

Suitability and uptake of vaccines in the last 4 weeks among child participants of a health screening campaign

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INTRODUCTION

Vaccine can be described as a tool available to parents to protect their infants and children from potentially deadly diseases. It can prevent deaths and save lives at the same time. This study was aimed at the suitability and uptake of vaccines in the last 4 weeks among child participants of a health screening campaign.

METHODS

A cross-sectional, prospective observational study was conducted at two communities through health campaign. A validated and self-administered questionnaire that includes two sections on socio-demographic details and a section on child vaccination practices was used. Statistical Package for Social Sciences v26.0 was used for data analysis.

RESULTS

The mean age is 50.1 ± 22.7 years. Majority were females (68.3%), of Chinese ethnicity (21.7%), married (73.3%) and not employed (75.0%). Majority had none or primary level of education only (60.0%). Majority of the children were suitable to receive vaccine i.e. 58/60 or 96.7%.

CONCLUSION

The uptake of children in receiving vaccine is high. This augurs well for a nation keen to have healthy citizens that can spur the economy.

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INTRODUCTION

Over the years, vaccines have caused some controversy over its safety but there are no convincing proof of harm that has been found. In Malaysia, vaccines such as Hepatitis B and Haemophilus influenzae are compulsory for infants and children up to 15 years old by the Ministry of Health. Vaccine can be described as a tool available to parents to protect their infants and children from potentially deadly diseases.¹ A vaccine is a weaker version or part of the germ that is causing the disease. It contains the same antigen as the disease. When the infection in vaccine form is inserted in children, their immune system is triggered to make antibodies that protect them from catching the disease when they are exposed to the actual disease in question.²

The main use of vaccines is that they protect children against common deadly diseases such as polio, measles, diphtheria and so on. They stimulate the immune system to synthesize antibodies, thus enhancing immunity and providing protection to the child.³ Immunization is considered as the most cost-effective public health intervention, preventing an estimated 2 to 3 million deaths yearly.⁴ Vaccination also helps in the case of newborn babies. Babies receive antibodies from their mother but after a year of life, immunity wears out. Therefore, vaccines boost their immunity. Unvaccinated kids are at higher risk and more vulnerable to the disease than the accinated ones.⁵

In Malaysia, the WHO Expanded Programme on Immunisation provides free vaccination to children since birth up to fifteen years of age. Notwithstanding the huge success of increased immunization coverage rates (>90%) in Malaysia, the hesitancy for vaccine uptake prevails as a rising concern denoted by increasing number of diseases that can potentially be eliminated by vaccines.⁶ A

ten-fold spike in measles was observed in 2013 to 2018 by the Malaysian Health Ministry from 125 to 1467 respectively. Even though vaccine coverage has been more than 95% consistently, vaccine uptake for measles indicated a decrease in 2017 to 88.8%.⁷ Few reasons behind vaccine refusals are religious exemptions, philosophical disapproval like desiring a natural living or overstated concerns for vaccine safety such as relating autism to childhood vaccination. However, no such link regarding autism has been proven by reputed studies.⁸ Furthermore, lack of knowledge about vaccinations causing misconceptions, or impact of wrong information shared online as well as former unpleasant incidents regarding vaccination are other reasons.⁹ This hesitancy could develop into refusal leading to more unvaccinated children, resulting in outbreaks of vaccine-preventable diseases.¹⁰ Therefore, the suitability and uptake of vaccines among children in a health screening campaign are further explored in this study.

MATERIALS AND METHODS

A cross-sectional, prospective observational study was conducted at two communities through health campaign. Ethical approval was sought with the Medical Research Ethics Committee, Universiti Putra Malaysia. All participants provided their written informed consent. The inclusion criteria were Malaysian parents aged 18 years and above who were attending the health campaign and who could understand and complete the questionnaires in English or Malay version. The exclusion criteria comprise of those who has mental health issues.

Universal sampling was used to recruit respondents in this study. Those who fulfilled the inclusion criteria was taken as respondents in this study. A validated and self-administered questionnaire that includes two sections on socio-demographic details

and a section on child vaccination practices was used.

The respondents need to take approximately about 10 to 15 minutes to complete all the questions in the questionnaires. A written informed consent will be taken before the process of data collection started. All information of the respondents remains confidential and is solely for research purpose.

Operational Definition

The independent variables for this study are:

1. Sociodemographic characteristics which include age, gender, ethnicity, educational status, marital status and occupation of the parent

Dependent factors are:

Child vaccination practices

For data analysis of the raw data this study, Statistical Package for Social Sciences v26.0 was used. Descriptive analysis was used to analyze the data distribution normality, frequencies, means and standard deviation.

RESULTS

The mean age is 50.1±22.7 years. Majority were females (68.3%), of Chinese ethnicity (21.7%), married (73.3%) and not employed (75.0%). Majority had none or primary level of education only (60.0%). Majority of the children were suitable to receive vaccine i.e. 58/60 or 96.7%. (Table 1)

Table 1: Socio-demographic characteristics of the participants (N=60)

Variable	Frequency	Percentage
Age, years mean ± standard deviation	50.1±22.7	
Gender		
Male	19	31.7
Female	41	68.3
Ethnicity		
Malay	16	26.7
Chinese	30	50.0
Indians	13	21.7
Others	1	1,7
Marital Status		
Married	44	73.3
Never married/divorced	16	26.7
Occupation		
Employed	15	25.0
Not employed	45	75.0
Educational level		
None	8	13.3
Primary	28	46.7
Secondary	15	25.0
Tertiary	9	15.0

DISCUSSION

Immunization in children has been a great success in the public health sector for a long time. However, the suitability and uptake of vaccines during childhood has raised concerns whether acute diseases decrease the efficiency or elevate the adverse reactions of vaccines. Vaccine comprises an active ingredient which is the antigen that gives rise to the immune response, along with other components including preservatives, additives and adjuvants. Some children are prone to allergies to these components, mainly foods such as eggs (60% at 6 years).¹¹

Several vaccines produced on embryonated chicken eggs contain egg proteins, mainly ovalbumin with high amounts present in influenza, yellow fever and rabies which are embryonated chicken eggs vaccines while reduced amounts in Measles-Mumps-Rubella (MMR) or tick-borne encephalitis vaccines which are chicken embryos or fibroblasts of chicken embryos vaccines. However, children with mild allergies can uptake any influenza vaccines or MMR vaccine safely without hospital admission while children with severe allergies require a medical setting intervention or hospital admission for vaccination.¹² Moreover, hidden milk proteins may be present in a few vaccines to avoid virus degradation. Allergic reactions have been observed following MMR vaccine in children with milk and egg allergy.¹³ In OPV (Oral Polio Vaccine) and DPT (diphtheria, pertussis and tetanus) vaccine, existence of milk proteins is suggested and therefore, children with allergic reaction history are recommended on a 60 min observation following vaccination.¹⁴

Although anaphylactic reaction to yeast is considered rare, those who have such allergy are suggested to take only yeast-free vaccines such as bivalent human papillomavirus vaccine, over

vaccines that has yeast proteins including quadrivalent human papillomavirus vaccine or hepatitis B vaccine.¹⁵ Furthermore, gelatin which acts as a stabilizer in many vaccines is responsible for major allergic events including IgE as well as non-IgE induced reactions.¹⁶ However, a reduction in allergic events is noticed with greater hydrolysed porcine gelatin in use within these vaccines.¹⁷ The risk group includes children allergic to red-meat like bovine, pork or lamb where pork-meat sensitive children (38%) already have particular IgE towards gelatin thereby increasing the risk of anaphylactic reactions during vaccination.¹⁸ In order to avoid bacterial or fungal contaminants in vaccines, small amounts of antibiotics are used, like neomycin, streptomycin etc. However, few adverse events from case reports have been outlined.¹⁹ Moreover, some children are allergic to latex which is found in the vial or syringe of vaccines. However, hypersensitivity events are uncommon in the case of vaccine contaminated by latex. Latex free vaccines are available at present.¹³

In the case of adverse reactions to vaccines in the past, future doses are contraindicated. However, there are circumstances where benefits are more than the risks like the event of an outbreak.²⁰ Blood disorders such as thrombocytopenia or thrombocytopenic purpura could be a precaution for MMR as well as MMRV vaccines.²¹ How safe the live attenuated influenza vaccines (LAIV) in children with lung, heart, kidney or metabolic diseases such as diabetes or any blood disorder is not confirmed yet. However, children from the age of 5 undergoing these disorders, as well as asthma should be carefully dealt with prior to vaccination with LAIV.²² Moreover, Inactivated Influenza Vaccine is recommended for children on long-term aspirin therapy as well as children who have had wheezing or asthma in the past 12 months from 2 to 4 years of age while use of LAIV is advised against. However,

there is no proof of increased wheezing following LAIV vaccination in those who have had previous wheezing or asthma history and it has not been identified if wheezing would have taken place without LAIV immunization.²³

Children with epilepsy are known to develop fever and infection that can potentially trigger seizures. Some vaccines such as measles-mumps-rubella (MMR) vaccines, trivalent inactivated influenza vaccines have been linked to febrile seizures in young children in the past.²⁴ After immunization in children having epilepsy, the risk of seizure is not known. A study was done to determine the risk of seizure after immunization in children (less than 7 years old) with epilepsy.²⁵ From the results obtained, it was seen that parents can be at ease as immunization does not appear to cause an increase of seizure in children with epilepsy. However, further studies are required to confirm these findings.

Together with its role in boosting the immune system, vaccination has also been seen as a potential modifier of the risk of childhood leukaemia. According to a study carried out by Xiaomei et al, it was seen that vaccinations such as diphtheria and tetanus are not associated with the risk of leukaemia and that Hib vaccination has the ability to reduce the risk of childhood leukaemia.²⁶ In the case of HIV, most children who are born to women are already infected with human immunodeficiency (HIV) do not get infected but some acquire the virus at the time of delivery or shortly after. Nevertheless, it was seen that immunization is usually safe and beneficial for HIV-infected children, despite the fact that HIV-induced immune suppression diminishes the benefit compared with that received in HIV-uninfected children.²⁷ But it should be noted that some complications can happen after immunization in the case of severely immunocompromised children but

there is no evidence that immunization accelerates the course of HIV infection.²⁸

As for children taking anticancer medication or are under chemotherapy, vaccination should be put to a halt. Cancer chemotherapy is known to suppress the immune system.²⁹ The decrease is most noticeable during the induction and consolidation chemotherapy. After the completion of all therapies, immune functions take months to recover to normal. Primary immunization responses are more affected by immunosuppression than booster responses.³⁰ Hence, vaccination should not be conducted during induction and consolidation chemotherapy. Other vaccinations options exist in the period of maintenance therapy. Killed vaccines are used in immunosuppressed children as they are less risky but they may not be as effective as the live viral vaccines. Live bacterial vaccines such as the Bacille Calmette-Guérin, oral typhoid should also be avoided.³¹

As for those who are receiving a blood transfusion or blood products, it is better to delay vaccines for a certain period of time. Immunoglobulins have the ability to inhibit the immune response to some vaccines.³² However, according to the CDC, a blood transfusion at the age of 3 days should not have a great impact on the routine immunization schedule. The varicella and the MMR vaccine would not be due for one year and the precautions associated with blood transfusion are usually for the previous eleven months infants only. As for the whole blood is concerned, the wait to administer MMR or varicella-containing vaccine is around 6 months.³³

Strength of the study lies in the important data collected which indicate that majority of parents are adhering calls for their child to be vaccinated. Limitation lies in the fact that this is a cross sectional study which may limit causality and the small sample size which may limit its generalisability.

CONCLUSION

The uptake of children in receiving vaccine is high. This augurs well for a nation keen to have healthy citizens that can spur the economy.

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