UNIVERSITI PUTRA MALAYSIA

PARENTAL AWARENESS, ATTITUDE AND PRACTICES ON CHILDHOOD IMMUNIZATION INSELANGOR: AN ONLINE STATEWIDE SURVEY

GROUP 23

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Parental Awareness, Attitudes and Practices on Childhood Immunization in Selangor: An Online Statewide Survey

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ABSTRACT

Introduction: Vaccine is a product that stimulates a person's immune system to produce immunity to a specific disease and it is very important as it protects children from vulnerable diseases. Poor vaccination awareness, attitude and practices causes a significant increase in cases of vaccine-preventable diseases. Therefore, the aim of the study is to assess the parental awareness, attitude and practices on childhood immunization in Selangor through an online statewide survey.

Method: A cross sectional study design was conducted from 20 December 2020 until 5 July 2021. Respondents were selected by convenience sampling in which Malaysian parents in Selangor with at least one child aged less than 15 years old were randomly selected to answer the questionnaire. The Chi-Square and Fisher's Exact tests were used to determine the association between the sociodemographic status of the respondents with their awareness, attitude and practice towards childhood immunization. Multiple logistic regression models were used to determine the determinants of the level of awareness, attitude, and practice towards childhood immunization. Spearman's rank correlation coefficient was used to determine the association between parental awareness and attitude with actual practices.

Result: 201 respondents completed the questionnaire, giving a response rate of 88.94%. The majority of our respondents were aged 41 and above (41.3%), female (80.6%), Malay (80.6%) and Muslim (81.1%), had a tertiary educational level (86.1%) and were employed (80.1%), came from a M40 household income bracket (47.3%), and had 3 to 4 children (51.2%). In this study, The majority of the respondents have good awareness (52.7%), good attitude (53.7%) and good practice (60.2%) towards childhood immunization in Selangor.There is a positive moderate correlation between awareness and attitude scores with the actual practice towards childhood immunization. In multiple logistic regression models, it was found that the families in the T20 income bracket had a 5 higher odds of having better awareness towards childhood immunization as compared to the B40 income bracket group (p=0.001). Also, families in the M40 income bracket had a 2.3 higher odds of having better awareness towards childhood immunization as compared to the B40 income group (p=0.042).

Next, it was shown that the families in the T20 income bracket had a 2.9 higher odds of having better attitudes towards childhood immunizations as compared to the B40 income bracket group (p=0.013). It was also found that the families in the T20 income bracket had a 2.4 higher odds of having better practices towards childhood immunization as compared to the B40 income bracket group (p=0.038) and mothers had a 3.9 higher odds of having better practice towards childhood immunization as compared to fathers (p=0.001).
Conclusion: The majority of the parents have good awareness, attitude and practice towards childhood immunization in Selangor. This augurs well for reducing serious childhood infectious diseases.

Keyword: Parents, Awareness, Attitudes, Practices, Childhood immunization, Selangor

CHAPTER 1: INTRODUCTION

1.1 Background

According to the Centers for Disease Prevention and Control, vaccines are a product that stimulates a person's immune system to produce immunity to a specific disease, protecting the person from that disease. There are four types of vaccine in which they may contain live bacteria or viruses that have been attenuated (weakened or altered so as not to cause illness), such as the Bacillus Calmette–Guérin (BCG) vaccine. Other than that, inactivated or killed organisms or viruses such as hepatitis A vaccine; inactivated toxins (for bacterial diseases where toxins generated by the bacteria, and not the bacteria themselves, cause illness) such as diphtheria vaccine; or merely segments of the pathogen (this includes both subunit and conjugate vaccines) such as hepatitis B vaccine (Hospital Sultan Ismail, 2019). Vaccination programme started in Malaysia in the 1950s. The current Malaysian National Immunization Programme protects children from 13 diseases all together. The vaccines in this programme are the Bacillus Calmette–Guérin vaccine (BCG), 6-in-1 vaccine (diphtheria, tetanus, pertussis, polio, *Haemophilus influenzae* type b (Hib) and hepatitis B), Measles, Mumps and Rubella vaccine (MMR), Human Papillomavirus vaccine for teenage girls, Japanese Encephalitis vaccine for children in Sarawak state only, and the latest vaccine added into the programme which is the Pneumococcal Conjugate Vaccine (PCV). All of these vaccines are free for Malaysian citizens when they take the vaccine at government clinics or hospitals.

Vaccination is very important as it protects children from vulnerable diseases. Children's immune systems are not fully developed, so vaccines can offer immunity to them. Vaccine not only protects children, but everyone in the community as well because a vaccinated community creates herd immunity. Herd immunity is achieved when there is a high rate of vaccination in the community, thus it will be less likely for the community to contract the diseases. This can help to prevent the spread of disease and reduce the morbidity and mortality rates of the community, and at the same time, help the government to save costs of controlling the disease outbreaks and treating these preventable diseases.

According to the World Health Organisation (WHO), a total of four to five million deaths are prevented annually in the whole world. However, global coverage of vaccines has not achieved 100%. This can be seen in the data from 2019, where it showed that approximately more than 19 million children below one year of age did not receive basic vaccines. Only about 85% of infants globally received three doses of diphtheria-tetanus-pertussis (DTP3) vaccine, in which around 14 million infants missed out the first dose of the vaccine due to lack of access to health facilities. If only immunization coverage in every part of the world is improved, vaccines can save another 1.5 million people from their deaths.

It is crucial to determine the causes of non-vaccination so that new methods can be implemented to increase immunization coverage. Hence, a statewide survey regarding the attitude, awareness and practices of parents on childhood vaccination in Selangor, Malaysia is conducted to achieve the research objectives.

1.2 Problem statement

Poor vaccination has been a contributing factor in the significant increase in cases of vaccine-preventable diseases that has been reported locally in recent years. The reasons for the occurence of poor vaccination may be due to lack of parental awareness, knowledge and inaccurate information about childhood vaccinations. In Malaysia, 1,958 cases of measles had been recorded in 2018, and it showed an increase compared to 2017 where only 1,709 cases were reported. Out of the 1,958 cases, 25% of the cases were children who were too young for the vaccine, whereas 34% of the cases were eligible children for the vaccine but remained unvaccinated. For pertussis and neonatal tetanus, it also showed an increase from 2017 to in 2018, where 353 increased to 892 in pertussis cases, and 16 increased to 26 in neonatal tetanus cases. The soaring number of cases as well as mortality rates has warrant the attention to conduct a study to assess the parental awareness, attitude and practices on childhood immunization. Moreover, different studies that showed different findings of the association between some sociodemographic status such as age, working status, and number of children have further encouraged this research to be carried out.

1.3 Importance/ significance of study

This study is important as it assesses the parental awareness and attitude and their actual practice towards childhood immunization which will aid in the improvement of immunization coverage. The findings from this study will help gain and provide new information for the government and associated organizations to increase vaccination rates and improve the success of immunization programmes.

1.4 Research question

1) What is the level of parental awareness, attitude and practice on childhood immunization in Selangor?

2) What are the sociodemographic status that influence the parent's awareness, attitude and practice towards childhood immunization in Selangor?

3) What are the level of parental awareness and attitude and their association with actual practices towards childhood immunization in Selangor?

1.5 Research objective

1.5.1 General Objectives

1) To determine the parental awareness, attitude and practices on childhood immunization in Selangor.

1.5.2 Specific Objectives

1) To determine the association between sociodemographic status and parental awareness, attitude and practices towards childhood immunization.

2) To determine association between the parental awareness and attitude with actual practices towards childhood immunization.

1.6 Research hypothesis

Null Hypothesis

1) There is no association between sociodemographic status and parental awareness, attitude and practices towards childhood immunization.

2) There is no association between parental awareness and attitude with actual practices towards childhood immunization.

Alternate hypothesis

1) There is an association between sociodemographic status and parental awareness, attitude and practices towards childhood immunization.

2) There is an association between parental awareness and attitude with actual practices towards childhood immunization.

CHAPTER 2: LITERATURE REVIEW

2.1 Epidemiology of vaccine-preventable diseases

According to UNICEF (2020), immunization is currently a very cost effective public health intervention and has prevented an estimation of 2 to 3 million deaths yearly. The World Health Organization (2019) reported that the measles vaccine caused more than a 72% decrease in measles mortality, as well as yielding a result of an estimated 23.2 million prevented deaths within 18 years, making it a worthy product to obtain. Although immunization has saved many lives, mortality rates from vaccine preventable diseases (VPD) are still high. In 2019, there were 14 million unvaccinated children globally who were not protected from measles, diphtheria and tetanus disease. Measles cases worldwide rose from 132,490 in 2016 to 869,770 in 2019, making it the highest measles case recorded since 1996. Meanwhile in 2019, global measles mortality has increased by almost half since 2016, with an estimation of 207,500 deaths. Several countries also suffered massive measles outbreaks which contributed up to 73% of all reported cases in 2019.

Based on the World Health Organization, in 2019, there were 22,625 diphtheria cases reported worldwide. In India alone, there was an increase of more than 800 cases since 2018 with an estimated 9,622 cases in 2019. UNICEF (2020) stated that 19.7 million children under the age of 1 all around the world were not vaccinated with the three recommended doses of Diphtheria, Tetanus and Pertussis (DTP3) vaccine. Out of all the countries with high figures of children unequipped with the DTP3 vaccine, India had 21 million children that were not immunized with the DTP3 vaccine. Madhavi and Manikyamba (2015) found that in a hospital-based study in Kakinada, India, there is a rise in dropout rate with each subsequent immunization visit. This may indicate poor health education about immunization from healthcare workers to parents. In the study, the most frequent causes for incomplete or no immunization were children that were sick, lack of information, not knowing vaccination schedules upon migration and misconception.

In 2019, Malaysian citizens were surprised by the return of the once eradicated virus which is the polio virus. After more than 25 years, there was a confirmed case of polio virus in Sabah. The more alarming fact is that 23 out of 199 children in Tuaran, Sabah were not immunized with the polio vaccine in 2019 (Hisham, 2019). Furthermore, measles cases showed a marked increase with 1958 cases that were reported in 2018 as opposed to 1709 cases in 2017. It was also noted that 34% of cases did not obtain the MMR vaccine (Ministry of Health, 2018). The incidence of unvaccinated children may be contributed by the circulating ambiguous and false information which adversely influences the parent's decision on vaccinating their children. Although the overall measles cases in 2019 has decreased more than 800 cases as compared to 2018, there was a measles outbreak involving three states namely Kelantan, Terengganu and Pahang. There were 158 confirmed cases and 12 deaths reported from the outbreak. (Ministry of Health, 2019). As for pneumococcal infections, it was proclaimed that pneumonia is the second main cause of mortality in Malaysia for 2018. It was also seen to be the leading cause of death in children aged 0 to 14 years old (Department of Statistics Malaysia, 2019). In light of the

soon-to-be introduced pneumococcal vaccination, there is hope for pneumococcal infections to dwindle if everyone takes part in herd immunity.

2.2 Importance of immunization

Vaccination is very important in order to protect oneself and the community from infectious diseases. There are many advantages of vaccination. Firstly, certain harmful infectious diseases can be avoided through this easy and effective method. For some diseases, vaccination offers lifetime protection, while for others the effect is diminished after a few years and booster doses are needed (Norwegian Institute and Public Health, 2018).

Second, immunization can be life-saving for children. Children can be vaccinated for more illnesses than ever before, because of advancements in medical science. Some diseases have been largely eliminated after thousands of children have been injured or killed, and others are near to extinction, mostly due to safe and efficient vaccines (Vaccines.gov, 2018).

Immunization is convenient in terms of time as well as money. It is because of lost time at work, medical costs or long-term disability treatments, certain vaccine preventable diseases can result in prolonged illnesses which can take a great toll in the financial sector. In comparison, it is a safe investment to get vaccinated against this disease and is typically protected by insurance. The vaccination for children programme is a federally funded programme that provides children from low-income households with vaccines at no cost (Vaccines.gov, 2018).

Lastly, if exposure to a disease happens in a society, the risk of epidemic will be less because of them having been vaccinated (Pope & Husney, 2019). This will help to protect the people who are unable to be vaccinated like infants, allergic to vaccination, cannot receive vaccination due to pharmaceutical reasons or get vaccination but unable to respond well to the vaccination (Centers for disease control and prevention, 2018). By this, we can keep people around us safe and also stop the transmission of the disorder not only to the family but also to the society (Vaccines.gov, 2018).

2.3 Malaysian National Immunization Programme

Vaccines have come a long way ever since the discovery of the smallpox vaccine by Edward Jenner in 1796. After the World Health Organization (WHO) successfully eradicated smallpox due to the introduction of vaccine globally in 1956, WHO proceeded to launch the Expanded Programme on Immunization (EPI) in 1974, where each country was encouraged to set up its own immunization schedule accordingly to eradicate diphtheria, pertussis, tetanus, poliomyelitis, measles, and tuberculosis. immunizing children was prioritised as these 6 diseases were frequent at young age (Keja et al., 1988).

Malaysia was not left out from this programme. The Malaysian National Immunization Programme started with the DTaP vaccine for diphtheria, tetanus and acellular pertussis. Later on, the Bacillus Calmette–Guérin (BCG) vaccine for tuberculosis, followed by Oral Polio Vaccine (OPV) for poliomyelitis was released. Over the course of the years, new vaccines were added into the programme, such as hepatitis B vaccine and Hib vaccine for *Haemophilus influenzae* type B. MMR vaccine for measles, mumps, rubella was also introduced into the programme. A DT (diphtheria and tetanus) booster dose for 7 years olds, Human Papillomavirus (HPV) vaccine for 13 years old girls, and a tetanus booster dose for 15 years olds were also included in the programme. Japanese Encephalitis (JE) vaccine for Sarawak state only and an extra dose of measles vaccine for Sabah state only were included in the programme as well. MR vaccine for measles and rubella was given to those born before July 2015 at 7 years old, but this vaccine is no longer in the programme (Ministry Of Health, 2015). The latest vaccine added into the programme is the Pneumococcal Conjugate Vaccine (PCV) which is free starting from 1 December 2020 in government clinics (Malay Mail, 2020).

The Ministry of Health has arranged the vaccines into the schedule of the Malaysian National Immunization Programme. The schedule ensures children receive the vaccine within 2 years old, except for the HPV vaccine, where the dose will be given to teenage girls at 13 years old. Although there are no specific laws in Malaysia about compulsory vaccination for children, Malaysian parents are expected to follow this schedule to vaccinate their children in order to prevent them from contracting any of the 13 diseases. Immunization in Malaysia is free in all Ministry of Health Malaysia facilities, however, parents will have to pay a fee in private clinics (Immunise4Life, 2020). There are also other vaccines that are available in private clinics or hospitals, although it is not included in the programme, such as rotavirus vaccine, varicella vaccine, and hepatitis A vaccine (Immunise4Life, 2020).

Malaysia is constantly improvising the schedule from time to time, to suit the needs of the people accordingly. In 2008, the Ministry of Health introduced a 5-in-1 vaccine, where children will be given a shot of combination vaccine for diphtheria, tetanus, pertussis, polio and *Haemophilus influenzae* type B (Hib). As of 26 December 2020, the government has announced a new schedule which will have a 6-in-1 vaccine, where hepatitis B vaccine will be added into the combination. The purpose of this is to reduce the number of injections so there will be lesser pain for the child (The Star, 2020).

2.4 Sociodemographic status of parents

A study done by Abdullah et al. in 2016 involving 760 parents in Hulu Langat district of Selangor has investigated the association between the parents' sociodemographic status and practice of childhood immunizations. Another study done by Krishna et al. in 2019 involving 1,015 mothers in Petaling district of Selangor has determined the sociodemographic status associated with the mothers who were immunization defaulters. The World Health Organisation, WHO (2005) explained that the word "defaulter" is defined as individuals who miss scheduled vaccinations for

any causes. However, the limitation of these studies are their cross-sectional study designs do not allow causal direction of the relationships to be established.

2.4.1 Age

The study by Krishna et al. (2019) showed that mothers from older age groups (40 and above) are more likely to miss scheduled vaccinations of their children. Among mothers who were 40 years old and above, 40.9% were immunization defaulters while 59.1% were non-defaulters. Among mothers who were aged 30 to 39, 18.8% were immunization defaulters while 81.2% were non-defaulters. Among mothers who were aged 20 to 29, 23.4% were immunization defaulters while 76.6% of them were non-defaulters.

A similar study was done by Abdullah et al. (2016), however the statistics were different. It is shown that among respondents who were aged 40 years and above, 100% vaccinated their children. Among respondents aged 30 to 39, 2% did not vaccinate their children while 98% did. Among respondents aged 18 to 29, 2.5% did not vaccinate their children while 97.5% did.

2.4.2 Gender

The study conducted by Abdullah et al. (2016) showed that mothers are more likely to not vaccinate their children compared to fathers. 2.6% of female respondents did not vaccinate their children while 97.6% did. 1.5% of male respondents did not vaccinate their children while 98.5% did.

2.4.3 Ethnicity

According to the study conducted by Krishna et al. (2019), parents who are non-Malay are more likely to miss scheduled vaccination of their children. Among the non-Malay group, 29.5% were immunization defaulters while 70.5% were not. Among the Malay group, 16.6% were immunization defaulters while 83.4% were not.

2.4.4 Religion

The study conducted by Krishna et al. (2019) showed that mothers who are non-Muslim are more likely to miss scheduled vaccination of their children. Among the non-Muslim group, 27.9% were immunization defaulters while 72.1% were not. Among the Muslim group, 17.5% were immunization defaulters while 82.5% were not.

The study conducted by Abdullah et al. (2016) showed that different levels of religious belief of parents are also associated with their children's vaccination. 0.4% of respondents who have satisfactory religious belief did not vaccinate their children, while 99.6% of them did. 3.8% of respondents who have unsatisfactory religious belief did not vaccinate their children, while 96.2% did.

2.4.5 Monthly household income

The study conducted by Abdullah et al. (2016) showed that 100% of parents with a monthly household income of more than RM11,000 vaccinated their children. Among the parents with monthly household income of RM9,001 to RM11,000, 1% did not vaccinate their children while 99% did. Among the parents with monthly household income of RM7,001 to RM9,000, 2.1% did not vaccinate their children while 97.9% did. Among the parents with monthly household income of RM5,001 to RM7,000, 1.2% did not vaccinate their children while 98.8% did. Among the parents with a monthly household income of less than RM5,000, 4% did not vaccinate their children while 96% did.

2.4.6 Educational level

According to the study conducted by Krishna et al (2019), respondents with an undergraduate or postgraduate studies education background are less likely to miss their children's scheduled immunization. Among the respondents that had a degree and above, 18% were immunization defaulters while 82% were not. Among the respondents that had a diploma and below, 43.5% were immunization defaulters while 56.5% were not.

A similar study was conducted by Abdullah et al. (2016) and the results were the same. 100% of the respondents whose educational level were university and equivalent vaccinated their children. Also, 100% of the respondents whose educational level were up to primary school or received zero formal education vaccinated their children. Among the respondents whose educational level were STPM and equivalent, 6.1% did not vaccinate their children while 93.9% did. Among the respondents whose educational level is secondary school, 6.9% did not vaccinate their children while 93.1% did.

2.4.7 Working status

The study conducted by Krishna et al. (2019) showed mothers who are employed are less likely to miss their children's scheduled vaccination compared to unemployed mothers. Among employed mothers, 19.4% were immunization defaulters while 80.6% were not. Among unemployed mothers, 31% were immunization defaulters while 69.9% were not.

A similar study was conducted by Abdullah et al. (2016) showed different results. 100% of unemployed respondents vaccinated their children. 2% of employed respondents did not vaccinate their children while 98% did.

2.4.8 Number of children

The study conducted by Krishna et al. (2018) showed mothers with 5 or more children are more likely to miss scheduled vaccinations of their children. 45% of them were immunization defaulters while 55% were not. Among mothers with 3 to 4 children, 27.6%

were immunization defaulters while 72.4% were not. Among mothers with 1 to 2 children, 17.6% were immunization defaulters while 82.4% were not.

A similar study was conducted by Abdullah et al. (2016) showed different results. 100% of respondents with more than 5 children vaccinated their children. Among respondents with 3 to 4 children, 0.8% did not vaccinate their children while 99.2% did. Among respondents with 1 to 2 children, 2.5% did not vaccinate their children while 97.5% did.

2.5 Parental awareness towards childhood immunization

It is no surprise that there is a large population of children globally that either have not received vaccination or did not complete their immunization. UNICEF (2020) reported that there were approximately 13.8 million zero-dose children which are children in the same age group who did not benefit from any vaccination. It was also found that in 2019, 14 million children did not get the initial dose for the DTP3 vaccine and more than 5 million did not complete the vaccination (World Health Organization, 2020). There are many factors such as lacking in health systems, deficient awareness and misconceptions about vaccination that can lead to low immunization coverage in a country. However, it is quite evident that parent's knowledge and awareness about childhood immunization are key determinants in shaping parents' decision on receiving immunization. There was a study done in the United States that showed a marked contrast in knowledge between parents who were following the immunization schedule as opposed to parents who turned down or delayed vaccines ($p<0.005$). It has been reported that parents who were given education on childhood immunization had a better understanding about it which suggests that educational intervention can influence a better outcome. A study done in China found that more than 50% of the respondents were not aware that vaccination begins since birth. Interestingly, many of the respondents answered correctly after they had been given an hour of educational intervention (Abdullah et al, 2018).

Misguided sources of information cause parents to be at risk of receiving misinformation that may cause them to deprive their children of immunization (Herath et al., 2018). A study done in four US States found that parents were unlikely to acknowledge the scientific evidence and benefits of vaccination as well as more prone to acquire non-medical exemptions from vaccination for their children when they gather information from the Internet (Jones et al., 2012). Abdullah et al. (2016) stated in her study that a higher percentage of parents immunize their children when respondents obtained information from healthcare providers. Thus, healthcare providers' should be included in educational intervention to provide better communication which will aid in improvement of compliance, knowledge and practice (Al-lela, 2014). Hence, it is clear that more effort should be given to assess and strengthen the parents' knowledge and awareness in order to maintain the control of vaccine preventable diseases.

2.6 Parental attitude towards childhood immunization

Dyda et al. (2020) had done research on “A systematic review of studies that measure parental vaccine attitudes and beliefs in childhood vaccination”. It reported that there was a different level of acceptance towards immunization, that some are willing to accept all the vaccines, some have interest but may complete or just take some of the vaccines, and some are anti-vaccine. Decreased vaccination uptake has been found in the community who are still questioning and concerned about vaccination and this may cause serious effects on the immunization coverage.

A cross sectional research model with 760 respondents was conducted in Hulu Langat, Selangor. The majority of the respondents were female (70%), Malay (87%), working (92%) and have higher education levels (70%). In this study, 12.8% of parents have insufficient knowledge of childhood immunization and 47.6% of them have negative attitudes towards child immunization. Attitudes and demographic level evaluation in this research showed that the degree of education had a significant association with the attitude standard on childhood immunizations (p<0.001) (Abdullah et al, 2018). In addition, several studies have shown that living with people who advocate for immunization and vaccinating their children has contributed to positive attitudes towards vaccination (Matta et al., 2020).

Overall, public attention had now been obtained and it shifted towards the threat of vaccination rather than its benefits. Numerous factors lead to this, including the belief that their child will not contract the vaccine preventable disease. Recent research in Malaysia reported that there was a higher chance for children to have incomplete vaccination because of their mother's lack of trust in vaccination (Abdullah et al., 2018).

2.7 Parental practice towards childhood immunization

Kaliyaperumal (2004) explained that the term “practice” is defined as the method which is done by people to portray their knowledge and attitude through their actions. Parental practice towards children immunization refers to parents demonstrating their awareness and attitude of vaccines through vaccination of their children.

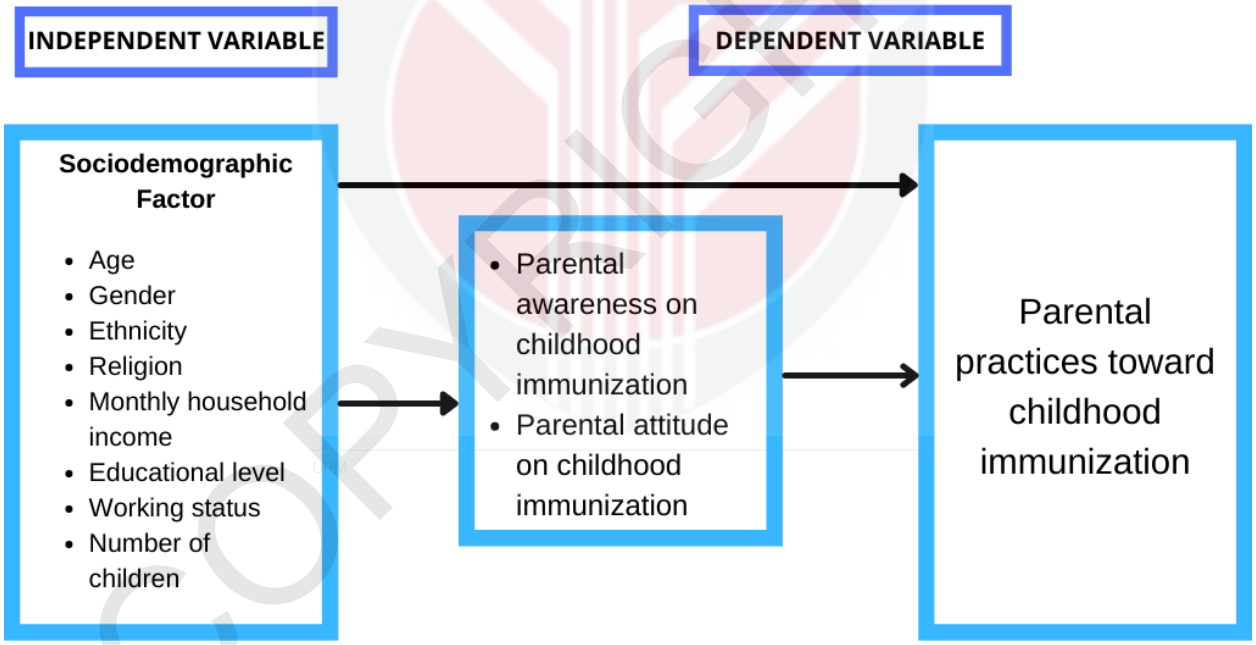
The reasons for parents who refuse vaccination can be divided into two categories - personal health beliefs and vaccine-related reasons (Rumetta et al., 2020). For personal health beliefs, parents have low confidence in vaccination, and thought that vaccination is a pharmaceutical conspiracy. Some parents prefer to approach health in a natural way and reject modern medicine, so they refuse vaccination. Religious beliefs of parents also made them believe that vaccines were unnecessary because humans’ immune system that God created is already sufficient to fight diseases. Alternative treatment such as homoeopathy was preferred by parents who refused vaccination (Lim et al., 2016).

For vaccine-related reasons, parents refused vaccination due to its adverse effects, which parents were worried about their children getting eczema, allergy, and brain injury after vaccination (Rumetta et al., 2020). The misbelief that the MMR vaccine can cause autism in children has raised fear among parents as well, and this leads to parents refusing vaccination

(Musa et al., 2019). Other than that, parents' religious beliefs also contribute to the refusal of vaccination. The issue of vaccines being non-halal was widely circulated in social media. Although the Ministry of Health has already announced that vaccines are halal except for the Rotavirus vaccine which is only available in private clinics, some parents were still doubtful about the halal status of vaccination (Khan & Zulkipli, 2018).

Other than refusing vaccination, reasons for parents defaulting vaccination of their children includes the misconception that children with trivial sickness such as diarrhea are not supposed to take immunization. Moreover, late appointment of vaccination may cause parents to miss the appointment (Norlijah et al., 2005). Parents being busy with work was also one of the reasons parents default vaccination of their children, along with a long waiting period when visiting clinics (Lim et al., 2016).

2.8 Conceptual framework



CHAPTER 3: METHODOLOGY

3.1 Study location

This study was conducted in Selangor state.

3.2 Study design

A cross sectional study design was used in this study. Cross sectional study is a type of observational research that analyses data of variables collected at one given point in time across a sample population or a pre-defined subset.The objective of this study design is to provide information in addition to the entire population being studied.

3.3 Study duration

This study was conducted from 20 December 2020 until 5 July 2021, and the data collection was done from 6 April 2021 until 9 May 2021.

3.4 Sampling

3.4.1 Study population

The study population for this research was parents aged at least 18 years old (as currently the Movement Control Order is being implemented in Selangor state, we will source the respondents mainly from our university as well as residence associations and parents-teacher associations).

3.4.2 Sampling population

The sampling population of this study was parents aged at least 18 years old in Selangor state.

3.4.2.1 Inclusion criteria

1) Malaysian parents who are at least 18 years old.
2) Malaysian parents with at least one child less than 15 years old. (as Tetanus booster for 15 years olds is the last vaccination in the Immunization Schedule of the National Immunization Programme, Ministry of Health Malaysia)

3.4.2.2 Exclusion criteria

1) Malaysians that have problems in understanding Malay or English language in order to understand the meaning of the questionnaire.

3.4.3 Sampling frame

Malaysian parents aged at least 18 years old.

3.4.4 Sampling unit

The sampling unit of this study was Malaysian parents staying in Selangor.

3.4.5 Sampling method

The sampling method that was used is convenience sampling in which Malaysian parents in Selangor are randomly selected to answer the questionnaire. Convenience sampling is a non-probability sampling technique where subjects are chosen because of their availability, convenient accessibility and proximity to the researcher. In this study, the sample was collected from the public in Selangor. Conduct analysis was done based on the convenience sampling.

3.5 Sampling size

The sample size was calculated using the equation to compare proportion between two groups,

$$n = \frac{\{[Z_{(1-\alpha/2)} \times \sqrt{2\bar{P}(1-\bar{P})}] + [Z_{(1-\beta)} \times \sqrt{P_1(1-P_1) + P_2(1-P_2)}]\}^2}{(P_1 - P_2)^2}$$

where,

$Z_{(1-\alpha/2)} = 1.96$ for 95% Confidence Interval

$Z_{(1-\beta)} = 0.84$ for 80% of power

$P_1 = Proportion\ 1$

$P_2 = Proportion\ 2$

$\bar{P} = \frac{P_1 + P_2}{2}$

3.5.1 Sample size calculation

The data used to calculate the sample size was taken from a study by Krishna et al. (2019), whose study is "Sociodemographic and health care factors in determining immunization defaulters among preschool children in Petaling District, Selangor".

$P_1 = \ Proportion\ of\ immunization\ defaulters\ among\ parents\ aged\ 40\ and\ above\ = \ 40.9\% \ = \ 0.409$

$P_2 = \ Proportion\ of\ immunization\ defaulters\ among\ parents\ aged\ 30\ to\ 39 \ = \ 18.8\% \ = \ 0.188$

$\overline{P} = \ \frac{0.409+0.188}{2} = \ 0.2985$

Hence, put in the formula:

$$n \ = \ \frac{\{[Z_{(1-\alpha/2)} \times \sqrt{2\overline{P}(1-\overline{P})}] + [\ Z_{(1-\beta)} \times \sqrt{P_1(1-P_1) + P_2(1-P_2)}]\}^2}{(P_1-P_2)^2}$$

$$n \ = \ \frac{\{[1.96 \ \times \sqrt{2\ (0.2985)(1-0.2985)}] + [0.84 \times \sqrt{0.409(1-0.409) + 0.188\ (1-0.188)}]\}^2}{(0.409-0.188)^2}$$

$n \ = \ 67$

For two proportions, n = 67 × 2 = 134 .

Therefore, the minimum required sample size was 134 participants.

Accounting for 50% non-response rates, the sample size required, n = 134 × 150% = 201 .

3.6 Variables

3.6.1 Dependent variables

1) Parental awareness on childhood immunization
2) Parental attitude on childhood immunization
3) Parental practice on childhood immunization

3.6.2 Independent variables

Sociodemographic status

1) Age
2) Gender
3) Ethnicity

4) Religion
5) Monthly household income
6) Educational level
7) Working status
8) Number of children

3.7 Study instrument

The research was conducted using survey questionnaires that were distributed as Google Forms, along with the consent form.

3.8 Questionnaire

The questionnaire consisted of 4 sections to determine the parents' sociodemographic status, their awareness and attitude towards immunization, and the practice of immunization done by the parents.

The first section consisted of 9 questions which was to identify the sociodemographic status of the parents. The questions included the parents' age, gender, ethnicity, religion, education level, working status, income, number of children, and age of youngest child.

The second section consisted of 12 questions to determine the awareness of parents towards vaccines. The questions were regarding the Malaysian National Immunization Programme, and where did the parents obtain information about immunization.

The third section consisted of 10 questions to determine the attitude of parents towards immunization. The questions were regarding general information about vaccines, and parents' opinions of vaccines.

The fourth section consisted of 4 questions that were regarding the parents' practice of immunization of their children.

3.8.1 Validity and reliability

The questions in the questionnaire was adapted based on validated questions by previous studies such as a study by Abdullah et al. (2018) titled "Predictors for inadequate knowledge and negative attitude towards childhood immunization among parents in Hulu Langat, Selangor, Malaysia" and Qidwai et al. (2007) titled "Knowledge, attitude and practice regarding immunization among family practice patients". Some questions were added into the adapted questionnaire to further suit our study.

3.8.2 Pilot test, validity and reliability

A pilot test was done with 10 percent of the actual sample size to fulfill the face validation part of this study. SPSS version 26.0 was used to calculate the Cronbach alpha where the alpha value obtained was (α= 0.813). Content validation was done with an expert committee consisting of two primary care physicians and two microbiologists. Changes post validation have been made to the questionnaire before the actual study begins.

3.8.3 Questionnaire distribution

Questionnaires were distributed through an online Google form platform by a pre-designated link.

3.8.4 Data collection

The information and purpose of our study were written on the google form to explain the details to the respondent. In the same form, the participants were asked to give their consent. After the consent was obtained, participants were able to answer the four sections of the questionnaire.

3.9 Data analysis

Data analysis was done with SPSS version 26.0. Categorical data was described as percentages and frequency. Continuous data was described as mean and standard deviation if normally distributed or median and interquartile range if otherwise. Each correct or positive answer for the awareness, attitude and practice section was given 1 mark and 0 if otherwise. These marks were summed up based on their own domains, and categorisation into good and poor awareness, attitude and practice was done by using the sample's median mark as a cut-off. Univariate analysis to determine the association between sociodemographic factors and awareness and attitude were done through Chi-square and Fisher's exact test. Multivariate analysis to determine the determinants of good awareness and attitude were done through multiple logistic regression. To determine the association between awareness and attitude with actual practice, Spearman's rank correlation coefficient was done.

3.10 Study ethics

The permission and ethical clearance has been given from the Ethical Committee for Research Involving Human Subjects, UPM (JKEUPM) which were put together at the appendix and the reference number was JKEUPM-2021-094. Throughout this research, all research ethics were strictly followed to ensure the research was done in an ethical and safety manner. For instance, we always respect our respondent's confidentiality and make sure all the questionnaires remain confidential. Besides that, we also ensured we gained appropriate consent from the respondents too.

CHAPTER 4: RESULTS

4.1 Response rate

The questionnaires were distributed as google form to parents in Selangor via social media and emails. A total of 226 participants responded, and 201 of them were eligible and gave consent to participate in this study. Thus, the response rate for our study was 88.94%.

The response rate is calculated using the formula below:

Response Rate = $consented\ and\ eligible \div eligible \times 100\%$

$= \frac{201}{226} \times 100\%$

= 88.94%

4.2 Data analysis, Data entry and Normality test

The Statistical Package for the Social Sciences (SPSS) version 26 had been used for data analysis, data entry and normality testing. For the normality testing, all the variables were not normally distributed. The test used to determine the normality was the Kolmogorov-Smirnov test. Other than that, descriptive statistical analysis was performed by using frequency and percentage on all variables studied. For analytical analysis, the association between sociodemographic status of parents and parental awareness, attitude as well as practice were analysed using Pearson's Chi-Square test (if less than 20% of cells had expected count less than 5) or Fisher's exact test (if more than 20% of cells had expected count less than 5). Next, association between parental awareness and attitude with actual practices were analysed using Spearman's rank correlation test. Independent variables that had a *p* value of less than 0.25 in univariate analysis were entered into the multiple logistic regression model to determine the determinants of the level of parental awareness, attitude, and practice towards childhood immunization.

4.3 Descriptive analysis

The first section of our questionnaire required the respondents to give their socio-demographic information. Table 4.1 showed the distribution of our respondents according to their socio-demographic factors. The majority of our respondents were aged 41 and above (41.3%). A great number of respondents were mothers (80.6%), Malay (80.6%) and Muslim (81.1%). A huge proportion of the respondents had a tertiary educational level (86.1%) and were employed (80.1%). Most of the respondents came from a M40 household income bracket (47.3%), and had 3 to 4 children (51.2%). The median of the respondents monthly household income is RM9000 (IQR:RM7000). The median number of children of the respondents is 3 (IQR:2).

Table 4.1: Distribution of sociodemographic characteristics of the respondents (N=201)

Variables	Frequency	Percentage (%)	Median (IQR)
Age (Years)			
18-25	5	2.5	
26-30	13	6.5	
31-35	38	18.9	
36-40	62	30.8	
≥41	83	41.3	
Gender			
Male	39	19.4	
Female	162	80.6	
Ethnicity			
Malay	162	80.6	
Chinese	18	9.0	
Indian	18	9.0	
Bumiputera Sabah or Sarawak	2	1.0	
Others	1	0.5	
Religion			
Islam	163	81.1	
Buddhism	14	7.0	
Hinduism	16	8.0	
Christian	7	3.5	
Others	1	0.5	
Education level			
No formal education	0	0	
Primary school	1	0.5	
Secondary school	27	13.4	
Tertiary (University)	173	86.1	
Working status			
Employed/Self employed	161	80.1	
Unemployed/Retired	40	19.9	
Monthly household income			9000(7000)
B40	49	24.4	
M40	95	47.3	
T20	57	28.4	
Number of children			3(2)
1-2	79	39.3	
3-4	103	51.2	
≥5	19	9.5	

Table 4.2 showed the distribution of awareness, attitude and practice of the respondents. The majority of the respondents have good awareness (52.7%), good attitude (53.7%) and good practice (60.2%) towards childhood immunization in Selangor.

Table 4.2: Distribution of awareness, attitude and practice of the respondents (N=201)

	Median scores (IQR)	Awareness		Median scores (IQR)	Attitude		Median scores (IQR)	Practice	
		Good	Poor		Good	Poor		Good	Poor
Parents (N=201) (%)	15.00(4)	106 (52.7)	95 (47.3)	9.00(2)	108 (53.7)	93 (46.3)	4.00(1)	121 (60.2)	80 (39.8)

Figure 4.1 showed the respondents' source of information regarding vaccination. Healthcare providers (68.2%) were the major source of information for vaccines, whereas internet (14.9%) and social media (6.5%) placed at second and third respectively.

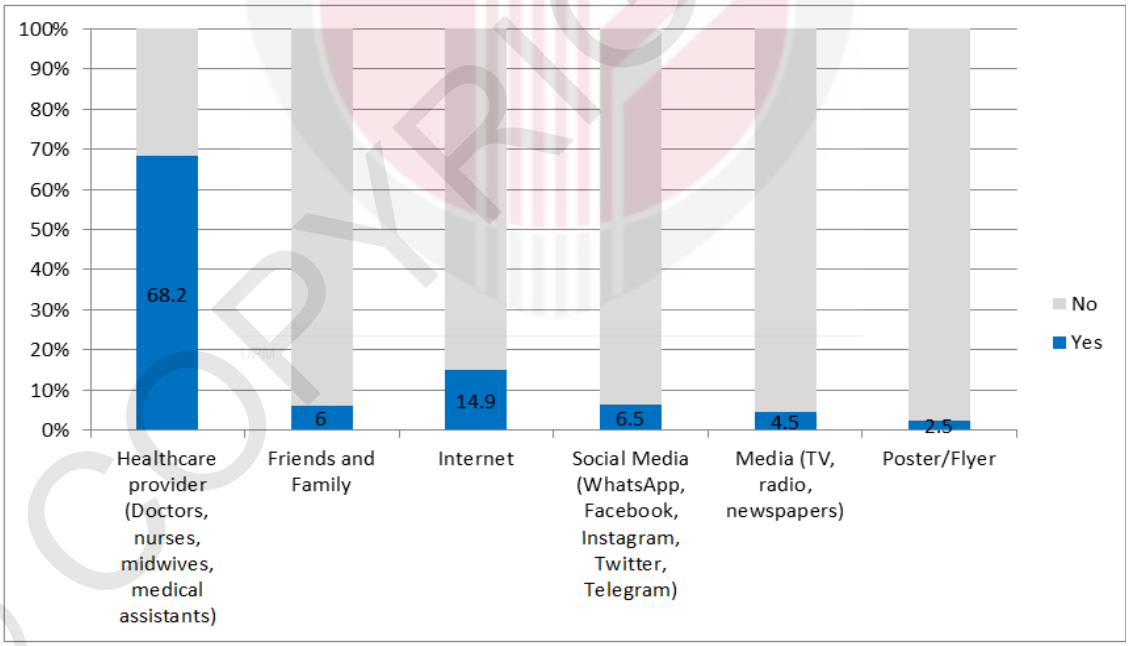


Figure 4.1: Source of information regarding vaccination of the respondents

Figure 4.2 shows the location to vaccinate children of the respondents. Majority of the respondents (64.68%) choose public health centres and government hospitals to vaccinate their children.

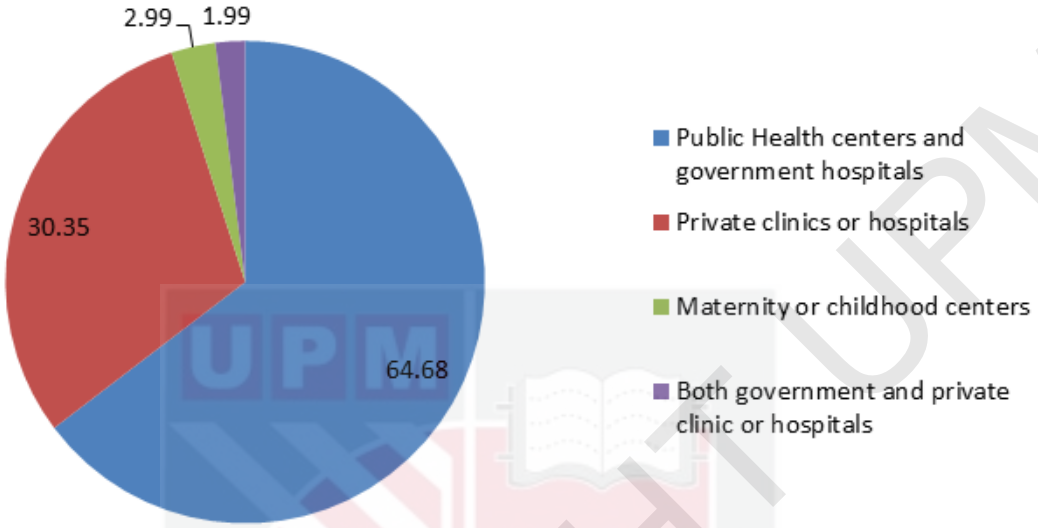


Figure 4.2 Location of vaccination of respondents' children

4.4 Analytic studies

The Chi-Square analysis and Fisher's Exact test were used to determine the association between the sociodemographic status of the respondents with their awareness, attitude and practice towards childhood immunization.

A great number of the respondents with good awareness towards childhood immunization were aged 31 to 35 years old (55.3%), females (54.9%), Chinese (66.7%), Buddhist (64.3%), had tertiary educational level (57.2%), employed (56.5%), in T20 income bracket (71.9%), and had 3 to 4 children (60.2%). Significant associations were seen between the respondents' awareness and their educational level (p=0.002), working status (p=0.031) and monthly household income (p<0.001).

Majority of the respondents with good attitude towards childhood immunization were aged 26 to 30 years old (76.9%), males (53.8%), Malay (56.2%), Muslim (57.1%), had tertiary education (55.5%), employed (56.5%), in T20 household income bracket (63.2%) and had 1 to 2 children (58.2%). There is a significant association between respondents' attitude and their monthly household income (p=0.037).

A large proportion of the respondents with good practice towards childhood immunization were aged 26 to 30 years old (76.9%), females (66%), Malay (63.6%), Muslim (63.8%), had tertiary educational level (61.8%), employed (61.5%), in T20 income bracket (70.2%), and had 1 to 2 children (64.6%). The respondents' gender (p=0.001) and monthly household income (p=0.050) have a significant association with their level of practice.

Variables that have significant value $p<0.25$ were selected into the multiple logistic regression model to determine the determinants of the level of parenteral awareness, attitude and practice towards childhood immunization.

Table 4.3: Association between sociodemographic status of the respondents with their awareness, attitude and practice towards childhood immunization (N=201)

Variables	Awareness		P	Attitude		P	Practice		P
	Good	Poor		Good	Poor		Good	Poor	
Age (Years) #			0.222*			0.214*			0.382
18-25	0(0.0)	5(100.0)		1(20.0)	4(80.0)		2(40.0)	3(60)	
26-30	7(53.8)	6(46.2)		10(76.9)	3(23.1)		10(76.9)	3(23.1)	
31-35	21(55.3)	17(44.7)		22(57.9)	16(42.1)		25(65.8)	13(34.2)	
36-40	34(54.8)	28(45.2)		34(54.8)	28(45.2)		39(62.9)	23(37.1)	
≥41	44(53.0)	39(47.0)		41(49.4)	42(50.6)		45(54.2)	38(45.8)	
Gender			0.203*			0.987			0.001*
Male	17(43.6)	22(56.4)		21(53.8)	18(46.2)		14(35.9)	25(64.1)	
Female	89(54.9)	73(45.1)		87(53.7)	75(46.3)		107(66.0)	55(34.0)	
Ethnicity #			0.082*			0.460			0.186*
Malay	87(53.7)	75(46.3)		91(56.2)	71(43.8)		103(63.6)	59(36.4)	
Chinese	12(66.7)	6(33.3)		7(38.9)	11(61.1)		8(44.4)	10(55.6)	
Indian	5(27.8)	13(72.2)		8(44.4)	10(55.6)		8(44.4)	10(55.6)	
Bumiputera Sabah or Sarawak	1(50.0)	1(50.0)		1(50.0)	1(50.0)		1(50.0)	1(50.0)	
Others	1(100.0)	0(0.0)		1(100.0)	0(0.0)		1(100.0)	0(0.0)	
Religion #			0.307			0.211*			0.123*
Islam	87(53.4)	76(46.6)		93(57.1)	70(42.9)		104(63.8)	59(36.2)	
Buddhism	9(64.3)	5(35.7)		5(35.7)	9(64.3)		6(42.9)	8(57.1)	
Hinduism	5(31.3)	11(68.8)		6(37.5)	10(62.5)		6(37.5)	10(62.5)	
Christian	4(57.1)	3(42.9)		3(42.9)	4(57.1)		4(57.1)	3(42.9)	
Others	1(100.0)	0(0.0)		1(100.0)	0(0.0)		1(100.0)	0(0.0)	
Education level #			0.002*			0.256			0.283
No formal education	0(0.0)	0(0.0)		0(0.0)	0(0.0)		0(0.0)	0(0.0)	
Primary school	0(0.0)	1(100.0)		0(0.0)	1(100.0)		0(0.0)	1(100.0)	
Secondary school	7(25.9)	20(74.1)		12(44.4)	15(55.6)		14(51.9)	13(48.1)	
Tertiary (University)	99(57.2)	74(42.8)		96(55.5)	77(44.5)		107(61.8)	66(38.2)	

Working status			0.031*			0.111*			0.453
Employed/Self employed	91(56.5)	70(43.5)		91(56.5)	70(43.5)		99(61.5)	62(38.5)	
Unemployed/Retired	15(37.5)	25(62.5)		17(42.5)	23(57.5)		22(55.0)	18(45.0)	
Monthly household income			0.000*			0.037*			0.050*
B40	15(30.6)	34(69.4)		19(38.8)	30(61.2)		23(46.9)	26(53.1)	
M40	50(52.6)	45(47.4)		53(55.8)	42(44.2)		58(61.1)	37(38.9)	
T20	41(71.9)	16(28.1)		36(63.2)	21(36.8)		40(70.2)	17(29.8)	
Number of children			0.070*			0.470			0.510
1-2	37(46.8)	42(53.2)		46(58.2)	33(41.8)		51(64.6)	28(35.4)	
3-4	62(60.2)	41(39.8)		51(49.5)	52(50.5)		58(56.3)	45(43.7)	
≥5	7(36.8)	12(63.2)		11(57.9)	8(42.1)		12(63.2)	7(36.8)	

Note: (#) Fisher's Exact Test, (*) significant p<0.25

Table 4.4 showed the association between parental awareness and attitude with actual practices which were analysed using Spearman's rank correlation coefficient.

There is a positive moderate correlation between awareness and attitude scores with the actual practice towards childhood immunization. This indicates that parents with higher awareness and attitude scores have better practice towards childhood immunization.

Table 4.4: Association between parental awareness and attitude with practice towards childhood immunization

Variable	Practice score	
	Correlation coefficient	**P value**
Awareness score	0.367	<0.001
Attitude score	0.402	<0.001

Multiple logistic regression models are used to determine the determinants of the level of awareness, attitude, and practice towards childhood immunization.Table 4.5 showed the results of the multiple logistic regression. It was found that the families in the T20 income bracket had a 5 higher odds of having better awareness towards childhood immunization as compared to the B40 income bracket group. This association is statistically significant (p=0.001). Also, families in the M40 income bracket had a 2.3 higher odds of having better awareness towards childhood immunization as compared to the B40 income group. This association is also statistically significant (p=0.042).

Next, it was shown that the families in the T20 income bracket had a 2.9 higher odds of having better attitudes towards childhood immunizations as compared to the B40 income bracket group. This association is statistically significant (p=0.013).

It was found that mothers had a 3.9 higher odds of having better practice towards childhood immunization as compared to fathers. This association is statistically significant (p=0.001).

Lastly, it was also found that the families in the T20 income bracket had a 2.4 higher odds of having better practices towards childhood immunization as compared to the B40 income bracket group. This association is statistically significant (p=0.038).

Table 4.5: Determinants of the level of parental awareness, attitude, and practice towards childhood immunization

Variable	Awareness			Attitude			Practice		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
Age (Years)									
18-25	-	-	0.999	0.273	0.027-2.726	0.269			
26-30	2.246	0.516-9.775	0.281	4.095	0.984-17.035	0.053			
31-35	1.410	0.541-3.675	0.483	1.326	0.578-3.042	0.505			
36-40	1.016	0.456-2.261	0.969	1.203	0.604-2.397	0.599			
≥41	Ref	Ref	Ref	Ref	Ref	Ref			
Gender									
Male	Ref	Ref	Ref				Ref	Ref	Ref
Female	1.622	0.716-3.677	0.246				3.929	1.803-8.563	0.001*

Ethnicity									
Malay	Ref	Ref	Ref				Ref	Ref	Ref
Chinese	2.307	0.687-7.748	0.176				1.003	0.037-26.877	0.999
Indian	0.441	0.134-1.456	0.179				4.544	0.224-91.976	0.324
Bumiputera Sabah or Sarawak	0.486	0.022-10.712	0.647				1.148	0.028-47.906	0.942
Others	8.8×10^8	-	1.000				1.9×10^9	-	1.000
Religion									
Islam				Ref	Ref	Ref	Ref	Ref	Ref
Buddhism				0.464	0.142-1.519	0.204	0.484	0.019-12.337	0.661
Hinduism				0.509	0.170-1.526	0.228	0.095	0.004-2.117	0.137
Christian				0.478	0.095-2.401	0.370	0.364	0.012-10.926	0.560
Others				6.6×10^8	-	1.000	-	-	-
Educational level									
Primary school	Ref	Ref	Ref						
Secondary school	9.3×10^8	-	1.000						
Tertiary (University)	2.1×10^9	-	1.000						
Working status									
Employed/ self-employed	1.945	0.815-4.641	0.134	1.532	0.711-3.302	0.276			
Unemployed/ retired	Ref	Ref	Ref	Ref	Ref	Ref			

Monthly household income									
B40	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
M40	2.323	1.031-5.231	0.042*	2.105	0.995-4.454	0.052	1.910	0.901-4.051	0.091
T20	4.959	1.901-12.936	0.001*	2.892	1.255-6.664	0.013*	2.433	1.051-5.630	0.038*
Number of children									
1-2	Ref	Ref	Ref						
3-4	2.125	0.954-4.735	0.065						
≥5	0.859	0.217-3.398	0.829						

Note: OR = Odd ratio; CI = Confidence interval, Ref = Reference, (*) significant p<0.05

CHAPTER 5: DISCUSSION

5.1 Response rate

The questionnaires were distributed as google form to parents in Selangor via social media and emails through a pre-designated link. A total of 226 participants responded, and 18 of them were ineligible to participate in this study as they did not meet the inclusion criteria. 7 out of the 18 were not staying in Selangor, 10 of them did not have children below 15 years old, and 1 of them was not staying in Selangor and did not have children below 15 years old. The remaining 7 participants were eligible to participate in this study but they did not give their consent to participate in our study. Thus, only 201 respondents gave consent to participate in our study and completed the questionnaire. This resulted in a response rate of 88.94%. The majority of our respondents were aged 41 and above (41.3%). A great number of respondents were mothers (80.6%), Malay (80.6%) and Muslim (81.1%). A huge proportion of the respondents had a tertiary educational level (86.1%) and were employed (80.1%). Most of the respondents came from a M40 household income bracket (47.3%), and had 3 to 4 children (51.2%).

5.2 Association between sociodemographic status and parental awareness, attitude and practices towards childhood immunization

From the collected data, the majority of the respondents had good awareness which is 106 (52.7%) towards childhood immunization. Analysis of the demographic characteristics of the respondents participating in the study showed that there is a significant association between household income and awareness in univariate and multivariate analysis. Parents in the T20 income bracket (71.9%) and M40 income bracket (52.6%) were associated with good awareness. This occurs because B40 has a lower household income compared to T20 and M40, which leads the B40 families to have difficulty accessing information about vaccination. Similar findings were found in Abdullah et al. (2018) where lower household income has poor awareness towards childhood immunization.

Next, the analysis of the demographic status with parental awareness, showed that the majority of the respondents has tertiary education level (57.2%). This study shows that there is a significant association between tertiary education level and level of awareness in univariate analysis but there is no significant association in multivariate analysis. The result of a previous study by Abdullah et al. (2018) showed a similar finding among parents in Hulu Langat, Selangor. This occurs because parents with higher education levels have a better knowledge of accessing material related to childhood immunization. This helps them become more aware of how immunization works and also knowing the advantages of the vaccination.

Besides that, working status also showed significant association with the level of awareness towards childhood immunization in univariate study but no significant association in multivariate study. Parents that are employed or self employed (56.5%) show a good level of awareness compared to the unemployed or retired parents. This might be because parents that are

employed or self employed are more likely to get information from their colleagues about immunization. The result of a previous study done by Ooh Poh Ling (2019) showed a similar finding where there is significant association between the working status and level of awareness towards childhood immunization. In that study, employed parents have a good awareness towards childhood immunization.

The other variables which are age of the parents, gender, religion, ethnicity and number of children showed no significant association on level of awareness in both univariate and multivariate analysis. Some of this result, such as gender contraindicated with the previous study done by Matta et al. (2020) where female genders showed significant association with the level of awareness.

Additionally, this study also showed that the majority of respondents had good attitude towards childhood immunization which were 108 respondents (53.7%). For the analysis demographic characteristics of the respondents, there was a significant association between income group and parental attitude towards childhood immunization in univariate and multivariate analysis.

In this study, families in the T20 income group (63.2%) were significantly associated with having a better attitude towards childhood immunization. Previous studies had shown that household income was significantly associated with the level of attitude whereby parents with higher income were 2 times more likely to have a positive attitude (Abdullah et al., 2018). Previous research found that family income can influence parental attitude towards immunization due to poverty and unavailability of time during work hours (Aziz et al., 2019).

Other variables studied did not show any significant association with level of attitude in our study. In contrast, a study done by Abdullah et al. (2018) found that there was a significant association between educational level and level of attitude towards childhood immunization.

The majority of our respondents have good practice towards childhood immunization, where 60.2% have good practice while 39.8% have poor practice towards childhood immunization. Out of all the variables of the respondents, only gender and monthly household income of the respondents were shown to be significantly associated with the practice towards childhood immunization.

There was a significant association between gender and the level of practice towards childhood immunization in both univariate and multivariate analysis. This study showed that mothers had higher odds (i.e a 3.9 times high odds) of having good practice compared to fathers. There were more female respondents (66%) that have good practice towards childhood immunization rather than male respondents (35.9%). This finding is similar to a study done in Lebanon which showed that gender had significant association with practice in their bivariate analysis (Matta et al., 2020). Their study found that females have a higher mean practice score compared to males. A study by Musa et al. (2019) stated that fathers seldom participate in government vaccination programmes, which is a worldwide issue. So, men's lack of exposure to information such as neglected in education programmes regarding vaccination can lead to vaccine hesitancy.

A significant association between monthly household income of respondents and the level of practice towards childhood immunization were also observed in both univariate and multivariate analysis. Parents in the T20 household income bracket had a 2.4 higher odds of having good practice rather than those in the B40 income bracket. 70.2% of respondents in the T20 income bracket have good practice towards childhood immunization. This finding is in contrast with a previous study done by Abdullah et al. (2016) in the Hulu Langat district of Selangor. Their study showed that the monthly household income of parents was not significantly associated with practice towards childhood immunization, but only the educational level of parents was significantly associated.

Our study showed that the rest of the variables such as religion did not show any significant association with parental practice towards childhood immunization. This finding is different from the study done by Krishna et al. (2019) in the Petaling district of Selangor, which showed significant association between religion and immunization defaulters, and also between number of children and immunization defaulters.

The multivariate analysis from this study showed that parents from the M40 income bracket have significant association with the level of awareness towards childhood immunization, but not with the level of attitude and practice. Although parents from the M40 income bracket had good awareness of vaccination, their attitude towards vaccination may be impacted by negative past experiences that their children went through after getting vaccinated or stories they heard from others (Musa et al., 2019). The National Health And Morbidity Survey 2019 by the Ministry of Health Malaysia reported that household income was still the main source of payment for healthcare. So, parents from the M40 income bracket might be worried that their children will be admitted to the hospital due to serious side effects from the vaccine, and their socioeconomic status will cause difficulties in paying the bills later. Hence, they have poor attitude and poor practice towards childhood immunization.

5.3 Association between parental awareness and attitude with actual practices towards childhood immunization

This study found that there is a positive correlation between parental awareness and attitude with actual practices towards childhood immunization. This finding is supported by a study done by Abdullah et al. (2016) which also found a positive association between parental awareness and attitude with practice towards childhood immunization.

Respondents with poor awareness have misconceptions about vaccination. According to our collected data, some respondents wrongly think that “vaccines can cause autism” and do not fully understand the importance of vaccines. Some of the respondents do not even know the full schedule of the Malaysian National Immunization Programme. This may lead them to have poor practice towards childhood immunization. This indicates that the source of information about vaccines obtained by the respondents plays a role in having good awareness and good practice towards childhood immunization. Although the majority of respondents obtain their vaccination information through health providers such as doctors and nurses (68.2%), some of the

respondents also obtain information through other mediums such as friends and family (6.0%), social media (6.5%), internet (14.9%), and others. Some mediums might contain unreliable information which leads to misinformations.

Based on our collected data, respondents with poor attitudes towards childhood immunization have perceptions such as “it is okay to skip my children’s vaccination” and “it is better for children to develop natural immunity by getting sick rather than to get a vaccine”. This type of perception will lead to them having poor practice towards childhood immunization and become immunization defaulters. From our collected data, the reason the respondents gave to delay their children’s immunization was their children experienced side effects or allergy after vaccination; advised by their doctor to delay; some vaccines are costly; clinics did not answer calls to make the appointment; and appointments were delayed due to the COVID-19 pandemic. Respondents with poor practice also did not encourage their family and friends to vaccinate their children as well.

Most of the respondents vaccinate their children in public health centres and government hospitals (64.68%). Some of the respondents prefer to vaccinate their children in private hospitals or clinics (30.38%), and maternal or childhood centres (2.99%). There are a few of the respondents that vaccinate their children in both government and private hospitals or clinics (1.99%).

The decrease in vaccination rates is a problem that parents and physicians should all be aware of. The results of our study proved the importance of parental awareness and attitude towards actual practice on childhood immunization. Thus, healthcare providers must be aware of parents' awareness and attitudes of their children's vaccinations in order to establish effective public education programmes or measures that can assist parents in making an informed decision for their children’s health and wellbeing.

CHAPTER 6: CONCLUSION, STRENGTH, LIMITATION AND RECOMMENDATION

6.1 Conclusion

In conclusion, the majority of the parents have good awareness, attitude and practice towards childhood immunization in Selangor. There is an association between sociodemographic status such as monthly household income and parental awareness, attitude and practice towards childhood immunization. There is a positive association between parental awareness and attitude with actual practices towards childhood immunization.

6.2 Strength

The strength of our study is that our study is one of the first studies on parental awareness, attitude, and practices on childhood immunization done involving the entire Selangor state. Next, our study was cost free as this study was conducted by using an online questionnaire. Lastly, our study was a cross sectional study which did not require a lot of time. Also, we can study multiple variables at the same time and the data can be used for another type of study.

6.3 Limitation

The limitations of our study is that it only focuses on the people that stay at Selangor. Thus, the results may not represent the whole population in Malaysia. Secondly, our study was a cross sectional study and this study design has several disadvantages which includes things such as unable to determine causal relationship and cannot be used to analyse behaviour of respondents over time. Besides that, selection bias and influences are unavoidable and can occur in this study which leads to inaccurate findings. Bias can lead to the under-representation or over-representation of the parameter. Furthermore, respondents might intentionally modify their answers on attitude and practice to meet the current proper norms instead of answering based on their real life experience. Therefore, vaccination history can be measured more accurately by checking the written record of the immunization reporting history.

6.4 Recommendation

We recommend future researchers who plan to do a similar study to schedule their time frame for data collection accordingly. In our case, the time given for us to collect the data was insufficient and we had to use up the time that had been allocated to analyse the data instead. Next, future researchers can expand their study location to other states and not just limit it to Selangor, to enable generalization of the data gathered for the whole nation. Other than that, future researchers can increase their sample size to ensure higher accuracy of data to better represent the status of the immunization in Malaysia. Lastly, we recommend the Ministry of

Health Malaysia to organise more vaccination campaigns especially for B40 areas, as well as smoothen the vaccination process and tailor it to the convenience of parents. This is to help encourage parents to contribute to the efforts of increasing the vaccination rate in Malaysia.

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APPENDIX

Gantt chart

Activity	December	January	February	March	April	May	June	July
Proposal preparation								
Submission of Proposal Preparation of Proposal Presentation Proposal Presentation								
Preparation of Ethical Approval/Letters								
Data Collection and Analysis								
Report Writing								
Submission of Final Report Preparation of Final Report Presentation and Scientific Article Final Report Presentation Correction of Final Report Submission of Scientific Article Preparation of Poster Competition Submission of Poster								
Submission of Log Book								

Questionnaire

Information and Consent

Good day. We are Group 23, Year 2 students from the Doctor of Medicine course in Universiti Putra Malaysia, who are currently taking the MDR3901 Research Project.

In fulfilling the course assignment, we are conducting a research on “Parental awareness, attitude and practices on childhood immunization in Selangor: an online statewide survey”. We sincerely need your help in filling up this questionnaire. We are looking for Malaysian parents who are at least 18 years old, residing in Selangor and have at least one child less than 15 years old.

This questionnaire consists of 4 sections. There is no time limit for answering this survey, and it will take no longer than 10 minutes to complete it. Your personal information and your identity will remain confidential, and will only be used for research purposes. Your cooperation is deeply appreciated.

If you have any inquiries or problems regarding the survey, please do not hesitate to contact the person in charge below:

Khairil Ritzman Rawi Bin Abd Rahman Ravindran: 017-3868584
Shanna Lyn Carino: 011-39965297
Nur Afrisya Nasywa Binti Kamaludin: 018-2094940

Thank you very much.

Salam sejahtera, kami dari kumpulan 23, pelajar perubatan tahun 2 daripada Universiti Putra Malaysia, mengambil kursus MDR3901 Projek Penyelidikan.

Dalam memenuhi tugas kursus ini, kami sedang melakukan kajian mengenai "Kesedaran, sikap dan amalan ibu bapa terhadap imunisasi kanak-kanak di Selangor: satu tinjauan di seluruh negeri dalam talian". Kami sangat memerlukan pertolongan anda untuk mengisi soal selidik ini. Kami sedang mencari ibu bapa warganegara Malaysia yang berumur sekurang-kurangnya 18 tahun, menetap di Selangor dan mempunyai sekurang-kurangnya seorang anak yang berumur kurang dari 15 tahun.

Borang soal selidik ini hanya mengandungi 4 bahagian. Tiada had masa yang ditetapkan dan masa yang diperlukan untuk menyiapkan soalan ini kurang daripada 10 minit. Maklumat peribadi dan identiti anda akan dirahsiakan dan hanya akan digunakan untuk tujuan kajian sahaja. Kerjasama anda amat dihargai.

Jika ada sebarang pertanyaan atau masalah mengenai borang soal selidik ini, sila hubungi nombor yang tertera di bawah:

Khairil Ritzman Rawi Bin Abd Rahman Ravindran: 017-3868584
Shanna Lyn Carino: 011-39965297
Nur Afrisya Nasywa Binti Kamaludin: 018-2094940

Terima kasih.

1. E-mail address / *Alamat e-mel*

_____

2. Phone number / *Nombor Telefon*

_____

3. Are you a Malaysian? / *Adakah anda warganegara Malaysia?*

- ❑ Yes. / *Ya.*
- ❑ No. / *Tidak.*

4. Are you residing in Selangor? / *Adakah anda menetap di Selangor?*

- ❑ Yes. / *Ya.*
- ❑ No. / *Tidak.*

5. Would you like to participate in this online survey? / *Adakah anda sudi menyertai kaji selidik dalam talian ini?*

- ❑ I have read the foregoing information. I consent voluntarily to be a participant in this study. / *Saya telah membaca maklumat di atas. Saya bersetuju untuk menyertai kajian ini secara sukarela.*
- ❑ I have read the foregoing information. I do not consent to be a participant in this study. / *Saya telah membaca maklumat di atas. Saya tidak bersetuju untuk menyertai kajian ini.*

Section 1 (Sociodemographic Data) / Bahagian 1 (Data Sosiodemografi)
This section is to determine the sociodemographic status of the respondents.
Please answer all of the questions and tick at the appropriate boxes.

Bahagian ini adalah untuk menentukan status sosiodemografi responden.
Sila jawab semua soalan dan tandakan pada kotak yang sesuai.

1. Age / *Umur*

- ❏ 18 - 25 Years Old / *18 - 25 Tahun*
- ❏ 26 - 30 Years Old / *26 - 30 Tahun*
- ❏ 31 - 35 Years Old / *31 - 35 Tahun*
- ❏ 36 - 40 Years Old / *36 - 40 Tahun*
- ❏ 41 Years Old and above / *41 Tahun dan ke atas*

2. Gender / *Jantina*

- ❏ Male / *Lelaki*
- ❏ Female / *Perempuan*

3. Ethnicity / *Etnik*

- ❏ Malay / *Melayu*
- ❏ Chinese / *Cina*
- ❏ Indian / *India*
- ❏ Bumiputera Sabah or Sarawak
- ❏ Others / *Lain-lain*: ……...

4. Religion / *Agama*

- ❏ Islam
- ❏ Buddhism
- ❏ Hinduism
- ❏ Christian
- ❏ Others / Lain-lain:: ……...

5. Highest education level / *Tahap pendidikan tertinggi*

- ❏ No formal education / *Tiada pendidikan formal*
- ❏ Primary school / *Sekolah rendah*
- ❏ Secondary school / *Sekolah menengah*
- ❏ Tertiary (University) / *Pendidikan tinggi (Universiti)*

6. Working status / Status pekerjaan

- ❏ Employed/Self-employed / *Bekerja/Bekerja sendiri*
- ❏ Unemployed/Retired / *Tidak bekerja/Bersara*

7. Monthly household income / *Pendapatan isi rumah bulanan*

_____

8. Number of children / *Bilangan anak*

_____

9. Age of youngest child (in years) / *Umur anak termuda (dalam tahun)*

_____

Section 2 (Awareness) / *Bahagian 2 (Kesedaran)*

This section is to determine the parental awareness towards childhood immunization among respondents.
Please answer all of the questions and tick at the appropriate boxes.

Bahagian ini adalah untuk menentukan kesedaran ibu bapa terhadap imunisasi kanak-kanak di kalangan responden.
Sila jawab semua soalan dan tandakan pada kotak yang sesuai.

No. / *Bil.*	Awareness / *Kesedaran*	Yes / *Ya*	No / *Tidak*	Not Sure / *Tidak pasti*
1.	Vaccines that are included in Malaysian National Immunization Schedule includes / *Vaksin yang diberi dalam Jadual Imunisasi Kebangsaan Malaysia ialah:*			

	Hepatitis A			
	Hepatitis B			
	Rotavirus			
	Influenza			
	MMR (Measles, Mumps, Rubella)			
	Hib (*Haemophilus influenzae* type B)			
	PCV (Pneumococcal)			
	Meningococcal			
	DTaP (Diphtheria, Tetanus, Acellular Pertussis)			
	Polio (Poliomyelitis)			
	BCG (Tuberculosis)			
	Varicella (Chicken pox)			
	HPV (Human papillomavirus) - for girls / *untuk perempuan*			
2.	The initiation of the vaccination programme is at delivery or first month. / *Program vaksin bermula pada waktu kelahiran bayi atau bulan pertama.*			
3.	Available vaccinations are carefully checked for safety. / *Keselamatan vaksin yang ada telah diperiksa dengan teliti.*			
4.	Immunizing children is vital for their good health. / *Mengimunisasi anak ialah penting bagi kesihatan mereka.*			
5.	Vaccines strengthen the immune system. / *Vaksin menguatkan sistem imunisasi.*			
6.	Vaccines must be administered at intervals to maintain a long-term effect. / *Vaksin mesti diberi secara berkala untuk mengekalkan kesan jangka*			

	masa panjang.			
7.	Vaccines protect my children against the spread of contagious diseases. / *Vaksin melindungi anak saya daripada penyebaran penyakit berjangkit*.			
8.	Vaccines are sufficient to provide immunity for my children against diseases. / *Vaksin adalah mencukupi untuk memberi daya tahan badan kepada anak-anak saya terhadap penyakit.*			
9.	Vaccines are medicines that are capable of killing bacteria and viruses. / *Vaksin adalah ubat yang mampu membunuh bakteria dan virus.*			
10.	Immunization can cause autism. / *Imunisasi boleh menyebabkan autism.*			
11.	Were you offered information about vaccination by medical staff during visits to the clinic? / *Adakah anda diberi informasi tentang vaksin oleh kakitangan perubatan semasa lawatan ke klinik?*			

12. Where did you get the information about vaccination? / *Dari manakah anda mendapat maklumat mengenai vaksin?*

- ❏ Healthcare provider (Doctors, nurses, midwives, medical assistants) / *Penyelia kesihatan (Doktor, jururawat, bidan, pembantu perubatan)*
- ❏ Friends and Family / *Rakan dan Keluarga*
- ❏ Internet
- ❏ Social Media (WhatsApp, Facebook, Instagram, Twitter, Telegram) / *Media Sosial (WhatsApp, Facebook, Instagram, Twitter, Telegram)*
- ❏ Media (TV, radio, newspapers) / *Media (TV, radio, surat khabar)*
- ❏ Poster/Flyer / *Poster/Risalah*
- ❏ Others / *Lain-lain*: ……..

Section 3 (Attitude) / *Bahagian 3 (Sikap)*

This section is to determine the parental attitude towards childhood immunization among respondents.

Please answer all of the questions and tick at the appropriate boxes.

Bahagian ini adalah untuk menentukan sikap ibu bapa terhadap imunisasi kanak-kanak di kalangan responden.

Sila jawab semua soalan dan tandakan pada kotak yang sesuai.

No. / *Bil.*	Attitude / *Sikap*	Strongly Agree / *Sangat setuju*	Agree / *Setuju*	Neutral	Disagree / *Tidak setuju*	Strongly disagree / *Sangat tidak setuju*
1.	Parents should be allowed to send their children to school even if their children are not immunized./ *Ibu bapa dibenarkan untuk menghantar anak mereka ke sekolah walaupun anak mereka tidak diimunisasi.*					
2.	If I vaccinate my child, he/she may have a serious side effect./ *Sekiranya saya memberi vaksin kepada anak saya, dia mungkin akan mendapat kesan sampingan yang serius.*					
3.	I do not offer vaccination to my children because injections are associated with pain./ *Saya tidak menggalakkan vaksinasi untuk anak-anak saya kerana suntikan tersebut menyakitkan.*					

4.	I am satisfied with the vaccination programme offered by the Malaysian Ministry of Health./ *Saya berpuas hati dengan program vaksinasi yang ditawarkan oleh Kementerian Kesihatan Malaysia.*					
5.	I am satisfied with the nursing services through which vaccines are given to my children./ *Saya berpuas hati dengan perkhidmatan kejururawatan yang memberi vaksin kepada anak-anak saya.*					
6.	I think vaccination is important to prevent infectious disease./ *Saya rasa vaksinasi adalah penting untuk menghalang penyakit berjangkit.*					
7.	I think vaccination is not safe for my children./ *Saya rasa vaksinasi tidak selamat untuk anak-anak saya.*					
8.	I think it is okay to skip my children's vaccination./ *Saya rasa tidak mengapa untuk tidak mengambil vaksin tertentu yang ditetapkan dalam jadual imunisasi*.					

9.	Child immunization is prohibited in religion. / *Imunisasi untuk kanak-kanak adalah dilarang di sisi agama.*					
10.	It is better for children to develop natural immunity by getting sick rather than to get a vaccine./ *Lebih baik untuk kanak-kanak untuk mendapat imuniti semula jadi dengan mendapat jangkitan daripada mengambil vaksin.*					

Section 4 (Practice) / *Bahagian 4 (Amalan)*

This section is to determine the parental practice towards childhood immunization among respondents.

Please answer all of the questions and tick at the appropriate boxes.

Bahagian ini adalah untuk menentukan amalan ibu bapa terhadap imunisasi kanak-kanak di kalangan responden.

Sila jawab semua soalan dan tandakan pada kotak yang sesuai.

1. Are all of your children immunized? / *Adakah semua anak anda diimunisasi?*

   ❏ Yes, for all. (Please continue with question number 2) /
   Ya, untuk semua. (Sila teruskan ke soalan nombor 2)

   ❏ Yes, for some. / *Ya, untuk sesetengah.*

   ❏ No. / *Tidak.*

   ❏ Not sure. / *Tidak pasti.*

If you answered “Yes, for some”, “No” or “Not Sure”, please state your reasons.
(If you answered “Yes”, you do not have to answer this question.) /
Jika anda menjawab “ Ya, untuk sesetengah”, “Tidak” atau “Tidak pasti”, Sila berikan sebab anda.
(Jika anda menjawab “Ya”, anda tidak perlu menjawab soalan ini.)

No. / *Bil.*	Practice / *Amalan*	Yes/ *Ya*	No/*Tidak*	Not Sure/ *Tidak pasti*
2.	When you vaccinated your child, did you ever: / *Bila anda sudah memvaksin anak anda, adakah anda pernah:*			
	Delay vaccination?/ *Menangguh vaksinasi?*			
	Give vaccination while your child was sick?/ *Memberi vaksinasi ketika anak anda sakit?*			
	Have a child who experienced side effects from being vaccinated?/ *Adakah anda mempunyai anak yang mengalami kesan sampingan selepas vaksinasi?*			
3.	Do you influence people around you (friends, family, colleagues etc) to vaccinate their children as well?/ *Adakah anda akan menyarankan kepada orang di sekeliling anda (rakan, keluarga, rakan sekerja,etc) untuk memvaksinasi anak mereka?*			

4. Where do you vaccinate your child? / *Di manakah anda memvaksin anak anda?*

- ❏ Public Health centers and government hospitals / *Pusat kesihatan awam dan hospital kerajaan*
- ❏ Maternity or childhood centers / *Pusat bersalin atau pusat kanak-kanak*
- ❏ Private clinics or hospitals / *Klinik atau hospital swasta*
- ❏ Others / *Lain-lain*: ……..

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FORM 2.4: RESPONDENT'S INFORMATION SHEET AND INFORMED CONSENT FORM

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

1. STUDY TITLE : Parental Awareness, Attitude And Practices On Childhood Immunization In Selangor: An Online Statewide Survey.

2. INTRODUCTION:

Vaccine is a product that stimulates a person's immune system to produce immunity to a specific disease and it is very important as it protects children from vulnerable diseases. Poor vaccination causes a significant increase in cases of vaccine-preventable diseases.

Hence, we are carrying out a research titled "Parental Awareness, Attitude And Practices On Childhood Immunization In Selangor: An Online Statewide Survey". The purpose of this study is to determine the awareness, attitudes and practices on childhood immunization among parents in Selangor state in order to gain more information to aid in the improvement of immunization coverage in the country. We sincerely need your help in filling up this questionnaire. *We are looking for a total of 201 Malaysian parents who are at least 18 years old, residing in Selangor and have at least one child less than 15 years old.* This questionnaire consists of 4 sections. There is no time limit for answering this survey, and it will take no longer than 10 minutes to complete it.

It is important that you know why the study is being performed and what it will entail. Before you decide if you are willing to participate, please take your time to read through and consider this information carefully. If something is unclear or if you would like more details, please contact the investigator stated in the form. You must sign this informed consent form after you truly understand all the information, and that you wish to participate. As a participant of this study, you have the right to access your records or the results of this study. You can get your data upon a written request to the principal investigator.

Your involvement is voluntary in this study. If you don't want to, you don't have to be in this study. You can withdraw from it at any time if you volunteer to be in this study. If you withdraw, any data collected from you up to your withdrawal will still be used for the study, unless you specifically withdraw consent for this. No new information will be gathered or added to existing data in the case of withdrawn consent, and you may request that all previously retained samples be destroyed to avoid further analysis.

3. WHAT WILL YOU HAVE TO DO?

You will be given a questionnaire through online Google Form to be answered which will take less than 10 minutes. The Google Form contains four sections which will enquire you about your sociodemographic status as well as your awareness , attitude and practice towards childhood immunization. It is important that you answer the questionnaire honestly. Y*our participation is voluntary, and you may withdraw anytime without penalty or loss of benefit to which you are entitled. You will also not be paid for your participation in this study.*

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

You should not participate in this study if you are a Malaysian that has problems in understanding Malay or English language in order to understand the meaning of the questionnaire.

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

You will not be compensated for participating in this study but it will help you in accessing your level of awareness, attitude, and practices towards childhood immunization.

(b) TO THE INVESTIGATOR?

Information obtained from this study will aid in the improvement of immunization coverage as well as providing new information for the government and associated organizations to increase vaccination rates and improve the success of immunization programmes.

6. WHAT ARE THE POSSIBLE RISKS?

There are no possible risks towards the respondents who will answer this questionnaire as this study is conducted through an online Google Form without involving physical interactions with the respondents. Therefore, there will be no plans of compensation or insurance to the participants in this study.

7. WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?

All the data you have provided will be safeguarded and will remain private and confidential. When this research is published, your identity will still remain confidential. Direct access to your details will be given to the Research Monitor(s), Auditor(s), and JKEUPM Ethics Review Panel and Regulatory Authorities ONLY to verify clinical trial procedures and results. All the data generated by the participants will be stored for a minimum of 3 years in an encrypted laptop and then permanently deleted.

8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

If you have any questions about the study, or you want access to your records or the results of the study, please contact:

Principal Investigator: Prof. Syafinaz Amin Nordin
Affiliation: Department of Medical Microbiology, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia
Telephone number: 0397692478
Email: syafinaz@upm.edu.my

Co-Investigator: Dr Navin Kumar A/L Devaraj
Affiliation: Department of Family Medicine, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia
Telephone number: 0397692879
Email: knavin@upm.edu.my

Co- investigator: Khairil Ritzman Rawi Bin Abd Rahman Ravindran
Affiliation: Faculty of Medicine & Health Sciences, Universiti Putra Malaysia
Telephone number: 017-3868584
Email: 200909@student.upm.edu.my

Co-investigator: Shanna Lyn Carino
Affiliation: Faculty of Medicine & Health Sciences, Universiti Putra Malaysia
Telephone number: 011-39965297
Email: 202771@student.upm.edu.my

Co-investigator: Nur Afrisya Nasywa Binti Kamaludin
Affiliation: Faculty of Medicine & Health Sciences, Universiti Putra Malaysia
Telephone number: 018-2094940
Email: 203782@student.upm.edu.my

This study had been approved by the JKEUPM Ethics Review Panel. Any information regarding rights of study participants, including grievances and complaints, you may contact them at:
Telephone number: 03-9769 1002
Email: jkeupm@upm.edu.my

Please initial here if you have read and understood the contents of this page_____

9. CONSENT

I …… Identity Card No. …… address……..

……..hereby voluntarily agree to take part in the research stated above *(clinical /drug trial/video recording/ focus group/interview-based/ questionnaire-based).

I have been informed about the nature of the research in terms of methodology, possible adverse effects and complications (as written in the Respondent's Information Sheet). I understand that I have the right to withdraw from this research at any time without giving any reason whatsoever. I also understand that this study is confidential and all information provided with regard to my identity will remain private and confidential.

I* wish / do not wish to know the results related to my participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to me be used in any form of publication or presentation (if applicable)

* delete where necessary

Signature ……..…… Signature ……..…….
(Respondent) (Witness)

Date :…….. Name :……..

I/C No. :……..

I confirm that I have explained to the respondent the nature and purpose of the above-mentioned research.

Date ……..…… Signature ……..…….
(Researcher)

BORANG 2.4: PENERANGAN DAN PERSETUJUAN RESPONDEN

Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

1.TAJUK KAJIAN: Kesedaran, Sikap Dan Amalan Ibu Bapa Terhadap Imunisasi Kanak-kanak Di Selangor: Satu Tinjauan Di Seluruh Negeri Dalam Talian.

2. PENGENALAN:
Vaksin adalah produk yang merangsang sistem imunisasi tubuh seseorang untuk menghasilkan kekebalan terhadap penyakit tertentu dan sangat penting kerana dapat melindungi kanak-kanak dari penyakit yang mudah berjangkit. Vaksinasi yang lemah menyebabkan peningkatan yang ketara dalam kes penyakit yang dapat dicegah menggunakan vaksin.

Oleh itu, kami sedang menjalankan kajian bertajuk “Kesedaran, Sikap Dan Amalan Ibu Bapa Terhadap Imunisasi Kanak-kanak Di Selangor: Satu Tinjauan Di Seluruh Negeri Dalam Talian". Tujuan kajian atas talian ini adalah untuk mengetahui kesedaran, sikap dan amalan mengenai imunisasi kanak-kanak dalam kalangan ibu bapa di negeri Selangor untuk mendapatkan lebih banyak maklumat untuk membantu meningkatkan rangkaian imunisasi di negara ini. Kami sangat memerlukan pertolongan anda untuk mengisi soal selidik ini. *Kami mencari sejumlah 201 ibu bapa Malaysia yang berumur sekurang-kurangnya 18 tahun, menetap di Selangor dan mempunyai sekurang-kurangnya seorang anak berumur di bawah 15 tahun.* Soal selidik ini mengandungi 4 bahagian. Tiada had masa yang ditetapkan dan masa yang diperlukan untuk menyiapkan soalan ini kurang daripada 10 minit.

Penting untuk anda mengetahui mengapa kajian ini dilakukan dan apa yang diperlukan. Sebelum anda memutuskan sama ada anda bersedia untuk mengambil bahagian, luangkan masa anda untuk membaca dan mempertimbangkan maklumat ini dengan teliti. Sekiranya ada sesuatu yang tidak jelas atau jika anda mahukan maklumat lebih lanjut, sila hubungi penyiasat yang dinyatakan dalam borang. Anda mesti menandatangani borang persetujuan yang dimaklumkan ini setelah anda benar-benar memahami semua maklumat, dan bahawa anda ingin turut serta. Sebagai peserta kajian ini, anda berhak mengakses rekod anda atau hasil kajian ini. Anda boleh mendapatkan data anda dengan membuat permintaan kepada penyelidik utama.

Penglibatan anda adalah secara sukarela dalam kajian ini. Sekiranya anda tidak mahu menyertai kajian ini, anda tidak perlu mengikuti kajian ini. Anda boleh menariknya dari bila-bila masa sekiranya anda sukarela mengikuti kajian ini. Sekiranya anda menarik diri, sebarang data yang dikumpulkan dari anda sehingga penarikan anda akan tetap digunakan untuk kajian ini, kecuali anda secara khusus menarik balik persetujuan untuk ini. Tidak ada maklumat baru yang akan dikumpulkan atau ditambahkan ke data yang ada dalam hal persetujuan yang ditarik balik, dan anda mungkin meminta agar semua sampel yang disimpan sebelumnya dihancurkan untuk menghindari analisis lebih lanjut.

3. APAKAH YANG PERLU ANDA LAKUKAN?
Anda akan diberi borang soal selidik melalui Borang Google dalam talian untuk dijawab yang akan memakan masa kurang dari 10 minit. Borang soal selidik tersebut mengandungi empat bahagian iaitu terdiri daripada status sosiodemografi anda serta kesedaran, sikap dan amalan anda terhadap imunisasi kanak-kanak. Penting untuk anda menjawab soal selidik dengan jujur. Penyertaan anda adalah secara

sukarela, dan anda boleh menarik diri pada bila-bila masa tanpa penalti atau kehilangan faedah yang anda berhak. Anda juga tidak akan dibayar untuk penyertaan dalam kajian ini.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?
Anda tidak boleh mengambil bahagian di dalam kajian ini jika anda adalah rakyat Malaysia yang mempunyai masalah dalam memahami bahasa Melayu atau Inggeris untuk memahami maksud soalan soal selidik yang diberikan.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PESERTA?
Anda tidak akan dibayar untuk menyertai kajian ini, tetapi dapat membantu anda untuk menilai tahap kesedaran, sikap dan amalan anda terhadap imunisasi kanak-kanak**.**

b) KEPADA PENYELIDIK?
Maklumat yang diperoleh daripada kajian ini dapat membantu untuk meningkatkan liputan imunisasi serta memberikan maklumat baru untuk kerajaan dan organisasi berkaitan untuk meningkatkan kadar vaksinasi dan meningkatkan kejayaan program immunisasi.

6. ADAKAH IA BERISIKO?
Tidak ada risiko yang akan berlaku kepada responden yang akan menjawab soal selidik ini kerana kajian ini dilakukan melalui Google Form dalam talian tanpa melibatkan interaksi fizikal dengan responden. Oleh itu, tidak ada rancangan untuk membayar ganti rugi atau insurans kepada peserta kajian ini.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?
Semua data yang diberikan akan dilindungi dan akan dirahsiakan. Semasa penyelidikan ini diterbitkan , identiti anda akan tetap dirahsiakan. Akses terus ke maklumat anda akan diberikan hanya kepada Monitor Penyelidikan, Auditor, dan panel Kajian Etika (JKEUPM) dan Pihak Berkuasa Peraturan untuk mengesahkan prosedur dan keputusan percubaan klinikal. Semua data yang dihasilkan oleh peserta akan disimpan sekurang-kurangnya 3 tahun dalam komputer riba yang disulitkan dan kemudian akan dihapuskan secara kekal.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?
Jika anda ada sebarang soalan mengenai kajian ini, atau anda ingin mengakses rekod atau keputusan kajian ini, anda boleh menghubungi:

Penyelidik utama: Prof. Syafinaz Amin Nordin
Afiliasi: Department of Medical Microbiology, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia
Nombor telefon: 0397692478
Email: syafinaz@upm.edu.my

Penyelidik bersama: Dr Navin Kumar A/L Devaraj
Afiliasi: Department of Family Medicine, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia
Nombor telefon: 0397692879
Email: knavin@upm.edu.my

Penyelidik bersama: Khairil Ritzman Rawi Bin Abd Rahman Ravindran
Afiliasi: Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia
Nombor telefon: 017-3868584
Email: 200909@student.upm.edu.my

Penyelidik bersama: Shanna Lyn Carino
Afiliasi: Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia
Nombor telefon: 01139965297
Email: 202771@student.upm.edu.my

Penyelidik bersama: Nur Afrisya Nasywa Binti Kamaludin
Afiliasi: Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia
Nombor telefon: 018-2094940
Email: 203782@student.upm.edu.my

Kajian ini telah diluluskan oleh Panel Kajian Etika JKEUPM. Sebarang maklumat mengenai hak peserta, termasuk rungutan dan aduan, anda boleh menghubungi mereka:
Nombor telefon: 03-97669 1002
Email: jkeupm@upm.edu.my

Sila tandatangan di sini sekiranya anda telah membaca dan memahami kandungan halaman ini _____

9. PERSETUJUAN

Saya…… No Kad Pengenalan. …… beralamat…… ……..dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan.Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang melibatkan saya.

I setuju/tidak bersetuju untuk imei/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan ……..…… Tandatangan ……..…….
(*Responden*) (*Saksi*)

Tarikh :…….. Nama :……..…..

No. K/P: ……..…..

Saya mengesahkan bahawa saya telah menerangkan kepada responden ini sifat dan tujuan penyelidikan yang tersebut di atas.

Tarikh ……..…… Tandatangan ……..…….
(*Penyelidik*)

Ref. no: UPM/TNCPI/RMC/JKEUPM/1.4.18.2 (JKEUPM)
Date: 6 April 2021

Dear Prof./Dr./Mr./Ms.,

APPLICATION FOR JKEUPM ETHICAL CLEARANCE: APPROVED

With reference to the above, I am pleased to inform you that your application for ethical clearance for the research project entitled **'Parental Awareness, Attitude and Practices on Childhood Immunization in Selangor: An Online Statewide Survey'** has been approved.

Please note that the official letter of approval will be issued as soon as possible. However, the ethical clearance is considered effective from the date of this email, and you may now proceed with your research.

Kindly remind the ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.

Researchers should also complete a Study Final Report upon study completion. The form can be obtained from the Ethics Committee for Research Involving Human Subjects (JKEUPM) website (http://www.tncpi.upm.edu.my/faildokumen).

If you have any enquiries, please contact Ms. Nurulhasanah Ishak (03-97691605) or Ms. Nor Ellia Abd Ajis (03-97691244).

Note: Please use this reference number for any transaction:-

JKEUPM-2021-094 Thank you.

Yours faithfully,

Prof. Dr. Zamberi Sekawi
Chair
Ethics Committee for Research Involving Human Subjects
Universiti Putra Malaysia

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UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA

FORM 3.2 STUDY FINAL REPORT

1.	JKEUPM Ref. No.	JKEUPM-2021-094
2.	Study Title	Parental Awareness, Attitude and Practices on Childhood Immunization in Selangor: An Online Statewide Survey
3.	i. Principal investigator a. Name b. Address c. Tel.No d. Email ii. List of co-investigators	i. Principal investigator a. Prof. Syafinaz Amin Nordin b. Department of Medical Microbiology, Faculty of Medicine & Health Sciences, UPM, 43400 Serdang, Selangor, Malaysia. c. 0397692478 d. syafinaz@upm.edu.my ii. Co-investigators a. Dr. Navin Kumar A/L Devaraj b. Department of Family Medicine, Faculty of Medicine & Health Sciences, UPM, 43400 Serdang, Selangor, Malaysia. c. 0397692879 d. knavin@upm.edu.my a. Khairil Ritzman Rawi Bin Abd Rahman Ravindran b. Faculty of Medicine & Health Sciences, UPM, 43400 Serdang, Selangor, Malaysia. c. 0173868584 d. 200909@student.upm.edu.my a. Shanna Lyn Carino b. Faculty of Medicine & Health Sciences, UPM, 43400 Serdang, Selangor, Malaysia. c. 01139965297 d. 202771@student.upm.edu.my a. Nur Afrisya Nasywa Binti Kamaludin b. Faculty of Medicine & Health Sciences, UPM, 43400 Serdang, Selangor, Malaysia. c. 0182094940 d. 203782@student.upm.edu.my
4.	Name Of Funding Agency	Not applicable
5.	Study Site	Selangor
6.	Total number of eligible subjects in study site	201

FORM 3.2 STUDY FINAL REPORT

7.	Recruitment of subjects in study site i. Number of participants recruited: ii. Number of participants completing trial/ study: iii. Proposed in original application: iv. Number of withdrawals from trial to date due to: a) withdrawal of consent b) no response from participants c) loss to follow-up d) death (not the primary outcome) Total study withdrawals: v. Number of treatment failures to date (Prior to reaching primary outcome) due to: a) adverse events b) lack of efficacy Total treatment failures:	i. 226 ii. 201 iii. 201 iv. a) Not applicable b) Not applicable c) Not applicable d) Not applicable Total study withdrawals: Not applicable v. a) Not applicable b) Not applicable Total treatment failures: Not applicable
8.	Duration of study	20 December 2020 - 5 July 2021
9.	Protocol Violation or Deviation	Not applicable
10.	Executive summary *(Summary of research background, objectives, methodology, findings and conclusion of the research project) - maximum 500 words)* *Committee may request additional information if required.	Vaccine is a product that stimulates a person's immune system to produce immunity to a specific disease and it is very important as it protects children from vulnerable diseases. Poor vaccination awareness, attitude and practices causes a significant increase in cases of vaccine-preventable diseases. Therefore, the aim of the study is to assess the parental awareness, attitude and practices on childhood immunization in Selangor through an online statewide survey.

FORM 3.2 STUDY FINAL REPORT

		A cross sectional study design was conducted from 20 December 2020 until 5 July 2021. Respondents were selected by convenience sampling in which Malaysian parents in Selangor with at least one child aged less than 15 years old were randomly selected to answer the questionnaire. The Chi-Square and Fisher's Exact tests were used to determine the association between the sociodemographic status of the respondents with their awareness, attitude and practice towards childhood immunization. Multiple logistic regression models were used to determine the determinants of the level of awareness, attitude, and practice towards childhood immunization. Spearman's rank correlation coefficient was used to determine the association between parental awareness and attitude with actual practices. 201 respondents completed the questionnaire, giving a response rate of 89.94%. The majority of our respondents were aged 41 and above (41.3%), female (80.6%), Malay (80.6%) and Muslim (81.1%), had a tertiary educational level (86.1%) and were employed (80.1%), came from a M40 household income bracket (47.3%), and had 3 to 4 children (51.2%). In this study, The majority of the respondents have good awareness (52.7%), good attitude (53.7%) and good practice (60.2%) towards childhood immunization in Selangor.There is a positive moderate correlation between awareness and attitude scores with the actual practice towards childhood immunization. In multiple logistic regression models, it was found that the families in the T20 income bracket had a 5 higher odds of having better awareness towards childhood immunization as compared to the B40 income bracket group (p=0.001). Also, families in the M40 income bracket had a 2.3 higher odds of having better awareness towards childhood immunization as compared to the B40 income group (p=0.042). Next, it was shown that the families in the T20 income bracket had a 2.9 higher odds of having better attitudes towards childhood immunizations as compared to the B40 income bracket group (p=0.013). It was also found that the families in the T20 income bracket had a 2.4 higher odds of having better practices towards childhood immunization as compared to the B40 income bracket group (p=0.038) and mothers had a 3.9 higher odds of having better practice