

RESEARCH PAPER



Assessment of knowledge and attitude among postnatal mothers towards childhood vaccination in Malaysia

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ABSTRACT

Aim: Mothers knowledge and attitude toward childhood vaccination influence uptake is the most adequate tool and preventive aspects to infectious disease epidemics. The present study assesses and measures knowledge and attitude of postnatal mothers toward vaccination.

Methods and results: The present study adopted a cross-sectional study design, whereby 200 postnatal mothers were identified during their postnatal visit to clinics. The subjects were accessed using questionnaire to assess the level of knowledge and attitude of mothers regarding vaccination. The objectives were to study the level of knowledge, the attitude, and to find the association between knowledge and attitude of the study subjects. The data were analyzed using SPSS version 16. The results was analyzed through chi-square test. The association between age ($p = .031$), education ($p = .021$), occupation ($p = .013$), and knowledge score toward vaccination was found to be statistically significant. However, ethnicity ($p = .127$), employment ($p = .197$), and mode of delivery ($p = .750$) toward mothers vaccination knowledge were not significant for the study. Mothers education, age, and occupation were found to be associated with attitude toward childhood vaccination. No association was found between ethnicity, employment, and mode of delivery with attitude of childhood vaccination.

Conclusion: More than half of the studied mothers had good knowledge scores on vaccination, more than two-thirds of the studied mothers had good attitude scores on vaccination. However, the religious misconception and fear of autism was the main cause of vaccine resistance in Malaysia.

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Introduction

The process of immunization involves preventing, controlling, or eradicating a number of childhood communicable diseases and also improves life expectancy of an individual. Vaccine stimulates the body immune system to protect an individual against subsequent bacterial, viral, or fungal infections or diseases.¹ Vaccination services are provided by government and private healthcare facilities in Malaysia. Primary healthcare system in Malaysia is well developed when compared with other developing countries. Malaysia was also ranked 49th for their health system performance by WHO in the year 2000.² Even then, the reemergence of vaccine preventable diseases such as diphtheria, pertussis, and measles in Malaysia remains a contentious health issues.³

Proper vaccination is desired for halting infectious or communicable disease by improving immunization among children and adults. Vaccines can also reduce disease escalation in the population. However, the vaccination and immunization policy remains fractured around the world. The United States of America (USA) have introduced the legislation to enforce vaccination for school attending children while Australia does not make it mandatory for the school populace but offers

some financial incentives to those who are vaccinated. Slovenia has far more stringent vaccination program, those who failed to comply the vaccination program in Slovenia are penalized financially.^{4,5}

Malaysian vaccination program was started in the year 1960. Diphtheria, pertussis, and tetanus vaccine (DPT) was the first vaccine introduced, and later bacillus calmette guerin (BCG), polio, rubella, mumps, and hepatitis B vaccines were supplemented in 1988 as an expanded program on immunization⁶ vaccination has definitely helped in reducing the incidence of vaccine preventable diseases. The death rate for measles dropped 84% between 2000 and 2016 worldwide due to proper vaccination of the new born kids.⁷ The Malaysia government issued a report claiming that 98.53% new born were vaccinated for BCG, 96.92% for DPT-HIB, 96.87% for polio, 95.25% for MMR, 95.35% for hepatitis B, and 94.33% for HPV but the incidence of vaccine preventable diseases can still be traced among Malaysians children.^{8–10} Despite a high vaccination rate, Malaysia was enthrled with 18 new cases with two deaths due to diphtheria in states of Malacca and Kedah.^{11,12} These type of disease cases were unexpected as diphtheria can be controlled by vaccination program

practiced in Malaysia.¹³ Further investigation revealed that both deceased infants did not receive the complete set of recommended vaccination for which they succumb to the complication developed by the infection. Since then, the Ministry of Health, Malaysia embarks on numerous health programs, public talks, and forums to restore faith in current vaccine policies and to confront the public hesitancy toward vaccination programs. Studies revealed various misconception perceived from unverified internet and mass media sources toward the vaccines which is the primary reason for hesitancy among many Malaysian parents.¹⁴ Citizens of Malaysia and many Muslim countries have developed an assumption that active ingredients in vaccines is derived from nonhalal sources. They have a very strong perception that vaccine ingredients are prohibited in Islam. Even though relevant Islamic religious authorities in Malaysia have issued a fatwa confirming that vaccine available in Malaysian hospital is halal.¹⁵ Another reason which has attracted vaccine hesitancy is the perception that it may cause autism, this was suggested as the most prevalent parental concern in the USA, the same thought has also percolated among few Malaysians.^{16,17} Studies also indicate that illiterate, poor, and superstitious mothers are less likely to follow vaccination program. Research study indicates that geographical barriers and negative publicity of vaccines may also be a reason for lack of vaccination coverage.^{18–22} Poor knowledge, negative attitude, and perception among parents have been identified as a reason for noncompliant toward vaccines. Community-based educational interventions are strongly needed, to improve parent's knowledge and attitude toward the government-sponsored vaccination program.^{23,24} The concern of childhood vaccination is often testified as one of the hallmark attainment in public and child health promotion, despite this realization, the idea has been challenged particularly due to lack of awareness among mothers. This paper provides insight about mothers knowledge and attitude toward children's vaccination as the findings obtained may serve as the basis for effective intervention. The objective of this study was to assess knowledge, and attitude of Malaysian postnatal mothers (after child birth) toward childhood vaccination in Ipoh, Perak.

Results

The internal consistency of survey questionnaire was established using Cronbach's alpha. The test was computed for each sections of the questionnaire. The reliability measure was observed as 0.773 and 0.764 for respective sections of the questionnaires for the variables of attitude and knowledge, of Malaysian mothers toward vaccination program. Postpiloting the questionnaire were modified to meet the compatibility of local settings and suit the participants.

Mothers demographic

A total of 200 postnatal Malaysian mothers were enlisted, the mean age of the mothers in the study sample was 27.29 ± 2.45 years. The majority of the mothers enrolled were employed (65%) and graduated (55%). Since the survey was conducted in Ipoh which is considered an urban area and, it is the capital

city of Perak, the number of graduates and employed mothers were on the higher side. Among those employed a sizeable number of them (55%) worked as laborers. Approximately 32%, 14%, and 9.5% of the respondents were professionals, entrepreneurs, and administrator like clerks, secretary, respectively. Most of the respondents (86.5%) had a vaginal delivery without complications. The majority of the respondents (51%) have more than one child. Table 1 shows the demographic information of postnatal mothers living in Malaysia.

Knowledge on childhood vaccination

Knowledge on childhood immunization was computed on a three-point Likert scale. Majority of respondents (73.5%) agreed that routine vaccination plays an important role in protecting children from infectious diseases and its complications. A substantial number of mothers (68.5%) knew that first vaccination dose is scheduled at the time of birth. A good number of the respondents, 59% knew that within first year the child may be exposed to most of the vaccine preventable diseases and hence compliance with the vaccination program will limit the incidence of such diseases. A total of 53.5% of the respondents knew that the multiple administration of the same vaccine is important for increasing the child immunity. More than half of the mothers (55%) knew that the simultaneous administration of multiple vaccines such as *Infanrix*[®]-hexa which is a hexavalent combination will have no negative effects on child health or immunity. Nearly less than half, 43.5% of the respondents agreed that it is good and important to vaccinate children during vaccination campaigns. Out of the total mothers, 37% agreed that children should also be vaccinated against seasonal influenza to prevent any epidemic. But only 48.5% of the postnatal mothers rejected any association or link between vaccination and autism, this is cause of concern as still 23% of the mothers believe on such a myth. Table 2 displays a summary of mothers knowledge on childhood vaccination.

Table 1. Demographic descriptive statistics.

Characteristics	Category	n* (200)	Frequency %
Age (years)	18–20	21	10.5
	21–25	43	21.5
	26–30	57	28.5
	31–35	37	18.5
	36–40	21	10.5
	>40	21	10.5
Ethnicity	Malay	149	74.5
	Chinese	19	9.5
	Indian	32	16.0
Education level	Secondary	90	45.0
	College/University Graduate	110	55.0
Employment status	Employed	130	65.0
	Unemployed	69	34.5
Occupation	Housewife	78	39
	Laborer	11	5.5
	Professional	64	32
	Entrepreneur	28	14.0
	Administrative	19	9.5
Mode delivery	Normal Birth	173	86.5
	Cesarean	27	13.5
Number children	1	59	29.5
	2–3	102	51.0
	4–5	34	17.0
	>5	4	2.0

*n = number of participants.

Table 2. Knowledge toward childhood vaccination of postnatal mothers**.

Statements	Disagree (%)	Neutral (%)	Agree (%)	p value
Routine vaccination prevents children from some infectious diseases and its complications. <i>Vaksinasi mengelakkan bayi dijangkiti penyakit berbahaya.</i>	1.5	25	73.5	.018
First vaccination is given at birth. <i>Vaksinasi pertama diberi sebaik sahaja bayi lahir.</i>	5.0	26.5	68.5	.049
Most diseases against which children are vaccinated occur during the first years of life. <i>Kebanyakan penyakit akan menyerang kanak—kanak yang tidak mengambil vaksin pada beberapa tahun di awal pertumbuhan bayi.</i>	12.0	28.5	59.0	.02
Multi-doses of the same vaccine given at intervals are important for child immunity. <i>Peningkatan dos vaksin secara selang-seli adalah penting bagi kesihatan bayi.</i>	5.5	41	53.5	.001
More than one vaccine given at intervals are important for child immunity. <i>Pemberian lebih daripada satu vaksin secara selang-seli adalah penting bagi kesihatan bayi.</i>	8.5	36.5	55.0	.003
It is important to vaccinate children during vaccination campaigns. <i>la adalah penting untuk memberi vaksin kepada bayi sewaktu kempen-kempen kesihatan dan vaksinasi dijalankan.</i>	18.0	38.5	43.5	.003
It is recommended to vaccinate children against seasonal influenza. <i>Bayi harus diberi vaksin influenza.</i>	21.0	42.0	37.0	.05
Vaccination can cause autism. <i>Vaksinasi boleh menyebabkan autisme.</i>	48.5	28.5	23.0	.010
Common colds, ear infection, and diarrhea are not contraindications for vaccination. <i>Selesema, penyakit telinga dan cirit-birit tidak merupakan kesan sampingan pengambilan vaksinasi.</i>	25.0	38.0	37.0	.04

**n = 200.

Attitude on childhood vaccination

Table 3 presents the maternal attitudes toward childhood vaccination. Substantial mothers, 89% strongly agreed that vaccination is important for a healthy child. Majority (88.5%) of respondent believed vaccination is more beneficial than harmful and, most of the mothers (85%) agreed that vaccines are safe for use. Vaccine sometimes being considered prohibited in Islam because of the source of the vaccine, but majority of the postnatal mothers (44%) dismissed this notion and considered vaccine as halal as it considered as life-saving drugs. A minority of women still believe (4%) that it is necessary for vaccine to be halal and hence should be prohibited for use. Almost 33% of mothers had a neutral view to the statement that vaccines are associated with side effects. Surprisingly, a total of 36% of mothers were still not sure that the child was surely immunized with the disease/s against which he/she was vaccinated. The study suggests minority of mothers irrespective of ethnicity rejects of immunization of their children but

the reasons for rejection may be varied. Majority of the mothers (47% agreed and 37% strongly agreed) had an opinion that compliance toward the vaccination schedule is important as vaccination plays an important role in keeping the child healthy ($p < .05$).

Sociodemographic knowledge toward childhood vaccination

Table 4 portrays the association between demographic characteristics toward knowledge on childhood immunization among postnatal mothers. The study is important as it will suggest the sociodemographic determinants affecting the knowledge of childhood immunization among postnatal mothers in ipoh. The study revealed that age, education, and occupation ($p < .05$) are significant parameters in measuring the knowledge of postnatal mothers toward childhood vaccination. However, ethnicity and employment does not play any significant role in analyzing the knowledge of postnatal mothers toward childhood vaccination.²⁵

Table 3. Attitude toward childhood vaccination of postnatal mothers***.

Statements	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	p value
Child vaccination is important. <i>Vaksinasi adalah penting bagi bayi.</i>	1.5	0.5	9.0	27.5	61.5	.031
Vaccination is more beneficial than harmful. <i>Vaksinasi mempunyai lebih kebaikan berbanding keburukan.</i>	1.5	0.5	9.5	37.0	51.5	.003
Vaccines used for child vaccination are safe. <i>Vaksin yang digunakan untuk bayi adalah selamat.</i>	1.5	3.5	10.0	34.0	51.0	.096
Child vaccination is prohibited in religion. <i>Vaksinasi adalah haram disisi agama saya.</i>	44	25.5	17.0	9.5	4.0	.0024
Vaccination is associated with side effects. <i>Vaksinasi mempunyai banyak kesan-kesan sampingan.</i>	23.5	30	33.5	9.5	3.5	.016
Child can become infected after vaccination with the disease/s against which he/she was vaccinated. <i>Walaupun telah diberi vaksinasi, bagi beberapa penyakit yang spesifik, namun masih terdapat kemungkinan anak saya masih boleh dijangkiti penyakit tersebut.</i>	1.0	18.5	44.5	26.0	10.0	.0009
Compliance to vaccination schedule is important. <i>Setiap ibu mesti mengikut jadual vaksinasi bayi mereka.</i>	–	0.5	15.5	47.0	37.0	.015
Vaccination keep your child healthy. <i>Vaksinasi adalah penting bagi kesihatan bayi.</i>	–	–	13.0	42.0	45.0	.0195

***n = 200.

Table 4. Association between demographic characteristics toward knowledge on vaccination.

Demographic characteristics	Knowledge toward vaccination (%) <i>n</i> = 200		
	Poor	Good	<i>p</i> value
Age			
18–20	2.5	8	.031
21–25	9	12.5	
26–30	13	15.5	
31–35	6	12.5	
31–35	6	4.5	
36–40	6	4.5	
>40			
Ethnicity			
Malay	24	50.5	.127
Chinese	2	7.5	
Indian	52.5	13.5	
Education			
Secondary	16.5	28.5	.021
College/University	12	43	
Employment			
Employed	17	48	.197
Unemployed	11	23.5	
Occupation			
Housewife	11.5	27.5	.013
Labor	1	4.5	
Professional	12.5	19.5	
Entrepreneur	1	1	
Administrative	3	3	
Delivery mode			
Normal birth	25	61.5	.750
Cesarean	3.5	10	

Table 5. Association between demographic characteristics toward attitude on vaccination.

Demographic characteristics	Attitude toward vaccination (%) <i>n</i> = 200		
	Negative	Positive	<i>p</i> value
Age			
18–20	1.5	9	.039
21–25	6	15.5	
26–30	6	22.5	
31–35	5	13.5	
36–40	4.5	6	
>40	5	5.5	
Ethnicity			
Malay	38	36.5	.342
Chinese	6.5	3	
Indian	8	8	
Education			
Secondary	15	30	.000
College/University	22.5	32.5	
Employment			
Employed	32	33	.318
Unemployed	20	14.5	
Occupation			
Housewife	17	22	.004
Labor	2	3.5	
Professional	11	21	
Entrepreneur	3.5	10.5	
Administrative	4	5.5	
Delivery mode			
Normal birth	44	42.5	.242
Cesarean	8.5	5	

Sociodemographic attitude toward childhood vaccination

The results are tabulated in Table 5, it reflects the attitude of Malaysian postnatal mothers toward childhood immunization. The results suggest that age, education, and occupation ($p < .05$) are sociodemographic determinants for measuring the attitude of postnatal mothers toward childhood vaccination. However, ethnicity and employment ($p > .05$) are not significant for measuring the attitude of postnatal mothers toward childhood vaccination. Age, education, and occupation are the sociodemographic determinants for measuring the knowledge of postnatal mothers toward childhood vaccination.²⁵

Discussion

The present study was conducted to synthesize a valid and a reliable questionnaire which can measure the knowledge and attitude of postnatal mothers living in Ipoh, Perak, Malaysia toward childhood vaccination. Several studies have been conducted to analyze the knowledge and attitude of postnatal mothers toward childhood vaccination.^{25–28} The present study aims to realize the knowledge and attitude of Malaysian postnatal mothers for different sociodemographic status toward the childhood immunization. The internal consistency reliability of the final questionnaire was good for both knowledge and attitude.²⁹

Knowledge of mothers on childhood vaccination

It is imperative that vaccination of children depends on the mothers or parent's knowledge and attitude.^{30,31} The study revealed that mothers knowledge is an important component for childhood immunization ($p < .05$). It was estimated that

57.5% of mothers have good knowledge about the vaccination program in Malaysia. The results were congruent to the previous study done in Malaysia.¹

In the current study, majority (73.5%) agreed that the routine vaccination prevents children from serious microbiological infection and its complication. Similar opinion was disclosed by Bernsen, the study envisaged that 85% of the respondents knew the role of childhood vaccination in prevention of life-threatening diseases. The expanded program on vaccination in 1998 resonates our findings that vaccination reduces the incidence of infectious diseases while only a meager percentage of mothers were unaware of this fact.³²

Postnatal mothers enrolled in the study knew the importance multidose vaccines as the multiple dose at different age is essential to boost the immunity of the child ($p < .05$). Centre for Disease Control and Prevention suggests that most vaccines in the child vaccination schedule, require multiple doses for producing sufficient and persisting antibody response.³³ Our result superimposed views expressed in a previous study conducted in Taif, Saudi Arabia.³⁴ Even though, it was adduced by the study that multiple dose is beneficial in enhancing the immune response of children, the study also revealed a counterview that vaccination may induce autism, similar views was also expressed in the USA.¹⁶ Contrary views for multiple dose vaccines has been expressed in the many of the advanced country and thus imposing a strong sense of creating awareness for the combined and multiple dose vaccines.³⁵

There has been paradoxical view specially in underdeveloped countries that mass vaccination campaigns may not be safe, as the parents have a view that infected or expired vaccines may be accidentally used during mass vaccination campaign.³⁶ Contrary to this mothers view, mass vaccination campaign for eradication of Measles and Rubella by 2020 has been considered highly successful in all six World Health Organization regions. The campaign has been effective barring few countries where the

program has not been effective as intended, owing to ownership and political will of the countries. Similar campaign was conducted for polio and diphtheria.^{37–39} Our study revealed that majority (87%) of the mothers believe in government-sponsored immunization campaign, as it is easy for them to follow-up vaccination process ($p < .05$). Previous studies have suggested the such vaccination campaign increases vaccination rate of the country.⁴⁰ However, still a sizable Malaysian mothers have a pessimistic view on the effectiveness of vaccines particularly against seasonal influenza. Mothers might only be inclined to vaccinate their child if complete information is conveyed about the risk of deadly seasonal infection such as influenza.⁴¹ Moreover, it was subsumed that 37% of mothers are of a view that vaccination is contraindicated during common colds, ear, and diarrheal infections and become a reason for vaccine denial or delay. The guide for contraindications to childhood vaccination suggests that delay of vaccination based on misconceptions about contraindications puts an infant or a child at health risk.⁴²

Attitude of mothers toward vaccination

In the present study, majority of the mothers agreed (61.5%) that vaccination is important to keep child healthy, most mothers (51.5%) strongly agree that vaccination exceeds their harms, and 51% are of a strong view that vaccines are safe for children. However, there have been instances of outbreak of vaccine preventable diseases in countries like Pakistan, Malaysia, Nepal, and Egypt.^{43–45} This would emphasize the fact that cultural factors may be more influential rather than limited knowledge and negative attitude toward vaccination.^{44,46} Our study reflected that the majority of the vaccine compliant mothers are educated. Compliance to vaccination schedule signify that mothers will bring their children for immunization at the specified period which will reduce infant mortality rates. However, noncompliance to vaccination schedule may predispose the children to diseases, hence promoting complications and increasing rates of infant mortality.⁴⁷ Lack of knowledge about vaccination schedules and the distance of tertiary hospital may be a predisposing factor that may lead to noncompliance toward childhood vaccination.⁴⁸ Consequently, mothers are less likely to complete vaccination schedules if they are poorly informed about the need for vaccination.

Association between demographic characteristic on knowledge and attitude toward childhood vaccination

Mothers knowledge and attitude toward childhood vaccination are the predicting factor for vaccine uptake.⁴⁹ In the present study, good knowledge and positive attitude of postnatal mother toward vaccination may a significant impact on the incidence of vaccine preventable diseases, the study is line with the studies done by Gust.⁵⁰ The study elucidates that most of the respondents have good knowledge and positive attitude toward vaccination, however, poor knowledge among Indians and negative attitude among Malays may be a cause of concern. A study conducted among medical students in a Malaysian public university reflected similar results on pertussis.⁵¹

This study also revealed the level of knowledge and attitude of postnatal mothers, it was found to be significantly associated with age, occupation, and education. Results further showed that ethnicity, employment, and mode of child delivery did not affect the knowledge and attitude of respondents toward vaccination. The older mothers were less likely to have good knowledge and positive attitude toward child vaccination compared to the middle-age group. Perhaps, in older mothers, this reflects a higher prevalence of traditional archaic views, such as circumstance being the cause of disease, only those who are fit to live will survive and vaccine are not halal specially among Muslims. This association between age, knowledge, and attitude toward child vaccination could be justified as whereby the middle age mothers at the era of digital age may be more keen to have information on finger tip from the social media. Similar association between knowledge and attitude of mothers toward child vaccination was expressed in Nigeria and Saudi Arabia.^{28,52}

Our study also revealed significant association between mothers educational level on knowledge and attitude toward childhood vaccination. Higher level of education among mothers helps in the understanding importance of childhood vaccination, which becomes a major contributing factor in controlling the spread of vaccine-preventable diseases. Majority of the respondents in the study had a positive attitude for vaccination and a view that it can prevent many childhood diseases. The results resonates the previous finding in east-central Ethiopia that mothers knowledge is an important determinant in complying childhood vaccination. Furthermore, the study also reflected the mothers occupation is also a determinant in vaccination compliance ($p < .05$).⁵³ This study confounded that age, education, and occupation of postnatal mothers living in Ipoh, Perak Malaysia are important determinants for knowledge and attitude toward childhood immunization.

Our findings suggest that hospitals and institutes should start a comprehensive educational campaigns and training to clear the misconceptions about vaccines especially in semiurban and rural areas of Malaysia. The study reflects that a 23% of the mothers still believes that vaccination may cause autism and also few (9.5% agree and 4% strongly agree) believe that it is not halal to be used among Muslim community.

But still there were certain limitation to our study. The sample size for this study chosen was 200 only, which is relatively small and regional. The views expressed by the respondents may not reflect the actual views of Malaysia. Moreover, Malaysia is a multiracial country and the sample did not represent the actual Malaysian demography. Even though the questionnaire included elements of people's knowledge and attitude on vaccination but the study was not able to address vaccination status of the respondents.

Methods

Subjects and methods

This manuscript details a descriptive, cross-sectional study among postnatal mothers (6 weeks following child birth) living in Ipoh, Perak. Respondents were individually visited

at Klinik Kesihatan Gunung Rapat and Klinik Kesihatan Tanjung Rambutan and consent was sought before they were enrolled for the study. The numbers of respondents for this study were calculated using the sample size calculator, Raosoft. Sample size was designed and constructed with the intention response ratio of 50%, confidence level 95%, and the margin of error 5%, the entire sample size actualized for this research work was tailored as 250 postnatal mothers. A total of 200 respondents contributed to the survey which accounts for 80% of the intended sample size. Each clinic contributed 100 respondents each. Both the clinic respondents were almost similar in demography and hence further demographic differentiation of the sample based on clinic was not desired. The data were analyzed continuously once the study received 50% of the targeted population. The result did not varied much after 80% of the data. Hence, the data collection was stopped after 80% of the target sample.

Study settings

The study was carried out for four weeks from 3rd November 2017 to 1st December 2017 in selected health care clinic at Ipoh, Perak. Information about the knowledge and attitude of postnatal mothers toward vaccination was collected by using self-administered structured questions. The participants were briefed about the objectives of the research project and the consent was obtained before recruiting as respondents. Respondents were conveniently selected regardless of age, and occupation from the selected regions. Exclusion criteria were those mothers not willing to participate in the study, and mothers who are not available during the time of data collection. The information was collected through paper questionnaire.

Data collection

The survey questionnaire was divided in to two parts, part A sought information on sociodemographic characteristics from the respondents, and part B collected information on knowledge and attitude of postnatal mothers toward childhood vaccination. The respondents knowledge was tested with structured questionnaire, on three-point Likert scale, ranging from 1 = strongly disagree, 2 = neutral, and 3 = strongly agree. Questionnaire for analyzing attitude toward childhood vaccination was developed on Likert scale which consists of five statements from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. Each subject was advised to choose one response for each statement. The total score of attitude ranged from 1 to 40 and the total score for knowledge ranged 1–27. The threshold median score for the study was absorbed as 30 for attitude and 22 for knowledge. A score ≥ 30 was considered positive attitude and ≥ 22 was considered as good knowledge, respectively. Knowledge and attitude were dependent variables and sociodemographic information such as age, ethnicity, education level, employment status, etc. were considered as independent variables. Pearson correlation was tabulated to see the independent effect of associated predictors on the dependent variables and predictors with p value ≤ 0.05 were considered as final

associated predictors of knowledge and attitude among postnatal mothers toward childhood vaccination.

Pilot study

A pilot study was conducted for 30 postnatal mothers who were selected conveniently and were later excluded from the main study sample. Reliability of the questionnaire was analyzed by Cronbach alpha test (r alpha). High score of 0.764 and 0.773 was computed for questionnaire related to attitude and knowledge, respectively. Withal, postpiloting questionnaire was modified to meet the compatibility of local settings and suit the participants. The questionnaire was written in easy english for easy understanding.

Statistical analysis

SPSS software package version 16.0 was utilized for data analysis. Descriptive statistics including frequency, distribution, and mean and standard deviation were tabulated to describe different characteristics. Chi-square test was used to analyze the results. Pearson correlation was tabulated to show correlation between knowledge, and attitude among postnatal mothers, p value less than 0.05 was considered as benchmark to statistical significance.

Ethical consideration

The study was ethically approved by Institutional Ethical Approval Committee, Universiti Kuala Lumpur Royal College of Medicine Perak. Participants were briefed about the objective of the study and written consent was taken from the participants. All the responses were collected voluntarily and the information was dealt with high level of confidentiality and anonymity.

Conclusion

The findings of this study concedes that age, education, and occupation are strong determinants for accessing the knowledge and attitude of postnatal mothers living in Ipoh, Perak. It was envisaged that low education especially among middle and older aged mothers contributed to failure of adherence toward the vaccination schedule. The study warrants that negative attitude of housewife toward childhood vaccination should be addressed effectively. Even though, the government is conducting a lot of awareness campaign but so far there are limited methods available to track nonvaccinated child. The Ministry of Health, Malaysia should design a strategy to track nonvaccinated child and convince the parents for vaccination to prevent any further fatality due to vaccine preventable diseases.

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Disclosure of potential conflicts of interest

The authors have no conflicts of interest to disclose.

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