Analysis of Factors in Response to Rotavirus Vaccination Counselling in A Private Paediatric Clinic

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ABSTRACT

Rotavirus vaccine is available as an optional vaccine in Malaysia. The counselling of optional vaccines is considered an integral part of the health services offered in a private paediatric clinic. While ensuring that all babies are up-to-date with their compulsory immunization, counselling of optional vaccines like the rotavirus vaccine could give parents the choice to make an informed decision on the acceptance of this vaccine. Over a period of two years, we counselled the parents regarding diarrhoea caused by rotavirus disease and the rotavirus vaccine. In this study, the factors that were significantly associated with the acceptance of the rotavirus vaccine were the gender of the baby, the mother's age, the mother's occupation, the mode of payment for the vaccine, the number of previous visits to the clinic by the parents, the number of counselling sessions given to the parents and the pre-counselling awareness or knowledge of rotavirus disease and rotavirus vaccine. It is hoped that these findings may assist busy clinicians in their continuous efforts to provide health education and vaccination counselling to the parents of their patients.

KEY WORDS:
rotavirus vaccination, counselling, acceptance

INTRODUCTION

Rotaviruses are 70-nm non-enveloped icosahedral viruses that belong to the family *Reoviridae*. Seven rotavirus serogroups (serogroups A to G) have been described, although most human pathogens belong to groups A, B, and C. The virus infects the mature villus epithelial cells of the small intestine, and infection often leads to fever, vomiting, and diarrhoea in children[1].

Rotavirus is transmitted by the faecal-oral route, via contact with contaminated hands, surfaces and objects[2]. The faeces of an infected person can contain more than 10 trillion infectious particles per gram[3]; out of which only 10–100 are required to transmit infection to another person[4]. Rotavirus shed from faeces can persist in the environment for extended periods of time[5] and it has been reported that faecal matter is able to protect the virus against inactivation in the dried state[6]. Furthermore, rotavirus has been shown to survive when dried on human hands as well as inanimate objects[6], increasing the potential of direct human to human transmission as well as via contact with solid surfaces such as toys and food utensils.

Rotavirus is the major cause of gastroenteritis causing hospitalization worldwide in young children and primarily affects children between 6 and 24 months of age. Globally, the detection rate for rotavirus among children hospitalised for diarrhoea in various income groups between 2000-2004 was 39-44%[7]. In South East Asia rotavirus is estimated to cause death in 1 out of every 111-203 Bangladeshi children and up to 100000 deaths in India every year[8]. In Malaysia, Hsu *et al* (2005) reported about 23000 total visits for acute gastroenteritis caused by rotavirus annually contributing to 50% of all hospitalizations due to acute gastroenteritis[9]. Another more recent review by Chan *et al*, 2008 found the incidence of rotavirus- induced diarrhoea causing hospitalization was 38% with an estimated incidence of rotavirus induced diarrhoea of 27 per 10000 population under 5 years of age[8]. The World Health Organisation (WHO) in 2008 reported rotavirus as a cause of severe gastroenteritis killing an estimated 1600 children under the age of 5 every day, the majority in Africa and Asia[10].

To reduce an estimated half a million deaths and two million hospitalizations from diarrhoea caused by rotavirus each year, the WHO recommended that oral rotavirus vaccines be added to the national childhood immunization programmes. Two oral rotavirus vaccines now available in Malaysia are Rotarix® (Glaxo Smilth Kline Biologicals) available since July 2006 as a two-dose regime and RotaTeq® (Merck and Co., Inc.) available since July 2007 as a three-dose regime. These vaccines are available at some private clinics and private hospitals and are given to patients on a demand basis. The Rotavirus vaccine has not yet been made compulsory by the government of Malaysia. Hence the patients cannot routinely obtain this vaccination free of charge from government clinics. Patient's request for the rotavirus vaccine is based on several factors including knowledge of the disease and availability of the vaccine.

AIM OF THE STUDY

To assess the patients' and their parents' sociodemographic characteristics for acceptance of rotavirus vaccination after counselling at a private general paediatric specialist clinic situated in Taman Melawati, which is a residential area in the Klang Valley. This study which was conducted from January 2007 to January 2009 reviews possible factors that are involved in parental acceptance of the rotavirus vaccine.

RATIONALE FOR THE STUDY

Taman Melawati is primarily a middle to high income

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residential area. It was felt that a large percentage of the parents or caregivers who came to the clinic were not aware or were inadequately informed of the optional vaccinations that were important for their children. Moreover, they were unaware of the availability of these vaccines in the paediatric clinic. It was also felt that counselling on vaccinations on the whole was not given enough importance in the health care services provided by private clinics to the community. Most parents who came to the clinic were both working and sent their children to nurseries, day care centres or to baby sitters. Many parents who came to the clinic were young and dependant on care takers and nurseries to take care of their children, during their working period. These practices increased the exposure of their babies to other children. The increased exposure to other children and the children's habit of sharing toys at these centres were important factors that contributed to the observed higher prevalence of transmission of communicable diseases, like rotavirus diarrhoea. Considering the common modes of transmission of rotavirus diarrhoea, counselling on the rotavirus vaccine was a vital part of the overall health services provided by the clinic. The counselling was targeted towards those babies who were already eligible, or would become eligible by age, to take the rotavirus vaccine. The parents could then make an informed decision whether or not to take the vaccine. The counselling of the rotavirus vaccine in this clinic was always done after ensuring that the basic compulsory vaccinations were up-to-date for the age of the baby.

METHODS

Sample and data collection

Our study sample consisted of routinely collected data from January 2007 to January 2009. This involved a total of 280 babies and their respective parents.

Categorization of data

The data obtained was categorized based on some parameters of clinical relevance where complete information could be obtained from the parents of the babies who were counselled, given the constraints of a private paediatric clinic. Tables are presented as divided into two or three categories, in order that the chi-square analyses be interpreted meaningfully.

Baby's background

Babies were categorized according to gender, race, place of birth whether in the government or private hospitals or clinics, mode of feeding whether fully breastfed, fully bottlefed or had mixed feeding, place of care whether at home or at the daycare centre.

Parents' background

Parents were categorized according to age where they were divided into two groups between 20-29 years and those who were equal to or more than 30 years, place of residence as being in the same area as the clinic (5km or less from the clinic) or in a different area (> 5 km from the clinic). The payment mode depended on whether they could claim the cost and or get free reimbursement for the vaccination fees from their offices or could not. Parents were classified into broad groups according to their occupation. The classification of occupation,though uniformly similar in both parents had to be divided into three groups for the mothers and into two groups for the fathers in order to make the statistical analyses meaningful. The mothers who were homemakers were classified as the first group and the second group included professionals and those involved in technical occupations while the third group consisted of those in the office management sector but who were not professionals and others who did not belong to any of these categories. The fathers were classified into two groups where the first group included the professionals and those involved in the technical sectors. The second group consisted of fathers who were in office management but who were not professionals, one homemaker and others who did not belong to any of these groups. The number of times the parents came to the clinic or the number of previous visits was divided into two groups. The number of counselling sessions was divided into two groups where the first group consisted of those who were counselled only once and the second group consisted of those who were counselled twice or more times. The maximum number of counselling sessions per patient was limited to four.

Vaccine Background

The Rotarix® vaccine used in this clinic was a two dose oral rotavirus vaccine given as early as 6 weeks. Two doses of the oral vaccine has to be given by 24 weeks with a minimum interval of 4 weeks. The precounselling level of vaccine awareness of parents were classified into two groups.The first group was parents of patients who had never heard of either the disease or the vaccine and the second group included those who either had partial of or had complete knowledge of the disease or the vaccine or those who had heard of the side effects of the vaccine.

Back ground for selection criteria

Patients were chosen according to the inclusion and exclusion criteria stated below. In addition, no parent was forced to listen to the counselling nurse. As such, no counselling session was aborted due to parental anxiety as the inclusion criteria considered parental consent to listen to the trained nurse as the single most important criteria at the commencement of the counselling. In all circumstances where counselling was not done but where the child was eligible in terms of age for the vaccine, a pamphlet containing information on the vaccine was given to the parent or the care giver.

INCLUSION CRITERIA

Parents of babies aged 0 to 5 months who had not already taken a single dose of the rotavirus vaccine.These parents were not in a hurry to leave the clinic, not unduly anxious about their child's presenting complaint and were willing to spend an extra 10-15 minutes in the clinic when told that they would be given some useful information regarding vaccination. These parents came to the clinic for:

1 compulsory vaccinations.
2 treatment of illnesses that were not clinical emergencies.
3 treatment of their babies who were not acutely ill or unduly fretful.

EXCLUSION CRITERIA

1 Parents whose children were more than 5 months old.
2 Parents whose children were acutely ill or unduly fretful.
3 Parents who by themselves brought their children for rotavirus vaccination without being counselled by the

clinic nurse.

4 Parents who brought their children for the rotavirus vaccine due to information gathered from the clinic such as pamphlets or other sources but who were not counseled by the clinic nurse.

Method of vaccination counselling

A nurse was fully trained on all essential factors of the rotavirus diarrhoea and rotavirus vaccine. She conducted all the counselling sessions with the help of the same picture and a standard flip chart for all patients. She gave a brief overview of the disease, mode of transmission, including the relevance of rotavirus infection in nurseries and day care centres with the sharing of toys. Increased risk with bottle or mixed feeding was also emphasized. Other factors highlighted included rotavirus vaccination schedule, age of patient who could receive the vaccine, importance of starting on the first dose as early as six weeks so that two doses could be completed by six months of age and preferably earlier, method of administration and the ease of the oral route. Each counselling session took between 10-15 minutes. During the counselling sessions, parents could ask any questions they wished. These questions were answered by the trained nurse and where necessary, the nurse referred to the paediatrician for additional clarification.

The information given to the parents on the advantages of the vaccine was relatively uniform but some added information relevant to the individual child was given. These slight variations emphasised the particular relevance to the individual child as the case deemed fit. This additional feature where needed, was highlighted to the nurse by the paediatrician who would have already examined the baby for the presenting complaint. Side effects were informed briefly and a picture of intussusception was shown but the relevance of this was explained in the light of side-effects related to previous brands of the vaccine now withdrawn from the market. Parents were informed that the vaccine was optional. The vaccine price was also discussed. After the counselling sessions, the counselling nurse would make a guess on vaccine acceptance. This guess was based on eye to eye contact, attentive listening by both parents, whether parents were easily distractable or not, and questions asked by one or both parents.

ANALYSIS OF RESULTS

Data was analysed using SPSS software version 15. A p value of < 0.05 was considered statistically significant.

DISCUSSION

The data obtained in this private clinic was not aimed for research but were routinely collected data. The constraints that were encountered in the clinic in ensuring parental satisfaction and in respecting parental reluctance to give some information necessitated some assumptions and deductions to be made in discussing the results of the data analysis. These assumptions were made in the light of the results of the statistical analysis.

The characteristics of patients who come to a private paediatric clinic are different from the general community and hence information and deductions from this study cannot be generalized to the entire population. The population segment that seek treatment in a private paediatric clinic may not reflect the actual demography and epidemiology of the general population and our findings therefore may only be related to a confined spectrum of parents and patients.

Table I: Characteristics of babies of parents counselled

Characteristics		*Vaccine acceptance (n =280)*				*p* value*
		Yes		No		
		n	%	n	%	
Gender						<0.001
	Male	45	41.3	64	58.7	
	Female	24	14.0	147	86.0	
Race						0.029
	Malay	70	26.5	194	73.5	
	Chinese	5	50.0	5	50.0	
	Indian	4	66.7	2	33.3	
Place of birth						0.066
	Government	105	73.9	37	26.1	
	Private	88	63.8	50	36.2	
Mode of feeding					0.898	
	Breastfed	41	69.5	18	30.5	
	Bottle-fed	92	71.3	37	28.7	
	Mixed feeding	63	68.5	29	31.5	
Place of care						0.265
	Home	26	26.5	72	73.5	
	Day care	60	33.0	122	67.0	

* chi-square test

However, this data is obtained from a part of the population that mostly lived in and near Taman Melawati. An understanding of some aspects of vaccine counselling and vaccine acceptance in relation to patient demography and some other relevant parental and patient features was obtained from the study. It is hoped that our findings may shed some light on the continued usefulness of vaccine counselling as an important patient educational tool even in a private setting, where circumstances may not be ideally suited.

This study showed statistical significance in nine areas which included the baby's gender, the baby's race, the mother's age, the mother's occupation, the ability to claim the vaccine fee, number of previous visits, precounselling parental awareness and the number of counselling sessions. Another interesting finding was the ability of the counselling nurse to guess if the parents, immediately after her counselling session, would be likely to accept the vaccine or not. This guess was made with accuracy based on the highly significant statistical result.(Table III)

Baby's gender and vaccine acceptance The percentage of male babies who accepted the vaccine was greater than the percentage of female babies (Table I). The reason for this could be cultural; some series indicate that male babies have a greater incidence of certain types of diseases[11,12]. This could be a cause for greater parental anxiety in dealing with their male babies. In our study it was felt that both cultural factors and parental anxiety could have contributed to the findings.

Table II: Characteristics of parents counselled

Characteristics		*Vaccine acceptance (N =280)*				*p* value*
		Yes		No		
		n	%	n	%	
Mother's age						0.042
	20-29	36	23.8	115	76.2	
	>=30	45	34.9	84	65.1	
Father's age						
	20-29	33	35.9	59	64.1	0.900
	>=30	66	35.1	122	64.9	
Residence						0.101
	Same area as clinic	40	32.0	85	68.0	
	Different area	36	23.2	119	76.8	
Mother's occupation						0.002
	Home maker	17	23.6	55	76.4	
	Professional/technical	14	21.5	51	78.5	
	Office mgt & others	60	42.0	83	58.0	
Father's occupation						0.651
	Professional/technical	35	33.3	70	66.7	
	Officemgt/Homemaker/others	63	36.0	112	64.0	
Ability to claim vaccine fee						<0.001
	Yes	56	34.1	108	65.9	
	No	89	76.7	27	23.3	
No. of previous visits						<0.001
	0-4	50	19.7	204	80.3	
	=>5	18	69.2	8	30.8	
Parents' awareness						<0.001
	Don't know	52	21.6	189	78.4	
	Heard only/some knowledge/ Have knowledge	26	66.7	13	33.3	

* chi-square test

Race and vaccine acceptance As Table I illustrates, there is statistical significance. In this study the highest percentage of parents of babies who accepted the vaccine were of Indian ethnicity. As seen in Table I, most patients in this study were of Malay ethnicity. In view of the comparatively small number of Chinese and Indians involved in this study, we are unable to make any definite conclusion pertaining to the influence of race and vaccine acceptance from this study.

The place of birth and mode of feeding of the babies showed no significant association.

The place of care This important factor in the epidemiology of rotavirus diarrhoea and which was also included in the counselling,did not influence the result of the study as there was no significant association as is clear in Table I.

Mother's age and vaccine acceptance As evident in Table II, we found that there was a greater percentage of acceptance of the vaccine among the older mothers. It was felt, that experience from severe diarrhoeal episodes from their previous babies was one important contributory factor in convincing these mothers of the cost-effectiveness and importance of the rotavirus vaccine. It was also likely, though not statistically tested as related variables in the acceptance of the vaccine, that the older mothers tended to have some previous knowledge of the rotavirus diarrhoea or the vaccine. This could probably be another factor in their more ready acceptance of the vaccine counselling. We felt strongly that many older mothers who accepted the vaccine had the ability to claim the fee paid for the vaccine from their offices although the link between age and the ability to claim were, again, not variables that were tested independently due to inherent constraints in a private clinic.

Father's age No statistical association was noted.

Residence No association was noted.

Parental occupation This had a significant association with maternal occupation. This association was possibly mainly due to the facility for reimbursement of the vaccination fee. As is obvious in Table II, it is noteworthy that in this study the highest percentage of mothers who did not accept the vaccine counselling belonged to the professionals and technically-associated vocations. We feel that maternal occupation was not linked to the mother's level of understanding of the disease although this was not

Table III: Vaccine acceptance, by counselling sessions and nurse's guess

Characteristics		*Vaccine acceptance (n =280)*				*p* value*
		Yes		No		
		n	%	n	%	
No. of counselling sessions						0.001
	1	44	22.6	151	77.4	
	>=2	36	42.4	49	57.6	
Nurse's guess						<0.001
	Yes	55	59.8	37	40.2	
	No/Not sure	43	22.9	145	77.1	

* chi-square test

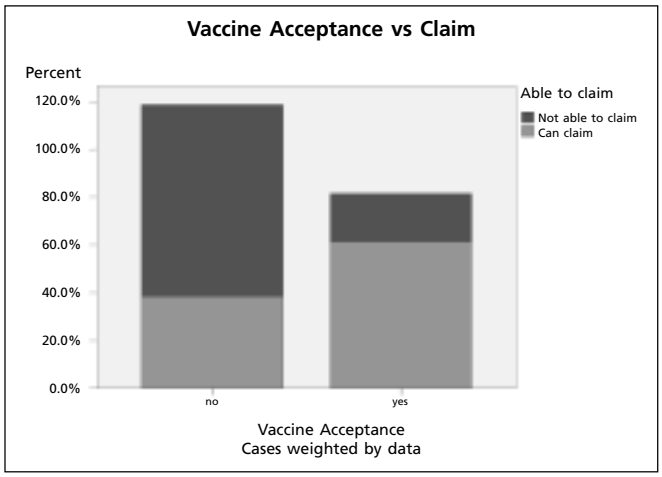

Fig. 1: Vaccine acceptance among those could claim or get free reimbursement of the vaccine bills vs those who could not claim the vaccine bills indicates that more patients who could claim took the vaccine.

independantly statistically tested. Likewise, the mother's occupation had little to do with having previous knowledge or awareness of the disease or the availability of the vaccine.

There was no significant association with the *father's occupation* and counselling acceptance.

The ability to claim the vaccine fee and hence the mode of payment to vaccine acceptance showed significant differences and higher vaccine acceptance rates among those who could claim the vaccine fee from their companies or offices from those who could not. (Figure 1) The mode of payment and the ability to obtain reimbursement for the vaccine fee was a highly significant factor, as seen in Table II, in the acceptance of counselling and indicates that an obvious relationship exists between the cost of optional vaccines and its acceptance. These were not different from all other services rendered in a private specialist clinic where cost is undoubtedly an important factor. It could be reasonably postulated that the acceptance rates will be significantly higher if this vaccine is offered free by the government.

Number of previous visits The number of previous visits and vaccine acceptance showed that the more times the patient came to the clinic the higher the acceptance rate. (Table II) It may be assumed that familiarity of the patient and parents to the surrounding, and increased confidence levels with the doctor and nurse were important factors. The improved patient-clinic rapport undoubtedly increased the comfort zone for more questioning by the patients who were less conscious of the questions asked. Eagerness to find out how many other patients had taken the vaccine and increased probability of constructive mother–to–mother exchange of views were some plausible explanations as to why more than one visit to the clinic yielded more positive counselling results.

Parent's awareness Prior to counselling, a significant proportion of parents in this study were not aware of the public health impact of rotavirus disease or its potential for causing severe disease and prevention through vaccination. This finding concurs with the finding in other studies[13]. In general many parents knew that diarrhoea could cause hospitalization and death among children. Many parents were surprised that the rotavirus was a hardy virus that could live for a period of time on surfaces of toys and could not be destroyed by ordinary methods of cleaning. They expressed interest on this matter and asked questions. However, it should be emphasized that this level of precounselling knowledge of vaccine does not reflect the knowledge of the parents in general who came to the clinic as the inclusion criteria did not include all those who by themselves came to take the vaccination without being counselled.

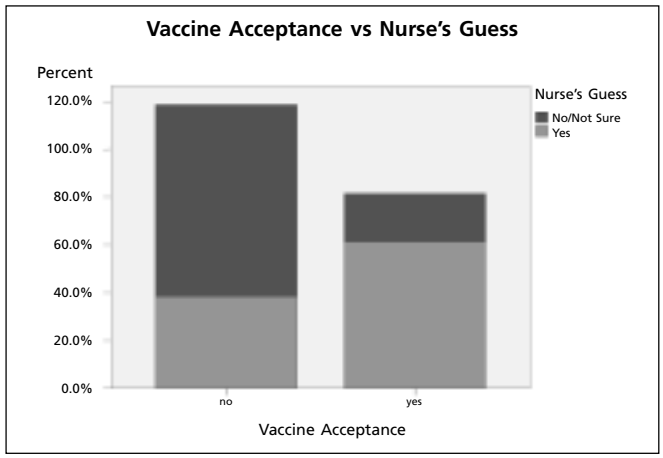

Fig. 2: Vaccine acceptance vs Nurse's Guess shows the counselling nurse was able to guess with reasonable accuracy among those who accepted and did not accept the vaccine.

Our data suggest that an initial lack of disease awareness may be one barrier to acceptance of vaccine as the percentage who had some precounselling awareness of the vaccine seemed to accept the counselling more readily as seen in Table II. Vaccine awareness as an obstacle to vaccine counselling acceptance was also found in other studies[14,15]. It was felt that prior knowledge of the disease or the vaccine gives an edge to the counselling nurse as the ability to grasp the information seemed to be enhanced with a tendency for greater relevance and focus in the questions asked. Only one baby's parents knew of the association with intussussception.

Counselling sessions and vaccine acceptance showed the greater the number of counselling sessions, the greater the chance of accepting the vaccine as shown in Table III. In this study we limited the maximum number of actual counselling sessions to four. The level of patient understanding, the depth and the clarity of understanding were thought to be contributory factors. As we gathered, the patient also had more time to do a cyber-search on information regarding side effects. As the counselling sessions increased, the level of trust of patient towards the doctor and nurse and the clinic improved. This had a positive counselling result. It was also felt, though not statistically analysed, that the number of relevant questions asked by patients seemed to increase with the number of counselling sessions.

Nurse's guess The ability of the counselling nurse to guess correctly on whether the vaccine would or would not be accepted by the patient was shown to be significantly accurate (Table III and Figure 2). The positive visual, verbal and non-verbal cues given by both parents when accepting the counselling was significantly picked up by the counselling nurse. The interest in attentive listening and relevant questioning were positive indicators in patient acceptance. It was subjectively felt that the first five minutes of undivided attention given by both parents simultaneously, was perhaps an important indicator that the 'message' was positively "sent across". It may also be a point worth considering in the meaningfulness of continued counselling sessions during subsequent visits. These are important considerations in a private clinic with limited time and resources in terms of staffing.

CONCLUSION

Admittedly, a private paediatric setting has numerous restrictions in terms of the ideal set up for counselling, the findings of this study should encourage paediatricians to perservere to counsel vaccines in their clinics. Counselling is especially important in vaccinations that are not yet made compulsory in the government vaccination schedule. This is mainly because counselling on such useful vaccines can be an integral part of health education to the public, and can provide useful protection against vaccine-preventable diseases to the patients who accept the counselling.

The level of pre-counselling knowledge of the vaccine in a selected group of parents and the subsequent acceptance of the vaccine, post-counselling, given the cost constraints and other factors discussed, should definitely encourage all paediatricians to continue efforts on vaccine counselling whenever possible. The results of these analyses indicate that a private clinic can also benefit by active vaccine counselling in terms of improving rapport and patient confidence with the clinic as a whole. Clearly, even if the initial counselling session is not successful one should not be discouraged. This is due to many other positive attributes that can be obtained by counselling, such as improvement of the clinic-patient relationship and trust and higher patient confidence levels in the doctor and the nurse which is statistically indicated by greater acceptance of the counselling during subsequent visits. Counselling more than once at ensuing visits also gives the parents greater opportunity to assimilate relevant information regarding the vaccine. This has been shown to improve rotavirus vaccine acceptance rates. The results obtained with regards to the payment mode and the acceptance of rotavirus vaccine counselling indicates that cost is certainly an issue in rotavirus vaccine acceptance rates and it is reasonable to assume that many more patients will accept the vaccine if it is incorporated into the routine government vaccination schedule.

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