

Parental Perception and Attitude on Childhood Immunization and Other Government Healthcare Programs after the Dengue Vaccine Controversy: A Hospital-Based-Cross-Sectional Study*

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The dengue vaccine controversy in the Philippines caused significant public anxiety affecting childhood vaccines, as well as other healthcare programs. An assessment of parental perception and attitude on childhood immunization and other government healthcare programs after the dengue vaccine controversy is lacking in the local setting. This study determined the perception and attitude of parents on childhood immunization and other government health care programs after the dengue vaccine controversy at a tertiary pediatric hospital in Quezon City.

A hospital-based cross-sectional survey was done at a tertiary pediatric hospital. A total of 96 subjects participated in the study. Parents with children ages 9 to 18 years old whose child was either vaccinated or non-vaccinated with dengue vaccine seen in the dengue clinic, outpatient department and private clinics were invited to answer the structured questionnaire. Proportional stratified sampling was employed. Mann Whitney U-test compared the perception and attitude scores between parents of children who were recipients and non-recipients of dengue vaccine. A p-value of <0.05 was considered as significant.

The overall perception and attitude of parents on childhood immunization, deworming and vitamin A supplementation did not differ significantly between parents of non-dengue vaccinated children and dengue-vaccinated children (P-value >0.05). Sociodemographic factors such as gender, marital status, educational

attainment, employment and economic status did not differ significantly in their perception and attitude in terms of childhood immunization, deworming and vitamin A supplementation. (P-value >0.05)

The overall perception and attitude of parents in both groups showed no significant difference toward childhood immunization, deworming and vitamin A supplementation. This study showed that there is no association with the overall perception and attitude of parents on childhood immunization, deworming and vitamin A supplementation and their sociodemographic factors.

KEYWORDS: dengue vaccine, childhood immunization, deworming, vitamin A supplementation

INTRODUCTION

The World Health Organization (WHO) reported dengue fever as one of the most important mosquito-borne viral illnesses. It is a growing global threat that has rapidly spread to all tropical and subtropical regions in the recent decades, posing significant socioeconomic and disease burden.^{1,2} Dengue fever is regarded as one of the major public health problems in the Philippines. In response to this, the Department of Health (DOH) implemented the National Dengue Prevention and Control Program. The strategies of this program include surveillance, case management and

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diagnosis, integrated vector management, outbreak response, health promotion, advocacy and research.³

Despite the consistent effort of the international and local government to reduce dengue burden, there is still growing global epidemic of dengue hence the WHO Initiative for Vaccine Research (IVR) facilitated the development and introduction of dengue vaccines.⁴ CYD-TDV (live attenuated dengue vaccine) was developed by Sanofi Pasteur (Lyon, France) for use in individuals aged 9 to 45 years, in five low or middle income countries: Brazil, Costa Rica, El Salvador, Mexico and Philippines.⁵ The DOH launched its school-based dengue immunization program last April 4, 2016 vaccinating grade 4 students from the National Capital Region, CALABARZON, and Central Luzon.⁶ As of December 2017, approximately 800,000 children were administered with the dengue vaccine.⁷

In November 2017, Sanofi made an official statement that the live attenuated dengue vaccine may pose severe dengue among those who had not contracted the disease previously.⁸ This announcement led to the temporary suspension of school-based dengue vaccination program which then ensued panic and confusion among parents and relatives of children vaccinated with dengue vaccine. The controversy has gained much attention affecting government-initiated health programs. The fear from this controversy resulted to parents refusing to vaccinate their children even against established vaccine preventable diseases, which gave rise to a phenomenon known as vaccine hesitancy. The phrase "vaccine hesitancy" refers to a delay in acceptance or refusal of safe vaccines despite the availability of vaccination services. To date, 1 in 5 children worldwide fail to receive routine immunization, and about 1.5 million children die each year of diseases that could be prevented by vaccination. Concern over vaccine safety is one of the most dominant reasons for vaccine hesitancy. These concerns could have been brought by widely circulating media reports highlighting a rare

occurrence of an adverse reaction to a vaccine or associating certain disorders to vaccines or their components. Most of these concerns were unfounded or without clear evidence and yet somehow managed to instill fear in the minds of parents.⁹ The series of events led the author to come up with a study which aims to determine parents' perception and attitude towards childhood immunization and other government healthcare programs after the dengue vaccine controversy.

METHODOLOGY

Study Design

This is a cross sectional study conducted in the Outpatient Department of a Tertiary Pediatric Hospital in Quezon City.

Study Participants

Inclusion Criteria

The participants enrolled in this study are parents of children ages 9 to 18 years old consulting at the Outpatient Department of a Tertiary Pediatric Hospital regardless of vaccination status for dengue fever. They were invited to participate in the survey and were requested to sign a written informed consent before the questionnaire administration.

Sample size

The population of this study are parents of children ages 9 to 18 years old whose child was either vaccinated or non-vaccinated with the dengue vaccine seen in the dengue clinic, outpatient department and private clinics. In the hospital census, there were around 11,259 members of this population (7,866 from the dengue clinic, 2,618 from OPD charity clinic and 775 from the private clinics).

The formula used to compute the sample size necessary to answer the primary objective of this descriptive study is

$$n = deff \times \frac{N\hat{p}\hat{q}}{\frac{d^2}{1.96^2}(N-1) + \hat{p}\hat{q}}$$

where

n = sample size

$deff$ = design effect

N = population size

$\hat{p}$ = the estimated proportion

$\hat{q} = 1 - \hat{p}$

d = desired absolute precision or absolute level of precision

Using a design effect of 1, population size of 11,259, 50% hypothesized frequency to give the highest possible minimum sample size, 95% precision, and 95% confidence interval; the computed minimum sample size is 96. Using proportional stratified sampling, 67 were parents of children from the dengue clinic while 22 were parents from the OPD charity clinic and 7 were parents from the private clinics.

Study procedure

The study protocol was reviewed and approved by PCMC Institutional Research Ethics Committee (IREC) prior to the conduct of the study.

The principal investigator conducted a research orientation with the members of the research team. Duties and responsibilities were assigned to each member before commencement of the study.

The principal investigator conducted a focused group discussion involving eight parents. There was equal number of male and female participants with age 20 years old and above, with children consulting at the outpatient department. The length of the focus group discussion (FGD) was 60 minutes. The FGD was held at a consultation room near the outpatient clinic. The participants answered ten open-ended questions (Appendix I) after they have voluntarily signed a written informed consent (Appendix II). The principal investigator

formulated a 13-item questionnaire from the data gathered from the focused group discussion conducted.

Study instrument

The questionnaire used in this study was formulated from the data gathered from the focused group discussion. This questionnaire was validated using both the English and Filipino languages. The internal consistency of the questionnaire was measured using Cronbach's alpha while Interclass correlation coefficient was used to measure test-retest reliability.

The minimum sample size requirement to validate the tool was 26 based on the target Cronbach's alpha of 0.90 for a 13-item questionnaire with significance level of 5%, power of 95%, and target of excluding Cronbach's alpha of 0.7 in the confidence interval.

The items were answered by each participant using a five-point Likert scale. The possible responses ranged from "strongly disagree" to "strongly agree". A score of zero to four could be received for each statement.

The internal consistency of the questionnaire showed a high Cronbach alpha of .756 which indicates good internal consistency among the items in the questionnaire. This means that the items consistently measure the parental perceptions and attitudes on childhood immunization and other government healthcare programs after the dengue vaccine controversy.

The test-retest reliability of the questionnaire which was measured by Interclass correlation showed a high test-retest correlation of 0.877 which indicates good reliability of the questionnaire. This means that individuals consistently report the same responses during different time periods. (See Appendix III)

New participants for the study were then recruited and oriented by the principal investigator. The investigator explained the study thoroughly and gave the participants adequate time and opportunity to raise questions. All inquiries from the participants were addressed. The participants were asked to sign a voluntary informed consent (See Appendix IV) after the investigator made sure that all of the subjects have fully understood the proceedings. Once qualified, the data from each participant were gathered using the General Information Sheet. Each subject answered a 13-item questionnaire formulated from the previously conducted focused group discussion. (See Appendix V) The data were encoded and analyzed. (See Appendix VI)

Ethical considerations

This research was reviewed and approved by the Institutional Review and Ethics Committee. The principal investigator proceeded with the study after its approval. All the qualified participants signed voluntarily the informed consent before proceeding with the study. Each participant was oriented and was given the right to withdraw at any point of the study. There was no compensation in any form given to any of the participants.

The investigators ensured the confidentiality of the data gathered in this study. The participants were assured that all the results were used solely for the purpose of this study.

Data processing and Data analysis

The sociodemographic characteristics of the participant were described as categorical variables and summarized using frequencies and proportion. The perceptions and attitudes of parents, the distribution of parents who strongly agree, agree, neutral, disagree, and strongly disagree per question in the tool were summarized using frequencies and proportion. A numerical value was assigned to each response (0- strongly disagree, 1-disagree, 2- neutral, 3-agree, 4-strongly

agree). The median and range of ratings per item in the questionnaire were also described. Mann Whitney U-test was used to compare the perception and attitude scores between parents of children who were recipients and non-recipients of dengue vaccine. SPSS 23 was used in all analysis. A p-value of <0.05 was considered as significant.

The answers to the 13-item questionnaire were grouped according to the following variables:

1. Parental perception towards childhood immunization, 2. Parental attitude towards childhood immunization, 3. Parental perception towards deworming and 4. Parental perception towards vitamin A supplementation then the weighted means were computed using the five-point scale with the following interpretation:

Range	Verbal Interpretation
0.00 to 0.79	Generally, strongly disagree
0.80 to 1.59	Generally, disagree
1.60 to 2.39	Generally, not sure
2.40 to 3.19	Generally, agree
3.20 to 4.00	Generally, strongly agree

RESULTS

A. Demographic Data

A total of 96 participants completed the questionnaire. Majority (51%) of the respondents were 30 to 41 years old with a mean age of 39. Eighty-six percent (86%) of the respondents were females. More than half (67%) were married and 64% of the respondents were high school graduates. Majority (92%) of the participants belong to the lower income class. Thirty one percent (31%) of the participants have children who received the Dengue vaccine (see Table 1).

Table 1. Comparative Frequency and Percentage Distribution of the Sociodemographic Characteristics of Parents of Dengue Vaccine Recipients and Non-Dengue Vaccine Recipients

Characteristics (n=96)	Dengue Vaccine Non-Recipients n=66, n (%)	Dengue Vaccine Recipients n=30, n (%)
Age of Parents		
18-29	9 (13.6)	1 (3.3)
30-41	35 (53.0)	14 (46.7)
42-53	19 (28.8)	14 (46.7)
54 and above	3 (4.5)	1 (3.3)
Gender		
Male	7 (10.6)	3 (10.0)
Female	57 (89.4)	27 (90.0)
Marital Status		
Single	20 (30.3)	6 (20.0)
Married	41 (62.1)	23 (76.7)
Separated	4 (6.1)	1 (3.3)
Widowed	1 (1.5)	0 (0.0)
Educational Attainment of Parents		
Primary	5 (7.6)	1 (3.3)
Secondary	40 (60.6)	21 (70.0)
College	13 (19.7)	4 (13.3)
Graduate Level	7 (10.6)	4 (13.3)
Vocational	1 (1.5)	0 (0.0)
Employment		
Employed	21 (31.8)	8 (26.6)
Unemployed	45 (68.2)	22 (73.3)
Monthly income		
Upper Class ($\geq$ 80,000)	2 (3.0)	1 (3.3)
Middle Class (30,000-79,999)	3 (4.5)	2 (6.7)
Lower Class ($\leq$ 29,000 pesos)	61 (92.4)	27 (90.0)
Number of Children		
1	8 (12.1)	4 (13.3)
2	14 (21.2)	9 (30.0)
3	23 (34.8)	10 (33.3)
$\geq$ 4	21 (31.8)	7 (23.3)
Number of Children given Dengue Vaccine		
1	0 (0.0)	22 (73.3)
2	0 (0.0)	8 (26.6)
3	0 (0.0)	0 (0.0)
$\geq$ 4	0 (0.0)	0 (0.0)

B. Parental Perception on Childhood Immunization

Eighty five percent (85%) of parents of dengue vaccine non-recipients and 83% of dengue vaccine recipients responded positively that vaccines strengthen their child's immunity (agree and strongly agree). The two groups perceived childhood immunization as safe and effective (dengue vaccine non-recipients 86.9%, dengue vaccine recipients 73.3%). Majority of the respondents (56.2%) are not sure if newer vaccines carry more risks and adverse effects. Parents from both groups perceived that doctors are still the most reliable source of information about childhood immunization (dengue vaccine non-recipients 90.8% dengue vaccine recipients 96.6%). Thirty-three

percent of dengue vaccine non-recipients and 43.4% of dengue vaccine recipients are not sure if childhood vaccines cause harmful adverse effects, illness and even death. Fifty-five percent (55%) of the respondents agreed and strongly agreed that information about benefits and side effects of childhood vaccines are readily available and accessible. (See Table 2)

The overall perception of parents towards childhood immunization after the dengue vaccine controversy averaged to 2.56 ± 0.51 with a verbal interpretation of generally agree. The mean score on perception of non-dengue vaccinated children (2.56 ± 0.49) and dengue vaccinated children (2.54 ± 0.56) are not significantly different (P-value 0.629).

Table 2. Perception of Parents on Childhood Immunization after the Dengue Vaccine Controversy

Variables	Likert scale responses	(n=96), n (%)	Dengue vaccine Non-Recipients (n=66), n (%)	Dengue vaccine Recipients (n=30), n (%)	P-value
Childhood vaccines strengthen my child's immunity	Strongly disagree	3 (3.1)	1 (1.5)	2 (6.6)	0.1056
	Disagree	1 (1.0)	1 (1.5)	0 (0.0)	
	Not sure	11 (11.4)	8 (12.1)	3 (10)	
	Agree	36 (37.5)	21 (31.8)	15 (50)	
	Strongly Agree	45 (46.8)	35 (53)	10 (33.3)	
Childhood immunization is safe and effective	Strongly disagree	4 (4.1)	2 (3.0)	2 (6.6)	0.1959
	Disagree	2 (2.0)	1 (1.5)	1 (3.3)	
	Not sure	10 (10.0)	5 (7.5)	5 (16.6)	
	Agree	43 (44.7)	31 (46.9)	12 (40.0)	
	Strongly Agree	37 (38.5)	27 (40.0)	10 (33.3)	
Newer vaccines carry more risks and adverse effects.	Strongly disagree	15 (15.6)	12 (7.9)	3 (10.0)	0.1813
	Disagree	15 (15.6)	10 (15)	5 (16.6)	
	Not sure	54 (56.2)	37 (56)	17 (56.6)	
	Agree	7 (7.2)	5 (7.5)	2 (6.6)	
	Strongly Agree	5 (5.2)	2 (3.0)	3 (10.0)	
Doctors are the most reliable sources of information about childhood immunization.	Strongly disagree	2 (2.0)	2 (3.0)	0 (0.0)	0.9891
	Disagree	1 (1.0)	1 (1.5)	0 (0.0)	
	Not sure	4 (4.1)	3 (4.5)	1 (3.3)	
	Agree	32 (33.3)	18 (27.2)	14 (46.6)	
	Strongly Agree	57 (59.3)	42 (63.6)	15 (50)	
Childhood vaccines cause many harmful adverse effects, illness and even death.	Strongly disagree	22 (22.9)	17 (25.7)	5 (3.3)	0.0996
	Disagree	35 (36.4)	26 (39.3)	9 (30.0)	
	Not sure	35 (36.4)	22 (33.3)	13 (43.4)	
	Agree	2 (2.0)	1 (1.5)	1 (3.3)	
	Strongly Agree	2 (2.0)	0 (0.0)	2 (6.6)	
Information about benefits and side effects of childhood vaccines are readily available.	Strongly disagree	3 (3.10)	2 (3.0)	1 (3.3)	0.1214
	Disagree	7 (7.2)	5 (7.5)	2 (6.6)	
	Not sure	33 (34.3)	20 (30)	13 (43.4)	
	Agree	41 (42.7)	30 (45.4)	11 (36.6)	
	Strongly Agree	12 (12.5)	2 (3.0)	3 (10.0)	
Overall perception	Mean	2.56	2.56	2.54	0.629
	SD	0.51	0.49	0.56	

C. Parental Attitude on Childhood Immunization

Parents in both groups (dengue vaccine non-recipients 87.8%, dengue vaccine recipients 79.0%) agreed to vaccinate their children by a doctor or in the presence of a doctor. The two groups affirmed (87.4%) that a general consult must be done before vaccine administration. Majority, 72.8% of these parents (dengue vaccine non-recipients 77.2%, dengue vaccine recipients 63.2%) showed positive attitude towards childhood immunization provided that they were informed and understood the expected side effects before vaccine administration. (See Table 3)

The overall attitude of parents towards childhood immunization after the dengue vaccine controversy averaged to 3.04 ± 0.77 with a verbal interpretation of generally agree. The mean score on attitude of parents of non-dengue vaccinated children (3.07 ± 0.73) and dengue vaccinated children (2.80 ± 1.08) towards childhood immunization after the dengue vaccine controversy did not differ significantly (P-value 0.778).

Table 3. Attitude of Parents on Childhood Immunization after the Dengue Vaccine Controversy

Variables		(n=96), n (%)	Dengue vaccine Non-Recipients (n=66), n (%)	Dengue vaccine Recipients (n=30), n (%)	P-value
I will only allow my children to be vaccinated during their scheduled immunization if:					
It will be administered by a doctor or in a presence of a doctor.	Strongly disagree	3 (3.1)	2 (3.0)	1 (3.3)	0.9861
	Disagree	1 (1.0)	0 (0.0)	1 (3.3)	
	Not sure	10 (10.4)	6 (9.0)	4 (13.3)	
	Agree	50 (52.0)	36 (54.5)	14 (46.6)	
	Strongly Agree	32 (33.3)	22 (33.3)	10 (33.3)	
Check-up will be done before giving the vaccines.	Strongly disagree	3 (3.1)	2 (3.0)	1 (3.3)	0.8112
	Disagree	2 (2.0)	2 (3.0)	0 (0.0)	
	Not sure	7 (7.2)	5 (1.5)	2 (3.3)	
	Agree	47 (48.9)	31 (46.9)	16 (53.5)	
	Strongly Agree	37 (38.5)	26 (39.3)	11 (36.6)	
I have fully understood the expected side effects.	Strongly disagree	3 (3.1)	2 (3.0)	1 (3.3)	0.6389
	Disagree	2 (2.0)	1 (1.5)	1 (3.3)	
	Not sure	21 (21.8)	12 (18.1)	9 (30)	
	Agree	47 (48.9)	36 (54.5)	11 (36.6)	
	Strongly Agree	23 (23.9)	15 (22.7)	8 (26.6)	
Overall Attitude	Mean	3.04	3.07	2.80	0.778
	SD	0.77	0.73	1.08	

D. Parental Perception on Government Healthcare Programs

This study determined the effect of dengue vaccine controversy on other government healthcare programs. The results showed that 73% of parents of dengue vaccine non-recipients and 70% of parents of dengue vaccine recipients perceived that deworming is safe and effective. The participants from both groups agreed (39.5%) and strongly agreed (32.3%) that parasitism can lead to malnutrition. However, 35.4% of parents from both groups (dengue vaccine non-recipients 33.3%, dengue vaccine recipients 40%) are uncertain of the adverse effects of deworming. (see Table 4)

The overall mean perception scores of parents towards deworming is 2.65 ± 0.62 with verbal interpretation of generally agree. The mean score on perception of non-dengue vaccinated children (2.65 ± 0.65) and dengue vaccinated children

(2.63 ± 0.33) on deworming are not significantly different (P-value 0.076).

Ninety percent of the respondents perceived that vitamin A supplementation is safe and effective. It has a mean score of 3.24 with a verbal interpretation of generally agree. The mean score on perception of non-dengue vaccinated children (3.28 ± 0.82) and dengue vaccinated children (2.90 ± 1.60) on vitamin A supplementation are not significantly different (P-value 0.938).

Table 4. Perception of Parents on Other Government Health Care Programs

Variables		(n=96), n (%)	Dengue vaccine Non- Recipients (n=66), n (%)	Dengue vaccine Recipients (n=30), n (%)	P-value
Government healthcare programs such as deworming is safe and effective.	Strongly disagree	2 (2.0)	1 (1.5)	1 (3.3)	0.969
	Disagree	1 (1.0)	1 (1.5)	0 (0.0)	
	Not sure	24 (25.0)	16 (24.2)	8 (26.6)	
	Agree	38 (39.5)	27 (40.9)	11 (36.6)	
	Strongly Agree	31 (32.3)	21 (31.8)	10 (33.3)	
Parasitic worms in children can lead to malnutrition.	Strongly disagree	2 (2.0)	1 (1.5)	1 (3.3)	0.3827
	Disagree	1 (1.0)	0 (0.0)	1 (3.3)	
	Not sure	6 (6.2)	3 (4.5)	3 (10)	
	Agree	44 (45.8)	31 (46.9)	13 (43.3)	
	Strongly Agree	43 (44.7)	31 (46.9)	12 (40)	
Deworming has harmful adverse effects to children and some even lead to deaths.	Strongly disagree	14 (14.5)	9 (13.6)	5 (3.3)	0.2224
	Disagree	26 (27)	17 (25.7)	9 (30)	
	Not sure	34 (35.4)	22 (33.3)	12 (40)	
	Agree	12 (12.5)	10 (15.1)	2 (6.6)	
	Strongly Agree	10 (10.4)	8 (12.1)	2 (6.6)	
Overall Perception	Mean	2.65	2.65	2.63	0.076
	SD	0.62	0.65	0.33	
Government healthcare programs such as Vitamin A Supplementation is safe and effective.	Strongly disagree	2 (2.0)	1 (1.5)	1 (3.3)	0.9380
	Disagree	1 (1.0)	1 (1.5)	0 (0.0)	
	Not sure	7 (7.2)	2 (3.0)	5 (16.6)	
	Agree	41 (42.7)	32 (48.4)	9 (30)	
	Strongly Agree	45 (46.8)	30 (45.4)	15 (50)	
Overall Perception	Mean	3.24	3.28	2.90	0.938
	SD	0.93	0.82	1.60	

E. Association of Sociodemographic Characteristics and Parental Perception and Attitude on Childhood Immunization, Deworming and Vitamin A supplementation

The overall mean perception on childhood immunization of female and male parents is 2.56. It has a verbal interpretation of generally agree. Analysis showed that there is no significant difference on the perception of female and male respondents on childhood immunization (P-value 0.400).

The overall mean attitude on childhood immunization of female and male parents is 3.04 with a verbal interpretation of generally agree. Analysis showed that there is no significant difference on the attitude of female and male respondents on childhood immunization (P-value 0.523).

The evaluation of the overall mean perception of female and male parents on deworming is 2.65. It has a verbal interpretation of generally agree. Analysis showed that there is no significant difference on the perception of female and male respondents on deworming (P-value 0.980).

Assessment of the overall mean perception of female and male parents on vitamin A supplementation is 3.24 with a verbal interpretation of generally strongly agree. This study showed that there is no significant difference on the gender of parents and their perception on vitamin A supplementation (P-value 0.901). (See Table 5)

Table 5. Association of Gender and Parental Perception and Attitude on Childhood Immunization, Deworming and Vitamin A supplementation

Variables		Overall Mean	Female n = 84 (87.5%)	Male n = 12 (12.5%)	P-value
Perception on immunization	Mean	2.56	2.57	2.47	0.400
	SD	0.51	0.49	0.66	
Attitude on immunization	Mean	3.04	3.07	2.80	0.523
	SD	0.77	0.73	1.08	
Perception on deworming	Mean	2.65	2.65	2.63	0.980
	SD	0.62	0.65	0.33	
Perception on Vitamin A supplementation	Mean	3.24	3.28	2.90	0.901
	SD	0.93	0.82	1.60	

The result of this study showed that the overall mean perception on childhood immunization of single and married parents is 2.56. It has a verbal interpretation of generally agree. The data in this study showed that there is no significant difference on the marital status of parents and their perception on childhood immunization (P-value 0.533).

The outcome of this study demonstrates that the overall mean attitude on childhood immunization of single and married parents is 3.04. It is interpreted as generally agree. The result of the evaluation showed that there is no significant difference on the perception of single and married parents on childhood immunization (P-value 0.682).

The overall mean perception on deworming of single and married parents is 2.65. The mean is verbally interpreted as generally agree. Analysis showed that there is no significant difference on the marital status of parents and their perception on deworming (P-value 0.643).

The analysis of this study revealed that the overall mean perception of single and married parents on vitamin A supplementation is 3.24. This study showed that regardless of marital status, the respondents generally strongly agreed on vitamin A supplementation. Analysis showed that there is no significant difference on the marital status of parents and their perception on vitamin A supplementation (P-value 0.997). (See Table 6)

Table 6. Association of Marital Status and Parental Perception and Attitude on Childhood Immunization, Deworming and Vitamin A supplementation

Variables		Overall Mean	Single, Widowed, or Separated n = 30 (87.5%)	Married n = 66 (12.5%)	P-value
Perception on immunization	Mean	2.56	2.52	2.57	0.533
	SD	0.51	0.51	0.51	
Attitude on immunization	Mean	3.04	3.00	3.06	0.682
	SD	0.77	0.98	0.64	
Perception on deworming	Mean	2.65	2.67	2.64	0.643
	SD	0.62	0.67	0.60	
Perception on Vitamin A supplementation	Mean	3.24	3.09	3.31	0.997
	SD	0.93	1.25	0.71	

The overall mean perception on childhood immunization of parents with primary, secondary or vocational and college or graduate level of education is 2.56. It has a verbal interpretation of generally agree. The analysis of this study showed that there is no significant difference on the educational attainment of parents and their perception on childhood immunization (P-value 0.090).

The results of this study demonstrate that the overall mean attitude on childhood immunization of parents with primary, secondary or vocational and college or graduate level of education is 3.04. This analysis showed that regardless of educational attainment, the respondents generally agree on childhood immunization. The evaluation of this report showed that there is no significant difference on the level of

education of parents and their attitude on childhood immunization (P-value 0.304).

The analysis of this study showed that the overall mean perception on deworming of parents with primary, secondary or vocational and college or graduate level of education is 2.65. This study shows that parents generally agree on deworming regardless of educational attainment. Further analysis showed that there is no significant difference on the educational attainment of parents and their perception on deworming (P-value 0.787).

The overall mean perception of parents of all level of education on vitamin A supplementation is 3.24. This data showed that regardless of parental level of education, the respondents generally strongly agreed on vitamin A supplementation. There is no significant difference on parents' educational attainment and their perception on vitamin A supplementation (P-value 0.827). (See Table 7)

Table 7. Association of Educational Attainment and Parental Perception and Attitude on Childhood Immunization, Deworming and Vitamin A Supplementation

Variables		Overall Mean	Primary, Secondary or Vocational n = 30 (%)	College or Graduate n = 66 (12.5%)	P-value
Perception on immunization	Mean	2.56	2.50	2.69	0.090
	SD	0.51	0.50	0.51	
Attitude on immunization	Mean	3.04	2.98	3.17	0.304
	SD	0.77	0.81	0.67	
Perception on deworming	Mean	2.65	2.66	2.63	0.787
	SD	0.62	0.69	0.42	
Perception on Vitamin A supplementation	Mean	3.24	3.24	3.24	0.827
	SD	0.93	0.91	0.99	

The overall mean perception (2.56) and attitude (3.04) regardless of employment status on childhood immunization showed that the parents generally agreed on childhood immunization. Statistics showed that there is no significant difference on the employment status of parents and their perception and attitude on childhood immunization. (See Table 8)

The overall mean perception of parents on deworming regardless of employment status is 2.65. The employed and unemployed parents generally agreed on deworming. There is no significant difference regardless of employment status of parents and their perception on deworming (P-value 0.964).

This study showed that the overall mean perception on vitamin A supplementation of both unemployed and employed parents is 3.24. The parents generally strongly agreed on vitamin A supplementation regardless of employment status. Analysis showed that there is no significant difference on the perception of unemployed and employed parents on vitamin A supplementation (P-value 0.865).

Table 8. Association of Employment Status and Parental Perception and Attitude on Childhood Immunization, Deworming and Vitamin A supplementation

Variables		Overall	Unemployed n = 67 (69.8%)	Employed n = 29 (30.2%)	P-value
Perception on immunization	Mean	2.56	2.62	2.42	0.326
	SD	0.51	0.44	0.61	
Attitude on immunization	Mean	3.04	3.05	3.01	0.564
	SD	0.77	0.65	1.00	
Perception on deworming	Mean	2.65	2.67	2.61	0.964
	SD	0.62	0.59	0.68	
Perception on Vitamin A supplementation	Mean	3.24	3.25	3.21	0.865
	SD	0.93	0.88	1.05	

The result of the study showed that the overall mean perception on childhood immunization and economic status is 2.56. The parents of different economic status generally agreed to have their child vaccinated. Analysis showed that there is no significant difference on the economic status of parents and their perception on childhood immunization (P-value 0.947).

The overall mean attitude on childhood immunization of lower class and middle- or upper-class parents is 3.04 with a verbal interpretation of generally agree. Analysis showed that there is no significant difference on the attitude of lower class and middle- or upper-class parents on childhood immunization (P-value 0.631).

This study demonstrates that the overall mean perception of parents of different economic status on deworming is 2.65. Parents with different economic status generally agreed on deworming. The parents' perception on deworming has no significant difference regardless of economic status (P-value 0.703).

The overall mean perception of lower class and middle- or upper-class parents on vitamin A supplementation is 3.24. These parents generally strongly agreed on vitamin A supplementation regardless of their economic status. Analysis showed that there is no significant difference on the perception of lower class and middle- or upper-class parents on vitamin A supplementation (P-value 0.425). (See Table 9)

Table 9. Association of Economic Status and Parental Perception and Attitude on Childhood Immunization, Deworming and Vitamin A supplementation

Variables		Overall	Lower class n = 88 (91.7%)	Middle or Upper class n = 8 (8.3%)	P-value
Perception on immunization	Mean	2.56	2.56	2.52	0.947
	SD	0.51	0.50	0.61	
Attitude on immunization	Mean	3.04	3.04	3.00	0.631
	SD	0.77	0.76	0.91	
Perception on deworming	Mean	2.65	2.65	2.62	0.703
	SD	0.62	0.62	0.60	
Perception on Vitamin A supplementation	Mean	3.24	3.23	3.37	0.425
	SD	0.93	0.92	1.06	

DISCUSSION

Vaccine safety scares are circumstances in which unwanted events are rightly or wrongly connected with vaccination and create feelings of anxiety and distrust in vaccines and health authorities.¹⁰ These scares have the potential to damage public confidence in vaccines and lower immunization rates, resulting in disease outbreaks and deaths.¹¹

In the Philippines, dengue vaccination was suspended in December 2017 when the vaccine manufacturer issued a warning against its own vaccine. Most vaccine memoranda reported on social media and on televisions were on vaccine related deaths. This led to significant public anxiety around dengue vaccine and other childhood vaccines, as well as other health interventions such

as deworming in both public health programs and private clinics.¹² Parents became more conscious on their children's health and changed their health seeking behavior.¹³

Despite the dengue vaccine controversy, parents in this study (84.3%) perceived that childhood vaccines benefit their children by strengthening their immune system. This is line with the study by Alshammari *et al.* which showed that 60-90% of the respondents were knowledgeable regarding the health benefits of vaccinations in children even though 18.4% of their children had experienced vaccination-related minor adverse effects.¹⁴

In line with the safety and effectiveness of childhood immunization, 83.2% of parents from

both groups responded positively (agree and strongly agree). However, four percent from both groups believed that childhood vaccines are harmful with majority are from parents with dengue vaccinated children (9.9%). Some of the respondents, 6.1% (dengue vaccine non-recipients 4.5%, dengue vaccine recipients 9.9%), perceived that childhood immunization is unsafe and not effective. This is also evident in the study conducted by Bults *et al.* which showed that fear of side effects or harmful consequences is the most reported reason of parents in declining the H1N1 vaccination in Netherlands.¹³

Kara *et al.*, reported that an increased frequency of vaccine-related adverse events may result in the global perception that vaccines are hazardous, despite continued improvements in vaccine safety.¹⁵ This is also evident in the statement by the SAGE Vaccine Hesitancy Working Group that past negative or positive experience with a particular vaccination can influence hesitancy or willingness to vaccinate. Personal experience or knowledge of someone who experienced an adverse event following immunization (AEFI) can also influence hesitancy.¹⁶ This negative experience by parents with either vaccinated or non-vaccinated children may have led to vaccine hesitancy. This is contrary to a previous study by King *et al.* which showed that the impact of influenza vaccine suspension in Australia is limited to the influenza vaccine alone. It did not affect their confidence in other established vaccination programs.¹¹

Twelve percent of parents in this study (dengue vaccine non-recipients 10.5%, dengue vaccine recipients 7.6%) perceived that newer vaccines carry more risks and adverse effects. This is line with the study by Noakes *et al.* which showed that respondents were more comfortable with old vaccines that they felt had been tried and tested. The respondents expressed more anxiety when discussing the introduction of new vaccines.¹⁷ According to SAGE Vaccine Hesitancy Working Group, parents may hesitate to accept a new vaccine when not proven to be effective.¹⁶

Despite the vaccine safety scare, majority of parents (92.6%) in this study agreed or strongly

agreed that doctors are the most reliable source of information about childhood immunization. However, 10.3% of parents from both groups disagreed or strongly disagreed that this information is readily available or accessible. This is evident in the local study conducted by Valido *et al.* which showed that trust in public health institutions has been criticized during the dengue vaccine controversy. Doctors are the most cited trustworthy sources of information. The lack of avenues and confidence in discussing what transpired in the implementation of the vaccination program has led to loss of trust in the dengue vaccination as well as other immunization public health programs.¹⁸

King *et al.* concluded that parents accorded great importance on information from a trustworthy and reputable source. General practitioners were acknowledged as a trusted source of information. However, information from physicians was not always a practical solution as they are not immediately accessible.¹¹

This perception of inaccessibility of reliable information led parents to seek additional medical information from social media, television or internet. Knowledge has been identified as an important factor which influence parents' decisions. A wider source of information has been related to a better level of knowledge in the frame of decision-making about vaccination.¹⁹ The absence of clear messages from trusted health authorities created an information void for parents, inadvertently allowing the perpetuation and persistence of a negative association.¹¹

Parents became more hypervigilant about their child's health after the dengue vaccine controversy. Majority of parents in this study are still willing to give the scheduled childhood vaccines to their children provided that it is administered by a doctor or at least in the presence of a primary physician during administration (85.3%), after a thorough general consult has been done (87.4%) and after they have fully understood the benefit and side effects of the vaccine (72.8%). This is evident in the local study by Valido *et al.* wherein there is a

greater demand for more and specific information during the dengue vaccine controversy in the Philippines. After the dengue vaccine scare, these parents now preferred to consult from private health practitioners.¹⁸

A qualitative study conducted in the United Kingdom (UK) to examine parents' views of the Measles Mumps Rubella (MMR) vaccine controversy determined that health scares increase parental information needs, particularly in relation to future vaccination intent. However, it appears that for many study parents, in the circumstance of the suspension, vaccination was conditional on the provision of a clear safety message via authoritative sources.¹¹

Despite the vaccine safety scare, majority of the parents in this study still believed that other government healthcare programs such as deworming and vitamin A supplementation are safe, effective and beneficial. However, 22.9% of the respondents perceived deworming as harmful. This is in line with the study by Larson et al. which showed that dengue vaccine panic does not only undermined trust in the dengue vaccine, vaccines more broadly, but also other interventions provided by health clinics, such as deworming medication.¹²

The overall perception and attitude of parents towards childhood immunization in this study did not differ significantly in terms of gender, marital status, educational attainment, employment status and economic status. This is in line with the study by Brackowska et al. which showed that economic status of families had no significant effect on the opinions about safety of vaccination.²⁰ However this is in contrast with the findings of an earlier study by Brackowska et al. which showed that parents with a higher level of education and past vaccine-related experience encountered more frequent negative opinions on vaccination.²¹ A study by Brown et al. showed that lower vaccine uptake was associated to lower parental income and lower parental education which is in contrast with our study.²²

CONCLUSION and RECOMMENDATIONS

We interviewed a total of 96 parents with children 9 to 18 years old who were non-dengue vaccine recipients and dengue vaccine recipients using a self-administered questionnaire.

The overall perception and attitude of parents in this study showed that they generally agree on childhood immunization, deworming and vitamin A supplementation despite the dengue vaccine controversy. There was no significant difference in the overall perception and attitude of parents whose children were or were not recipients of the dengue vaccine in terms of childhood immunization, deworming and vitamin A supplementation after the dengue vaccine controversy. This study showed that there is no association on the overall perception and attitude of parents on childhood immunization, deworming and vitamin A supplementation and their gender, marital status, educational attainment, employment and economic status.

Future similar studies may be conducted in other provinces or regions to determine parental perception and attitude toward the government's immunization program and other health care programs.

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