



Parents' attitudes, beliefs and uptake of the school-based human papillomavirus (HPV) vaccination program in Jakarta, Indonesia – A quantitative study

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ARTICLE INFO

Keywords:

HPV vaccination
Cervical cancer prevention
Acceptance
Uptake
Attitude
Beliefs
Parents
Theory of Planned Behaviour

ABSTRACT

The Indonesian government has provided free HPV vaccines for female students in years 5–6 in Jakarta since 2016. We examined parents' beliefs, attitudes and intentions to allow their daughters to receive the HPV vaccine, as well as the uptake of the vaccine. This cross-sectional study was conducted between September and November 2019 in Jakarta. We invited 680 parents or guardians of year 6 female students from 33 primary schools who were offered the free HPV vaccine to complete a questionnaire; 484 (71%) responded. Analysis was done in two groups: the 'Decided' Group (those parents who allowed or denied for their daughter to receive the HPV vaccination), and the 'Undecided' Group (those parents who did not recall being approached about the HPV vaccine or forgot their response). In the 'Decided' group, 295 (83.6%) parents allowed their daughters to receive the vaccination, while 58 (16.4%) parents refused it. In the 'Undecided' group, 49 (70%) parents reported a strong intention to allow their daughters to receive the vaccination; 21 (30%) had weak intention. Attitude, subjective norms and perceived behavioural control were shown to be significant predictors of HPV vaccine uptake when multilevel multivariate logistic regression analysis was undertaken. On the contrary, no independent variable was seen as a significant predictor for parents' intentions to vaccinate their daughter against HPV. No sociodemographic characteristic was significantly associated with parents' decisions or intentions regarding HPV vaccine for their daughters. Further qualitative research is needed to explore parents' knowledge and reasons behind their decision-making processes.

1. Introduction

Cervical cancer is one of the most common malignancies in women worldwide (Ferlay et al., 2019). There were 569,847 new cases with 311,365 deaths worldwide in 2018 (Bray et al., 2018). In Indonesia, there were about 32,000 new cases in 2018 and 18,279 deaths (Bruni et al., 2018), making cervical cancer one of the most frequent cancers occurring in Indonesian females.

Cervical cancer is curable if diagnosed and treated in the early stages of disease (Banerjee, 2017). In high income countries, the number of deaths caused by the disease has been reduced since cervical cancer screening programs have been available (Fisher and Brundage, 2009). However, the uptake of cervical cancer screening programs in Indonesia is sub-optimal, and many women do not seek help until their cervical

cancer is at an advanced stage, resulting in poor prognosis, and decreased life expectancy (Anggraeni et al., 2011). In these situations, primary prevention practices such as vaccination are important to reduce HPV infections.

The use of HPV vaccines is proven to be effective in decreasing 68% of cases due to the cervical cancer causal agents, HPV variants 16 and 18, when a 50% coverage rate is achieved (Drolet et al., 2015). The vaccine is also a cost-effective prevention method (Guerrero et al., 2015) and have been widely used and integrated into different national vaccination programs in a large number of high income countries including Australia, the United States of America, New Zealand, Canada and most of Europe (Villa, 2014). Even though the cost effectiveness of HPV vaccination in males depends on the vaccine coverage in females (Chesson et al., 2011), several countries such as Australia, Austria,

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<https://doi.org/10.1016/j.pmedr.2021.101651>

Received 12 May 2021; Received in revised form 22 November 2021; Accepted 25 November 2021

Available online 27 November 2021

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Canada, USA and UK have recommended HPV vaccination for boys (Stanley, 2014). However, many countries, including many LMIC that have only either recently piloted the vaccine or integrated it into their national vaccination program (Bruni et al., 2021), prioritise HPV vaccine for girls.

Despite the HPV vaccines' effectiveness, the HPV vaccines' uptake varies and remains low in several countries, ranging from 2.4% in Hong Kong, to 94.4% in Scotland (Loke et al., 2017). While sociodemographic characteristics such as parents' education or socioeconomic status are associated with HPV vaccination status among girls (Schülein et al., 2016), physician's recommendation, parents' acceptance and peer encouragement are also facilitators to uptake (Loke et al., 2017). Meanwhile, lack of information and parents' concerns about the vaccine's safety are barriers to HPV vaccine uptake (Gilmour et al., 2013; Loke et al., 2017; Suppli et al., 2018). Cost is also important since higher uptakes were found mostly in countries where the vaccine is publicly funded (Garon et al., 2019; LaMontagne et al., 2011; Loke et al., 2017).

A number of theoretical models or frameworks have been used to explain behaviour related to HPV vaccination, with the Theory of Planned Behaviour (TPB) being one of the most common theories used (Batista Ferrer et al., 2015). The theory suggests that a person's behaviour is predicted by their attitude, subjective norms and perceived behavioural control (Ajzen, 1991). The three variables are found to be significantly associated with HPV vaccine uptake or intention in several studies (Hertweck et al., 2013; Roberto et al., 2011), while in another study, only some of the variables are associated with HPV vaccination behaviour (Askelson et al., 2010).

The Indonesian government has provided the quadrivalent HPV vaccine (Gardasil® 4vHPV) for free to all year 5 and 6 female students in selected cities in Indonesia through school-based vaccination programs. The vaccine is administered in schools by doctors from local health centres (*Puskemas*), as school nurses are not common in Indonesian school settings. Parents/guardians were required to provide written informed consent indicating whether or not they allowed their daughters to receive HPV vaccine.

The first city that implemented the program was Jakarta in 2016 (Aziza, 2016), followed by Yogyakarta in 2017 (Handito, 2017), and Surabaya, Makassar, and Manado in 2018 (Ramdan, 2020). Before this program, Indonesians could access the HPV vaccine in hospitals, usually private hospitals in urban areas, by paying for it themselves. The overall uptake of the vaccine as a result of these programs is estimated to be over 90% (Pranita, 2019). The results are consistent with two previous studies examining parents' acceptance of the HPV vaccine in Indonesia (Endarti et al., 2018; Jaspers et al., 2011): 96.1% parents from a total of 746 participants in five major cities in Indonesia (Banjarmasin, Manado, Bali, Medan, Surabaya) said they would accept the vaccine for their daughters (Jaspers et al., 2011), while 91% of 100 mothers in Yogyakarta said they would give the vaccine to their daughters (Endarti et al., 2018). Parents' age, health beliefs about cervical cancer, and attitudes towards vaccination in general, were significantly associated with parents' intentions to accept the vaccine (Jaspers et al., 2011), and the intention to vaccinate was strong despite insufficient knowledge on the HPV vaccine or cervical cancer (Endarti et al., 2018).

Most previous research in Indonesia examined parents' intentions to have their daughters receive the HPV vaccine, or parents' acceptance of the vaccine (Endarti et al., 2018; Jaspers et al., 2011). Only limited research examining what factors associated with uptake has been conducted (Bowyer et al., 2014). To our knowledge there is no research that used theoretical model to explain parents' decisions regarding HPV vaccine for their daughters, while evidence show that designing intervention using theoretical background might be more effective to alter someone's behaviour (Glanz et al., 2008; Michie et al., 2008). Thus, whilst the media report that the resultant coverage rates of the school-based demonstration projects in Indonesia are high (Pranita, 2019), there is a need to unpack what specific factors have contributed to this success before rolling the project out on a national scale. Thus the aim of

this study is to examine what factors contribute to parents' decisions to allow or not allow their daughters to receive the HPV vaccine in Jakarta, Indonesia.

2. Methods

2.1. Study design, setting and participants

This study is a part of a larger concurrent triangulation mixed methods study. Findings from in depth interviews are presented elsewhere. The study was conducted in Jakarta, Indonesia, where the Indonesian government has been piloting a school-based HPV vaccination demonstration program since 2016. In 2019, Jakarta had an estimated population of 10.55 million (Jayani, 2019). The target population for the school-based HPV vaccination program in Jakarta is female students in years 5 and 6. However, at the time of data collection, year 5 students had not yet been vaccinated, therefore the study focused on year 6 students only.

2.2. Data sampling and data collection

Data was collected from September to November 2019. Stratified random sampling was used to make sure the sample represented parents from public schools, private schools, and religiously affiliated schools in Jakarta.

School principals were provided an explanation of the research study verbally and in writing. Those who agreed to participate were asked to provide written informed consent. A teacher in every school was asked to assist distributing the research packs to every year 6 female student to take home to their parents. Research packs comprised a Participant Information Sheet, survey, and a sealable return envelope to ensure confidentiality. A specified collection box was available in the school office to receive completed surveys. Return of the completed survey indicated consent to participate.

2.3. Questionnaire, variables and measurement

The Theory of Planned Behaviour (TPB) is one of the most commonly used theories in HPV vaccination behaviour research, and consists of: (1) attitudes, (2) perceived behavioural control, and (3) subjective norms (Batista Ferrer et al., 2015). Thus, the survey was based on this theory using previously validated items (Degarege et al., 2019). KEW translated the survey into Bahasa Indonesian and an independent translator back translated it to make sure the meaning of the translation was not altered. Since the items were used in a different country with different cultural and social backgrounds, the survey was piloted on several Indonesians to ensure sufficient cross-cultural adaptation.

The survey consisted of questions about participants' demographic characteristics, self-reported previous history of other childhood vaccinations for their daughters, and three independent variables: attitudes towards vaccination in general, subjective norms, and perceived behavioural control. Parents who recalled being asked if their daughters could receive the vaccination were included in the 'Decided' analysis group; those who reported that they had forgotten being approached about the HPV vaccine or forgot their response to the invitation, were included in the 'Undecided' analysis. As such, parents in this group were responding to hypothetical questions about vaccine intentions rather than their actual behaviours.

The *Attitude toward vaccination in general* section consisted of 10 items asking participants' their perceptions of the benefits and barriers of general vaccinations. Items were coded on a four-point Likert scale from "strongly disagree" to "strongly agree". *Subjective norms* consisted of seven questions about the people that parents' belief would approve or disapprove their decision-making regarding vaccinating their daughters against HPV. These items were coded on a three-point scale: "Would rather I vaccinated", "Wouldn't mind if I vaccinated or not" and "Would

rather I did not vaccinate”.

Perceived behavioural control consisted of four items assessing parents’ perceived behavioural control and how confident they were in having their daughters vaccinated. These items were coded on a four point from “strongly agree” to “strongly disagree”.

Data for previous vaccination history, attitude towards vaccination in general, subjective norms and perceived behavioural control were converted to numerical values and transformed into categorical data using a median split. This was done to simplify analyses and interpretation (DeCoster et al., 2011). Those in the upper median were considered as having a good previous vaccination history, having a positive attitude toward the benefits of vaccinations, having a positive support from people around them, and having a high level of perceived behavioural control.

2.4. Statistical analysis

Data were analysed using the statistical software package, IBM SPSS Version 23. Descriptive analysis was used to describe demographic characteristics. Chi-square test was used to examine the relationship between parents’ demographic characteristics and previous vaccination history with parents’ decisions or intentions. Multilevel multivariate logistic regression was used to assess how significant parents’ attitude towards vaccination in general, subjective norms and perceived behavioural control to predict their decisions or intentions regarding the HPV vaccine.

2.5. Ethical consideration

Ethical approval to conduct this study was obtained from the Human Research Ethics Committee of the University of Wollongong (2019/076). Governance approval was also obtained from the Health Office in Jakarta and participating schools. Only schools that provided written informed consent to participate were included in the study. Parents were informed that their participation was voluntary and their decisions on whether or not they participated would not affect their or their daughters’ relationships with their schools or the University of Wollongong.

3. Results

3.1. Response rate, participant demographics, uptake and intention rates

A total of 43 schools were recruited; 10 schools refused to participate as they were preparing for the national exam. Of the 680 parents invited, 484 (71.2%) responses were received; 61 were excluded due to incomplete data. Drop out analysis was conducted. Only education status ($p = 0.05$) associated with whether or not parents completed the survey. Other sociodemographic characteristics were not significant (gender $p = 0.18$; age $p = 0.66$; employment status $p = 0.34$; religion $p = 0.77$; ethnicity $p = 0.68$).

Three hundred and fifty three parents recalled being invited to vaccinate their daughter and their responses were included in the ‘Decided’ analysis group; 70 had forgotten being approached or forgot how they responded and were included in the ‘Undecided’ group.

The majority (359 (83.5%)) of participants in both groups were female; 70% identified as Muslim (Table 1).

Table 1
Participants’ demographics and vaccination history and the relationship with HPV vaccine uptake and intention to vaccinate.

	Decided group N = 353		p	Undecided group N = 70		p	Difference
	Allowed vaccination	Did not allow vaccination		Strong intention to vaccinate	Weak intention to vaccinate		
Gender			0.10			0.46	0.82
Male	41 (13.9%)	13 (22.4%)		6 (12.2%)	4 (19.9%)		
Female	254 (86.1%)	45 (77.6%)		43 (87.8%)	17 (81.1%)		
Age			0.92			0.29	0.87
<30	29 (9.8%)	6 (10.3%)		3 (6.1%)	2 (9.5%)		
31–40	115 (38.9%)	25 (43.1%)		18 (36.7%)	11 (52.3%)		
41–50	136 (46.1%)	24 (41.3%)		25 (51%)	8 (38.1%)		
>50	15 (5.1%)	3 (5.1%)		3 (6.1%)	0		
Employment status			0.81			0.95	0.00
Employed	132 (44.7%)	25		12 (24.5%)	5 (23.8%)		
Not employed	163 (55.3%)	33		37 (75.5%)	16 (76.2%)		
Education			0.58			0.53	0.15
No education	3 (1%)	0		0	0		
Primary education	24 (8.1%)	4 (6.9%)		5 (10.2%)	4 (19%)		
Junior secondary education	42 (14.2%)	5 (8.6%)		7 (14.3%)	4 (19%)		
Senior secondary education	143 (48.5%)	31 (53.4%)		30 (61.2%)	9 (42.8%)		
Higher education	83 (28.1%)	18 (31%)		7 (14.3%)	4 (19%)		
Religion			0.06			0.40	0.08
Buddhism	7 (2.4%)	0		2 (4.1%)	0		
Christianity	61 (20.7%)	6 (10.3%)		5 (10.2%)	1 (4.8%)		
Hinduism	2 (0.7%)	0		0	0		
Islam	225 (76.3%)	52 (89.7%)		42 (85.7%)	20 (95.2%)		
Ethnicity			0.24			0.46	0.39
Javanese	115 (39%)	19 (32.7%)		17 (34.7%)	6 (28.6%)		
Sundanese	27 (9.1%)	9 (15.5%)		7 (14.3%)	1 (4.8%)		
Betawi	81 (27.4%)	21 (36.2%)		17 (34.7%)	10 (47.6%)		
Minangkabau	13 (4.4%)	3 (5.2%)		0	1 (4.8%)		
Chinese	20 (6.8%)	1 (1.7%)		4 (8.2%)	1 (4.8%)		
Other	39 (13.2%)	5 (8.6%)		4 (8.1%)	2 (9.5%)		
Previous vaccination history			0.2			0.06	0.04
Good vaccination history	119 (40.3%)	28 (48.3%)		26 (53%)	6 (28.6%)		
Poor vaccination history	176 (59.7%)	30 (51.7%)		23 (47%)	15 (71.4%)		

Two hundred and ninety-five parents (83.6%) in the ‘Decided’ group reported giving permission for their daughters to receive the vaccine, while 58 (16.4%) did not. In the ‘Undecided’ group, 49 parents (70%) reported having a strong intention to vaccinate their daughter. No significant association was found between any demographic characteristics and parents’ decisions or intentions, or between daughters’ previous vaccination history and parents’ decisions or intentions. Some differences were seen with previous vaccination history and parents’ employment status between the ‘Decided’ group and ‘Undecided’ group (Table 1).

3.2. Parents’ attitudes towards vaccination in general, subjective norms and perceived behavioural control regarding HPV vaccines

Table 2 presents mean and median scores of parents’ attitudes towards vaccination in general, subjective norms and perceived behavioural control in the ‘Decided’ group and in the ‘Undecided’ group. The table also depicts distribution of the participants based on median. All variables presented an acceptable Cronbach Alpha (>0.7) (Pallant, 2010). While the majority of participants from both groups were at lower part of median in terms of attitude towards vaccination in general, distributions of subjective norms and perceived behavioural control in both groups were slightly different. The ‘Undecided’ group had a higher proportion in the lower median of subjective norms (64.29%) while the ‘Decided’ group had a higher proportion in the lower median of perceived behavioural control (62.32%).

3.3. Predictors of parents’ decisions and intentions regarding the free HPV vaccine for their daughters

Table 3 shows how parents’ attitudes towards vaccination in general, subjective norms and perceived behavioural associated with their decisions or intentions regarding HPV vaccine for their daughters. In the ‘Decided’ group, parents’ decisions was significantly predicted by their positive attitude towards the vaccination in general (OR 2.9; 95% CI 1.31–6.71), and their belief that people around them would approve their decisions (OR 6.8; 95% CI 3.02–15.53). In contrast, parents who felt they had a high level of perceived behavioural control were more likely not to allow their daughters to receive the vaccine (OR 0.4; 95% CI 0.24–0.86). In the ‘Undecided’ group, attitude towards vaccination in

Table 2
Mean (SD), median and distribution of attitude, subjective norms and perceived behavioural control in the ‘Decided’ group and ‘Undecided’ group.

Variable		Decided group	Undecided group	Difference
Attitude Towards Vaccination In general	Mean (SD)	19.9 (3.3)	18.1 (3.06)	0.00
	Max	30	30	
Subjective Norms	Median	20	18	
	Upper Median/Lower median	133 (37.7%)/220 (62.3%)	26(37.1%)/44 (62.9%)	0.93
	Mean (SD)	7.8 (4.03)	5.97 (2.91)	0.00
	Max	14	14	
Perceived Behavioural Control	Median	7	6	
	Upper Median/Lower median	175 (49.6%)/178 (52.4%)	25 (35.7%)/45 (64.3%)	0.03
	Mean (SD)	6.6 (2.5)	6.4 (2.3)	0.58
	Max	12	12	
	Median	7	6	
	Upper median/Lower median	133 (37.7%)/220 (62.3%)	31 (44.3%)/39 (55.7%)	0.30

general, subjective norms and perceived behaviour control were not associated with parents’ intentions to allow their daughters to receive the HPV vaccine.

Previous vaccination history and participants’ employment status were also included in the final analysis. However, these variables were not significant predictors for parents’ decisions or intentions (Table 4).

4. Discussion

This cross-sectional study examined factors influencing parents’ decisions to allow their daughters to receive the free school-based HPV vaccine in Jakarta, Indonesia, or their intentions to have their daughters vaccinated. We found that parents’ attitudes toward the benefits of vaccinations in general, their belief that other people would approve vaccination (positive subjective norms) and low level of perceived behavioural control were significant predictors of HPV vaccine uptake, while none of these variables was significantly associated with parents’ intentions. No parents’ sociodemographic variables were a significant predictor for their decisions and intentions. School-based vaccination programs are a common mechanism used in Indonesia to expand the reach of vaccinations, and it is likely that parents who were accustomed to allowing school-based vaccinations for their daughters were also likely to allow their daughters to receive the HPV vaccine.

Results show that even though attitudes towards vaccination in general, subjective norms and perceived behavioural control are significantly associated with parents’ decisions, subjective norms had the strongest association (OR = 7.3). Subjective norms have also been found to be a significant predictor for mothers’ intentions to vaccinate their daughters in Alabama (Cunningham-Erves et al., 2016) and in the US Midwest (Askelson et al., 2010). Specifically, Fahy and Desmond (2010) showed that a stronger intention to vaccinate a daughter against HPV was related to the approval from peer groups and recommendations from health care professionals (Fahy and Desmond, 2010). These may be useful to develop targeted HPV vaccine health information campaigns.

Those parents in our study who felt they had a low level of behavioural control tended to accept the free vaccine. This may indicate perceived difficulties in arranging vaccination outside of the school-based immunisation program due to finance, transport or time constraints. Providing the vaccination for free enhanced parents’ control because they could decide whether or not to provide the vaccination to their daughters without the need to consider cost as a barrier. On the contrary, those who were confident they could afford the vaccine for their daughters were more likely not to allow their daughters to receive the vaccine. Economic factors seem to be a key factor in parents’ behavioural control and an important reason behind parents’ approval regarding a free HPV vaccine. This is similar to findings among parents in rural Vietnam, who would not normally be able to afford the HPV vaccine themselves and allowed their daughters to be vaccinated because it was free (Cover et al., 2012). Results from studies in Latvia and The US also show that parents with lower levels of education, which may parallel with lower socioeconomic status, were more likely to accept the vaccine if it was offered for free (Patel et al., 2017; Wong et al., 2011). Even in high-income countries such as Australia, economic factors may also be an important reason to accept vaccines where financial incentives exist for administration of vaccines (Department of Social Services, 2020).

Our results show that no sociodemographic characteristics were significantly associated with parents’ decisions, in contrast to a previous study (Schülein et al., 2016). This may be related to the fact that the Indonesian government provides the HPV vaccine for free for all girls in Year 5 and Year 6 in all primary schools in Jakarta, eliminating barriers related to cost and therefore parents’ socioeconomic status. Regarding intention to vaccinate, findings from this study are also different from the two previous studies in Indonesia (Endarti et al., 2018; Jaspers et al., 2011). We found that only 70% of parents in the ‘Undecided’ group had a strong intention to allow their daughter to receive the HPV vaccine in

Table 3
Multilevel multivariate logistic regression model examining predictors of parents' decisions and intentions.

Variable	Decided group			Undecided group		
	Coefficient	p	OR (95% CI)	Coefficient	p	OR (95% CI)
Positive attitude towards vaccination in general	1.08	0.00	2.90 (1.31–6.71)	1.15	0.07	3.20 (0.90–11.5)
Approval from others (subjective norms)	1.92	0.00	6.8 (3.02–15.5)	1.00	0.12	2.70 (0.70–9.9)
High level of perceived behavioural control	−0.80	0.01	0.40 (0.20–0.9)	−0.49	0.37	0.60 (0.20–1.9)

Table 4
Adjusted Multilevel multivariate logistic regression model examining predictors of parents' decisions and intentions.

Variable	Decided group			Undecided group		
	Coefficient	p	OR (95% CI)	Coefficient	p	OR (95% CI)
Employed	0.29	0.36	1.34 (0.70–2.58)	0.04	0.94	1.04 (0.27–3.98)
Good vaccination history	−0.58	0.08	0.55 (0.29–1.07)	0.75	0.21	2.12 (0.64–6.98)
Positive attitude towards vaccination in general	1.17	0.00	3.23 (1.40–7.42)	0.98	0.14	2.66 (0.70–10.14)
Approval from others (subjective norms)	1.99	0.00	7.36 (3.20–16.91)	0.98	0.13	2.68 (0.72–10.01)
High level of perceived behavioural control	−0.83	0.01	0.43 (0.22–0.83)	−0.39	0.48	0.607 (0.21–2.08)

the future, compared to 91% (Endarti et al., 2018) and 96.1% (Jaspers et al., 2011). There are several possible reasons as to why results from our study are different to previous studies. Jaspers' study was conducted in 2009 and given that the HPV vaccination was only new, it is likely that participants had not previously encountered the topic of HPV and HPV vaccination. Our study was conducted in 2019 and parents may have had a higher exposure to the topic of HPV and HPV vaccination.

Secondly, our results may also be a reflection that social norms have changed. Evidence indicates that parents with less knowledge were more likely to consent (Fishman et al., 2014; Lawless et al., 2020) and it is possible that parents in our study could have received more diverse information about the HPV vaccine due to increased media exposure over the following decade.

In addition, Indonesia is the fourth highest internet user worldwide with almost 200 million users (Johnson, 2021). A survey in Indonesia showed that 65 % of users believed the information they found on the internet without question (Centre for International Governance Innovation & IPSOS, 2017). Since misinformation on health is the most common type of misinformation circulated on social media (Fanani, 2017), it is highly likely that parents encountered incorrect or overly negative information about the HPV vaccines which may have impacted their intentions to vaccinate, as has been the case elsewhere (Simms et al., 2020). This suggests the need for additional research, especially qualitative studies, to explore where parents obtain their information about the HPV vaccine and what this had.

Finally, parents who are reluctant to vaccinate are generally from higher economic backgrounds (Ogilvie et al., 2010; Patel et al., 2017; Wong et al., 2011). We used stratified random sampling to ensure diversity in socioeconomic and cultural backgrounds. Participants in the previous study in Indonesia were mostly from low socioeconomic regions (Jaspers et al., 2011) and this could also explain our different results.

Our study is the first, to our knowledge, that examines factors associated with the HPV uptake among girls, with parents as participants in Indonesia. This research has some limitations. Data were collected using a self-reported survey several months after the HPV vaccine was delivered through the school-based program, thus there may be recall bias. Ideally a minimum of 50 level-2 units (i.e. schools) were needed for multilevel multivariate logistic modelling (Sommet and Morselli, 2017), however, we were only able to recruit 33 schools because data collection took place during the national exam preparation for year 6 students, and because the global COVID-19 pandemic prevented further recruitment. Due to the limited number of schools in the study, there were only 70 participants in the 'undecided' group. Thus, results should be interpreted cautiously. The difference of education status between parents who did and did not complete the questionnaire

may also indicate some response bias.

5. Conclusion

Parents who thought other people would approve HPV vaccine for their daughters were 7.3 times more likely to allow their daughters to be vaccinated, therefore, it is important to educate people about the HPV vaccine and cervical cancer, especially extended family and respected community members. Considering parents with high perceived behavioural control were more likely to refuse the vaccination and information about the HPV vaccine is easily accessible regardless of its accuracy, it is important to direct these parents to reliable information.

There is a need for future qualitative research to explore parents' knowledge, attitude and beliefs about the HPV vaccine and the school-based vaccination program in Indonesia. Findings could be used to inform culturally appropriate targeted health information campaigns when expanding the HPV vaccination program across Indonesia.

6. Financial disclosure

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CRediT authorship contribution statement

Kurnia Eka Wijayanti: Conceptualization, Investigation, Validation, Data curation, Formal analysis, Writing – original draft, Writing – review & editing, Project administration. **Heike Schütze:** Conceptualization, Writing – review & editing, Supervision. **Catherine MacPhail:** Writing – review & editing, Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

Authors thank A/Prof Rowena Ivers for reviewing drafts and Professor Marijka Batterham from Statistical Consulting Centre in The University of Wollongong for her assistance with the data analysis.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pmr.2021.101651>.

[org/10.1016/j.pmedr.2021.101651](https://doi.org/10.1016/j.pmedr.2021.101651).

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