



## **The Barriers of Child Immunization Completion among Parents in the Community Health Centre, Johor Bahru**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Authors HBH and RRM designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors NFBS and NBO managed the analyses of the study. Author TSY managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Introduction:** Immunization is one of the most cost-effective strategies for reducing child mortality. There is a vital need to assess parents' barriers involving child immunization completion to improve and increase vaccination coverage and completeness.

**Objective:** To determine the barriers of child immunization completion among parents in the Community Health Centre of Johor Bahru.

**Methodology:** The Maternal and Child Health Clinic, Jalan Abdul Samad providing primary immunization was selected via non-random and convenience sampling. Children between 1 month to 2 years old who were immunized were identified. Data were obtained from parents who brought in their children for primary vaccination at the Maternal and Child Health Clinic, Jalan Abdul Samad.

**Results:** The response rate for this study was 100% (n=306). All the eligible parents who were approached by the researchers agreed to participate in this research. Out of all respondents, 3 (1.0%) completely refused the immunization of their child, 23 (7.5%) defaulted with the immunization, and 280 (91.5%) completed the immunization. In terms of perception towards immunization, 60 or 19.6% of the total respondents stated that their preference for alternative treatments is their main reason if they decide not to have their children vaccinated. After adjusting for socio-demographic differences, the researchers discovered that parents who have significantly lower coverage for all 10 childhood vaccines themselves were less likely to agree that vaccines are necessary to protect the health of children, to believe that their child might get a disease if they aren't vaccinated, or to believe that vaccines are safe.

**Conclusion:** This first systematic evaluation of immunization refusal in Malaysia showed that a small number of parents refused immunization.

*Keywords: Immunization; vaccination; infectious disease; refusing; defaulting; compliance; perception; complication; barriers.*

## 1. INTRODUCTION

One of the most economical means of lowering child mortality is through immunization, which was endorsed by the World Health Assembly that comprised of 194 member states. It launched the 2011-2020 Global Vaccine Action Plan (GVAP) in 2012 with the goal of reducing the mortality rate of children below five years of age and boosting global immunization to reach 90% coverage worldwide [1]. But as per the 2017 report of the World Health Organization (WHO), the total number of infants who were immunized with three doses of the DTP3 or diphtheria-tetanus-pertussis vaccine was only roughly 86% of all children worldwide. This meant 19.4 million of all children under-5 did not receive the vaccine. In the Western Pacific Region alone, the WHO reported that only around 60% of all children under-5 in Papua New Guinea, the Philippines, and Samoa were covered by the DTP3 vaccine, while it achieved around 100% coverage for Malaysia, Singapore, and Vietnam back in 2015 [2]. The immunization program of Malaysia, done free of charge via public health facilities, began in the early 1950s. This program resulted in notably high immunization levels of children nationwide, which greatly contributed to the overall good health of Malaysian children. But with all its success worldwide and the proven benefits on the health and life expectancy of people, global immunization still has a long way to go. Ehreth [3] mentioned that out of roughly one hundred thirty million children born each year, thirty million of them do not get vaccinated. Gust [4] and Skull [5] both noted various reasons for low compliance in different settings. Marzo, M. Babu, N. A. Rajkumar, Azli, Kannan and Mokhtar [6] also noted that an outbreak of infectious

diseases of the invasive kind can occur due to the low compliance or hesitation of parents to get their children vaccinated. If this occurs, children may become ill and their treatment will require the use of already limited public health resources.

Insufficient immunization is due to numerous factors. And according to the studies conducted by Suarez [7] and Anjum, et al. [8], the improvement of immunization coverage can happen with the increased knowledge of parents about vaccination. It can then result in the successful implementation of programs related to it. This is supported by Heining [9], who stated that the misperception of parents regarding immunization is one of the biggest hindrances in childhood immunization. Marzo, Krishnan, and Moganaraja [10] further added that this misconception is also a major factor preventing the achievement of higher rates of vaccination. These may also result in vaccines not being fully utilized, as parents' beliefs towards immunization and their practices can impact the immunization status of their children. Parents, after all, are the decision-makers for matters concerning their children's health.

The decision-making of parents can also be affected by the widespread misinformation towards vaccine-safety, as well as numerous conflicting information about it. To increase the coverage of vaccination and improve immunization completeness, there needs to be an assessment of parental barriers regarding child immunization. While there are numerous published studies about the different reasons for the reluctance of parents to get their children immunized, there are only a few in the Malaysian setting.

The purpose of this study is to identify the barriers of parents for the completion of child immunization in the Community Health Centre in Johor Bahru. The specific objectives are to identify the parents who chose to default immunization in the chosen location, as well as to determine the reasons for refusal and discover barriers for the immunization of children. Also, the study aims to find out if a relationship exists between the completion of child immunization and the demographic data of parents in the chosen location of the study.

## **2. METHODOLOGY**

### **2.1 Study Location**

This study was conducted at one of the community centres in the State of Johor. Johor Bahru has a population of 402,489 people, making the district the fourth most populous in Malaysia. The researchers have chosen the Maternal and Child Health Clinic, Jalan Abdul Samad as the study site. The Maternal and Child Health Clinic offer maternity and child care services, as well as other services focusing on children and women's health. There are a total of 26 nurses working at the Maternal and Child Health Clinic, and the ratio between nurses and patients is 1:20 on average per day. This location is suitable for the selected population of this study, as researchers will focus on general child health services and specific immunization refusal.

### **2.2 Study Design**

This study incorporated a descriptive, cross-sectional design study. According to Cherry (2018), cross-sectional studies are usually relatively inexpensive and allow researchers to collect a great deal of information quickly. Data is often obtained using self-report surveys and researchers are then able to amass large amounts of information from a large pool of participants.

### **2.3 Sampling Method and Sample Size**

The researchers use non-random and convenience sampling. The total sample size was 306 respondents, which was selected using the Raosoft sample size calculation.

### **2.4 Sampling Criteria**

The inclusion criteria for this study are any parents with children below 2 years old. Caretakers were excluded from the study.

### **2.5 Research Instrument**

The questionnaire consisted of 3 sections. First, Section 1 aimed to determine the socio-demographic characteristics of respondents. Section 2 identified the reasons for parents refuse immunization of their children. Lastly, Section 3 identified the parental reasons for defaulting immunization on children among parents. Researchers adapted the questionnaire from the related previous studies conducted by Lim et al. (2016) entitled, "Exploring Immunisation Refusal by Parents in the Malaysian Context" where the content validity index was 88% and Cronbach's alpha was 0.92.

### **2.6 Data Collection Method**

Data collection was carried out as soon as ethical approval was gained by the researchers from the National Medical Research Register (NMRR). Respondents were given the explanatory statement information regarding the purpose of the study and consent was obtained before distributing the questionnaire. The nurses also became part of the study as interviewers. The researchers also informed the Local Preceptor on duty prior to the distribution of questions for awareness about the study being conducted. Each parent was given 10 minutes to answer the questions provided in the questionnaire.

### **2.7 Data Analysis**

Data obtained were coded and interpreted in SPSS version 21. Data analysis via descriptive statistics was used to identify the participants' demographic characteristics, while tables, frequencies, and percentages were used to present the results. The Chi-square test was used to determine the significant relationship between demographic data and child immunization completion among parents in the Community Health Center in Johor Bahru.

## **3. RESULTS**

The data obtained were analyzed to identify, describe, and explore the relationship between the demographic data and barriers of child immunization completion among parents in the Community Health Centre in Johor Bahru. The data came from self-administered questionnaires that were completed by 306 parents (n=306), resulting in a 100% response rate.

Table 1 shows the demographic profile of the respondents in terms of age, education level and occupation. Results showed that the respondents were mostly mothers, comprising 259 or 84.6% of the total respondents. 231 or 75.5% of the respondents were between 26 to 39 years old. The majority of parents, at 174 (56.9% of respondents), were graduates of secondary school. Results also showed that 85 or 27.8% of the parents were unemployed, underemployed, or housewives.

Table 2 shows the main reasons for respondents to refuse immunization. 60(19.6%) respondents believed in alternative treatment, such as homeopathy, 54 (17.6%) mentioned their adherence to their personal beliefs, while 50 (16.3%) were unsatisfied by the long waiting times at the clinic. Other reasons cited were due

to religious influence, inadequate information from health care providers, social media and family influence, and doubts about the vaccine(s) contents. 22 or 7.2% of respondents also assumed vaccines have no effect whatsoever.

Table 3 shows the reasons for defaulting immunization. 69 (22.5%) respondents claimed that their child was not well, 58 (19.0%) complained about the long waiting time at the clinic, 54 (17.6%) claimed to be busy with work, 43 (14.1%) forgot their child’s appointment, and 38 (12.4%) did not have any means of transportation to get to the clinic. Other reasons cited were because they were overseas (21 respondents or 6.9%), inadequate information about immunization from health care providers (13 respondents or 4.2%), and unsatisfactory services at the clinic (12 respondents or 3.9%).

**Table 1. Demographic distribution of the study sample**

Variable		Frequency (n)	Percentage (%)
Respondent	Father	47	15.4%
	Mother	259	84.6%
Age	<25	50	16.3%
	26-39	231	75.5%
	>40	25	8.2%
Education Level	Primary	20	6.5%
	Secondary	174	56.9%
	Tertiary	112	36.6%
Occupation	High Managerial, administrative or Professional	41	13.4%
	Intermediate managerial, administrative or Professional	65	21.2%
	Supervisory and skilled manual	54	17.6%
	Semi and unskilled manual workers	61	19.9%
	Pensioners, Casual / Lowest Grade, Unemployed with Benefits, Housewife	85	27.8%

**Table 2. Reasons for parents to refuse immunization**

Variable		Frequency (n)	Percentage (%)
Alternative treatment (homeopathy)	1-2 Disagree	246	80.4%
	3-4 Agree	60	19.6%
Assume vaccines have no effect	1-2 Disagree	284	92.8%
	3-4 Agree	22	7.2%
Doubtful of the vaccines contents	1-2 Disagree	267	87.3%
	3-4 Agree	39	12.7%
Did not receive information about vaccine/immunization from doctor/nurse	1-2 Disagree	287	93.8%
	3-4 Agree	19	6.2%
Negative information from family members	1-2 Disagree	273	89.2%
	3-4 Agree	33	10.8%
Information from TV, radio, newspaper, etc.	1-2 Disagree	266	86.9%
	3-4 Agree	40	13.1%
Religious influence	1-2 Disagree	258	84.3%
	3-4 Agree	47	15.4%
Personnel belief	1-2 Disagree	252	82.4%
	3-4 Agree	54	17.6%
Long waiting time at the clinic	1-2 Disagree	256	83.7%
	3-4 Agree	50	16.3%

**Table 3. Parental reasons for defaulting immunization**

Variable		Frequency (n)	Percentage (%)
Busy with work	1-2 Disagree	252	82.4%
	3-4 Agree	54	17.6%
Long waiting time at the clinic	1-2 Disagree	248	81.0%
	3-4 Agree	58	19.0%
Child not well	1-2 Disagree	237	77.5%
	3-4 Agree	69	22.5%
Forgot the immunization date	1-2 Disagree	263	85.9%
	3-4 Agree	43	14.1%
No transportation	1-2 Disagree	268	87.6%
	3-4 Agree	38	12.4%
Unhappy with the service provided at the clinic	1-2 Disagree	294	96.1%
	3-4 Agree	12	3.9%
Did not receive information about vaccine/immunization from doctor/nurse	1-2 Disagree	293	95.8%
	3-4 Agree	13	4.2%
Overseas, etc.	1-2 Disagree	285	93.1%
	3-4 Agree	21	6.9%

Table 4 shows the cross-tabulation between parental respondents and immunization completion. Findings show that 4 (1.3%) fathers defaulted immunization and 1 (0.3%) refused immunization. Whereas 19 (6.2%) mothers defaulted immunization and 2 (0.7%) refused immunization.

Table 5 shows the cross-tabulation between the age of parents and immunization completion. Findings show that 4 (1.3%) defaulters are parents less than 25 years old, 18 (5.9%) defaulters are parents' between 26 to 39 years old, and 1 (0.3%) defaulter is a parent above 40 years old. On the other hand, 2 (0.7%) parents who refused were between 26 to 39 years old, and 1 (0.3%) parent who refused was more than 40 years old.

Table 6 shows the cross-tabulation between the education level of parents and immunization completion. Findings show that all 3 (1.0%) respondents who refused were tertiary school graduates. 16 (5.2%) of the respondents who defaulted were secondary school graduates and 7 (2.3%) were tertiary school graduates.

Table 7 shows the cross-tabulation between the occupation of parents and immunization completion. Findings show that 9 (2.9%) respondents who defaulted are mainly pensioners, casual/lowest grade employees, unemployed with benefits, 6 (2.0%) respondents had a supervisory position or skilled manual job, and 5 (1.6%) had high managerial or administrative positions or are professionals. Those who refused immunization are equally divided between those who have high

managerial or administrative positions or are high-ranking professionals, hold intermediate managerial or administrative positions or are middle-ranking professionals, and those with supervisory positions and skilled manual jobs, with 1 (0.3%) respondents each.

Table 8 shows that there is no significant relationship between parents and immunization completion at the Johor Bahru Community Centre. Since the Pearson Chi-Square value is 0.846 and the  $p$ -value is 0.452 ( $p$ -value > 0.05). Therefore, the researchers reject the alternative hypothesis.

Table 9 indicates that there is also no significant relationship between the age of parents and immunization completion at the Johor Bahru Community Centre because the Pearson Chi-Square value is 3.299 and the  $p$ -value is 0.506 ( $p$ -value > 0.05). Therefore, the researchers reject the alternative hypothesis.

Table 10 indicates that there is no significant relationship between the education level of parents and immunization completion at the Johor Bahru Community Centre, as the Pearson Chi-Square value is 7.761 and the  $p$ -value is 0.080 ( $p$ -value > 0.05). Therefore, the researchers reject the alternative hypothesis.

Table 11 shows that there is no significant relationship between the occupation of parents and immunization completion at Johor Bahru Community Centre, since the Pearson Chi-Square value is 11.391 and the  $p$ -value is 0.162 ( $p$ -value > 0.05). Therefore, the researchers reject the alternative hypothesis.

**Table 4. Cross-Tabulation between Parent Respondents and Immunization Completion**

Variable			Vaccinated			Total
			Completed	Defaulter	Refusal	
Respondent	Father	Count	42	4	1	47
		% within Respondent	89.4%	8.5%	2.1%	100.0%
		% within Vaccinated	15.0%	17.4%	33.3%	15.4%
	Mother	Count	238	19	2	259
		% within Respondent	91.9%	7.3%	0.8%	100.0%
		% within Vaccinated	85.0%	82.6%	66.7%	84.6%
	Total	Count	280	23	3	306
		% within Respondent	91.5%	7.5%	1.0%	100.0%
		% within Vaccinated	100.0%	100.0%	100.0%	100.0%
Total	Count	280	23	3	306	
	% within Respondent	91.5%	7.5%	1.0%	100.0%	
	% within Vaccinated	100.0%	100.0%	100.0%	100.0%	

**Table 5. Cross-Tabulation between Age of Parents and Immunization Completion**

Variable			Vaccinated			Total
			Completed	Defaulter	Refusal	
Age	<25	Count	46	4	0	50
		% within Age	92.0%	8.0%	0.0%	100.0%
		% within Vaccinated	16.4%	17.4%	0.0%	16.3%
		% of Total	15.0%	1.3%	0.0%	16.3%
	26-39	Count	211	18	2	231
		% within Age	91.3%	7.8%	0.9%	100.0%
		% within Vaccinated	75.4%	78.3%	66.7%	75.5%
		% of Total	69.0%	5.9%	0.7%	75.5%
	>40	Count	23	1	1	25
		% within Age	92.0%	4.0%	4.0%	100.0%
		% within Vaccinated	8.2%	4.3%	33.3%	8.2%
		% of Total	7.5%	0.3%	0.3%	8.2%
Total	Count	280	23	3	306	
	% within Age	91.5%	7.5%	1.0%	100.0%	
	% within Vaccinated	100.0%	100.0%	100.0%	100.0%	
	% of Total	91.5%	7.5%	1.0%	100.0%	

**Table 6. Cross-Tabulation between Education Level of Parents and Immunization Completion**

Variable			Vaccinated			Total
			Completed	Defaulter	Refusal	
Education Level	Primary	Count	20	0	0	20
		% within Education Level	100.0%	0.0%	0.0%	100.0%
		% within Vaccinated	7.1%	0.0%	0.0%	6.5%
	Secondary	Count	158	16	0	174
		% within Education Level	90.8%	9.2%	0.0%	100.0%
		% within Vaccinated	56.4%	69.6%	0.0%	56.9%
	Tertiary	Count	102	7	3	112
		% within Education Level	91.1%	6.3%	2.7%	100.0%
		% within Vaccinated	36.4%	30.4%	100.0%	36.6%
	Total	Count	280	23	3	306
		% within Education Level	91.5%	7.5%	1.0%	100.0%
		% within Vaccinated	100.0%	100.0%	100.0%	100.0%
% of Total		91.5%	7.5%	1.0%	100.0%	

**Table 7. Cross-Tabulation between the Occupation of Parents and Immunization Completion**

Variable			Vaccinated			
			Completed	Defaulter	Refusal	Total
Occupation	High Managerial, administrative or Professional	Count	35	5	1	41
		% within Occupation	85.4%	12.2%	2.4%	100.0%
		% within Vaccinated	12.5%	21.7%	33.3%	13.4%
	Intermediate managerial, administrative or Professional	% of Total	11.4%	1.6%	0.3%	13.4%
		Count	62	2	1	65
		% within Occupation	95.4%	3.1%	1.5%	100.0%
	Supervisory and skilled manual	% within Vaccinated	22.1%	8.7%	33.3%	21.2%
		% of Total	20.3%	0.7%	0.3%	21.2%
		Count	47	6	1	54
	Semi and unskilled manual workers	% within Occupation	87.0%	11.1%	1.9%	100.0%
		% within Vaccinated	16.8%	26.1%	33.3%	17.6%
		% of Total	15.4%	2.0%	0.3%	17.6%
Pensioners, Casual / Lowest Grade, Unemployed with Benefits	Count	60	1	0	61	
	% within Occupation	98.4%	1.6%	0.0%	100.0%	
	% within Vaccinated	21.4%	4.3%	0.0%	19.9%	
Total	% of Total	19.6%	0.3%	0.0%	19.9%	
	Count	76	9	0	85	
	% within Occupation	89.4%	10.6%	0.0%	100.0%	
Total	% within Vaccinated	27.1%	39.1%	0.0%	27.8%	
	% of Total	24.8%	2.9%	0.0%	27.8%	
	Count	280	23	3	306	
Total	% within Occupation	91.5%	7.5%	1.0%	100.0%	
	% within Vaccinated	100.0%	100.0%	100.0%	100.0%	
	% of Total	91.5%	7.5%	1.0%	100.0%	

**Table 8. Relationship between Parents and Immunization Completion**

Variable	Chi-Square Tests				
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.846 <sup>a</sup>	2	.655	.648	
Likelihood Ratio	.693	2	.707	1.000	
Fisher's Exact Test	1.543			.452	
Linear-by-Linear Association	.568	1	.451	.462	.289
N of Valid Cases	306				

a: 0 cells (.0%) have expected count less than 5

**Table 9. Relationship between Age of Parents and Immunization Completion**

Variable	Chi-Square Tests				
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.299 <sup>a</sup>	4	.509	.506	
Likelihood Ratio	2.853	4	.583	.624	
Fisher's Exact Test	2.882			.543	
Linear-by-Linear Association	.243	1	.622	.717	.379
N of Valid Cases	306				

a: 0 cells (.0%) have expected count less than 5

**Table 10. Relationship between the Education Level of Parents and Immunization Completion**

Variable	Chi-Square Tests				
	Value	df	Asymptotic significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7.761 <sup>a</sup>	4	.101	.080	
Likelihood Ratio	10.064	4	.039	.034	
Fisher's Exact Test	6.364			.124	
Linear-by-Linear Association	1.661	1	.197	.229	.127
N of Valid Cases	306				

a: 0 cells (.0%) have expected count less than 5

**Table 11. Relationship between the Occupation of Parents and Immunization Completion**

Variable	Chi-Square Tests				
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.391 <sup>a</sup>	8	.181	.162	
Likelihood Ratio	13.820	8	.087	.092	
Fisher's Exact Test	12.362			.053	
Linear-by-Linear Association	.755	1	.385	.421	.211
N of Valid Cases	306				

a: 0 cells (.0%) have expected count less than 5

#### 4. DISCUSSION

Results showed that there was a high rate of possible immunization refusal and defaulting among the respondents. When classified into four specific groups, namely those who strongly agree, agree, are unsure, or disagree with immunization, it was discovered that at least two-thirds of respondents thought of refusing or defaulting immunization and that gender, age, occupation, and education levels were factors for it.

Comprising 84.6% of the total respondents, it was discovered that it was mostly the mothers who brought in their children for immunization out of concern for their child's health. This echoes the study conducted by Lim et al. in 2016, wherein they discovered that 89.7% of the respondents who brought in their children to be vaccinated in the clinic were mothers [11]. The contrast between the two studies lies in terms of the age range of the majority of respondents. In this study, 75.5% of respondents were between 26 to 39 years old, while the same age range only made up 31.8% of the total respondents of the study conducted by Lim [11]. The 2013 study done by Mustafi and Azad, where the highest age range of respondents is between 26 to 39 years old, supports the recent data that mothers in the locations of these studies fell into the average age range of 24 to 30 years old [12]. This age range falls under the reproductive age defined by the World Health Organization (WHO), which is between 15 to 49 years old [13]. The reproductive age is not only the years when a woman can become pregnant but also the period where a woman can be in that state once again within five years after her last pregnancy.

When it comes to the occupation and educational level of respondents, it was discovered that 27.8% of those who wish to default immunization were either pensioners, the unemployed who were receiving benefits, or casual or lowest

grade employees. On the other hand, 56.9% of respondents achieved a secondary level of education, which contrasts with the results obtained by the 2011 study of Abdurraheem [14].

This study confirms the fact that parents still have hesitations and concerns about child immunizations, to the point of complete vaccine refusal. These concerns affect any immunization program, as Omer, Salmon, Orenstein, and Halsey (2009) stated that such a program's success is dependent on how high the rate of immunization acceptance and subsequent coverage is [15]. But because of the low levels of immunization, Mayinbe et al. (2005) claimed that the threat of infectious diseases for children still remains a major health problem of the general public worldwide, especially those in areas with very limited resources available [16].

##### 4.1 Reasons for Child Immunization Refusal among Parents

It was notable that most respondents, specifically 287 (93.8%) of them, disagreed with the statement found in the questionnaire that they did not receive information about immunizations from health care providers, specifically their doctors, while only 19 or 6.2% were in agreement to it. 60 or 19.6% of respondents also preferred alternative treatment and believed in homeopathy, as they consider them to have considerably fewer side effects than immunization. This supports the results of the study made by Fredrickson, Davis, and Bocchini [17] wherein they discovered that possibly experiencing side effects was the most commonly stated reason for parents to refuse child vaccination. Some respondents also cited religion as a reason for refusal, stating that certain religious organizations actively discourage vaccinations among its members. Kulig, Meyer, Hill, Handley, Lichtenberger, and Myck [18] did a similar study but in the Nigerian setting and they discovered that Muslim mothers



made up the majority of respondents who opted not to have their children immunized. Religion was also seen as the main factor for the decision of these mothers in Nigeria.

#### **4.2 Reasons for Parents for Defaulting Child Immunization**

Out of all respondents, 54 (17.6%) stated that parents defaulting immunization was due to them being busy with work and 58 or 19% blamed the clinic's long waiting times. 69 (22.5%) respondents also attributed it to the illness of their child during their immunization schedule. This figure is nearly the same as that in the studies of Lim et al. [12] wherein 22.6% of respondents had the same reason. However, it is lower than that of Azhar et al. [19] wherein 38% of respondents mentioned that their child having a fever exceeding 38°C during the immunization period was their reason for defaulting. Also, 43 (14.1%) of respondents stated that they simply forgot about the scheduled appointment, while 38 or 12.4% of respondents did not have any means of transportation available. These findings are consistent with other studies, such as that of Yawn et al. [20], wherein immunization costs and transportation were identified factors for defaulting. Yawn et al. attributed this to the Sabah's poverty level, which greatly increased from the 9.8% rate in 1999 to 11.6% in 2004. 12 or 3.9% of respondents also blamed the unsatisfactory services provided by the clinic. This supports the study of Joshi et al. [21] where they acknowledged that one of the biggest factors of any healthcare facility's success is patient satisfaction. Also, 13 or 4.2% of respondents stated that their defaulting immunization was due to the inadequate information provided to them about immunization by the healthcare providers, while 21 (6.9%) respondents said that they were overseas at that time.

#### **4.3 Relationship between Demographic Data and Child Immunization Completion**

Based on the data obtained, it was determined that no significant relationship exists between the demographic data of parents and child immunization completion in the Community Health Centre in Johor Bahru. 280 or 91.5% of the respondents were also discovered to have sufficient knowledge about child immunization completion. The researchers also found out that significant differences exist in terms of

immunization completion, particularly among women with varying marital and employment statuses, which differed from the earlier study conducted by Anokye [22]. On the other hand, no significant relationship exists between the status of child immunization and the education level of mothers, their ages, and their awareness of immunization schedules. This was unlike the results of other studies, such as that of Yenit et al. [23], wherein these three factors were discovered to play a significant role in child immunization completion. In particular, those studies were one in saying that mothers who had a higher level of education were more informed about completing the vaccination of their children. This awareness is important because as purported by Okwaraji et al. [24], one of the best ways to curb down the under-five mortality rate is by getting children vaccinated.

#### **5. CONCLUSION AND RECOMMENDATIONS**

With this, the researchers recommend conducting information campaigns and teaching parents about the importance of having their children immunized prior to their session in the clinic. It should be done together with regular health education, not just for these parents but for all patients for better awareness. Such a campaign should also include those at the Outpatient Department.

Extending the clinic's operating hours is also recommended. This will prevent parents from defaulting the immunizations of their children, as the longer operating hours will allow them to bring in their children to the clinic after work.

Personalized care, wherein children under 6 are taken care of by a nurse, is a norm in most of the health clinics in Johor Bahru. With this, the researchers recommend that the nurses in charge of setting immunization appointments call the parents a day before their scheduled appointments as a reminder to them.

There is also a need to improve the understanding of parents about childhood immunization. To do that, the members of the community should be given proper health education, not just about the importance of vaccinations but also the possible dangers of not having them immunized. For example, the Malaysian Ministry of Health can conduct

campaigns and activities that the local community can participate in.

### CONSENT AND ETHICAL APPROVAL

Approval from Lincoln University College (LUC) Research Ethics Committee was obtained before commencing the study. Consent approval was also sought from the District Health Office ethics committee and the Director of Nursing of the Mother and Child Health Clinic. Written consent for participation was secured prior to the participation of respondents and they anonymously answered the questionnaires, making it impossible for researchers to identify the participants. The participants were also told about their right to refuse to participate in the study.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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