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Knowledge, Attitude, and Compliance on Child Immunization among Mothers

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ABSTRACT

This study is focused on the mothers' compliance towards child immunization and its relationship with their demographic profile, knowledge, and attitude. A descriptive-correlational research design was used. There were 150 mothers who participated in the study from Barangay Kauswagan, Cagayan de Oro City selected through purposive sampling. A questionnaire was used to gather the data. The results of this study revealed that most of the mothers (30%) are aged 21-25 years old, 46.7% are living-in with their partners, and 50% are high school graduates. The mothers usually come from families with monthly income of ₱6,000-₱8,999 (21.3%) and ₱9,000-₱11,999 (21.3%), and 49.3% have only one child. Additionally, the mothers are knowledgeable on immunization, have a highly positive attitude towards immunization, and are generally compliant to their children's immunization status. The marital status, knowledge, and attitude of the mothers on immunization are correlated with the mothers' compliance towards child immunization. The best predictor of compliance towards immunization is the knowledge of the mother. The knowledge gained through proper health education from health workers regarding immunization is vital to a successful child immunization program as this will correct misconceptions and provide accurate facts and thorough understanding of child immunization.

Keywords: child immunization, knowledge, attitude, compliance, vaccine-preventable diseases

INTRODUCTION

Recently, in the Philippines, the Measles vaccine has suffered collateral damage from public distrust due to the Dengvaxia vaccine. This was after its manufacturer, Sanofi Pasteur, reported findings that Dengvaxia provides valuable protection for some, but higher risks for others. The fears resulted in a general distrust of the country's immunization program. Some parents refused Measles vaccinations of their children, and this resulted in outbreaks of the highly contagious disease ("To wipe out Measles", 2018).

Even though the Expanded Program on Immunization in the Philippines has already been well-established, alarming cases of the highly contagious vaccine-preventable disease, Measles, have erupted in different regions of our country. This alarming outbreak poses a danger among the entire population.

Although, globally, millions of children are being vaccinated each year to help protect them from infectious, sometimes fatal, vaccine-preventable diseases, a research by WHO and UNICEF in 2016 showed that worldwide, 12.9 million infants, about 1 in 10, did not receive any vaccinations during the year ("1 in 10 infants worldwide", 2016). This critically means that these infants missed the first dose of diphtheria-pertussis-tetanus (DPT)-containing vaccine. Furthermore, an estimated total of about 6.6 million infants who received their first dose of DPT-containing vaccine did not complete the full three doses of DPT immunization series. This puts children at significant risk of potentially deadly diseases.

Since 2010, the percentage of children who were able to receive a full course of routine immunizations has remained at only 86% or 116.5 million infants. This means that there has been no significant change in any countries or regions during the past years, falling short of the target for global immunization coverage which is at 90% ("1 in 10 infants worldwide", 2016).

Child immunization has been considered as one of the most brilliant public health achievements, making it a highly cost-effective life saver among children ages 0-2 years old. In fact, in developing countries across the globe, improving the child immunization coverage is one of the keys to improving over-all national health as this minimizes the need for hospitalizations, treatment costs, and even mortality. However, there are many families that lack adequate knowledge on immunization, the need for subsequent doses, and completing the immunization schedule at an appropriate age. In many studies conducted, the mothers' knowledge and their attitude towards immunization are likely to influence the increasing immunization coverage.

This study mainly focused on the views of the mothers as subjects of this study as they are traditionally considered as the key decision-makers on this matter (Kundi, Obermeier, Helfert, Oubari, Fitzinger, Yun, & Rath, 2015). Although a recent study in New Zealand show that fathers can help improve vaccination coverage, the reason that the fathers' input into decision-making is lower compared to that of the mother because they have fewer opportunities for an interaction with health care specialists (Grant, Chen, Bandara, Marks, Gilchrist, Lewycka, & Morton, 2016).

Thus, it is necessary to gain a good understanding of the knowledge and attitude of mothers of children being immunized as well as their compliance to the age-appropriate immunization schedule of their children. This will help further increase the country's immunization coverage, thereby, leading the Department of Health to achieve its ultimate goal of reducing the morbidity and mortality of children against the most common vaccine-preventable diseases.

FRAMEWORK

This study is anchored on the Health Belief Model (HBM), which is one of the most commonly used conceptual frameworks to understand one's health behavior. It was first developed in the 1950s by social psychologists working in the U.S. Public Health Services, namely, Rosenstock, Hochbaum and Kegels. It was intended to predict which individuals would or would not use such preventive measures (Kozier & Erb, 2010).

The Health Belief Model (HBM) is based on the understanding that an individual will take a health-related action if he/she feels that a negative health condition can be avoided; has a positive expectation that by taking a recommended action, he/she can avoid a negative health condition; and that he/she can successfully take the recommended health action.

The model was first presented with only four key concepts which are: 1.) perceived susceptibility or one's opinion of chances of getting a condition, 2.) perceived severity or one's opinion of how serious a condition and its consequences are, 3.) perceived benefits or one's belief in the efficacy of the advised action to reduce risk or seriousness of impact, and 4.) perceived barriers or one's opinion of the tangible and psychological costs of the advised action. An added concept, cues to action, was added later to "stimulate behavior." Eventually, a recent addition to the model is the concept of self-efficacy or one's confidence in the ability to successfully act. This concept was added in 1988 to help the HBM better fit the

challenges of changing habitual unhealthy behavior.

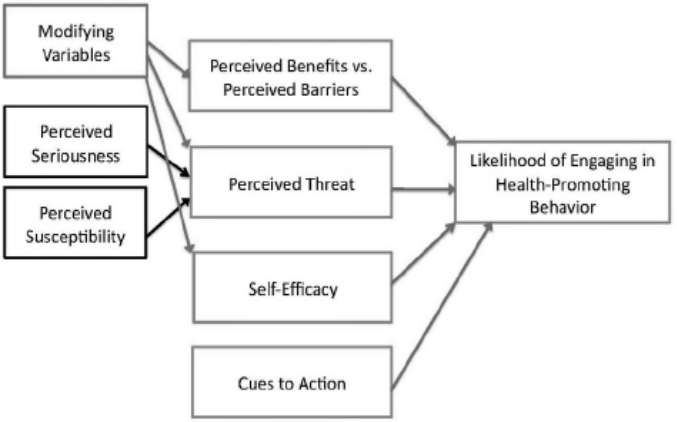

Figure 1. The Health Belief Model

This study is also conceptualized with the Sustainable Development Goals of the United Nations in mind. The Sustainable Development Goals are regarded as the blueprint for achieving a better and a more sustainable future for all, addressing different challenges across the globe including those related to health, poverty, inequality, climate, environmental degradation, and peace and justice. There are 17 interconnected goals identified that the United Nations aims to accomplish and target by 2030, and one of these goals is Goal 3: "Good health and well-being." It ensures healthy lives and promotes the well-being for all at all ages. To be able to meet this goal, individuals are called to vaccinate their family members for protection and to improve public health ("About the Sustainable Development Goals," n.d.). There have been many efforts to fully eradicate a wide range of diseases and address different persistent and emerging health issues, and one of these is the Expanded Program on Immunization.

The Expanded Program on Immunization (EPI) in the Philippines was established on September 16, 1976, through Presidential Decree No. 996 (Department of Health of the Republic of the Philippines, n.d.). It is an act that seeks to provide basic compulsory immunization to infants and children below eight years of age. They shall have access to vaccines that are recommended for their age to avoid vaccine-preventable diseases. The basic immunization services

will include immunization against six vaccine-preventable diseases which initially included tuberculosis, diphtheria, tetanus, pertussis, poliomyelitis, and measles. This mandatory basic immunization is given free of cost at any government hospital or health center. Overall, the goal of the Expanded Program on Immunization is to reduce the morbidity and mortality among children against the most common vaccine-preventable diseases.

On July 26, 2010, Aquino signed Republic Act No. 10152 which is known as the "Mandatory Infants and Children Health Immunization Act of 2011." This mandatory act includes basic immunization for children under five including other types that will be determined by the Secretary of Health (Department of Health of the Republic of the Philippines, n.d.).

Since the Expanded Program Immunization (EPI) was established to protect infants from developing fatal, vaccine-preventable diseases, strict compliance to this immunization process will benefit the greater community reducing the spread of such diseases, and eventually, decreasing morbidity and mortality among children. According to Castillo, Comple, Cuadra, and Dela Cruz (2014), the EPI represents the kind of preventive behavior towards which the typical HBM was directed.

The purpose of HBM is to discover conditions that either facilitate or impede utilization which is similar in this study that focuses on the compliance of the mothers of infants regarding immunization. Its goal is to determine the factors affecting the failure to complete the immunization which could include the mothers' demographic profile, knowledge, and attitude to childhood immunization. It will also ascertain the relationship between participants' profile, the extent of knowledge about its importance and attitude and their level of compliance.

This study is focused on the knowledge, attitude, and compliance on immunization among mothers. Moreover, the figure below shows the relationship between the variables of this study. It indicates that the dependent variable is the level of compliance with immunization. The demographic profile, the level of knowledge, and attitude towards immunization are the independent variables.

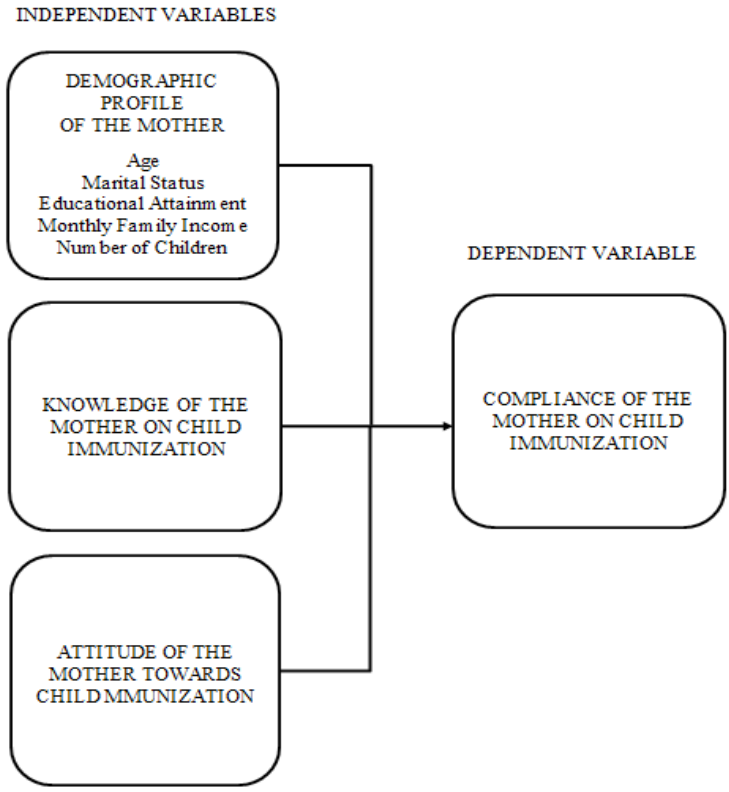

Figure 2. A schematic diagram of the study showing the interplay of variables

OBJECTIVES OF THE STUDY

This study aimed to determine the level of knowledge, attitude, and compliance on child immunization among mothers in Barangay Kauswagan, Cagayan de Oro City. Specifically, aimed to; (1) detemines demographic profile of the mothers in terms of age, marital status, educational attainment, monthly family income, and the number of children; (2) determines the level of knowledge of the mothers on child immunization; (3) determines the attitude of the mothers towards child immunization; (4) determines the level of compliance of the mothers on child immunization; (5) determines there is a significant relationship between compliance on child immunization and; The demographic profile of the mother, the level of knowledge of the mother on child immunization, and the attitude of

the mother towards child immunization; and (6) determines which variables best predicts the mothers' compliance on child immunization.

METHODS

This study made use of descriptive-correlational research design. This is one of the two classes of non-experimental quantitative research. This means that the study described the data and characteristics of the population being studied and attempted to understand the relationships among the variables. It is descriptive as it described the mothers' demographic profile which includes the age, marital status, educational attainment, monthly family income, and the number of children. The study delved further into the mothers' level of knowledge on child immunization, attitude towards child immunization, and compliance on child immunization.

Moreover, the study employed correlational investigation to determine if the independent variables which include the demographic profile, level of knowledge on child immunization, and attitude to child immunization have a noteworthy impact on the mothers' level of compliance to child immunization.

The study was at Barangay Kauswagan, Cagayan de Oro City. It is one of the most prosperous barangays in Cagayan de Oro City situated at the east by the Cagayan de Oro River, the west by Barangay Bulua, the north by Barangay Bonbon, and the south by Barangay Carmen.

The entire barangay has a total land area of 512.50 hectares. It is divided into seven zones with fifteen subdivisions or villages and has two barangay health centers to cater to the entire barangay.

There were 150 mothers who participated in the study selected through purposive sampling. Purposive sampling is a non-probability sampling where the samples are selected based on the characteristics of the population and the objective of the study. It is also known as judgmental, selective, or subjective sampling.

In this study, a specific set of criteria for the inclusion of the participants of the study has been set. The mothers were able to meet the criteria which included the following: must be at least 18 years of age, must have a child aged 0-2 years old, and must be presently residing at Barangay Kauswagan, Cagayan de Oro City.

A written questionnaire was used to collect and gather data. The study utilized a modified research instrument adapted from the study, "Parents' knowledge and

attitudes about immunization in India" by George (2004). The questionnaire was written in the English language with a Cebuano translation for it to be understandable to the participants.

The first part consisted of a survey of the participant's demographic profile which included the age, marital status, educational attainment, monthly family income, and the number of children of the mother. As for sections two, three, and four, all questions were answerable using the Likert Scale.

For the second part of the questionnaire, it had ten items that measured the level of knowledge of the mother towards child immunization. In this section, the scale below was used:

Scale	Range	Descriptive Rating	Qualitative Interpretation
5	4.50 - 5.00	Strongly Agree	Highly Knowledgeable
4	3.50 - 4.49	Agree	Knowledgeable
3	2.50 - 3.49	Neutral	Moderately Knowledgeable
2	1.50 - 2.49	Disagree	Less Knowledgeable
1	1.00 - 1.49	Strongly Disagree	Not Knowledgeable

As for the third part which also had ten items, it aimed to identify the attitude of the mother towards child immunization. This part of the questionnaire used the scale that follows:

Scale	Range	Descriptive Rating	Qualitative Interpretation
5	4.50 - 5.00	Strongly Agree	Highly Positive
4	3.50 - 4.49	Agree	Positive
3	2.50 - 3.49	Neutral	Moderately Positive
2	1.50 - 2.49	Disagree	Negative
1	1.00 - 1.49	Strongly Disagree	Highly Negative

Finally, the last part is a 10-item self-made questionnaire that sought to determine the level of compliance of the mother towards child immunization. The scale that utilized for this area was:

Scale	Range	Descriptive Rating	Qualitative Interpretation
5	4.50 - 5.00	Strongly Agree	Highly Compliant
4	3.50 - 4.49	Agree	Compliant
3	2.50 - 3.49	Neutral	Moderately Compliant
2	1.50 - 2.49	Disagree	Less Compliant
1	1.00 - 1.49	Strongly Disagree	Not Compliant

There were thirty mothers who were randomly selected and excluded from the actual study sample. They were part of a pilot test to evaluate for clarity, applicability, reliability, and to estimate the time needed to fill in the research tools. The research instruments underwent a reliability test at the Office of the Vice President of Research, Publication, and Extension. The second, third, and fourth part of the research instrument passed the Cronbach's Alpha Test with scores of 0.724, 0.763, and 0.953 respectively. After passing the said test, the research questionnaires were distributed to the actual participants of the study.

Research Protocol

A letter to the City Health Officer of Cagayan de Oro City and the Chairman for Health and Nutrition of Barangay Kauswagan, Cagayan de Oro City to secure their permission. An informed consent was also secured from the participants of the study. Moreover, the participants were assured that all their responses treated with utmost confidentiality.

An approval was secured from the City Health Officer of Cagayan de Oro City and the Chairman on Health and Nutrition of Barangay Kauswagan to initiate the study. Upon approval of the request, the questionnaires were distributed to the participants during the Immunization Day in the Barangay Health Center which was every Wednesday. The participants were determined through purposive sampling and were selected based on the following criteria: a.) must be at least 18 years of age, b.) must have a child aged 0-2 years old, and c.) must be presently residing at Barangay Kauswagan, Cagayan de Oro City.

An informed consent was obtained from each of the mothers who agreed to participate in the research after explaining the objectives and importance of this study. They were asked whether they were willing to participate in the study or

not and were informed that data collected from them will be treated with privacy and confidentiality. In addition, clarifications from the participants regarding the questions in the questionnaire were explained thoroughly for more accurate and reliable responses. The filled-up questionnaires were also examined to validate any vague entries that needed further validation in the presence of the participants. Afterwards, the participants were thanked for their cooperation and support in the study.

Appropriate statistical tools were employed according to the problems of this study. The following statistical techniques were used:

Frequency and Percentage. The data of the participant's profile such as the age, marital status, educational attainment, monthly family income, and the number of children were organized, analyzed, and interpreted through frequencies and percentages.

Mean. To determine the level of knowledge, attitude, and compliance on child immunization among mothers, the mean was used.

Pearson Product-Moment Correlation. The Pearson Product-Moment Correlation was used to correlate the mothers' compliance with immunization and: a.) demographic profile, b.) level of knowledge on child immunization and c.) attitude towards child immunization of the mother.

Multiple Regression Analysis. To identify the variable that best predicts compliance to immunization among mothers, a Multiple Regression Analysis was used.

RESULTS AND DISCUSSION

The results of the survey conducted among the mothers residing in Barangay Kauswagan, Cagayan de Oro City. The participants were selected through purposive sampling having met the previously specified criteria.

There were 150 mothers who consented to participate in the study and filled-up the researcher-made survey questionnaires distributed during Immunization Day after being thoroughly informed of the objectives of the study and their right to participate or refuse to participate in the said study.

The following statistical techniques were used to analyze the gathered data: Frequency and Percentage, Mean or Average, Pearson Product-Moment Correlation, and Multiple Regression Analysis. The organized data will be presented using tables and interpreted in this chapter. Furthermore, the presentation of data is based on the flow of the statement of the problem.

Objective 1: To determine demographic profile of the mothers in terms of age, marital status, educational attainment, monthly family income, and the number of children.

Table 1

Frequency and Percentage Distribution of the Demographic Profile of Mothers

Variables		Frequency	Percentage
Age	Below 21	20	13.3%
	21-25	45	30.0%
	26-30	37	24.7%
	31-35	30	20.0%
	36-40	11	7.3%
	Above 40	7	4.7%
	Total	150	100%
Marital Status	Single	19	12.7%
	Living-In with Partner	70	46.7%
	Married	61	40.7%
	Total	150	100%
Educational Attainment	Elementary	10	6.7%
	High school	75	50.0%
	College	61	40.7%
	Post-Graduate	4	2.7%
	Total	150	100%
Monthly Income	Below 3,000	16	10.7%
	3,000-5,999	21	14.0%
	6,000-8,999	32	21.3%
	9,000-11,999	32	21.3%
	12,000-14,999	16	10.7%
	15,000-17,999	11	7.3%
	18,000-20,999	4	2.7%
	21,000-23,999	6	4.0%
	24,000-26,999	1	0.7%
	27,000-29,999	0	0.0%
	30,000-32,999	1	0.7%
	33,000 & Above	10	6.7%

Table 1 Continued

		Total	150	100%
Number of Children	1		74	49.3%
	2		33	22.0%
	3		24	16.0%
	4		7	4.7%
	5		7	4.7%
	6 & Above		5	3.3%
		Total	150	100%

Age. Table 1 shows the frequency and percentage distribution of the participants in terms of age. The results reveal that the majority of the participants were aged 21-25 years old (45 participants or 30%), followed by 37 participants or 24.7% aged 26-30 years old. There are 30 participants (20%) from those aged 31-35 years old, 20 participants (13.3%) aged below 21 years old, and only 11 participants (7.3%) aged 36-40 years old. The least number of participants are from those aged 40 years old above (7 participants or 4.7%).

The result is similar to the findings of the study conducted by Rahji & Ndikom (2013), wherein most of the participants are within their reproductive age. These findings support the belief that a woman's fertility peaks in the early and mid-20s, after which it starts to decline slowly.

Marital Status. Table 1 shows the frequency and percentage distribution of the participants in terms of marital status. Even though all participants are mothers, the table tells us that more participants were living-in with partners (70 participants or 46.7%). It means that our society is already open to issues such as cohabitation. There are 61 participants or 40.7% of mothers who are married. Also, it is sad to note that about 12.7% or 19 participants are single mothers.

According to Kuang, Perelli-Harris & Padmadas (2019), cohabitation among young adult women has increased rapidly in the Philippines, from 6% in 1993 to 24% in 2013. Furthermore, their research findings revealed that lower levels of education are significantly associated with a higher risk of cohabitation, which suggests the rising cohabitation in the Philippines. The results of their study support a large number of mothers living-in with partners.

Educational Attainment. The same table presents the frequency and percentage distribution of the participants in terms of educational attainment. Half of the number of participants (75 participants or 50%) finished the secondary level or high school only. About 61 participants or 40.7% completed a college degree.

There are only 10 participants (6.7%) who finished only up to elementary level, and only 2.7% (4 participants) who finished a post-graduate degree.

The findings of this study support the claim of the Philippine Statistics Authority (PSA) that the educational attainment of the population in this country has improved ("The Educational Attainment", 2013).

Furthermore, the results of a survey conducted by the Philippine Statistics Authority in 2017 wherein 9% of Filipinos aged 6 to 24 years old are Out of School supports the increasing number of mothers who finished high school or secondary level only. The survey also revealed that the reason for non-attendance in school among 57% of Filipino young women is mostly due to marriage or family matters ("Nine Percent of Filipinos", 2018).

Monthly Family Income. Table 1 also shows the frequency and percentage distribution of the participants in terms of monthly family income. The monthly family income of the participants is widespread. However, most of the mothers come from families with an average monthly famtily income of ₱6,000-₱8,999 (32 participants or 21.3%) and ₱9,000-₱11,999 (32 participants or 21.3%). The mothers coming from families with an average monthly income of ₱3,000-₱5,999 (21 participants or 14%) follows.

The findings imply that most mothers come from households with minimum income level compared to the average monthly family income of Filipinos, which is at ₱22,000 according to a survey conducted by Philippines Statistic Authority in 2015 ("Average Family Income in 2015", 2016)

Number of Children. The same table also displays the frequency and percentage distribution of the participants in terms of the number of children. Majority of the participants (74 participants or 49.3%) have only one child. There are 33 participants (22%) with only two children and 16% of the participants (24 participants) who have three children. There are 7 participants (4.7%) with four children, and five children in the family. Only 3.3% of the participants (5 participants) have six children or more.

The results of the table indicate that effective Family Planning Program by the Barangay Health Center has been widely promoted and implemented in this area since only a few of the participants have many children in their household. Also, a survey conducted by the Philippine Statistic Authority in 2010 which reported that there had been a decrease in the average number of persons in a household in the past twenty years supports the above findings ("Household Population of the Philippines", 2012).

Objective 2: To determine the level of knowledge of mothers on child immunization.

Table 2

Mean Distribution of the Level of Knowledge of Mothers on Child Immunization

Indicators	Mean	Standard Deviation	Descriptive Rating	Qualitative Interpretation
1. I am familiar with the terms, "immunization" or "vaccination".	4.51	0.63	Strongly Agree	Highly Knowledgeable
2. I know that vaccines are injections or substances orally given to people to protect them from diseases.	4.64	0.66	Strongly Agree	Highly Knowledgeable
3. I am aware that some vaccines require more than one dose.	4.38	0.75	Agree	Knowledgeable
4. I know that both children and adults can be immunized against vaccine-preventable diseases.	4.42	0.74	Agree	Knowledgeable
5. I am informed that for certain types of vaccines, it is necessary to give booster doses to protect the child from the diseases associated with them.	4.36	0.71	Agree	Knowledgeable
6. I am familiar with all the vaccines that protect people from the certain diseases.	4.09	0.81	Agree	Knowledgeable
7. I am aware that vaccines are tiny amounts of disease-causing organisms given to children in order to increase their immunity against diseases.	4.15	0.85	Agree	Knowledgeable
8. Some vaccines are given several times to prevent diseases. If children do not receive all their vaccine doses, I know that the vaccine may not be effective in preventing the disease.	4.34	0.79	Agree	Knowledgeable
9. I am aware that children who are immunized against a certain disease may still develop the disease but with less severe symptoms.	4.41	0.71	Agree	Knowledgeable
10. I am informed that when children are immunized, they can develop fever.	4.30	0.84	Agree	Knowledgeable
Over-all Mean	4.36	0.44	Agree	Knowledgeable

Legend:

Scale	Range	Descriptive Rating	Qualitative Interpretation
5	4.50 - 5.00	Strongly Agree	Highly Knowledgeable
4	3.50 - 4.49	Agree	Knowledgeable
3	2.50 - 3.49	Neutral	Moderately Knowledgeable
2	1.50 - 2.49	Disagree	Less Knowledgeable
1	1.00 - 1.49	Strongly Disagree	Not Knowledgeable

Table 2 presents the level of knowledge of mothers on child immunization. The participants are generally knowledgeable about child immunization with an over-all mean of 4.36. This finding implies that efforts to disseminate child immunization information and advocacy to the community have been effective as these campaigns help improve the mothers' knowledge of child immunization.

The above findings are similar with a study in Saudi Arabia by Alharthi et al. (2017) that reported that the overall knowledge of participants on childhood immunization in their study was high and that there is a significant relationship between the mothers' knowledge and her attitude to immunization.

Furthermore, the table shows that there are only two indicators that the participants are highly knowledgeable: the indicators "I am familiar with the terms, immunization or vaccination." with a computed mean of 4.51 and the "I know that vaccines are injections or substances orally given to people to protect them from diseases." with a computed mean of 4.64, which also garnered the highest computed mean among all the indicators. This is similar to the findings of a research study by Hedaoo et al. (2018) in India, where most participants have heard about the term immunization.

All other indicators of the level of knowledge have computed means with a qualitative interpretation of knowledgeable and among these indicators, it is the indicator, "I am familiar with all the vaccines that protect people from the certain diseases." which scored the lowest computed mean of 4.09. It means that the mothers, in general, are not familiar with vaccines that protect people from certain diseases but are not familiar with each of the vaccines.

Objective 3: To determine the attitude of the mothers towards child immunization.

Table 3

Mean Distribution of the Attitude of Mothers towards Child Immunization

Indicators	Mean	Standard Deviation	Descriptive Rating	Qualitative Interpretation
1. I consider immunizations as beneficial to children.	4.85	0.37	Strongly Agree	Highly Positive
2. I feel that immunizations should be made compulsory for all children.	4.59	0.69	Strongly Agree	Highly Positive
3. Even if some diseases cannot be prevented by immunizations, I think that immunizing children can ensure that they are healthy throughout childhood.	4.61	0.54	Strongly Agree	Highly Positive

Table 3 Continued

Indicators	Mean	Standard Deviation	Descriptive Rating	Qualitative Interpretation
4. I believe that vaccines are one of modern science's greatest discoveries.	4.55	0.60	Strongly Agree	Highly Positive
5. I consider vaccines expensive whenever it is not given for free by the government.	4.36	0.85	Agree	Positive
6. I feel that the government should provide free vaccines for all children.	4.61	0.68	Strongly Agree	Highly Positive
7. I believe that vaccines are helpful rather than harmful to children.	4.65	0.57	Strongly Agree	Highly Positive
8. I think that if vaccines were free, more children will be immunized.	4.41	0.81	Agree	Positive
9. I feel that the benefits associated with immunization of children far outweigh the potential risks associated with vaccines.	4.35	0.78	Agree	Positive
10. I believe that immunization will help protect children from certain diseases.	4.73	0.49	Strongly Agree	Highly Positive
Over-all Mean	4.58	0.41	Strongly Agree	Highly Positive

Legend:

Scale	Range	Descriptive Rating	Qualitative Interpretation
5	4.50 - 5.00	Strongly Agree	Highly Knowledgeable
4	3.50 - 4.49	Agree	Knowledgeable
3	2.50 - 3.49	Neutral	Moderately Knowledgeable
2	1.50 - 2.49	Disagree	Less Knowledgeable
1	1.00 - 1.49	Strongly Disagree	Not Knowledgeable

Table 3 presents the mean distribution of the attitude of mothers to child immunization. The participants, all in all, have a highly positive attitude to child immunization with an over-all computed mean of 4.58. In most of the indicators, seven out of ten indicators, the mothers responded with a descriptive rating of strongly agree which indicate a highly positive attitude towards immunization. There are only three indicators in which most of the mothers answered with a computed mean within the range of 3.50-4.49, but this is within the upper limit of the bracket.

These findings tell us that despite the ongoing threat associated with the Dengvaxia scare, the mothers have high confidence in the established immunization program. The attitude of the mothers is the same with the participants of the

study by Nisar, Mirza, and Qadri (2010) and Alharthi et al. (2017), on which the mothers have a strong positive attitude to child immunization.

Additionally, the mothers scored highest in the indicator, "I consider immunizations as beneficial to children" with a computed mean of 4.85 and "I believe that immunization will help protect children from certain diseases" with a computed mean of 4.73. The indicators that scored lowest are the "I feel that the benefits associated with immunization of children far outweigh the potential risks associated with vaccines" and "I consider vaccines expensive whenever it is not given for free by the government" with computed means of 4.35 and 4.36 respectively.

Objective 4: To determine the level of compliance of mothers towards child immunization.

Table 4

Mean Distribution of the Level of Compliance of Mothers on Child Immunization

Indicators	Mean	Standard Deviation	Descriptive Rating	Qualitative Interpretation
1. I intend to have my children completely immunized.	4.85	0.39	Strongly Agree	Highly Compliant
2. I give priority to vaccinating my children.	4.71	0.52	Strongly Agree	Highly Compliant
3. I don't like to miss the immunization schedule of my children.	4.37	0.75	Agree	Compliant
4. I follow the advice of health care professionals regarding immunization of my children.	4.81	0.41	Strongly Agree	Highly Compliant
5. I have allocated enough money for health.	3.91	0.76	Agree	Compliant
6. I don't need other people to remind me to submit my children for immunization.	4.02	1.04	Agree	Compliant
7. I bring my children on time to their scheduled vaccination date.	4.25	0.80	Agree	Compliant
8. I make sure all my children are fully immunized.	4.70	0.53	Strongly Agree	Highly Compliant
9. There's nothing that can stop me from having my children completely immunized.	4.44	0.75	Agree	Compliant
10. I am not afraid to bring my children for vaccination despite rumors against vaccines.	4.61	0.64	Strongly Agree	Highly Compliant
Over-all Mean	4.47	0.37	Agree	Compliant

Table 4 Continued

Legend:

Scale	Range	Descriptive Rating	Qualitative Interpretation
5	4.50 - 5.00	Strongly Agree	Highly Knowledgeable
4	3.50 - 4.49	Agree	Knowledgeable
3	2.50 - 3.49	Neutral	Moderately Knowledgeable
2	1.50 - 2.49	Disagree	Less Knowledgeable
1	1.00 - 1.49	Strongly Disagree	Not Knowledgeable

Table 4 reports the level of compliance of mothers towards child immunization. As seen in the table, the participants, at large, are compliant to child immunization with a computed mean of 4.47, which is nearly highly compliant with a difference of only 0.03. It is similar to previous studies by Adokiya, Baguune, & Ndago (2017) and Konwea, David, & Ogunsile (2018), where the level of compliance to childhood immunization among mothers was high.

In most of the indicators of the level of compliance, the mothers answered with a descriptive rating of strongly agree which has a qualitative interpretation of highly compliant. The mothers scored highest in the indicator, "I intend to have my children completely immunized" with a computed mean of 4.85. Next in line is the indicator, "I follow the advice of health care professionals regarding immunization of my children." It implies that the mothers intend to have all their children fully immunized and that they are more than willing to follow the advice of the health care professionals such as midwives, nurses, and doctors regarding immunization of their children.

The mothers scored lowest in the indicator, "I have allocated enough money for health" with a computed mean of 3.91 and a qualitative interpretation of compliant. This implies that some mothers have not allocated enough budget for health. Even though the government gives free immunization to children, the mothers still have their share of expenses which includes transportation cost to the health center and medicine expenses whenever the child develops a fever after immunization.

Objective 5: To determine if there a significant relationship between compliance to immunization and demographic profile of the mother, level of knowledge of the mother, and attitude of the mother.

Table 5

The Relationship between Compliance on Child Immunization and Demographic Profile, Knowledge, and Attitude of the Mothers

Variables	Correlation Coefficient	P-value	Interpretation
Age	0.100	0.111	Not Significant
Marital Status	0.147*	0.036	Significant
Educational Attainment	0.060	0.233	Not Significant
Monthly Family Income	0.037	0.325	Not Significant
Number of Children	0.080	0.167	Not Significant
Knowledge on Child Immunization	0.658**	0.000	Significant
Attitude towards Child Immunization	0.575**	0.000	Significant

** Correlation is significant at the 0.01 level
* Correlation is significant at the 0.05 level

Table 5 reveals the relationship between compliance on child immunization and that of the demographic profile, knowledge, and attitude of the participants. The above table tells that among the demographic profile, only the marital status of the mother has a significant relationship to the compliance on child immunization of the mothers with a P-value of 0.36, which is significant at 5% margin of error. Additionally, the maternal knowledge and attitude towards child immunization both have a highly significant relationship to the compliance on child immunization among the mothers. Both knowledge and attitude of the mother to child immunization are significant with P-value of 0.000 which is significant even at 1% margin of error.

Therefore, the null hypothesis of no significant relationship between compliance on child immunization and demographic profile, knowledge, and attitude of the mother towards child immunization is rejected since the mothers' compliance on child immunization is significantly associated with the marital status, knowledge on child immunization, and attitude to child immunization of the mother.

The finding is supported by the study of Al-lela et al. (2017) who reported that children who live with two parents are more likely to receive complete

immunization than children who lived with a single parent. They further reasoned that this could be that two parents have more time to devote health care to their children than single parents since a single parent might have tight time constraints.

The results of this study also resemble the findings of Logullo et al. (2015) who inferred that there was no significant relationship between maternal age and education attainment and with getting timely vaccinations. It is also similar to the study carried out by Vonasek, Bajunirwe, & Conwaay (2016) that showed that there is no association between the wealth of the household and full vaccination status. In the Philippines, a study conducted by Castillo et al. (2014) revealed that the number of children in their family does not affect the immunization status of the children.

On a similar note with the above findings of this research, a study conducted by Konwea, David, & Ogunsile (2018) in Nigeria revealed that there is a link between mothers' compliance to immunization with the mothers' knowledge of childhood immunization.

Objective 6: To determine which of the variables best predicts the mothers' compliance on child immunization.

Table 6

Regression Analysis of the Demographic Profile, Knowledge, and Attitude versus Compliance on Child Immunization of the Mother

Variables	Unstandardized Coefficients		Standardized Coefficients	t-test	P-value
	Beta	Std. Error	Beta		
Constant	1.289	0.271		4.756	0.000
Age	0.030	0020	0.105	1.470	0.144
Marital Status	0.078	0.037	0.142	2.134	0.035
Educational Attainment	-0.052	0.039	-0.090	-1.332	0.185
Monthly Family Income	-0.012	0.009	-0.089	-1.290	0.199
Number of Children	-0.027	0.019	-0.096	-1.402	0.163
Knowledge on Child Immunization	0.457	0.062	0.536	7.349	0.000
Attitude towards Child Immunization	0.252	0.066	0.274	3.830	0.000

$R= 0.725\ R^2=0.525\ F=22.449\ P<0.05$

Table 6 shows the regression analysis of the independent variables which are the demographic profile of the mother which includes age, marital status,

educational attainment, monthly family income, and number of children, the knowledge on child immunization, and the attitude to child immunization against the dependent variable which is the mothers' compliance on child immunization.

The marital status, knowledge on child immunization, and attitude towards child immunization showed to have significant relationship on the compliance of the mother towards child immunization since the individual t-values of their beta coefficients (2.134, 7.349, and 3.830 respectively) are high and their corresponding p-values are less than the level of significance (0.05). Furthermore, the beta coefficient of knowledge on child immunization (x1=0.457) is positive. It indicates that there is 0.457 increase in the level of compliance ($\hat{Y}$) of the mother as the level of knowledge of the mother on child immunization increases. Likewise, there is a 0.252 increase in the level of compliance as the attitude of the mother to child immunization increases. It is also the same with the marital status, where there is a 0.078 positive effect of being married to the level of compliance.

The regression analysis further shows that the model that can significantly predict the level of compliance is $\hat{Y} = 1.289 + 0.457x1 + 0.252x2 + 0.078x3$ where, $\hat{Y}$ refers to the level of compliance on child immunization, x1 is the level of knowledge on child immunization, x2 is the attitude towards child immunization, and x3 is the marital status. The table also presents the individual standard of error of estimates of the beta coefficients of the independent variables. The R2=0.525 means that 52.5% of the variation of the level of compliance of the mothers is explained by a linear relationship with the marital status, the level of knowledge, and the attitude to child immunization. The remaining 47.5% can be attributed to variables not included in the study. The F value of 22.45 is significant at $P<0.05$.

Based on the data in Table 6, the best predictor of compliance on immunization among mothers is the knowledge of child immunization followed by the attitude towards child immunization and marital status of the mother. Also, the data findings presented supports the study by Alharthi et al. (2017) that perceived knowledge and attitude of the mother to child immunization as predictors of full immunization status among children. Likewise, the study of Adokiya, et al. (2017) reported marital status as one of the six predictors of compliance to child immunization. Therefore, the null hypothesis that states that there is no best predictor of compliance on child immunization is rejected.

CONCLUSIONS

In light of the findings of this study, it can be concluded that among the demographic profile of the mothers, only the marital status has a significant relationship to the mothers' compliance on child immunization. In other words, mothers who are married are more likely to submit their children to complete immunization than mothers who are single parents. It also suggests that having a partner as support in making decisions regarding the health of children is indispensable as two parents have more time to devote on the health care of their children than a single parent who might face time constraints. There is no significant relationship between age, educational attainment, monthly family income, the number of children, and the mothers' compliance on child immunization.

Also, the knowledge of the mothers as well as the attitude towards child immunization has an impact on the mothers' compliance on child immunization. Moreover, among all the independent variables, it is the knowledge of child immunization that has the most influence on the mother to be compliant on having children immunized. This is followed by the attitude of the mothers towards child immunization and the marital status of the mother. Furthermore, knowledge gained through proper health education from health care workers regarding child immunization is vital to a successful child immunization program in the community as this will correct misconceptions and provide accurate facts and thorough understanding of child immunization.

RECOMMENDATIONS

The conclusions of this study summed up some key points to be carried out for future use. Here are the following recommendations:

1. The Department of Health and the City Health Office are encouraged to work together with the barangay officials in conducting continued free health services such as check-ups and medicines within the community as most of the families in the community have minimum income level and the participants have responded that they have not allocated enough monetary funds for health care;

2. The local government may sponsor a mass wedding to promote marriage which is a lifetime commitment between partners will be welcomed by the community residents as most of them do not have enough budget for such occasions. Additionally, this will foster responsible parenthood;

3. The barangay health workers, midwives, nurses, and doctors of the barangay health center may further strengthen their proper health education regarding child immunization through one-on-one teaching, mothers' classes, and house visits as these have been considered highly effective in disseminating accurate information that promotes understanding to the members of the community. The health care workers should also emphasize on teaching about the different vaccines, together with the diseases it can prevent, as most participants have reported lower scores in familiarity on the types of vaccines;

4. The school nurses are encouraged to provide appropriate health education at an earlier age regarding reproductive health issues to reduce teenage pregnancy as this is one of the probable causes for inability to finish the tertiary level or college education. And for school teachers and guidance counselors to address issues on morality early in their life as society is becoming more open to living-in arrangements among partners which is not usually for long-term; and

5. The future researchers may consider including the fathers as participants of future studies. Furthermore, a research that seeks to identify barriers of compliance to a complete immunization status of children is highly suggested.

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