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ATTITUDE TOWARDS VACCINATION: A CROSS-SECTIONAL STUDY AMONG THE PARENTS IN SUNGAI PETANI, KEDAH, MALAYSIA

Sohail Aziz ^{* 1}, Muhammad Zahid Iqbal ^{1, 2}, Muhammad Shahid Iqbal ³, Syed Ghouse Mohiuddin ¹, Shalini Sivadasan ⁴, Ravichandran Veerasamy ⁵, Abdul Nazer Ali ², Sunil Kumar Prajapati ² and Jagan Mohan Chandran ²

School of Pharmaceutical Sciences ¹, Universiti Sains Malaysia (USM), Malaysia.

Department of Clinical Pharmacy and Pharmacy Practice ², Department of Pharmaceutical Chemistry ⁵, Faculty of Pharmacy, AIMST University Malaysia.

Department of Clinical Pharmacy ³, College of Pharmacy, Prince Sattam-bin Abdulaziz University, Al-Kharj 16278, Saudi Arabia.

Department of Pharmacy Practice ⁴, KMCH College of Pharmacy, Coimbatore - 641048, Tamil Nadu, India.

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Correspondence to Author:

Mr. Sohail Aziz

Ph.D. Scholar,
Department of Clinical Pharmacy,
School of Pharmaceutical Sciences,
Universiti Sains Malaysia, Minden
11800, Pulau Pinang Malaysia.

E-mail: drmmziqbal@gmail.com

ABSTRACT: Purpose: To evaluate parent's attitude towards childhood vaccination and to determine the factors associated with non-adherence of parents to the mandatory vaccination schedule in Sungai Petani, Kedah, Malaysia. **Methods:** a Validated questionnaire was used as an instrument for evaluating parent's attitude regarding childhood vaccination. Data obtained was classified based on Bloom's cut-off point for determining parents' attitude. For the analysis of data SPSS version 20 was used and P-value of <0.05 was considered statistically significant. **Results:** a total of 396 parent's attitude was evaluated for obtaining different factors associated with the unscheduled vaccination. A significant difference was observed in parents attitude based on gender (P-value = 0.021). It was found that parent's income has a prominent impact on the parent's attitude and can be considered as a potential barrier in the provision of proper immunization of children against fatal diseases ($\Phi = 0.329$, P-value <0.001). By education level, parents in the postgraduate level of education were having a good attitude (SD \pm 4.15, Mean Rank = 39.01) in comparison to other categories of educational background (P-value <0.001). A significant difference was observed among the parents living in rural and urban areas (P-value <0.001, $\Phi = 0.298$). No significant association found based on religious beliefs or ethnicity. **Conclusion:** Lack of parents' belief in vaccines and their unawareness affects their attitude towards childhood vaccination. Educating parents through interactive mass media awareness campaigns can help eliminate public health issues related to vaccine-preventable diseases.

INTRODUCTION: Vaccination protects children from developing fatal diseases lifelong by Modlin, Arvin *et al.*, 2004. It is believed that development and innovations in vaccination are one of the greatest achievements during the past two centuries ¹.

Childhood immunization is one of the effective medical interventions which reduce morbidity and mortality in children and assure good health status of children in a society ².

Parents are the primary decision-makers in vaccinating their children. Their knowledge, attitude, and practice play a prominent role in deciding the future health status of the children ³. Improper or inadequate knowledge of parents directly influences their decisions about vaccination ⁴. Most parents in developing countries are unaware of the diseases which can be prevented

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by vaccination and their beliefs towards vaccination greatly influence the improvisation related to vaccination⁵. Parent's attitude act as a soul for following the proper vaccination schedule and their misconceptions regarding vaccination can increase the burden of diseases and death on society. Parent attitude is based on the locality and also has some cultural aspects which directly affect it⁶. In some instances trust in healthcare workers also influence the parent's attitude towards vaccination⁷. The belief of autism in the US by injecting three anti-viral vaccinations (MMR) has led to a drastic change in the beliefs of parents and parents feel a hesitancy in vaccinating their children⁸. All these misconceptions are spread through media which has a direct influence on parent decision and practice. Media play a prominent role in conveying information about vaccination and act as a communicator in providing public health information, prevention of diseases and the benefits of vaccination in preventing fatal and contagious diseases⁹.

MATERIALS AND METHODS: A cross-sectional observational study was conducted for the evaluation of outcomes based on independent variables from the parents living in Sungai Petani, Kedah, Malaysia. Different demographics factors were considered for evaluating attitude. The targeted study population was parents living at Sungai Petani and accessible at the public places. Only one member of the family was considered to participate in the study to avoid duplication of data from a family *viz.* if taken from both father and mother. A total of 396 parents were included in the current study. The inclusion criterion was: parents of children from 0 months to 15 years of age, Malaysian and resident of Sungai Petani. Non-Malaysian parents and less than 18 years of age were excluded from the current study.

A validated data collection tool was used for obtaining the data related to parents' demographic and their attitude towards vaccination. The attitude-based questions regarding vaccination that provide the key aspects related to improper vaccination and was made by an extensive literature review and validation by experts. Five points Likert scale was followed for evaluation of attitude and the range was from "strongly disagree" to "strongly agree." The scoring was in a sequence from strongly

disagree to agree with the value of 1 to 5 respectively strongly. The criteria for evaluation were defined by bloom's cut-off point and categorized as $\leq 59\%$ considered as a negative attitude, 60-79% neutral attitude and 80-100% is considered as a positive attitude. The internal consistency of the questionnaire was determined by Cronbach's alpha value was found to be 0.784 and considered reliable for carrying out the survey based on the attitude of parents towards vaccination.

Data Analysis: Descriptive statistics were used for data classifications. Normality of data was tested with the help of SPSS version 20 by using the Kolmogorov-Smirnov test (K-S test), and the p-value was found significant >0.05 which reveals that data was non-parametric. Non-parametric tests were applied for the analysis of data. Chi-square, Fisher's exact, Mann-Whitney U, Kruskal-Wallis was used for obtaining statistical significance, and effect size was calculated using Phi-Cramer test. P-value of less than 0.05 was considered statistically significant¹⁰.

Ethical Approval: The study proposal was submitted to the institutional review board for human ethical clearance (AIMST University) - Ref No: AUHAEC/FOP/2016/17. The proposal was also registered in the National medical research registry with the research identification number, *i.e.*, 33218.

RESULTS:

Demographics of Parents: Table 1 illustrates total demographic data of the parents who participated in the study. As shown in Table 1 the total number of parents were 396(100%) out of which 160(40.4%) were male, and 236(59.6) were female. A higher number of parents (31.5%) were equal/greater than 41 years of age. Parents from different ethnicities were included in the study comprising mainly of Indians (36.6%), Malay (25.8%) and Chinese (28.5%). Parents from an urban area were (64.9%) of the total respondents and mostly working in the private sector (54.5%).

Furthermore, the number of undergraduate parents was higher (32.8%) and mostly the parents mentioned family income of greater/equal to RM 4000 (47.5%). The attitude was evaluated through a validated questionnaire which comprised of 10

attitude-based questions. The response of parents to each question will be discussed following the demographics data.

TABLE 1: DEMOGRAPHICS OF PARENTS

Variables	n (%)
Gender	
Male	160(40.4)
Female	236(59.6)
Age	
≤25	79(19.9)
26-30	73(18.4)
31-35	61(15.4)
36-40	58(14.6)
≥41	125(31.5)
No. of total children	
1	109(27.5)
2	74(18.7)
3	91(23.0)
4	118(29.8)
≥5	4(1.0)
Ethnicity	
Malay	102(25.8)
Chinese	113(28.5)
Indian	145(36.6)
Others	36(9.1)
Religion	
Islam	102(25.8)
Buddhism	50(12.6)
Hinduism	131(33.1)
Christians	100(25.3)
Others	13(3.3)
Place of living	
Rural	139(35.1)
Urban	257(64.9)
Employment Status	
Government	45(11.4)
Private	216(54.5)
Unemployed	135(34.1)
Education level	
No formal education	48(12.1)
Primary	84(21.2)
Secondary	76(19.2)
Graduate	130(32.8)
Postgraduate	58(14.6)
Family income	
≤ RM 2000	118(29.8)
RM 2001-4000	90(22.7)
≥ RM 4001	188(47.5)

Parents' Attitude towards Vaccination: Table 2 illustrates the response of the parents about the vaccination. It shows that females have a significantly positive attitude towards vaccination in comparison to male (P-value =0.001).

Based on age, it was found that those respondents in the age group of 25 years or less having one kid have a significantly positive attitude in comparison to other age groups (P-value = 0.011, $\Phi=0.224$).

Parents from urban area 43.2% in comparison to parents from rural area 36.0% were having a positive attitude towards vaccination (P-value <0.001, $\Phi=0.298$)

Effects of Ethnicity and Religious Beliefs: Table 2 shows that there is no prominent association among parents from different ethnic groups with different religious beliefs (P-value = 0.305 for ethnicity and P-value = 0.063 for religion).

DISCUSSION:

Parents' Attitude towards Vaccination: Table 2 illustrates the parents' response to the attitude questions. Parent's attitude has been evaluated through a questionnaire consisting of ten questions related to attitude. A review of studies performed in European countries by Yaqob O *et al.*, described the factors affecting parents attitude include the hesitancy related to vaccine safety, lack of awareness and beliefs in alternative medicines¹¹. The attitude portion of the current study includes questions related to the parent's attitude determining factors like religious factors, worried about the side effects of vaccination and administration procedures of vaccinations. The current study will give us a proper image of disparities in attitude among the parent's from different areas with different belief resident of Sungai Petani. The criteria for evaluation were defined by bloom's cut-off point and categorized as ≤59% considered as a negative attitude, 60-79% neutral attitude and 80-100% is considered a positive attitude¹².

Current study reflects good attitude by females in comparison to male, and the significant difference can be correlated with a higher number of female respondents surveyed in this study. Comparing the results with a study conducted in Italy, a contrasting scenario shows that there is no association between a parent's gender and their attitude towards vaccination¹³. A relevant study to the attitude of parents about immunizing their children and the role of awareness on their attitude was conducted in America by Gust DA *et al.*, the results showed that females had a comparatively good attitude in comparison to male, which supports the results of current study¹⁴. A high percentage of female 73.3% and male 68.3% agreed when asked about their views if their

children experience any side effect they will not vaccinate their children. Vaccine safety and efficacy is one of the determinant factors which can lead to a negative attitude of parents and improper immunization of their children¹⁵. The result of the

current study is supported by many studies carried out in many countries, which shows that hesitancy to vaccines due to its side effect has always been an issue affecting the parent's attitude towards vaccination^{16, 17, 18}.

TABLE 2: PARENTS' RESPONSE TO ATTITUDE QUESTIONS

Variables	Negative n (%)	Neutral n (%)	Positive n (%)	P-value	Effect size #
Gender					
Male	16(10.0)	89(55.6)	55(34.4)	0.001*	0.187
Female	5(2.1)	125(53.0)	106(44.9)		
Age					
≤25	0(0.0)	43(54.4)	36(45.6)	0.011*	0.224
26-30	1(1.4)	39(53.4)	33(45.2)		
31-35	3(4.9)	39(63.9)	19(31.1)		
36-40	5(8.6)	36(62.1)	17(29.3)		
≥41	12(9.6)	57(45.6)	56(44.8)		
No. of total children					
1	0(0.0)	55(50.5)	54(49.5)	<0.001*	0.275
2	0(0.0)	49(66.2)	25(33.8)		
3	6(6.6)	53(58.2)	32(35.2)		
4	15(12.7)	55(46.6)	48(40.7)		
≥5	0(0.0)	2(50.0)	2(50.0)		
Ethnicity					
Malay	7(6.9)	53(52.0)	42(41.2)	0.305*	
Chinese	2(1.8)	64(56.6)	47(41.6)		
Indian	10(6.9)	82(56.6)	53(36.6)		
Others	2(5.6)	15(41.7)	19(52.8)		
Religion					
Islam	7(6.9)	53(52.0)	42(41.2)	0.063*	
Buddhism	2(4.0)	35(70.0)	13(26.0)		
Hinduism	9(6.9)	75(57.3)	47(35.9)		
Christians	3(3.0)	46(46.0)	51(51.0)		
Others	0(0.0)	5(38.5)	8(61.5)		
Place of living					
Rural	20(14.4)	69(49.6)	50(36.0)	<0.001*	0.298
Urban	1(0.4)	145(56.4)	111(43.2)		
Employment Status					
Government	2(4.4)	28(62.2)	15(13.3)	0.002*	0.206
Private	4(1.9)	114(52.8)	98(45.4)		
Unemployed	15(11.1)	72(53.3)	48(35.6)		
Education level					
No formal education	6(12.5)	26(54.2)	16(33.3)	<0.001*	0.277
Primary	10(11.9)	44(52.4)	30(35.7)		
Secondary	5(6.6)	48(63.2)	23(30.3)		
Graduate	0(0.0)	69(53.1)	61(46.9)		
Postgraduate	0(0.0)	27(46.6)	31(53.4)		
Family income					
≤ RM 2000	17(14.4)	59(50.0)	42(35.6)	<0.001*	0.329
RM 2001-4000	4(4.4)	62(68.9)	24(26.7)		
≥ RM 4001	0(0.0)	93(49.5)	95(50.5)		

** Fisher's Exact test, * Chi Square, # Phi Cramer's value

In a study carried out Turkey by Torun *et al.*, it was found out in that study that fathers were the one refusing to vaccinate their children and were showing a negative attitude towards vaccination and its role in controlling diseases¹⁹. A high

percentage of parents in the current study agreed that they would not vaccinate their children if they experience any side effects, which is supported by a systematic review of 15 studies and shows that most parents feel hesitated when their children

experience any side effect²⁰. Although, vaccination has shown phenomenal success in reduction of life taking diseases still the response is not homogenous on the basis of ethnicity and religion. Still, there is the refusal of vaccines due to religious or philosophical beliefs or due to a parent's attitude in regards to pain from the injection. All these factors were found in a study conducted in America where there is the rule of exemption by religious or philosophical belief¹⁵.

The current study shows that there is no significant correlation of attitude with religious beliefs or with ethnicity. Only one Malay Muslim male and two females stated that they had refused vaccination by religious beliefs while all others refused to have any religious beliefs which can affect their attitude regarding vaccination. A study conducted in America showed that ethnic differences could be a reason for improper immunization in a community which is in contrast to current study²¹.

Ethical and religious disparities as observed in the current study can be observed in a study conducted in Canada where they found that one group by religion has different attitude and perspectives in comparison to other²². The results of a study conducted in Malaysia shows that there was a difference in response of parents from different ethnicity towards the acceptance of vaccination based on their personal or religious beliefs but the number of refusing parents was very low as is in the current study²³.

A study based on the effects of religion and minimizing the bias and making the provision of vaccines available, the Malaysian government has taken steps in the preparation of Halal vaccines in co-operation with Saudi Arabia which shows that religious beliefs have strongly affected the basic immunization schedule²⁴. A study conducted in the Pahang state of Malaysia shows that there was no significant association of race or religion of decisions regarding vaccination and it doesn't affect their practice of vaccination²⁵.

In the current study, a high proportion of parents having age less/equal to 25 years has shown a significantly positive attitude towards vaccination, refusing any religious belief or any health-related issues which can act as a barrier towards proper

immunization of children. The current study is supported by a study conducted in Saudi Arabia, which showed that younger mothers and fathers have a comparatively good attitude towards vaccination than those having ages more than 35 years²⁶.

By factors influencing the childhood immunization, a study was conducted in Bangladesh which showed that parent's age has significant effects on the parent's attitude towards vaccination²⁷. Middle age females have a comparatively good attitude towards vaccination because of their knowledge and their experience through ages, and this result was found in a study conducted in rural areas of Bangladesh which is in contrast to current study which showed that younger age parents have comparatively good attitude²⁸.

The fact that the people resident of the rural area has less availability and hard to get access to all the healthcare facilities which makes them disadvantaged over people living in urban areas. The urban-rural inequities and the parent attitude remain side by side as is mentioned in a study conducted in Korea, which shows that the belief and the attitude of parents living in rural areas were different from the people living in urban areas²⁹.

The results of the current study are supported by a study in Australia which concludes that the availability and access to vaccination in remote areas are comparatively less and is considered an issue in maintaining proper childhood vaccination which has a direct influence on the parent's attitude and their decision regarding vaccination³⁰. A study based in America was conducted for evaluating the up-to-date and age-appropriate immunization, which shows that the urban population has better age-appropriate immunization due to their fair acceptance and their positive attitude towards acceptance of vaccination as a source of decreasing the burden of diseases³¹.

The current study also gives a picture of the parent's attitude and knowledge. As found earlier there was a significant difference in the parent's knowledge living in urban and those in rural areas, which indicates that the improper knowledge has led to an improper and negative attitude.

Same results were declared in a review articles, which support the stance that there is an imbalance of facilities among different areas which affect the attitude of people in accepting vaccination due to their beliefs and due to the society in which they live¹¹.

The current study is strongly supported by a study carried out in a rural area of Pakistan which shows that higher percentage of parents were having negative beliefs towards vaccination due to the improper awareness and distance of traveling for acquiring vaccination³². The current study shows that there is a significant association between the parent's education level and their attitude towards vaccinating their children. Contrasting results were found in a Dutch-based study, which shows that the more the education level of the parents, the more they opposed vaccination because of the belief of ineffectiveness or the side effects of vaccination in their children³³. There is a study conducted in America which supports the results of a current study by concluding that education level has an impact on parents' beliefs and their attitude and higher the education level higher is the acceptance level among the parents and the more positive their attitude is in acceptance of vaccination³⁴.

A survey based on the attitude of parents towards vaccination in five European countries shows that parent's education level has a prominent role in defining their attitude towards vaccination because of their knowledge about all the benefits of immunization³⁵. A study based on education and attitude about vaccination in Singapore shows that the acceptance level is always different among people of different level of education and it shows the difference in attitude based on education level³⁶. Employment status and family income can be considered as a factor influencing parental attitude because poverty and unavailability of time during work hours influence the parents' attitude towards vaccination.

Socioeconomic factors of parents are predictors in influencing child healthcare and their decision making about their children health and wellbeing and provision of all the facilities are solely based on their socioeconomic status^{37, 38}. A study based on the predictors affecting the childhood immunization shows that timely process of

immunization is affected by the parent's income and their employment status which can be judged as defining factors³⁹. A study conducted in Libya shows that there is no significant association between the employment of parents and their attitude towards vaccination which shows contrasting results from current study⁴⁰.

Limitations: There are several limiting factors in the current study. The study was single centered conducted in a specific locality of Kedah state which can't represent the entire Malaysian community. The results may be skewed due to a significantly higher number of female respondents as well as the lack of participants from a rural area. Regarding ethnicity, there was a difference in samples size from each group which can lead to biases in results.

CONCLUSION: In the past few decade parental decisions regarding vaccination of their children has been found unsatisfactory. The uncertainties related to vaccine safety and the beliefs that it may contain forbidden constituents have led to objectionable decisions by the parents. Parents believe that their decisions only affect their family, but in a broad sense, these individual decisions are affecting their community as a whole. The consequences can be observed by the recent spread of diphtheria amongst Malaysians. Understanding and highlighting these issues by carrying proper research can help resolve the forthcoming consequences.

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