HPV vaccination should be extended to boys as part of the Hong Kong Childhood Immunisation Programme

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Introduction

Human papillomavirus (HPV) causes a range of diseases in both sexes from benign warts to cancers. The HPV vaccine, which is the only form of primary prevention, is most effective if administered before sexual debut. In Hong Kong, the two-dose nonavalent HPV vaccine, which offers protection against subtypes of HPV that cause cancers as well as recurrent benign lesions, is offered free of charge to only female primary school students, as part of the Hong Kong Childhood Immunisation Programme.[1] As of 31 December 2020, the vaccine uptake rate for the first dose was at 85% and is expected to increase with the ongoing service and positive response.[2] The extension of HPV vaccination to boys should be considered, especially with the rising global incidence of HPV-related diseases in males.[3] Worldwide, only 32 countries have introduced gender-neutral HPV vaccination programmes, none of which are in East Asia.[4]

Risks of human papillomavirus infection for boys

Men have a poorer immune response to HPV infection, with seroconversion after infection being detected in only 20% to 30% of men, compared with about 70% of women.[5] This results in increased susceptibility of males to HPV infection and related malignancies.[5] Hong Kong has a rising incidence of oropharyngeal and penile cancers which are often related to HPV infection and not amenable to effective screening measures, resulting in late diagnosis with increased morbidity and mortality.[6] In Hong Kong, HPV-related genital warts are more common in males than in females.[7]

Liberal attitudes towards sex are also observed in Hong Kong, with 10% of youth having their first sexual intercourse by age 15, and 50% never using condoms for safe sex.[8] The most recent Youth Sexuality Study[9] revealed 13% of secondary school boys were unsure about their sexual orientation, and this may increase their exposure to HPV infections while experimenting with their sexuality.

Benefits of including boys in human papillomavirus vaccination programmes

With a girls-only programme, there is discriminatory access to a public good based on one's sex. Herd immunity is not extended to males who have unvaccinated sexual partners. A gender-neutral programme would extend protection to a larger population, reducing the long-term burden of HPV-related disease on the healthcare sector and avoiding health inequalities. A girls-only programme may also increase the stigmatisation of HPV as a female-only issue or lead to false messages that girls are prone to promiscuity and solely responsible for HPV transmission. Furthermore, a girls-only programme provides a one-way contribution to herd immunity, while girls bear all, albeit minimal, risks associated with the vaccine. This places boys in the position of free riders, which is morally questionable.[10] Since both sexes are equal vessels of transmission, a gender-neutral approach is beneficial in creating a moral norm of shared responsibility, eradicating the gender-based stigma surrounding sexual activity, and closing the knowledge gap about HPV-related diseases in males.

Foreseeable barriers

Traditionally, a female-oriented approach was employed to promote the uptake of HPV vaccines in Hong Kong. Female celebrities were used in advertisements, and the HPV vaccine was referred to as the 'cervical cancer vaccine' in Cantonese. Therefore, the HPV vaccine might be perceived as lacking relevance or benefit for boys, and parents might not consent to the vaccination of their sons. To the best of our knowledge, there is no literature

available on the parental perception and acceptability of HPV vaccination for boys in Hong Kong. However, the high uptake rate of the HPV vaccine among girls indicates a change in parental perception, suggesting acceptance and promising uptake rates if boys were offered the HPV vaccine.

A global shortage of HPV vaccines is evident despite major manufacturers expanding their production capacities. In 2019, the World Health Organization recommended temporary suspension of gender-neutral HPV vaccination programmes, at least until adequate supply could be resumed to allow for equitable access.[11] More recently, the supply has become more robust because two new vaccines have been approved, production capacity has increased, and administration of the vaccine has been delayed owing to the COVID-19 pandemic and active management of demand. By 2024, the global supply for HPV vaccines is anticipated to be adequate.[12]

Cost-effectiveness

The current girls-only HPV vaccination programme in Hong Kong is primarily based on considerations of cost-effectiveness, because high vaccination coverage of around 90% among females also provides benefits for their heterosexual male partners, resulting in herd immunity.[13] However, a gender-neutral programme also provides resilience when fluctuations in uptake are present in the short term or there is overall low uptake among females in the longer term and would become cost-effective in these settings at an appropriate vaccine price.[14,15] One study in Europe showed that at 80% coverage, gender-neutral HPV vaccination was cost-effective in tender-based procurement settings.[16] A study of gender-neutral nonavalent vaccination in France showed cost-effectiveness at a coverage rate of ≤60%.[17] A recent systematic review reported heterogenous cost-effectiveness results, which could be attributed to differing dependent parameters used in each study, such as discounted rates for health benefits, vaccine prices, and included disease pathologies.[18] Despite these unfavourable cost-effectiveness results, almost all analysed countries established gender-neutral programmes, taking into consideration ethics and equity issues.

Way forward

Hong Kong can consider pioneering a 'modified gender-neutral programme', offering both girls and boys a single shot of the nonavalent vaccine. Three clinical trials, the Costa Rica Vaccine Trial, the Papilloma Trial against Cancer in Young Adults, and the International Agency for Research on Cancer India HPV Trial, have extensively investigated single-dose HPV vaccination using bivalent or quadrivalent vaccines.[19] Data from the Costa Rica Vaccine Trial revealed sustained HPV antibodies 11 years post-vaccination among females who received a single dose, and comparable efficacy to the multi-dose regimen. Additionally, modelling analyses showed a single-dose regimen to be cost-efficient and successful in conferring health benefits, as compared to zero vaccination.[19] These trials were limited to females and mainly demonstrated sustained antibody response. Further research using cervical intraepithelial neoplasia as an endpoint in females and efficacy evaluation with longer follow-ups in males is essential to confirm the benefit of this strategy.

Conclusion

Although a gender-neutral vaccination programme would cost more financially, there are substantial benefits for both boys and girls. Renaming the vaccine in Cantonese, together with endorsement by local male celebrities can shift the narrative away from a 'female virus'. Additionally, HPV vaccination can be promoted as a long-term investment for sons' health, with public health education for parents and children to spread awareness of the harms of HPV infections in boys and the benefits of HPV vaccination for boys. With further research in this area, Hong Kong can be at the forefront of HPV eradication in Asia.

Author contributions

Concept or design: NTY Ngai.
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Critical revision of the manuscript for important intellectual content: WWT Lam, R Raghupathy.

All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

The authors have no conflicts of interest to disclose.

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Answers to CME Programme
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I. Outcomes of adolescents with acute lymphoblastic leukaemia

A	1. True	2. False	3. False	4. True	5. True
B	1. False	2. True	3. True	4. True	5. False

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II. Clinical course and mortality in older patients with COVID-19: a cluster-based study in Hong Kong

A	1. False	2. True	3. True	4. False	5. True
B	1. True	2. False	3. True	4. False	5. True