

THE RELATIONSHIP BETWEEN PARENTAL
KNOWLEDGE OF HUMAN PAPILLOMAVIRUS (HPV)
INFECTION AND THEIR ATTITUDES AND
INTENTIONS TOWARDS VACCINATING THEIR SONS
WITH HPV VACCINE IN SECONDARY SCHOOLS IN
GOMBAK, SELANGOR

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by

HAJAR IZZATI BINTI RAMLE

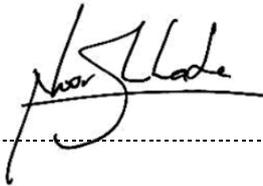
Dissertation submitted in partial fulfilment
of the requirements of the degree of
Bachelor of Nursing with Honours

August 2025

CERTIFICATE

This is to certify that the dissertation entitled “The Relationship between Parental Knowledge of Human Papillomavirus (HPV) Infection and their Attitudes and Intentions towards vaccinating their Sons with HPV Vaccine in Secondary Schools in Gombak, Selangor” is the bona fide record of research work done by Ms Hajar Izzati binti Ramle during the period from October 2024 to August 2025 under my supervision. I have read this dissertation and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfilment for the degree of Bachelor of Nursing (Honours).

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. I grant Universiti Sains Malaysia the right to use the dissertation for teaching research and promotional purposes.



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LIST OF ABBREVIATIONS

4vHPV	Quadrivalent Human Papillomavirus vaccine
9vHPV	Nonavalent Human Papillomavirus Vaccine
FDA	Food and Drug Administration
FVI	Face Validity Index
GK23	General HPV Knowledge Scale
HABS	HPV Attitudes and Belief Scale
HBM	Health Belief Model
HCP	Healthcare Provider
HPV	Human Papillomavirus
HR	High Risk
LR	Low Risk
OPSCC	Oropharyngeal Squamous Cell Carcinoma

**HUBUNGAN ANTARA PENGETAHUAN IBU BAPA MENGENAI
JANGKITAN HUMAN PAPILLOMAVIRUS (HPV) DENGAN
SIKAP DAN NIAT MEREKA UNTUK MEMBERIKAN VAKSIN
HPV KEPADA ANAK LELAKI DI SEKOLAH MENENGAH DI
GOMBAK, SELANGOR**

ABSTRAK

Human papillomavirus (HPV) merupakan satu isu kesihatan awam yang penting di peringkat global, yang memberi kesan kepada lelaki dan wanita serta menyumbang kepada pelbagai jenis kanser. Walaupun vaksin HPV telah tersedia di Malaysia, usaha imunisasi masih tertumpu kepada remaja perempuan, sekali gus menyebabkan remaja lelaki tidak mendapat perlindungan dan mewujudkan jurang jantina dalam pencegahan HPV. Kajian keratan rentas ini dijalankan untuk menyiasat hubungan antara pengetahuan ibu bapa mengenai jangkitan HPV dan sikap mereka terhadap pemberian vaksin HPV kepada anak lelaki remaja di sekolah menengah di Gombak, Selangor. Seramai 315 orang ibu bapa telah mengambil bahagian dalam kajian ini melalui soal selidik yang diisi sendiri menggunakan instrumen yang telah disahkan (GK23 dan HABS). Hasil kajian menunjukkan bahawa hanya 28.87% daripada ibu bapa mempunyai pengetahuan yang baik mengenai jangkitan HPV, manakala 38.7% mempunyai pengetahuan yang rendah. Sikap ibu bapa pula berbeza-beza, dengan kebimbangan terhadap keselamatan vaksin, kurangnya komunikasi mengenai kesihatan seksual, serta maklumat yang tidak tepat. Terdapat hubungan yang signifikan secara statistik antara tahap pengetahuan yang lebih tinggi dengan sikap yang lebih positif terhadap vaksinasi HPV, serta antara sikap positif dengan kesediaan untuk memberi vaksin kepada anak lelaki. Dapatan ini menekankan

keperluan mendesak untuk dasar kesihatan awam yang lebih inklusif, intervensi pendidikan yang disasarkan, dan strategi vaksinasi HPV yang bersifat neutral jantina bagi meningkatkan kadar pengambilan vaksin serta mengurangkan beban penyakit berkaitan HPV dalam kalangan lelaki di Malaysia.

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ABSTRACT

Human papillomavirus (HPV) is a significant public health concern globally, affecting both men and women and contributing to various types of cancers. Despite the availability of HPV vaccines in Malaysia, immunisation efforts predominantly target adolescent girls, leaving boys unprotected and contributing to gender disparities in HPV prevention. This cross-sectional study investigated the relationship between parental knowledge of HPV infection and attitudes toward vaccinating their adolescent sons in secondary schools in Gombak, Selangor. A total of 315 parents participated in the study through self-administered questionnaires adapted from validated scales (GK23 and HABS). The results revealed that only 28.87% of parents demonstrated good knowledge of HPV infection, while 38.7% had poor knowledge. Parental attitudes varied, with concerns noted regarding vaccine safety, lack of communication on sexual health, and misinformation. Statistically significant associations were found between higher parental knowledge and more positive attitudes toward HPV vaccination, as well as between positive attitudes and willingness to vaccinate. The findings underscore the urgent need for inclusive public health policies, targeted educational interventions, and gender-neutral HPV vaccination strategies to enhance vaccine uptake and reduce HPV-related disease burden among Malaysian males.

CHAPTER 1: INTRODUCTION

1.1 Introduction

This research dissertation aims to determine the relationship between parental knowledge of human papillomavirus (HPV) infection and their attitudes and intentions toward vaccinating their sons with the HPV vaccine in secondary schools in Gombak, Selangor. This chapter will discuss the background of the study, followed by the problem statement, research questions and objectives, the hypothesis of the study, the conceptual and operational definition of the key terms used in the study, and lastly, the significance of the study.

1.2 Background to the Study

Human papillomavirus (HPV), known as the root of the sexually transmitted cancer epidemic, has caused morbidity, mobility and economic burden to the world, with an estimated 620 000 new cancer-cases related to HPV in women and 70 000 new cancer cases related to HPV in men by 2019 (World Health Organisation, WHO, 2024). Globally, there are 251 846 deaths of HPV-related cervical cancer, with a productivity loss valued at 71.9 billion dollars, and a total of 23 397 deaths resulting from HPV-related neck and head cancer with the economic burden of 9.93 billion dollars in 2019 (Table 1.2) (Bencina et al., 2024). Even so, introducing vaccination efforts across the regions can offset the mortality rate and economic burden that HPV imposes. In Malaysia, the implementation of HPV vaccination is estimated, according to research (Aljunid et al., 2018), to reduce the overall economic burden associated with HPV-related cervical cancer and precancerous lesions from RM 51.5 million to 45.4 million annually.

Table 1.1 Humanistic and economic impact of HPV-related cervical cancer

Region	Number of deaths	Number of deaths as % of total deaths	YLL	YLL % occurring in Males/Females	AYLL	VYLL (\$)
Africa	48,057	19%	1,658,223	0%/100%	35	3,529,511,093
Eastern Mediterranean	8,500	3%	291,179	0%/100%	34	2,925,151,567
Europe	29,773	12%	796,945	0%/100%	27	20,626,100,782
The Americas	41,292	16%	1,231,963	0%/100%	30	28,228,834,147
South-East Asia	60,202	24%	1,985,161	0%/100%	33	14,214,482,015
Western Pacific	64,023	25%	1,861,468	0%/100%	29	2,377,989,255
Global	251,846	–	7,824,938	0%/100%	31	71,902,068,859

Abbreviations. AYLL, average years of life lost; HPV, human papillomavirus; VYPLL, values of years of productive life lost; YPLL, years of productive life lost; YLL, years of life lost.

Source: WHO region (2019)

Table 1.2 Humanistic and economic impact of HPV-related head and neck cancer

Region	Number of deaths	Number of deaths as % of total deaths	YLL	YLL % occurring in Males/Females	AYLL	VYLL (\$)
Africa	387	2%	11,575	72%/28%	30	26,123,879
Eastern Mediterranean	998	4%	31,322	70%/30%	31	326,909,566
Europe	7,942	34%	208,026	86%/14%	26	5,562,730,370
The Americas	3,321	14%	83,681	82%/18%	25	2,068,783,868
South-East Asia	8,691	37%	247,645	73%/27%	28	1,872,738,991
Western Pacific	2,058	9%	50,963	84%/16%	25	68,937,487
Global	23,397	–	633,213	79%/21%	27	9,926,224,161

Abbreviations. AYLL, average years of life lost; HPV, human papillomavirus; VYPLL, values of years of productive life lost; YLL, years of life lost; YPLL, years of productive life lost.

Source: WHO region (2019)

The double-stranded DNA virus can be transmitted through skin-to-skin genital contact during intercourse and vertically from the infected maternal genital tract during labour. This virus has more than 200 types, with approximately 40 types that can infect the anogenital tract, and are classified into high-risk (HR)-HPV and low-risk (LR)-HPV. Based on The International Agency Research on Cancer, Types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, and 59 are classified as HR-HPV that may cause dysplasia and cancers, while types 6, 11, 40, 42, 43, 44, 54, 61, 70, 72, 73, 81 and 89 classified as LR-HPV types predominantly associated with the non-malignant lesions (Genital Warts) (Adnan et al., 2020). Despite the immense cases of HPV-related cervical cancer in women, the incidence of HPV infection is equivalent among men and women. According to Bruni et al. (2023), the prevalence of men infected with HPV was 31% globally for any type and 21% for HR-HPV. Additionally, the global pooled genotype HPV in men was prevalent in type-16 and type-6, and the infection occurred in one in five men with one or more

HR-HPV that contributes to the progression of squamous cell cancer in the male genitalia or anus, mouth, and throat (Bruni et al., 2023).

In 2009, the United States Food and Drug Administration (FDA) approved that Merck's Gardasil vaccine can be used in men between the ages of 9 and 45 years old to prevent cancer related to HPV in men and genital warts. In Malaysia, Gardasil, Quadrivalent HPV vaccine (4vHPV), and Gardasil 9, Nonavalent Vaccine (9vHPV), are available for payment through private and government healthcare providers, and are not included in the HPV immunisation program. Even so, recent trends illustrated a decline in HPV vaccination coverage among girls. For instance, according to CodeBlue (2023), retrieved from the WHO immunisation data portal, the HPV vaccination coverage for girls aged 15 and above dropped drastically to 39% for the first dose in 2022, and the HPV vaccination coverage for girls aged 15 years old declined to 82% in 2022. Moreover, a presentation from the ROSE Foundation at the fourth meeting of Dewan Rakyat Parlimen ke-15 on August 16, 2023, mentioned that the total number of vaccine dropouts among girls from 2021 to 2023 was 580,000 (Jawatankuasa Pilihan Khas Wanita, Kanak-Kanak dan Pembangunan Masyarakat, 2023). Therefore, with the decline in vaccination coverage among girls from the previous years, including adolescent boys in the target population can help reduce HPV-related morbidity and mortality in men and ultimately eliminate cervical cancer and other HPV-related diseases.

Introducing the new HPV immunisation policy in childhood will be a challenge for the healthcare system, as parental acceptability is the first subject to tackle. In Malaysia, paediatric patient must obtain informed consent from their parents or surrogates before receiving any medical procedure or treatment. As a result, parents are the proxy decision-

makers in their child's vaccination, and their decision is influenced by their knowledge and attitude towards the HPV and the vaccine. Knowledge is an independent predictor of vaccine acceptability for parents due to the safety concerns, belief in vaccines, and the benefits of vaccines. According to Waller et al. (2020), 10% of parents in their research in England and Wales are unwilling to vaccinate their male child due to the unavailability of information regarding the safety and efficacy of the HPV vaccination. Hence, parental knowledge is the major contributor to facilitating the uptake of HPV vaccination programs for adolescent boys and achieving herd immunity.

1.3 Problem Statement

Malaysia has a widely available HPV vaccine for both genders and is the first Southeast Asia region to implement the national vaccination program introduced in 2010. However, the current policy primarily targets girls aged 13 years old, with no formal inclusion of adolescent boys in the program. The exclusion from the policy leaves boys vulnerable to HPV-related diseases such as head and neck cancer, penile cancer, and genital warts. In cross-sectional research by Sathasivam et al. (2023), it is estimated that about 31% of the cases of oropharyngeal squamous cell carcinoma (OPSCC) are linked to HPV-associated OPSCC. The same study also mentions that although the prevalence was not as high as in some developed countries, Malaysia has shown an upward trend regarding OPSCC cases (Sathasivam et al., 2023). In addition, according to the systematic review by Bruni et al. (2023), based on the 47 studies globally related to HPV prevalence in men, including age-specific information, the highest prevalence of about 35% is among people aged 25 to 29 for any HPV, and it is also high about 28% in boys aged 15 to 19.

Furthermore, according to Lehtinen et al. (2018), the heightened coverage of the HPV vaccine in both genders in early adolescence will reduce the HR-HPV subtype (16) in the general population. In addition, with the herd effects resulting from both genders' vaccination, the unvaccinated are indirectly protected from HPV (Lehtinen et al., 2018). Despite the growing evidence that gender-neutral vaccination programs can significantly reduce the spread of HPV, boys are not being systematically vaccinated. The parental knowledge of HPV and the vaccine in boys and attitudes about vaccinating their sons contribute to the incomplete coverage. Parents of boys lacking official recommendations have low awareness and reluctance to seek vaccination for their sons.

Factors contributing to the issues are firstly due to the exclusion of boys from the official vaccination program, which reinforces the belief that HPV and the vaccine are a 'female issue' (Grandahl & Nevéus, 2021). According to parents, they may not realise the risks HPV poses to their sons. This gender bias in public health policies creates misconceptions among parents, who may not be aware of the broader health risks and benefits of vaccinating boys. Additionally, the lack of public health campaigns or educational materials that specifically address HPV risks in boys further deepens the awareness gap. According to the research by Foster et al., (2023), men presented with low knowledge of HPV, and they displayed less interest in the HPV vaccine than women due to the feminisation of the HPV vaccine.

Societal norms and cultural beliefs also play a crucial role, as the HPV vaccine is often framed as introducing the adolescent to early sexual activity and relevant only to girls, making parents refuse to seek vaccination for their sons. In Asian culture, specifically in Malaysia, the majority are Muslim, and they are sensitive to issues related

to sex that create barriers to sexual and reproductive health information, support, and practices (Wong, 2012). Also, physicians are less likely to recommend the HPV vaccine for boys since they are not part of the target group in the standard vaccination protocol, limiting access to crucial information that could influence parental decisions. According to the research by Wong et al. (2017), physicians lack awareness of the HPV vaccine for boys, and parents are reluctant to recommend the uptake of the vaccine.

1.4 Research Questions

The research questions for this study are as follows:

- i. What is the level of parental knowledge of HPV infection among adolescent sons in secondary schools in Gombak, Selangor?
- ii. What is the score of parental attitudes towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor?
- iii. What is the status of parental HPV vaccination intention for their adolescent sons in secondary schools in Gombak, Selangor?
- iv. Is there any association between parental knowledge of HPV infection and parental attitudes towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor?
- v. Is there any relationship between parental knowledge of HPV infection and parental intention towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor?
- vi. Is there any relationship between parental attitude and parental intention towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor?

1.5 Research Objectives

1.4.1 General Objectives

The general objective of this study is to determine of parental knowledge of HPV infection, parental attitude and parental intention towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor.

1.4.2 Specific Objectives

The specific objectives for this study are as follows:

- i. To determine the level of parental knowledge of HPV infection among adolescent sons in secondary schools in Gombak, Selangor.
- ii. To determine the score of parental attitudes towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor.
- iii. To determine the status of parental HPV vaccination intention for their adolescent sons in secondary schools in Gombak, Selangor?
- iv. To examine the association between parental knowledge of HPV infection and parental attitudes towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor.
- vii. To examine the relationship between parental knowledge of HPV infection and parental intention towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor.
- v. To examine the relationship between parental attitude and parental intention towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor.

1.6 Research Hypothesis

Hypothesis 1: (H₀): Parental median attitudes score toward HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor of three level of parental knowledge of HPV infection are not different or equal

(H₁): At least one pair level of parental knowledge of HPV infection has different median parental attitudes score toward HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor.

Hypothesis 2: (H₀): There is no association between parental knowledge of HPV infection and parental intention towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor.

(H₁): There is an association between parental knowledge of HPV infection and parental intention towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor.

Hypothesis 3: (H₀): There is no association between parental attitude and parental intention towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor.

(H₁): There is an association between parental attitude and parental intention towards the HPV vaccination for their adolescent sons in secondary schools in Gombak, Selangor.

1.7 Significance of the Study

The findings from this study have addressed and determined the knowledge gaps among parents that might prevent the widespread adoption of HPV vaccination in the future implementation of HPV national immunisation programs for boys in Malaysia.

Parents' knowledge and attitudes are crucial in creating new policies regarding HPV vaccination in Malaysia, as they are the primary decision-makers regarding their children's healthcare. Moreover, addressing the disparity in HPV vaccination campaigns in Malaysia that focus on girls and association with cervical cancers in this study will shift the focus toward gender-neutral vaccination that contributes to the achievement of herd immunity and the elimination of cervical cancer in Malaysia.

In addition, findings from this study can guide the health education strategies regarding HPV in Malaysia by enabling healthcare providers (HCP), schools, and policymakers (Ministry of Health Malaysia) to build effective outreach efforts to address parental concerns and misconceptions about HPV infection and vaccination. Ultimately, the high uptake of HPV vaccination can reduce the long-term healthcare burden.

1.8 Conceptual and Operational Definitions

The operational terms used in this research proposal are shown below:

Terms	Conceptual Definition	Operational Definition
Human Papillomavirus (HPV)	Group of small, non-enveloped deoxyribonucleic acid (DNA) viruses that infect the skin and moist surfaces of the body (National Cancer Institute, 2011).	In this study, HPV refers to group of virus strains that targeted by the HPV vaccine and associated with genital warts and HPV-related cancers.
Parental knowledge of HPV infection	Knowledge is defined as the understanding of or information about a subject that someone	In this study, the parental knowledge regarding the HPV infection on adolescent boys in

	gets by experience or study, either known by one person or other people generally (Cambridge Dictionary, 2023).	secondary schools in Gombak was assessed using a self-administered questionnaire GK23 adopted from Sherman and Nailer (2018).
Parental attitude towards the HPV vaccination	Attitude is defined as the feeling or opinion about something or someone, or a way of behaving that is caused by this (Cambridge Dictionary, 2023).	In this study, the parental attitude towards the HPV vaccination for adolescent boys in secondary schools in Gombak was assessed using a self-administered questionnaire HABS adopted from Sherman and Nailer (2018).
Parental intention towards the HPV vaccination	Intention is defined as the thing that someone plan to do or achieve or an aim or purpose (Cambridge Dictionary, 2023).	In this study, the parental intention towards the HPV vaccination for adolescent boys in secondary schools in Gombak was assessed using with closed-ended question, such as willing, unwilling and contemplating adopted from Sherman and Nailer (2018).

CHAPTER 2: REVIEW OF LITERATURE

2.1 Introduction

This chapter provides a general review of the literature about human papillomavirus (HPV) and the immunisation programme in the healthcare system in Malaysia, parental knowledge of HPV infection, parental attitude and intention toward HPV vaccination for their adolescent boys.

2.2 HPV and HPV vaccination

Human Papillomavirus (HPV) is a common sexually transmitted viral infection that affects both genders, leading to various cancers in males, such as external anogenital condyloma, anal intraepithelial neoplasia, penile neoplasia, and anogenital and oropharyngeal cancers. This viral infection can be classified into two genotypes, which are high risk (HR), such as HPV 16 and HPV 18 as the carcinogenic genotypes, and low risk (LR), such as HPV 6 and 11 as the main cause of genital warts (Khoo et al., 2021). Globally, HPV infection is linked with penile cancer in about 50%, 88% of anal cancer, and 56% pooled in oropharyngeal cancer cases (Dayyani et al., 2010; Forman et al., 2012). In Malaysia, according to a study by Khoo et al. (2021), from collecting samples from genital and anal samples from health community-based Malaysian Men, they found that about 27.1% was traced with HR HPV and 3.2% was traced with LR HPV from the anogenital sample. The study also mentioned that the prevalence of HPV infection is from the youngest group, between the ages of 18 and 24 years (Khoo et al., 2021).

Due to the increment in morbidity and mortality of the disease in males, WHO's Strategic Advisory Group of Experts (SAGE) recommended the implementation of the HPV vaccine, quadrivalent (4vHPV) and nonavalent (9vHPV), to be used in vaccination

strategies targeting girls only or both genders, starting from November 2008 to counteract the spread of the disease. The quadrivalent vaccine consists of the non-infectious purified viral L1 capsid protein of HR HPV (16 and 18) and LR HPV (6 and 11) and is indicated for males aged nine to 26 years old to prevent anal cancer, precancerous or dysplastic lesions, anal intraepithelial neoplasia and genital warts (Adnan et al., 2020). At the same time, the nonvalent vaccine consists of non-infectious purified major capsid (L1) protein for HPV 6, 11, 16, 18, 31, 33, 45, 52 and 58, has the same indication for prevention but is recommended for males aged nine to 15 years old (Adnan et al., 2020).

Currently, in Malaysia, boys are not included in the school-based program as the focus remains on girls. Still, the vaccine is available through private healthcare providers, which makes it less accessible and affordable for most families. The exclusion of boys in the national program contributes to less susceptibility to HPV infection in males among Malaysians, which can perpetuate the risk of HPV transmission cycles both in vaccinated and unvaccinated individuals. For this reason, vaccinating the boys may extend the benefits beyond individual protection and achieve herd immunity that overall declines HPV transmission rates and indirectly protects the unvaccinated and high-risk individuals. According to Qendri et al. (2018), at 80% of vaccine coverage, 50% of the gains from boys' vaccination were attributable to women, 15% to heterosexual men and 35% to men who have sex with men (MSM), in addition to cervical cancer prevention.

In countries that adopted gender-neutral vaccination policies, they have reported reductions in HPV infection rates and related cancers among both sexes. According to Chow et al. (2021), after the introduction of gender-neutral HPV vaccination in 2007, they observed a 58% and 45% reduction in genital wart cases in females and heterosexual

males and an 89% reduction among young heterosexual males aged 15 to 20. Moreover, according to Brisson et al. (2016), based on the review of the meta-analysis of the transmission dynamics model on HPV, introducing men to the HPV vaccination programme results in 80% vaccination coverage and increases the overall reduction of HPV 16 among women by 93%. Clearly, in 2020, by introducing the school-based gender-neutral HPV vaccination program, Bhutan achieved a 96% vaccination coverage rate by 2021 (Sonam Yangchen et al., 2024).

2.3 Parental Knowledge of HPV for adolescent sons

Parents' knowledge regarding HPV for boys or men remains limited despite efforts to increase awareness. Parents globally are not exposed to and aware of the information regarding the risks posed by HPV to their sons and the availability of the vaccine to prevent it. Due to the lack of local studies in the Malaysian context, this review draws on Asian and international studies to highlight the global trend and its implications. Endarti et al. (2025) found that approximately 52.2% of parents in Yogyakarta have a low level of knowledge, and about 47.8% are unaware of the HPV and the vaccine, specifically regarding the benefits in cancer prevention (57.3%) and asymptomatic transmission (67.3%). This inadequate knowledge among the parents is due to the current HPV vaccination national program only focusing on girls, which neglects the boys in attaining a precautionary measure and information regarding HPV infection. This study is also consistent with studies in the United Kingdom (UK) before the implementation of the HPV program for boys, in which approximately 63.6% of parents of boys had never heard of HPV, and 53.7% had never heard of the HPV vaccine for boys. In addition, a study by Nguyen et al. (2022) reveals that parents of sixth- to ninth-grade boys have poor knowledge (81.1%) regarding asymptomatic transmission, in particular.

Alternatively, in Italy, due to the introduction of HPV vaccination in 12-year-old males free of charge result with parents are provided with messages regarding HPV infection and prevention for males. According to Mari et al. (2022), about 56.9% of parents of boys in the Lombardy region in Italy knew about HPV and related diseases, and about 34.8% who were informed about HPV received information from a paediatrician. Hence, the study supports that the extensive campaigns and proper policies for HCPs regarding HPV in males will lead to excellent communication and recommendations for parents. Indeed, this study is also consistent with research conducted in England and Wales, where 55% of respondents reported hearing about the HPV and HCP recommendations influencing the distribution of information regarding male-related HPV (Waller et al., 2020). Unlike other studies, about 80% of Korean mothers primarily had heard about HPV and illustrated moderate mean scores of GK23 and VK9 but had the lowest scores, particularly in male-related HPV and the vaccine, due to the lack of information on the issue.

2.4 Parental attitude towards the HPV vaccination for adolescent sons

Parental attitudes towards the HPV vaccination for their adolescent sons are pivotal in determining their intention to accept the vaccine for their sons. The common misconception regarding the HPV vaccination is that parents believe that HPV is more concern with females and unnecessary for boys. According to a study by Choi et al. (2023), the traditional norm that considered health as a responsibility hindered mothers from realising the severity of HPV for males. Consistently, a study in the United Kingdom illustrated that approximately 85.7% of unwilling parents are unaware of the HPV-related risks in males. Thus, due to the perceived susceptibility of the disease being low in parents

of boys, this could threaten the adolescent boys' health through parents' neglect and unwillingness to vaccinate their sons.

In addition, concern about the safety of the HPV vaccine is the perceived barrier to vaccination among parents. Waller et al. (2020) found that 34.9% of parents reported concerns about potential side effects, and 30.8% reported that the vaccine was too new to be considered for their sons. The data reported were consistent with the study by Sherman and Nailer (2018), which showed that items concerning the side effects of the vaccine and the perception that the vaccine scored the highest among unwilling parents. These safety concerns often arise from misinformation or a lack of understanding despite the HPV vaccine being extensively studied and proven safe.

Even so, parents who are aware of the benefits of the HPV vaccine perceive it as an effective preventive measure against severe health conditions for their sons. The vaccine's ability to prevent multiple types of cancers, such as penile, anal, and oropharyngeal cancers, as well as genital warts in males, is recognised by some parents, making them more likely to vaccinate their sons. A study in Korea reported that a mother's vaccination intention is strongly associated with the mother's perceived benefits of the HPV vaccine for boys (Choi et al., 2023). Another study also yields the same result, with 88.7% of parents who decided to vaccinate their sons believing that the HPV vaccine is an effective strategy for preventing HPV infection (Waller et al., 2020).

Moreover, the perceived severity of the disease often outweighs the benefits of the vaccine. Most parents view that HPV-related disease is not an immediate or severe threat to their sons, which leads to underestimating the potential long-term consequences of

HPV infection. A study in Korea found that the low perceived severity among parents in the study required attention, as parents with no intention scored the lowest mean score on threat items (4.4 out of 7) (Choi et al., 2023). It also aligns with a study by Sherman and Nailer (2018) which approximately 85.7% no intention group of parents are unaware that HPV is a disease that is a burden in males, has a risk of transmission to the female, and is associated with a variety of cancer that include anal, penile and oral.

Subsequently, the fallacious belief among parents that vaccinating their sons at a young age will promote risky sexual behaviour or promiscuity contributes to the refusal of the HPV vaccination. In England, both decided and not decided to vaccinate their son illustrated that the HPV vaccine was more likely to influence their son's sexual activity (6%). A study in Korea by Choi et al. (2023) also observed minimal HPV-related communication between mother and son, as the sex subject is a deeply ingrained taboo in Korea. In addition, according to Grandahl and Nevéus (2021), most Asian countries view sex as a deeply ingrained taboo subject, which leads to no sexual communication between parents and children, and this study found that this factor contributes to the unwillingness of parents to the HPV vaccination.

2.5 Parental intention towards the HPV vaccination for adolescent sons

Parental intention is pivotal in determining the acceptability and uptake of the HPV vaccine, particularly among male adolescents. Since the first introduction by the Food and Drug Administration (FDA) in 2011 approved the Gardasil vaccine for use in males and the global public health community, the Centre for Disease Control and Prevention (CDC) increasingly recommends vaccinating both boys and girls to prevent HPV-related diseases, the intention of parents to vaccinate their sons remains inconsistent and

generally lower than desired. In a study conducted in Lombardy, Italy, approximately 61.7% of parents were willing to vaccinate their sons despite being aware of the vaccine's availability and their sons' inclusion in the national immunisation plan (Mari et al., 2022). Similarly, in England and Wales, Waller et al. (2020) reported that approximately 55.9% of surveyed parents with sons expressed a willingness to vaccinate their sons, with the rest being either unsure or disinclined, even with government-supported HPV immunisation.

In Malaysia, there is no research addressing the parental willingness to vaccinate their son with HPV, as boys are not included in the Malaysian National Immunisation Programme. Despite this, several Asian countries have implemented similar strategies to Malaysia and explored the parental intention status for males despite the lack of implementation. According to Choi et al. (2023), Korean mothers displayed a high decline toward the HPV vaccine, with only 4.4% of mothers who participated intending to vaccinate their sons. Similarly, a study in Vietnam also demonstrated low acceptability, with 49% of participants willing to accept the vaccine if it were available (Nguyen et al., 2022). Even so, a study in Indonesia by Endarti et al. (2025) found that approximately 84.4% of parents accepted the HPV vaccine, as most respondents were aware of the vaccine's functionality and benefits. Overall, the inconsistent trend across both Western and Asian countries underscores a global issue in the broader adoption of male HPV vaccination.

2.6 Parental knowledge and attitudes toward the HPV vaccination for their adolescent sons

Current literature on the association between parental knowledge of HPV and parental attitudes toward male HPV vaccination remains limited and unexplored. Despite the lack, one study conducted by Mari et al. (2022) provided insight into the topic by illustrating the positive significance between parental knowledge and attitude toward HPV vaccination (86.5%). The study emphasised that higher parental knowledge can be achieved through awareness-raising campaigns and informative conversations with paediatricians, resulting in a positive attitude toward general and HPV vaccination (Mari et al., 2022).

2.7 Parental knowledge and intention toward the HPV vaccination for their adolescent sons

Research has consistently demonstrated that parental knowledge contributes to the parental intention to vaccinate their sons with the HPV vaccine. Research by Endarti et al. (2025) highlighted that those parents with a good understanding of the nature, transmission, consequences, and benefits of the HPV vaccine had high acceptability toward HPV vaccination in boys (p-value: 0.001). Similarly, studies in Asia countries, such as Vietnam and China, also indicate that knowledge of HPV and the vaccine is the strongest indicator of vaccine acceptability among parents with sons (Nguyen et al., 2022; Zhu et al., 2019). In addition, a study in England and Wales found that the pivotal barrier to parents' acceptability was the need for more information regarding HPV and the vaccine, which influenced their decision-making (Waller et al., 2020). A qualitative study conducted by Zhu et al. (2022) also illustrated that knowledge (29%) was commonly

assigned categories of the reasons parents decide to vaccinate their sons with HPV in Canada.

Despite several studies indicating a significant correlation, a study in Korea reported a null hypothesis between parental knowledge and the intention to vaccinate their adolescent son, as parents were more concerned about unrecognised vaccines recommended (Choi et al., 2023). Along with the study in Korea, a study by Sherman and Nailer (2018) indicated that parents' knowledge was not a significant indicator of their acceptability toward vaccinating their sons in the United Kingdom before the availability of the male HPV vaccine in the National Health Service. Additionally, conflicting messages about HPV and the vaccine, for instance, whom the vaccine is appropriate, what the vaccine prevents, confusion on the availability of vaccine for boys, vaccine benefits, mode of transmission, age suitability and injection site posed challenges for the acceptability of the HPV vaccine (Lacombe-Duncan et al., 2018).

2.8 Parental attitudes and intentions toward the HPV vaccination for their adolescent sons

Recent literature highlights the significant influence of parental attitude and intention on HPV vaccination for their adolescent son. Studies consistently show that positive parental attitudes—characterised by perceived benefits, perceived threats, perceived harms, perceived risks, influence, and general vaccination attitudes—are closely associated with a higher intention to follow through with recommended health actions, such as vaccinating their children. Conversely, negative attitudes are often driven by misinformation, fallacious beliefs, fear of side effects, and general attitudes, such as vaccine refusal. For instance, a study by Sherman and Nailer (2018) illustrated that those

subscales in HABS, including benefit, harm, influence, risk, and general vaccination attitude, were significantly related to parents who intended to vaccinate their children.

Interestingly, a similar study conducted in England, Canada, and Korea also displays significant differences, with similar predictors to those mentioned in the previously mentioned study, regarding parental willingness to vaccinate their sons (Choi et al., 2023; Waller et al., 2020; Zhu et al., 2022). In contrast to positive parental attitude, common factors contributing to harmful intention to the HPV vaccination are parental previous vaccine refusal or vaccine hesitancy in general and the fallacious idea that the HPV vaccine will promote promiscuity for their son. Thus, understanding the dynamics between parental attitude and intention is essential in designing effective health promotion strategies that address concerns, improve knowledge, and ultimately lead to better health outcomes for children.

2.9 Theoretical and Conceptual Framework

To explore the ideas of parental knowledge and attitudes towards vaccinating their sons with the HPV vaccine, the Health Belief Model (HBM) provides a clear framework for understanding their decision-making process. The conceptual model was constructed in the 1950s to assist the social psychologist in the United States Public Health Service (USPHS) in grasping preventive health behaviour, precisely ‘the widespread refusal in people of disease preventives or screening tests for the early detection of asymptomatic disease’ (Alyafei & Easton-Carr, 2024). The framework consists of four primary cognitive constructs: perceived susceptibility to illness, perceived severity of illness, perceived benefits of behaviour change, and perceived barriers to action. In addition, the model incorporated self-efficacy as a critical aspect of people's health behaviour in

decision-making (Bandura, 1977) and cues to action resulting in stimuli initiating the action for the change (Alyafei & Easton-Carr, 2024).

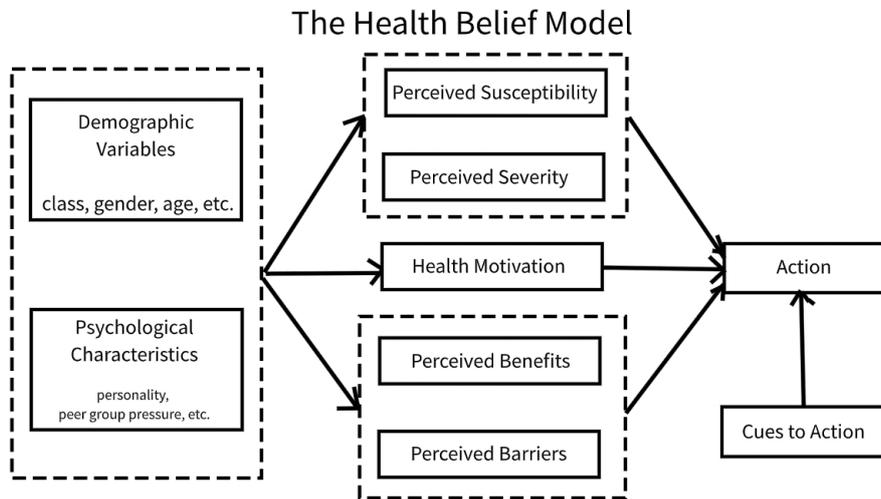


Figure 2.1 Structure of Health Belief Model (Glanz et al., 2015)

In this research, the HBM suggests that a parent's belief in their son's susceptibility to HPV infection is a crucial factor. Suppose parents are well-informed about the fact that boys and girls are at risk of contracting HPV and developing related health issues such as genital warts and cancers. In that case, they are more likely to view their sons as vulnerable and may be more open to vaccination. Secondly, perceived severity also plays a significant role; parents who recognise the severe consequences of HPV, including potential cancers in males, are more likely to see the value in vaccinating their sons. Furthermore, perceived benefits of the vaccine, such as its ability to protect against HPV-related diseases, influence parental attitudes. Parents who understand these benefits are more likely to support vaccination.

However, perceived barriers, including concerns about vaccine safety and side effects, may discourage parents from vaccinating their sons widely if they are misinformed or face logistical challenges. Additionally, cues to action, such as recommendations from healthcare providers or public health campaigns, can trigger parents to consider vaccination, especially if they receive positive guidance from trusted sources. Lastly, self-efficacy, or the parents' confidence in vaccinating their sons, is crucial. Parents who are knowledgeable and feel empowered to take action are more likely to vaccinate their sons. By applying the HBM, researchers can identify which factors most influence parental attitudes and target interventions to address knowledge gaps, reduce perceived barriers, and increase vaccination rates among boys.

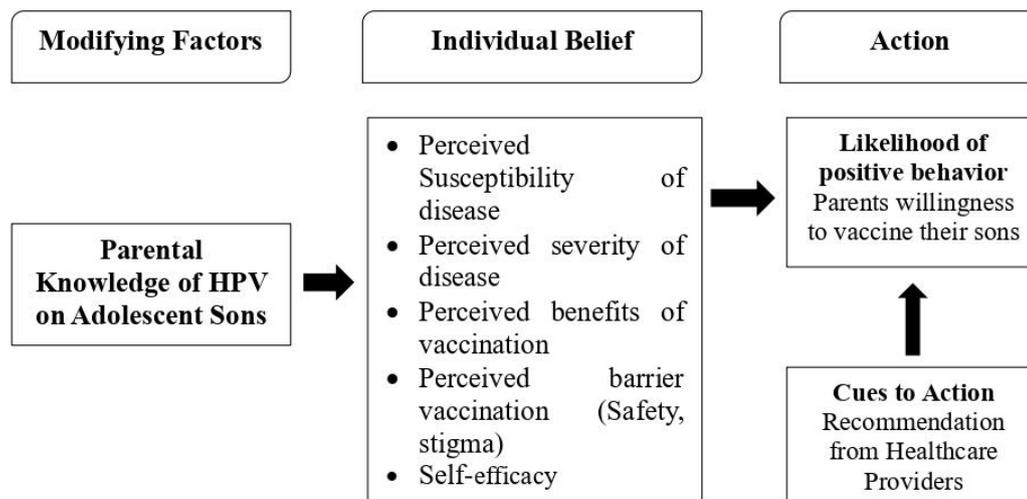


Figure 2.2 Conceptual framework adopted from the theory of the Health Belief Model (HBM)

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter demonstrated the approach and rationale used to support the chosen research methodology. Determining and understanding the suitable research design is essential for achieving the research objectives. The chapter begins with an explanation of the cross-sectional design and a justification for its application. Followed by a description of the study setting, population, participant selection criteria, and the sampling plan, which includes sample size estimation and the sampling method. The instrumentation and ethical considerations during the research are also discussed. The final section of this chapter will explain the analytical processes used with the quantitative data.

3.2 Research design

A cross-sectional study design was used in this study. The research design can assist in measuring the outcomes and exposure of the parental knowledge and attitude towards vaccinating their adolescent sons with the HPV vaccine simultaneously. In addition, this design advantage for the researcher to conduct relatively quick and inexpensive research with no ethical difficulties, collecting data on all variables at a one-time point using a questionnaire, studying multiple outcomes and exposure, easily generating hypotheses, and creating an in-depth research study (Wang & Cheng, 2020).

3.3 Study settings and population

The study setting was conducted at secondary schools under Pejabat Pelajaran Daerah (PPD) Gombak, Selangor Darul Ehsan, which are Sekolah Menengah Kebangsaan Seri Gombak, Sekolah Menengah Kebangsaan Sungai Pusu, Sekolah

Menengah Kebangsaan Hillcrest, Sekolah Menengah Kebangsaan Gombak Setia and Sekolah Menengah Kebangsaan Sungai Kertas (Figure 3.1).

The selection of these secondary schools in Gombak as research settings is based on their characteristics and alignment with the study's objectives. First, the school's large student population and diverse socioeconomic background provide a comprehensive perspective on parental knowledge and attitudes across various demographics. These government-owned public schools mainly consist of Malay, Chinese, and Indian students with different income classifications. This diversity ensures that the findings are representative of a broad community. Their active parent-teacher association, Persatuan Ibu Bapa dan Guru (PIBG), can also be instrumental in gathering in-depth data on parental knowledge and involvement, enriching the qualitative aspect of the study.

In addition, the selected four schools are central and accessible within Gombak, representing a mix of urban and suburban students that allows for a balanced analysis. The decision is also supported by the latest data according to research by Khoo et al. (2021) regarding the prevalence of anogenital HPV infection among Malaysian men in Selangor, highlighting the importance of studying this issue in the region.