health and/or religious contraindications. Parents are concerned that the vaccination of their children might lead to them engaging in risky sexual behaviours as a possible result of a lack of awareness of the effects of the vaccine and its relationship to the risk of developing cervical cancer. These results, which revealed low levels of awareness and education regarding the importance of the HPV vaccine, are consistent with the results obtained by the systematic review by Newman et al. (2018). Their findings showed that low levels of awareness and negative beliefs about the vaccine led to poor uptake and acceptance. Concerns over the safety and effectiveness of the HPV vaccine among women in the UK and low perceived susceptibility to HPV infections were found to reduce the uptake of the vaccine. For instance, parents who doubted the efficacy of a vaccine were less likely to permit their children to be vaccinated, unlike parents who are confident in the safety of the vaccine and aware of its importance.

Sherman and Nailer (2018), affiliated with the School of Psychology at Keele University, carried out a qualitative review that explored the levels of knowledge and awareness of the parents of teenage boys in the UK regarding the HPV vaccine. The self-report questionnaires were filled in at the beginning of the study and again at the end, after a treatment of education on the HPV virus and the importance of the vaccine. At baseline, the results showed that the participants had poor attitudes and mixed views towards the HPV vaccine. This significantly reduced the acceptance of the parents and uptake of the vaccine among boys eligible to receive the vaccine. The self-report questionnaire by Sherman and Nailer (2018) further showed that the knowledge of parents participating in the study who had heard about the effects of HPV regarding the health sequelae of men was poor relative to their knowledge of its impact on the health of females. Notably, parents who expressed willingness to vaccinate their sons against the HPV were more knowledgeable than those who were unwilling to do so. Education of the study population on the effects and risks associated with the HPV virus had a positive impact on their attitudes towards the vaccine as, in the end, the self-report questionnaires indicated improved attitudes and willingness to take their children

for vaccination (Sherman and Nailer, 2018). Currently, the vaccine is also administered to both boys and girls aged 12 to 13 years; this increases the herd immunity and protects men who engage in sex with other men or with women who are not vaccinated. However, the incidence of cancers that are attributed to HPV in males is on the rise, highlighting the need for increased awareness of the risks of the HPV virus for both males and females (Sherman and Nailer, 2018).

Additional barriers to uptake may be presented by religious leaders and medical practitioners, such as paediatricians and gynaecologists, who may misunderstand the purpose and value of the vaccine or not give the recommended dosages or vaccinate at the appropriate age. Religion is thought to influence vaccine uptake decisions as some parents and guardians file vaccine exemptions for children based on religious and personal beliefs (Pelčić et al., 2016). The role of religion in influencing decisions on vaccination for sexually transmitted diseases may be high, as some religions do not allow any discussion of sexuality and prevention of associated diseases (Shelton et al., 2013). Therefore, religion can also impact the acceptance of vaccines and the willingness of individuals to use them. For instance, a web-based survey conducted with 476 parents by Shelton et al. showed that some religions, such as Protestant, which do not allow the use of vaccines and contraceptives, hold an influence over the decisions that are made by their followers, unlike Catholic followers were more likely to vaccinate their daughters (2013). Also, parents who frequently attend religious services were found to be likely to decide against the use of vaccines. The study by Bodson and colleagues (2017) seconds the results obtained by this study, which showed that there is an association between religious practices and HPV uptake, HPV-related awareness, knowledge, and acceptance among women. The study by Bodson et al. was conducted with 326 women and showed that religious women were under-vaccinated and under-informed on the importance of the HPV vaccine for women, and this heightens their risk of acquiring HPV infections.

### **Role of education in increasing awareness and vaccine acceptance**

Health education enhances awareness and knowledge of HPV vaccination and related issues and has a positive effect on attitudes toward cervical cancer screening and prevention through the uptake of the HPV vaccine. Various studies that have been carried out on different populations have shown that the raising of awareness of illnesses and the interventions that can be implemented to reduce the risk of individuals in various at-risk populations. Leung and colleagues (2019) note that when members of a



population have knowledge of the HPV vaccine, its effectiveness, and safety, their attitudes regarding its use are more likely to be positive, and this improves its uptake. There are different educational and delivery methods that can be used to improve the awareness of a population regarding the importance of the HPV vaccine. Such educational materials can be targeted at either parents, healthcare providers, teenagers, teachers and institutions, or religious leaders, as these populations have a significant influence on the acceptance and uptake of the HPV vaccine (Leung et al., 2019). A study by Stretch et al. (2008), which evaluated parental attitudes towards the HPV vaccine in the UK, showed that the main concerns of parents were the safety and efficacy of the vaccine; this was after they had been educated on its importance. The study showed that parents trusted the opinions of healthcare providers. Therefore, increasing the knowledge of this population on the importance of the HPV vaccine has the potential to improve its acceptance and uptake. The authors of Stretch et al. (2008) are healthcare professionals in different organisations in the UK, including the Academic Unit of Obstetrics and Gynaecology, the University of Manchester, the Greater Manchester Health Protection Unit, and the Public Health Departments of the Stockport Primary Care Trust and the Bury Primary Care Trust. Similarly, a systematic review by Trim et al. (2012), which examined the levels of parental knowledge and their attitudes towards the HPV vaccine, found that a large percentage of the participants had low levels of awareness of the vaccine. The parents were also concerned about the safety and efficacy of the vaccine for their children. They also indicated that healthcare providers and the media were their main sources of information and the primary influences on their decision on whether to recommend the vaccine to their children or not (Trim et al., 2012). Therefore, the education of healthcare providers on the importance of the HPV vaccine has the potential to improve the positive attitudes of parents and its uptake to a significant degree.

Studies by Gilkey et al. (2016) and Mullins et al. (2013) also showed that improved awareness and attitudes of healthcare providers regarding the HPV vaccine led to a nine-fold increase in uptake in the specific populations. Gilkey et al. (2016) investigated the association between vaccination rates and the characteristics of recommendations given to healthcare providers and parents. The results they obtained showed that high-quality recommendations on the use of the HPV vaccine from practitioners led to increased uptake of the vaccine. Similarly, research by Mullins et al. (2013) indicated that sources of information on the HPV vaccine influenced the attitudes of individuals with respect to the vaccine and, consequently, its uptake. They showed that the preferred form of communication of information about the vaccine was when it was obtained directly from healthcare practitioners. Further, the study by Leung et al.

(2019) highlighted the need for increased awareness of the importance of the vaccine among healthcare practitioners. In their study, they examined evidence that evaluated the knowledge, awareness, attitudes, and beliefs of healthcare practitioners with respect to the HPV vaccine, as well as the sources of their information. They noted low levels of awareness of various aspects of the vaccine among healthcare practitioners and low levels of confidence in addressing parental concerns on the use and efficacy of the vaccine. The practitioners who exhibited low levels of knowledge did not encourage the uptake of the vaccine, which implies how the education of this particular population has the potential to lead to improved attitudes and enhanced uptake of the specific vaccine. Although the studies by Gilkey et al. (2016), Leung et al. (2019), and Mullins et al. (2013) focused on U.S. populations, they showed how the sources of information available to the eligible individuals and the levels of knowledge possessed by healthcare practitioners could affect their attitudes and, consequently, the uptake of the HPV vaccine.

The sources of knowledge of individuals about the HPV vaccine have also been shown to influence their attitudes towards it significantly, as well as their decision whether to be immunised. Informed parents, teachers, healthcare practitioners, social media, and mainstream media are sources of this type of information. On the one hand, if the information that candidates for vaccination receive from these sources is negative, the individuals are at risk of developing negative attitudes. On the other hand, if the information is positive, their attitudes are more likely to be influenced in a positive direction, and the uptake of the vaccine is likely to increase accordingly. In any case, the influence of the media on the acceptance of the vaccine by a population is vast, and positive media coverage during its introduction makes an immense contribution to shaping public perceptions (Hilton et al., 2010).

In 2008, during the introduction of the HPV vaccine for schoolgirls aged 12 to 18, the mainstream media played a huge role in positively influencing awareness, attitudes, and the uptake of the vaccine. The newspapers at the time published positive reviews of the vaccine, and this significantly improved the vaccine coverage of the teenage girls. Following the introduction of the vaccination programme, the on-camera diagnosis of cervical cancer of a 27-year-old woman further enhanced the acceptance of the vaccine by the masses in the UK (Hilton et al., 2010). Hilton et al., who are affiliated with the Medical Research Council, Social and Public Health Sciences, conducted research that showed how pointing out the prevalence of cervical cancer among young women and how their sexual behaviours influence their risk of contracting the disease, while important factors that contribute to the uptake of the vaccine in this population, do not encourage promiscuity among the women.

## **Interventions to improve coverage of immunisations in high-income countries**

HPV-associated infections are a significant burden on healthcare systems around the world. However, the uptake of the HPV vaccine is not 100% yet, and a large percentage of women are at risk of developing HPV-related infections and cancers. Therefore, interventions that aim to increase the coverage of these immunisations are important. To this end, such interventions should seek to raise awareness and offer education on the importance of the HPV vaccine and its association with cervical cancer. In high-income countries, such as the UK, the measures that can be implemented to enhance the uptake and coverage of the HPV vaccine include reminder/recall systems, mobile phone messages, education, eHealth, reminders by healthcare workers, financial incentives for primary care doctors, and the inclusion of HPV-related services at the point of primary care service delivery (Crocker-Buque and Mounier-Jack, 2018).

Mantzari et al. (2014), affiliated with the Centre for the Study of Incentives in Health and the Institute of Pharmaceutical Science, King's College London, conducted a study that examined the effectiveness of financial incentives in enhancing the uptake of the HPV vaccine among a cohort of 17–18-year-olds in England. They also evaluated the effects of financial incentives on the quality of individual decisions in opting to be vaccinated. The method employed to determine the effects was a measure of the participants' attitudes toward the HPV vaccine and its perceived effects. The girls who formed the study population received £45 after the completion of the three-dose schedule vaccine programme, and the main outcomes of the study were the rates of uptake of the first and the last vaccination and their decision quality (Mantzari et al., 2014). The findings of the study indicated an increased uptake of the intervention following exposure to financial incentives, although the decision quality was not affected. This showed that although the uptake of the vaccine among the study population improved, the levels of education and awareness of the importance of the vaccine were not affected, which was an indication of the ineffectiveness of financial incentives in enhancing the awareness levels of the population. Also, the uptake of the vaccine in the study population remained lower than the national target. Therefore, although this intervention may work in high-income countries, such as the UK, there is still a need to enhance the education levels of the girls before their vaccination, in order to improve their awareness levels.

The narrative review also showed that the delivery of the immunisation services at an organisation level, effective planning, and data management could further increase the uptake of the HPV vaccine in the UK. Nevertheless, there have been significant improvements as the constant efforts and initiatives of the government and private organisations continue to pave the way for the integration of the vaccine in the UK. These initiatives have led to improvements in the communication and integration methods of the HPV immunisation programs. These results are consistent with the results of a systematic review carried out by Perman et al. (2017), in which the researchers sought to evaluate how the efficiency of school-based vaccination programmes influenced the acceptance and uptake of the HPV vaccine. Their study showed that the service delivery at the organisational level influenced the uptake of the vaccine and that an improvement in the vaccination delivery programmes in school-based settings would enhance the acceptance of the vaccine.

The experiences of women and how the sexualities of young women and girls are constructed, as well as practices during the vaccination programme, could influence the uptake of the HPV vaccine and attitudes of other women toward it. Hanbury (2016), a student at the Department of Sociology at Lancaster University, conducted a study to explore the experiences of women during the HPV vaccination programme and how these experiences influenced their attitudes towards the HPV vaccine. The study showed that the HPV vaccination programmes that are regularly held countrywide are great opportunities that can be used to increase the knowledge of the eligible women regarding the importance of the vaccine (Hanbury, 2016). Also, these programmes could be used to educate the targeted girls on sexual health with the goal of improving the attitudes of the individuals toward the vaccine and, in turn, increasing their uptake.

To sum up, this discussion section has shown the various factors that influence the uptake of the HPV vaccine in the UK and how the implementation of the HPV immunisation programme in 2008 has led to increased acceptance and uptake. These results were consistent with the results of other studies that have been conducted previously in the UK and with other populations. However, there is a need for the implementation of measures that seek to increase the awareness and education levels of parents, eligible teenagers, teachers, religious leaders, the community at large, and minority communities.

## Conclusion

The link between the human papillomavirus, commonly referred to as HPV, and cervical cancer has been established by studies conducted across the globe in previous decades. HPV infection is a sexually transmitted disease that mostly has no symptoms associated with it. However, the risk of contracting one of the illnesses caused by HPV infection continues to be a worrying concern to healthcare providers and policymakers worldwide. HPV and its associated diseases continue to create a burden on healthcare in the world. Specifically, genital warts and cervical cancer are illnesses associated with HPV.

As discussed, many types of HPV exist; in particular, types 6 and 11 cause genital warts, whereas types 16 and 18 cause cervical cancer, which is a leading cause of cancer-related deaths. Globally, for women who are between 15 and 44 years of age, cervical cancer is a common form of carcinoma cancer. Unfortunately, despite the concern posed by HPV to medical providers, there continues to be no cure for HPV infection. However, the existence of a prophylactic vaccine for HPV is beneficial in the fight against its associated illnesses, especially cervical cancer. In the UK, a national school-based HPV vaccination programme has been in existence since 2008; the programme has been associated with exceptional efficacy. The programme, which consists of the routine administration of the HPV vaccine, began with eligible girls in 2008 and moved on to include eligible boys from September 2019. Some special focus groups, including pregnant women, gay men, and unvaccinated women past the originally targeted age group, have also been included in the programme as the government seeks to improve the efficiency of the programme. Gardasil vaccine, which protects against types 6, 11, 16, and 18 of HPV, has been used in the implementation of the programme.

Research to test the effectiveness of the Gardasil vaccine has been conducted in 14 countries. The research, sponsored by WHO, posits that there has been a reduction in diagnoses for genital warts and cervical cancer. Findings from the research have shown the significance of the vaccine in alleviating the burden on healthcare provision posed by HPV. Owing to the relationship between cancer and HPV, there are adverse effects faced by patients diagnosed with the illness. Despite studies indicating that the HPV vaccine is more effective when administered to more than 50% of the population, the vaccination programme faces several factors that hamper its efficacy. It can be intuitively inferred that knowledge informs decisions which underscores the fact that increasing popular awareness of the positive efficacy of the vaccine has the potential to lead to improved vaccine acceptance.

The challenges that have faced the vaccination programme include a lack of education and awareness regarding the need for the vaccine. Also, moral and parental concerns have hampered the success of the vaccination programme. Religious contraindications, such as discouragement by religions such as Protestant, have also contributed to lower vaccination rates. Parents fear that the vaccine will lead to early promiscuity and the practice of illicit sexual behaviours by their young ones, a concern also held by religious institutions. The lack of awareness was also postulated in girls and boys who had already received the vaccine; however, education and the raising of awareness were shown to be effective methods of increasing vaccine uptake, with educated individuals being more welcoming to vaccination efforts.

Increasing the awareness and knowledge of the population has been shown to improve attitudes, which translates to increased HPV vaccine uptake. Awareness of the safety and effectiveness of the vaccine must be instilled among the population if near-100% levels of vaccination are to be attained. Targets of education and awareness-raising initiatives include parents, teenagers, healthcare personnel, teachers, community leaders, and religious leaders. Indeed, parents and healthcare providers have been shown to be the greatest influencers of attitudes towards the vaccine. With parents naturally concerned about the safety of their children, ensuring they view the vaccine as safe would undoubtedly result in increased uptake. In turn, healthcare providers have been shown to influence the decisions of parents. Therefore, ensuring that healthcare providers support the vaccination programme would be likely to ensure higher uptake of the vaccine.

Varying degrees of success in shaping opinions regarding the HPV vaccine can be attributed to sources of information on the topic. Possible sources of information regarding the vaccine include the media, which include social media and the mainstream media. Their influence was effectively demonstrated when the vaccination programme was rolled out in the UK Newspaper reviews were also shown to influence the attitude of the public towards the HPV vaccine. It is the proper role of healthcare providers to address healthcare concerns in the population, and having them as sources of information on a vaccine is essential in ensuring high levels of uptake of the vaccine. Financial incentives were also found to be an effective way of increasing vaccine uptake. In addition, the shared experiences of women who had been vaccinated also increased uptake. Finally, organisations influence society, and issuing vaccinations at the organisational level proved successful in increasing the number of people vaccinated.



Public Health England (PHE) has been monitoring and evaluating the HPV immunisation programme in England. Trends in the uptake of the three-dose schedule were noted by PHE, particularly a reduction in the number of people being vaccinated when the first, second, and third doses were compared. Also, each year since 2008, an increase in vaccine uptake was posted. Then, in 2014, the immunisation programme changed from a three-dose to a two-dose schedule, citing costs and the efficacy of two doses. An incremental increase in uptake was noted over the course of the three years after 2014, attributable to the localisation of vaccine delivery. The findings of surveys discussed in this paper indicate that a great deal of disregard, misinformation, and stigma surround HPV. Among minority groups, the uptake of the HPV vaccine is very low. A number of studies discussed herein focused on parental perspectives. They conclude that various moral, social, and cultural concerns were the significant influencers of consent granted by parents for HPV vaccination.

Programme technicalities have also been evaluated in the literature to provide insight into uptake. A study of vaccination teams was conducted, and it revealed challenges the implementation of the immunisation programme faces. In addition, a qualitative service evaluation of the immunisation programme was carried out, indicating that collaboration and experienced service providers contribute to better programme delivery. Despite the challenges, various improvements were noted that have increased uptake and raised awareness among the population. Initiatives like Jo's Cervical Cancer Trust, surveillance of STIs by PHE, and the monitoring of cervical screening have increased HPV awareness and vaccine acceptance. Finally, a recommendation was made that thorough communication and integration strategies be conducted to ensure the eradication of cervical cancer based on the findings of the resources discussed.

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