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Knowledge and Practice towards Vaccination: a Cross-Sectional Study among the Parents in Sungai Petani, Kedah, Malaysia.

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Abstract – parents' perceptions and hesitancy towards vaccination act as a barrier towards the proper provision of scheduled vaccination. The study aimed to evaluate parent's knowledge and practice towards childhood vaccination and to explore the factors associated with non-adherence of parents to the mandatory vaccination schedule by the provision of a validated questionnaire. Out of 396 parents, a high percentage of females (42.8%) were having good knowledge with a mean rank score of 7.00 ±2.04 in comparison to male respondents (36.2%). Significantly moderate positive association (Φ= 0.359, p-value<0.001) was found based on the education level of respondents. Parents living at urban area 133(51.8%) in comparison to those living at rural area 42(30.2%) were having a good practice of vaccination. A number of children have significant effects on the parent's practice towards vaccination (p-value >0.001). Ethnicity (p-value=0.015) and religion (p-value=0.020) shows significant association with parent's practice, but it shows no impact on parental attitude. On the basis of the overall response of parents, only 27 (6.8%) of total parents mentioned that they hadn't vaccinated their children according to the schedule. Regional inequity, unavailability of facilities and hard to access childcare centers need to be addressed. Educational level of parents and income status of the family has a defining role in the provision of scheduled vaccination. Educating parents through interactive mass media awareness campaigns can be helpful in eliminating public health issues related to vaccine preventable diseases. Involving influential figures from the religious sector can improve the parents' trust towards vaccinating their children.

Index Terms – Children, diphtheria, ethnical disparities, knowledge, parents, practices regional inequity, vaccination.

1 INTRODUCTION

PREVENTION of diseases reduces the economic burden of diseases on society and is considered effective in comparison to cure. Before the introduction of the vaccine, the world was at higher risk of vaccine-preventable diseases, e.g., smallpox [1] These vaccines preventable diseases were solely controlled through preventive medicines and immunization is considered as an important part of these medicines [2]. Reduction, eradication and complete elimination of vaccine-preventable diseases worldwide are wholly solely through the introduction of vaccines [3].

Vaccines have not only reduced the burden of vaccines preventable diseases, but it also has a worth mentioning role of decreasing antibiotic resistance, reduction in bioterrorism and the promotion of economic growth [4]. Vaccination was introduced in Malaysian society in early 1950s, and an impressive rate of childhood immunization is one of the reasons behind good health status of Malaysian children [5]. A variety of aspects are responsible for good immunization status. Parent's knowledge, attitude and practice in making decision regarding their children vaccination is one of the major factor contributing to either proper or improper vaccination [6].

Lack of knowledge, low level of awareness and misperception regarding vaccines are the major barriers towards avoidance of vaccination. Socioeconomic factors, as well as religious beliefs in some instances, can be considered as a barrier for improper vaccination [7]. These multiple barriers when left unaddressed and unresolved leads to a higher range of unvaccinated individuals. When the number of unvaccinated individuals increases, it leads to an outbreak of a specific disease as the case of diphtheria in Malaysia is one of the examples [8].

Parental decisions regarding immunization are very important for increasing the immunization rate and compliance and for decreasing any possible immunization errors. Parents' knowledge and practices regarding immunization are the major factors that contribute to their vaccination decisions [9]. There are many barriers against immunization, including misinformation about vaccines, adverse effects of vaccines, vaccine-preventable diseases, and disease development after the administration of vaccines. Deficiencies in parents' knowledge about the adverse effects and contraindications of vaccines often lead to many immunization errors [10].

Many parents believe that mild illness is associated with vaccine contraindication, therefore mild illness is

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considered as a reason for not giving their children up-to-date vaccinations. To improve parents' awareness, good knowledge regarding vaccination is required. Therefore, physicians, pharmacists, nurses, and others health care providers should provide parents with correct information about the risks and benefits of vaccines [11].

Many studies showed that parents' knowledge regarding child immunization varies according to the family physician and other medical staff [12]. Although parents would like to know about the adverse effects, the benefits and other information about vaccines, many physicians include vaccine risk in their discussions with parents without comparing it to the risks involved in infectious disease [13]. Good parental practice regarding immunization will be able to reduce the incidence of infectious diseases. Parental practice regarding vaccination is related to appropriate sources of information, the number of sources, and the way that vaccine information is received by parents [14]. The sources of information provided by maternity clinics, the media, literature, and the internet cover vaccination benefits and the risks of vaccine-preventable diseases. The most important factor affecting parental practice is communication between parents and the sources of information or immunization providers [15]. Improving communication will improve parents' perceptions of the benefits and risks of vaccines. Parents will be more likely to continue with their child's immunization, although at the same time they may still be doubtful about vaccination [16]. There is a positive correlation between the parents' belief and the provision of information. In other words, any increase in parental knowledge and practice will lead to increases in vaccination rates of children [5, 17].

2 METHODOLOGY

A cross-sectional observational study was conducted for the evaluation of outcomes based on independent variables from the parents living in Sungai Petani. Different demographics factors were included for surveying knowledge and practice. The duration of the study was six months, during which data collection and analysis was performed. The targeted study population was parents living in Sungai Petani and accessible at the public places like shopping malls, bus stations and railway stations (convenience based sampling). 396 parents' from varied demographical categories were assessed and included in the study. The response was acquired by the provision of a validated questionnaire composed of three portions i.e. demographics, knowledge and practice.

The sample size was calculated using the Raosoft online software at http://www.raosoft.com/samplesize.html based on formula; $Necessary\ Sample\ Size = (Z\ Score)^2 \times SD \times (1 - SD)/(margin\ of\ error)^2$

Estimated sample size = 384 (Total Population = 228743)

Margin of error ± 5%, CI = 95%.

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 33218.

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 analysis of data. Chi-square, Fisher's exact, Mann-Whittney 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 significant [18].

3 RESULTS

Table 1 shows that females (42.8%) were having comparatively good knowledge of vaccination than males (36.2%). Ethnicity (p-value 0.251) and religion (p-value 0.509) shows no significant effects on parents' knowledge about vaccination. Educational level with the positive association has significant effects on the knowledge score of parents. Age group of parents ≤25 years of age was having good knowledge score (51.9%) than older parents.

Mean rank, and standard deviation (SD) (table 1) shows that parents who were government employed has a mean rank of 7.64 with SD ±1.72 comparatively higher than other variables in the group. Parents with ≥ RM 4001 show good mean score (7.43±1.81) and good knowledge of vaccination in comparison to parents having low family income. Age group of ≤25 were having higher mean rank (7.54) followed by parents of age 26-30 years (7.01).

4 DISCUSSION

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 the urban area were (64.9%) of the total respondents and mostly working at 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 knowledge and practice were evaluated through a validated questionnaire which comprised of 15 questions. Parent's knowledge was evaluated through the administration of a validated questionnaire having ten questions. The criteria for evaluation was defined by bloom's cut-off point and categorized as ≤59% considered as poor knowledge, 60-79% moderate knowledge and 80-100% is considered as good knowledge [19, 20].

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TABLE 1

OVERALL KNOWLEDGE AND PRACTICE LEVELS WITH DIFFERENT VARIABLES

Variables	Knowledge Levels					Practice Levels				
	Poor n(%)	Moderate n(%)	Good n(%)	*P*-Value	Effect Size #	Poor n(%)	Moderate n(%)	Good n(%)	*P*-Value	Effect Size#
Gender										
Male	62(38.8)	40(25.0)	58(36.2)	0.018*	0.142	50(31.2)	49(30.6)	61(38.4)	0.033*	0.103
Female	60(25.4)	75(31.8)	101(42.8)			48(20.3)	74(31.4)	114(48.3)		
Age										
≤25	16(20.3)	22(27.8)	41(51.9)	0.031*	0.206	11(13.9)	25(31.6)	43(54.4)	<0.001*	0.273
26-30	19(26.0)	24(32.9)	30(41.1)			12(16.4)	16(21.9)	45(61.6)		
31-35	27(44.3)	11(18.0)	23(37.7)			19(31.1)	23(37.7)	19(31.1)		
36-40	15(25.9)	22(37.9)	21(36.2)			13(22.4)	16(27.6)	29(50.0)		
≥41	45(36.0)	36(28.8)	44(35.2)			43(34.4)	43(34.4)	39(31.2)		
No. of total children										
1	20(18.3)	33(30.3)	56(51.4)	<0.001*	0.328	13(11.9)	25(22.9)	71(65.1)	<0.001*	0.407
2	13(17.6)	22(29.7)	39(52.7)			8(10.8)	30(40.5)	36(48.6)		
3	29(31.9)	27(29.7)	35(38.5)			20(22.0)	33(36.3)	38(41.8)		
4	60(50.8)	31(26.3)	27(22.9)			55(46.6)	33(28.0)	30(35.4)		
≥5	0(0.0)	2(50.0)	2(50.0)			2(50.0)	2(50.0)	0(0.0)		
Ethnicity										
Malay	34(33.3)	26(25.5)	42(41.2)	0.251*		22(21.6)	22(21.6)	58(56.9)	0.015*	0.201
Chinese	25(22.1)	34(30.1)	54(47.8)			22(19.5)	40(35.4)	51(45.1)		
Indian	50(34.5)	43(29.7)	52(35.9)			40(27.6)	50(34.5)	55(37.9)		
Others	13(36.1)	12(33.3)	11(30.6)			14(38.9)	11(30.6)	11(30.6)		
Religion										
Islam	34(33.3)	26(25.5)	42(41.2)	0.509*		22(21.6)	22(21.6)	58(56.9)	0.020*	0.210
Buddhism	13(26.0)	12(24.0)	25(50.0)			14(28.0)	21(42.0)	15(30.0)		
Hinduism	47(35.9)	39(29.8)	45(34.4)			36(27.5)	48(36.6)	47(35.9)		
Christians	25(25.0)	34(34.0)	41(41.0)			25(25.0)	28(28.0)	47(47.0)		
Others	3(23.1)	4(30.8)	6(46.2)			1(7.7)	4(30.8)	8(61.5)		
Place of living										
Rural	71(51.1)	35(25.2)	33(23.7)	<0.001*	0.333	59(42.4)	38(27.3)	42(30.2)	<0.001*	0.308
Urban	51(19.8)	80(31.1)	126(49.0)			39(15.2)	85(33.1)	133(51.8)		
Employment Status										
Government	9(20.0)	8(17.8)	28(62.2)	<0.001*	0.292	15(33.3)	16(35.6)	14(31.1)	<0.001*	0.286
Private	50(23.1)	69(31.9)	97(44.9)			32(14.8)	65(30.1)	119(55.1)		
Unemployed	63(46.7)	38(28.1)	34(25.2)			51(37.8)	42(31.1)	42(31.1)		
Education level										
No formal education	28(58.3)	16(33.3)	4(8.3)	<0.001*	0.359	24(50.0)	13(27.1)	11(22.9)	<0.001*	0.344
Primary	37(44.0)	27(32.1)	20(23.8)			27(32.1)	20(23.8)	37(44.0)		
Secondary	19(25.0)	20(26.3)	37(48.7)			19(25.0)	35(46.1)	22(28.9)		
Graduate	26(20.0)	35(26.9)	69(53.1)			21(16.2)	42(32.3)	67(51.5)		
Postgraduate	12(20.7)	17(29.3)	29(50.0)			7(12.1)	13(22.4)	38(65.5)		
Family income										
≤ RM 2000	59(50.0)	31(26.3)	28(23.7)	<0.001*	0.298	51(43.2)	37(31.4)	30(25.4)	<0.001*	0.344
RM 2001-4000	26(28.9)	28(31.1)	36(40.0)			18(20.0)	37(41.1)	35(38.9)		
≥ RM 4001	37(19.7)	56(29.8)	95(50.5)			29(15.4)	49(26.1)	110(58.5)		

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

Mothers were having good knowledge in comparison to fathers as shown in table 1. A significant difference in response was observed. The factor responsible for good knowledge of females in comparison to male is their interaction with the maternity and antenatal clinics as observed in a previous study [21].

The current study shows that parent ≤25 years of age have comparatively good knowledge in comparison to other age groups. About 41(51.9%) of parents in the age group ≤25 years of age have good knowledge, followed by parents having age 26-30 which was 30(41.1%). Although the previous studies show comparatively contrast results to the current study, which shows that with an increase in parents age their experience increase which positively affects their knowledge standard [22].

Family size is one of the determining factors for acquiring proper immunization in children. The current study shows a significant association between number of children and parents knowledge. Parents having one child 56(51.4%) and having two children 39(52.7%) have comparatively good knowledge about vaccination. A study conducted in Malaysia shows that family size has no effects on parents knowledge about vaccination [5].

Parents living in the urban area are mostly educated along with easily accessible health related facilities while those in rural areas tend to have low education level with comparatively fewer facilities [23]. A study conducted in Turkey found that mostly the parents living in rural areas were having no knowledge about vaccination which leads to improper childhood immunization [24]. The current study shows that parents living at urban area have comparatively higher knowledge in comparison to rural areas and the difference was significant. A study conducted in Pakistan shows the same results as there was lack of knowledge related childhood immunization in rural areas in comparison to urban areas due to either the access to the vaccination sites or the improper knowledge about vaccination and the same results were shown in other studies [14].

Education level can be considered one of the strongly associated factors related to children healthcare and a level of education directly affects the knowledge related to vaccination [25]. As shown in table 1 that parents having high level of education were having good knowledge about vaccination. Former studies support the results of current study showing that parent's level of education has considerable impacts on their knowledge related to child healthcare as proved by a study carried out in America [26].

An association related to family income and knowledge related to vaccination was found significantly in current study. The current study shows that the 50.5% of parents having family income of more than RM 4000 were having good knowledge which is comparatively higher than parents having low family income. A study was carried out in Malaysia which shows that there is no significant relationship between family income and their children immunization, proven by other studies showing effects of financial status on child health [5, 22].

Formerly performed studies related to childhood vaccination shows that there are many factors which have a direct influence on parents' practice [27, 28]. There is a significant difference in parents practice on the basis of gender. Females have comparatively good practice in comparison to males. As discussed in knowledge portion females were having better knowledge than males which is in accordance to previously performed studies conducted in Malaysia, China and Iraq, which shows that parent's practice is directly related to their knowledge about vaccination [5]. Higher percentage of Females 90.3% and males 75.6% stated that they acquired information from maternal or antenatal clinics which is in accordance to a study conducted in Nepal, Libya and Pakistan which shows that healthcare workers are the primary source with television, radio, internet and newspaper as other sources for educating parents about childhood vaccination [29, 30].

Internet was found comparatively a good source of information than television and radio which is in accordance with other performed studies [27]. More than 90% of males and females have completely immunized their children, which show good practice of parents in Sungai Petani towards vaccination (Table 1). A study conducted on parent's behavior, knowledge and its effects on practice which shows that low immunization rate can't be associated with parent's knowledge or awareness about vaccination, and they also mentioned that those parents' who have comparatively higher education standard accept and trust vaccination more easily in comparison to parents' with low education level [31].

As shown in table 1 parents in the age category of 26-30 (61.6%) and those having one child (65.1%) have good practice of immunization. A study conducted in America is in accordance to the current study, which shows that mostly the parents in younger ages had good practice in comparison to parents in older ages [32]. In contrast, few related studies have shown that older parents have comparatively good practice than young parents and the reason behind good practice was related to their experience by interacting with healthcare professionals [5, 12].

On the basis of ethnicity, the current study shows significant interaction between practice related to vaccination and ethnicity of parents. On the basis of ethnicity, Malays were having comparatively good practice followed by Chinese and Indians respectively. The difference can be associated with the availability of samples from different ethnicity. According to one study conducted in USA, cultural and traditional attenuated factors can also lead to racial disparities and difference in practice which can ultimately affect the primary health care of children [33]. A Malaysian study on multiethnic groups related to HPV vaccination supports the results of current study on the basis of ethnical disparities among Malay, Indian and Chinese [34]. Furthermore, a cross-sectional survey conducted among Korean, Chinese, and Vietnamese Americans and the results show that the practice was significantly different and racial disparities can be a contributing factor to improper vaccination practice [35]. A

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similar nature study furthermore supports the results of current study which was carried out in Malaysia among the people of different ethnicities and it also shows that there are ethnical disparities which correlate with the results of study [36].

People living in urban area are well facilitated and have access to all health-related facilities while those in rural areas are mostly distressed and lacking the basic needs of life [37]. Regional inequity and lack of practice as shown in table 1, 51.8% of parents living in the urban area and 30.2% of parents living in the rural area were having a good practice. A marked difference was seen in a study conducted in the Sub-Saharan countries of Africa, which illustrated that there is a marked difference in urban-rural child primary health care [38]. A systemic review based on inequity in childhood immunization conducted in India shows that there is persistent and prominent difference in the infant vaccination among the rural and urban population which is in accordance to current study [39, 40]. A significant difference associated to rural-urban population has been described in a study conducted in Canada [41] suggested that there is a need of interventions to reduce this inequity and to make health-related facilities available to the whole community.

Vaccination is the basic right of children and every child from any class should be able to acquire his basic health need. Employment status and income level contribute to the completion of proper vaccination as unavailability of resources and burden of works can act as a barrier which was found in a study conducted in Nigeria [42]. A study conducted in Malaysia shows that parents employment status has a significant impact on practice regarding vaccination while it shows that family income doesn't affect the practice [5]. In case of unavailability of resources and low-income families children get deprived of proper immunization, the result of a study conducted in Pakistan shows that family income is a responsible aspect for improper immunization [43].

The effects of employment status on the practice of parents as shown in table 1 are supported by a study conducted in OECD countries, which shows that employment status positively affects the vaccination status of children in comparison to unemployed parents [44]. Although socio-economic factors shouldn't be a reason for the children to be under-immunized, still in the developing countries there is a vulnerable inequity which leads to an imbalance in the proper immunization of children as described in a study conducted in Turkey [45]. The American Economic Association in their review study highlighted that parent's income has a direct impact on all the health-related activities of their children. Furthermore, they evaluate that parent's low income become a reason for the loss of children lives in early stages due to improper health practices which have been found in the current study as well [46].

Parental decisions and their level of education have been proven to have a direct impact of their children healthcare including proper vaccination [47]. The current study shows a significant and strong association between parent's education level and their practice of vaccination. The parents in the postgraduate category have a higher percentage of good practice 65.5% in comparison to other groups in the level of education. A study conducted in Libya is in contrast to the current study, which shows that there is no significant difference between the practice of educated and illiterate mothers [29]. In accordance to current study a similar study was conducted in Pakistan for finding the effects of parent's education on the primary health care of their children, the results of which conclude that there is a prominent association between parent's education level and their practice of immunizing their children against all diseases [48]. The current study is supported by a study conducted in India which is of the opinion that if parent's education level is improved in regards to vaccination, it will have a direct impact on their practice related to their children immunization [49]. A survey data from seventeen countries was obtained regarding the effects of education on childcare and primary health care of children at young ages; it shows during the post-neonatal effects of education has a strong impact on all the primary health care activities of children verily [50].

RECOMMENDATIONS

Based on the results we can conclude that there are some areas which should be highlighted and resolved for the attainment of better results in controlling the spread of vaccine-preventable diseases in the future. For the attainment of future goals;

- Parents should be educated specifically in rural areas and awareness enhancing activities should be introduced to improve their perception towards the acceptance of vaccination.
- The government should allocate more funds towards increasing the accessibility to vaccination for the whole community without any discrimination.
- Proper monitoring of vaccination-related activities in rural areas can enhance the practice of vaccination.
- Vaccinating children should be considered mandatory and proper laws should be implemented for acquiring the desired results.
- Religious beliefs should be addressed by the inclusion of influential figures from the religious sector.

CONCLUSION

Ethical disparities and religious beliefs were having no debatable association with the knowledge and practice of parents towards vaccination. Although the results show some differences in the practice of vaccination based on race or religion, but it was very less if compared to the studies carried out in US or other countries with various races. Maternal or antenatal clinics are the primary source of information for most of the parents and improving the standard of these childcare institutions can further improve the vaccine coverage.

Age and family size has been found a discussable factor for improving the provision of vaccination. Regional inequities have continued to affect children's health care and the current study shows that there is a significant contrast between parents' knowledge and perception in rural areas in comparison to urban areas. Parents from urban areas have shown a very good response towards vaccination in comparison to the parents living at rural areas.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

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