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Mothers' Knowledge on Immunization and the Commitment to Get Their Child Immunized in a Suburban Region of Selangor, Malaysia

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ABSTRACT

Background: Information regarding the significance of childhood immunization must be provided to mothers to ensure that they will effectively adhere to the immunization regimens that have been prescribed for their children. Furthermore, the recent increase in parental hesitancy towards vaccinating their children may be linked to the spread of inaccurate information by groups opposed to vaccination, which misleads parents about the benefits of childhood immunization. Thus, this study aimed to assess the level of the mother's knowledge and commitment of getting their child to immunize surrounding childhood immunization to uncover gaps in understanding and potential barriers to immunization. This study focuses on primigravida mothers for their knowledge, attitudes, and practices regarding immunization.

Methods: This study used a cross-sectional research design and gathered data from primigravida mothers who attended the Maternal and Child Health Clinic (MCH) in a suburban region of Selangor, Malaysia, from March to May 2018. The respondents were recruited via purposive sampling. The study included 72 respondents.

Results: The results indicated that 68.1% of the respondents had good knowledge about their children's immunization, and 84.7% had a commitment to get their child immunized. The Pearson correlation analysis revealed a statistically significant and positive correlation between the level of mothers' knowledge and commitment to get their children to immunize of children immunized. The simple linear regression analysis results indicated a statistically significant association between age, access to internet information, and readiness for children's immunization, with a p-value of less than 0.05. Two themes were identified: (1) personal coping strategies with the subthemes: a) faith in God, b) reflection on family, and c) unleashing the power of self-motivation, and (2) Personal expectation with the subthemes: a) fostering attentiveness and empathy in patient care, and b) hospital management's role.

Conclusion: Nurses should actively assess and deliver health education regarding children's immunization to enrich the parents' commitment of getting their children immunized, especially when online platforms have the potential to be a successful means for healthcare professionals to share factual to a larger target group. This will prevent mothers from relying on false or misleading information.

Keywords: Knowledge; Primigravida mothers; Commitment; Immunization; Malaysia

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INTRODUCTION

Immunization is a vital aspect of public health to prevent infectious diseases. Accordingly, the Malaysian government has strived to achieve successful immunization coverage and raise immunization rates. The incorporation of health services into immunization platforms is one example. Nevertheless, Malaysia has yet to achieve complete immunization coverage since 2005. Based on national surveillance, the number of fully vaccinated children did not increase over the years. Alarmingly, immunization has also become a current social and controversial issue.

Recent studies have highlighted the significant role of religious factors in vaccine hesitancy, particularly in Muslim-majority countries such as Afghanistan, Malaysia, and Pakistan (1,2). These studies discuss various reasons for vaccine hesitancy among Muslims, including religious beliefs, limited commitment to vaccination, and distrust in international health organizations' protocols. This hesitancy has contributed to outbreaks of vaccine-preventable diseases in these regions.

In Malaysia, scepticism about vaccine contents, particularly concerns about whether vaccines are halal, remains a major issue. There was a study that found parents' decisions to vaccinate their children were influenced by the presence of animal-derived products in vaccines, such as porcine trypsin, and whether these products were permissible under Islamic law (3). This aligns with the findings of other studies that noted the doubts about vaccine permissibility under Islamic law have led to increased vaccine hesitancy (2,4).

Additionally, the Malaysian Ministry of Health has reported that scepticism about vaccine ingredients has led to immunization objections on religious grounds (2). A study in a Muslim-dominated country has argued that parents' decisions on whether to take their children for immunization depend on whether the vaccine contains an animal-based product (porcine trypsin) and whether it is permitted under Islamic law (3). These determining factors are aligned with the Islamic fatwa, which states that the feasibility of immunization in Islam according to the teachings of the Quran and Hadith is not arbitrary (5). On another factor, a study by Ahmad et al. revealed that the risk of incomplete or no immunization was higher among Malaysian mothers who disbelieved that vaccines could prevent the transmission of diseases (6). On this context, various factors determined the commitment for getting their child to immunize of children's immunization, such as place, gender, racial background, nationality, household earnings, and maternal profile (age group, marital status, educational level, and occupation) (6).

As the number of anti-vaccination groups is increasing, healthcare practitioners' delivery of health education during clinic visits is essential to increasing parental commitment to get their child immunized of children's immunization. Recent years have shown people's reliance on online platforms for health information. Although online platforms are seen as a convenient way to obtain public health information, they contribute to confusion arising from the overflow of unfiltered information that needs to be more valid. In this context, social media is the most popular channel among users as a medium of expression and discussion about information related to public health. Through statements spread through social media, it is evident that some parents have orthodox beliefs about reliance on natural immunity over vaccine-induced immunity (7). This highlights the need for effective communication strategies to address these concerns and improve vaccine uptake because such misleading thinking can influence the perception of other parents to refuse immunization to their children. Therefore, healthcare practitioners should use social media to convey the importance of immunization and ensure the public understands the information.

Furthermore, mothers' knowledge and commitment to immunize their children in health clinics are crucial for successful immunization programs. However, with the growing rejection rates of vaccination due to misconceptions, it has become challenging for healthcare practitioners to educate parents on immunization. Hence, this study aimed to discover the level of mothers' knowledge and commitment to their children's immunizations, including factors affecting mothers' knowledge and understanding, particularly among primigravida mothers. By understanding their level of knowledge and commitment to getting their children immunized, healthcare providers can develop tailored communication strategies to address misconceptions and concerns related

to immunization. Additionally, the data from this study can serve as evidence for policymakers and public health authorities to develop and implement effective immunization policies and programs that can address the barriers to vaccination services for vulnerable populations. This includes strategies to strengthen vaccination infrastructure, enhance vaccine delivery systems, and address socio-economic disparities in immunization coverage.

METHODS

The study employed a cross-sectional design involving primigravida mothers attending an MCH clinic in a suburban area in Selangor, Malaysia. This study selected primigravida through purposive sampling because their limited knowledge and experiences in obstetric preparedness may situate them at the initial information-seeking phase. However, primigravida mothers who do not understand Malay or English will be excluded from the study.

Study Instruments

The questionnaire was divided into three parts. The first part required the respondents' sociodemographic details and the information source on children's immunization. The second part included questions with "true," "false," and "do not know" as the answers to test respondents' level of mothers' knowledge of children's immunization. The final questionnaire section comprised commitment of getting their child to immunize-related questions with "yes," "no," and "not sure" as the responses. The questionnaire was prepared in dual languages, which were Bahasa Malaysia and English. It was pre-tested on fourteen primigravida mothers attending an MCH clinic in a different district in Selangor, Malaysia. A self-administered questionnaire was distributed while the respondents waited for antenatal checkups at the study location. The pre-test resulted in a Cronbach Alpha score of 0.76 for the knowledge construct and 0.82 for the commitment construct, indicating good internal consistency and reliability. The questionnaire is thus considered valid and reliable. The researcher calculated the score by assigning points for correct answers and used the mean score as the cut-off point to specify good and poor levels of knowledge and commitment. Respondents scoring above the mean were classified as having good knowledge and commitment, while those scoring below were classified as having poor knowledge and commitment. This study has been approved by The Malaysian National Medical Research Registry (NMRR-17-3069-38759).

Sample Size Calculation and Statistical Analysis

The study sample size was measured following population sampling. A subset of subjects that reflected the overall primigravida population attending the MCH clinic at the study location in one month was selected. The sample size estimation formula was based on a 95% confidence interval and a width of 0.1 (8), and the estimated sample size was 72. Furthermore, SPSS 23 was used to perform descriptive and bivariate analyses. A simple linear regression analysis was employed to identify the mother's level of knowledge and commitment for getting their child to immunize indicators for the bivariate analysis. The Pearson correlation analysis was also utilised to determine the association between the mother's level of knowledge and commitment to get their child immunized. Therefore, a p-value of less than 0.05 was deemed significant.

RESULTS

Rate of Response

From the 85 distributed questionnaires, 72 valid, authorised, and completed questionnaires were collected during the three-month data collection period, with a response rate of 100%. The remaining respondents chose not to answer the questionnaire.

Table 1 presents the respondents' age range between 26 and 37 years old, with a mean age of 32 ± 3.4 years. Most of the respondents were below 30 years old (66.7%), attained varsity education (76.4%), and were employed (70.8%). The educational level category included primary, secondary, and tertiary education. Specifically, tertiary education includes Matriculation, Diploma, Degree, Masters, and PhD. It was found that most respondents received immunization-related information on the level of mothers' knowledge from the Internet (36.4%). The second most popular information source was from healthcare workers (32.2%), whereas family and friends

were the third most popular choice (22.5%). Regardless, 4.1 % of the respondents were unaware of immunization.

The Mother's Level of Knowledge of Immunization

Table 2 shows that 69.4% of the respondents identified that healthy children required immunization. Up to 91.7% identified the vaccine types. In contrast, 55.6% of the respondents identified that active immunization prevented disease-causing agents. Additionally, 69.4% identified that immunization involved all ages, and 41.7% identified that children were over-vaccinated in the first two years of life. Up to 83.3% asserted that children's immunization began at birth.

Meanwhile, 44.4% identified that vaccines should not be administered under certain health conditions. About 65% of the respondents were unaware that vaccines could be simultaneously administered. Regardless, only 8.3% identified that children were safer with extra immunization. Lastly, 48.6% identified that an extra vaccination may need to be administered for health protection.

Table 1: Respondents' sociodemographic characteristics (N=72)

Sociodemographic characteristics	Frequency (*n*)	Percentage (%)
Age Group		
26 years old to 30 years old	48	66.7
30 years old to 37 years old	24	33.3
Employment status		
Employed	51	70.8
Unemployed	21	29.2
Educational level		
School	17	23.6
University	55	76.4
Sources of Information Regarding Immunization		
Family and Friends	33	27.3
Healthcare provider	44	36.4
Internet	54	32.2
Uninformed	5	4.1

Table 2: Summary of mother's level of knowledge on immunization (N=72)

Question	Frequency (percentage), *n* (%)		
	Correct answer	Incorrect answer	Do not know
Healthy children do not need immunization	50 (69.4)	12 (16.7)	10 (13.9)
There are different types of vaccines	66 (91.7)	1 (1.4)	5 (6.9)
Active immunization is a killed or weakened form of a disease-causing agent	40 (55.6)	8 (11.1)	24 (33.3)
Vaccination is for all ages	50 (69.4)	8 (11.1)	14 (19.4)
Children get too many vaccines in the first two years of life	30 (41.7)	13 (18.1)	29 (40.3)
The immunization of children should be started at birth	60 (83.3)	1 (1.4)	11 (15.3)
In some health situations, vaccines should not be given	32 (44.4)	16 (22.2)	24 (33.3)
Vaccines can be given in combination	18 (25.0)	7 (9.7)	47 (65.3)
If the child receives extra immunization, it is more effective and safer	6 (8.3)	35 (48.6)	31 (43.1)
More than one dose of vaccine may be required for complete protection	35 (48.6)	6 (8.3)	31 (43.1)

The Commitment of Mothers to Get Their Child Immunized

Table 3 indicates the responses of respondents regarding the commitment to get their child immunized are summarised in Table 3. Up to 94.4% of the respondents openly discussed concerns about immunization shots with the doctor. Meanwhile, 93.1% reported a commitment to getting their child to immunize

to prevent lethal diseases. Nevertheless, only 27.8% admitted having sufficient information on children's immunization. Approximately 77.8% were aware of the required immunization appointments, followed by 88.9% who were mindful of the importance of adhering to children's immunization schedules, and up to 91.7% were prepared to have children immunized.

Relationship Between Sociodemographic Characteristics and The Level of Knowledge

Following the simple linear regression, **Table 4** shows that the mother's age was indicated by the mother's level of knowledge of immunization (p-value = 0.003). Similarly, the educational level demonstrated a statistical relationship with mothers' knowledge of children's immunization (p-value = 0.001). Nonetheless, the relationship between employment status and the mother's knowledge level was not statistically significant. Concerning the information source, the information from the online platform was found to have a statistically significant relationship with the mothers' level of knowledge of the child's immunization (p-value = 0.03).

Table 3: Summary of mothers' commitment to get their child immunized (N=72)

Question	Frequency, *n* (%)		
	Yes	No	Not Sure
I can openly discuss my concerns about shots with my child's doctor	68 (94.4)	1 (1.4)	3 (4.2)
I know that many of the vaccine shots prevent severe illnesses	67 (93.1)	1 (1.4)	4 (5.6)
I know that I already have enough information on immunization for the children	20 (27.8)	30 (42.7)	22 (30.6)
I know about the child's immunization appointment that I must fulfil for my future child	56 (77.8)	3 (4.2)	13 (18.1)
I am aware of the importance of following an immunization schedule for children	64 (88.9)	2 (2.8)	6 (8.3)
I am ready to send my child for immunization	66 (91.7)	0 (0.0)	6 (8.3)

Table 4: Summary of simple linear regression analysis for predicting the effect of sociodemographic characteristics and sources of information on the level of mother's knowledge (N=72)

Characteristics	N (%)	*B*	*t*	*P*-value
Age		0.198	-0.096	0.003*
Less than 30 years old	48 (66.7)			
More than 30 years old	24 (33.3)			
Employment status		0.412	0.714	0.478
Employed	51 (70.8)			
Unemployed	21 (29.2)			
Education level		1.537	3.542	0.001*
School	17 (23.6)			
University	55 (76.4)			
Information Sources				
Family and Friends	33 (27.3)	0.622	1.177	0.060
Healthcare Provider	44 (32.2)	0.582	1.101	0.087
Online	54 (36.4)	0.673	1.257	0.032*
Never been informed	5 (4.1)			

Note: *$p < 0.05$

Relationship Between Sociodemographic Characteristics and Mothers' Level of Knowledge

The results show that sociodemographic characteristics were not statistically associated with the mother's level of knowledge (**Table 5**).

Correlation Between Mothers' Level of Knowledge and Commitment To Get Their Child Immunized

The Pearson correlation analysis demonstrated a statistically strong positive relationship

between a mother's level of knowledge and their commitment to get their child immunized (r=0.505; *p*-value =0.001) (**Table 6**).

Table 5: Simple linear regression to assess the association between sociodemographic characteristics and mothers' level of knowledge (N=72)

Characteristics	N (%)	*B*	*t*	*P*-value
Age		0.521	1.607	0.113
Less than 30 years old	48 (66.7)			
More than 30 years old	24 (33.3)			
Employment status		0.104	0.303	0.763
Employed	51 (70.8)			
Unemployed	21 (29.2)			
Education level		0.478	1.752	0.084
School	17 (23.6)			
University	55 (76.4)			
Information Sources				
Family and Friends	33 (27.3)	0.174	1.418	0.161
Healthcare Provider	44 (32.2)	-0.166	0.865	0.390
Online	54 (36.4)	0.104	0.708	0.186
Never been informed	5 (4.1)			

Table 6: Correlation between the mother's level of knowledge and commitment to get their child immunized (N=72)

Correlation	Mean	Standard deviation	Pearson Correlation (r)	*p*-value
The level of the mother's knowledge	5.38	2.217	0.505	***0.001**
Commitment to get their child immunized	4.74	1.311		

Note: *$p < 0.05$

DISCUSSION

This study revealed that there was a statistical association between the age and the mother's level of the mother's knowledge. The findings also indicated that the mean level of mother's knowledge was higher among mothers below 30 years old than the older groups. This finding is similar to a study by Kumar et al. (2015), where the authors revealed that primigravida mothers in their twenties demonstrated a higher level of mothers' immunization knowledge than their counterparts. A contrasting finding was reported that younger parents of less than 20 years old presented lower mother knowledge and practice level than older parents (9). Nevertheless, the findings were reported to lower the level of mothers' knowledge among mothers less than 20 years old. Meanwhile, the lowest age of mothers in our study was 26 years old. With regards to getting the child immunized, a study done among primigravida mothers in Southern India indicated that all the respondents wanted their children immunized, despite only 74.7% of the mothers being aware of immunization benefits because the mothers unanimously agreed that immunization was necessary for children (5).

The Association Between Mothers' Educational Level and Mother's Level of Knowledge Regarding Child Immunization

The study findings showed a statistical association between mothers' educational level and mothers' knowledge of child immunization, where there is a higher level of mothers' knowledge of immunization among mothers who were university graduates compared to mothers who learned until high school. A study in India reported that the chances of children's immunization by educated mothers were thrice higher than those of uneducated mothers (10). Meanwhile, a survey of Nigerian mothers revealed that those who completed secondary and tertiary education were more likely to bring their children for immunization than those who did not complete high school (11). These findings insinuated that the academic level played an

important role in mothers' decisions to immunize children.

Another study revealed that nearly half of the respondents comprising highly-educated mothers provided timely immunization compared to the 50% of illiterate mothers who failed to immunize children within the given period (12). The common reason for not providing vaccinations involved family issues, consequently deprioritizing immunizations. Only one study found no significant differences between the parent's educational level and the willingness to immunize children (6).

The Relationship Between Information Sources and Mothers' Level of Knowledge

The findings show that online information was statistically significant with mothers' level of knowledge with healthcare providers being the most popular information source for mothers on immunization. This finding is consistent with the findings reported by Jones et al. (2012) that the healthcare provider was the most used information source for vaccines (13,14). It was reported in a previous study that mothers who received immunization information from medical staff had higher immunization knowledge level than mothers who received information from television, radio, the Internet, websites, posters, or brochures provided by medical institutions, family members, friends, or neighbours (14). As a result, healthcare personnel played an important role in giving mothers and community members declarative information about immunization.

The findings from this study reveal that online information was statistically significant with mothers' level of knowledge and healthcare providers were identified as the most popular information source for mothers on immunization. This result, however, conflicts with the most recent study on a related topic conducted in Malaysia, where participants displayed a noticeable lack of trust in modern medicine and mistrust of medical staff because they perceived that modern medicines did not permanently cure diseases (15). For this reason, healthcare professionals must provide mothers and other community members with correct immunization information. Particularly considering that, according to our research, many of these mothers obtained their knowledge about vaccinations via the Internet, with medical professionals as the main source of reliable information. Particularly, mothers who learned about vaccinations from medical professionals scored higher on immunization knowledge tests than mothers who learned about vaccinations from other sources such as television, radio, or the Internet. A similar effect was discovered in research, where mother thought that healthcare personnel, medical-related materials, and the media helped them better comprehend vaccinations (16). It changed how people used the Internet to access health-related information, such as whether to provide immunizations for their children (13,17).

Given the findings, it is imperative that nurses and healthcare professionals leverage online platforms to disseminate factual information and highlight the benefits of immunization. However, the perception of media sources varied across different countries due to the rising numbers of anti-vaccine groups who chose social media to influence information-seeking mothers, which made the mothers believe the statements made by these groups more than what they heard from the healthcare workers (19). To counter this issue healthcare professionals can use the same platforms to provide accurate, evidence-based information. Nurses can engage with parents through social media, blogs, and online forums to address their concerns directly, dispel myths, and provide clear and understandable information about the benefits and safety of vaccines (20). By doing so, they can build trust and counteract the influence of anti-vaccine sentiments that proliferate online. Additionally, incorporating personal stories and testimonials from other parents who have vaccinated their children can be a powerful tool in reassuring hesitant parents.

Correlation Between Mothers' Level of Knowledge and Commitment to Getting Their Child to Immunize

This study found a significantly strong positive correlation between mothers' level of knowledge and commitment to get their child immunized. It shows that the higher the mothers' knowledge level, the higher their commitment to get the child to immunize. A similar finding was documented in a study of mothers about their knowledge of the flu vaccine showed that mothers with a lack of vaccination knowledge were less likely to take the flu vaccine than mothers with a high degree

of mother knowledge (21). Meanwhile, in a previous study to determine the correlation between mothers' knowledge and their commitment toward children's immunization completeness, the authors discovered that although 66.1% of parents had sufficient information, only 56.3% of children completed immunization (1,9).

CONCLUSION

This study provided information on the mother's level of knowledge and commitment to get their child immunized among primigravida mothers in an MCH clinic in a suburban area in Selangor. The study results proved helpful in optimising the online platform to disseminate declarative information on immunization, thus preventing mothers from imbibing misleading information. Half of the mothers in this study get their information on immunization from other sources, such as online platforms and from friends and family members. Therefore, healthcare practitioners should find a strategy to reach the mothers, especially primigravida mothers, to provide them with health education on the benefits of immunization and how important it is for the mother to ensure that their child completes the immunization schedule. Additionally, healthcare workers should optimise the online platforms to instil confidence in mothers when deciding on immunization. Online platforms have become the most effective way for healthcare providers to deliver a reliable level of mothers' knowledge and motivate them to get their children immunized.

LIMITATIONS

This study faced several limitations. Firstly, time constraints posed a significant challenge, as mothers had to complete the questionnaire while waiting for their antenatal check-ups. This often meant they were rushed, leading to a lack of focus and potentially less thoughtful responses. Additionally, during busy periods at the clinic, the mothers were even more pressed for time, which may have further compromised the quality of their answers.

Another limitation was the small sample size. Given the study's specific focus on primigravida mothers in a suburban region of Selangor, Malaysia, the sample size was limited. This small sample size may affect the generalizability of the findings to a broader population. Despite these limitations, the study provides valuable insights into mothers' knowledge and commitment to child immunization, which can inform future research and interventions.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

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AUTHOR CONTRIBUTIONS

NM: detailed the manuscript and contributes to the concept development and design of the article through data collection, data analysis and data interpretation for the article.
AR: responsible for the study conception and design, data collection/analysis, and drafting of the manuscript.
LSP: administrative/critical revisions for important intellectual content.
NHZ: critical revision/technical, material support and approved the final version of the manuscript.

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