INNSPUB

International Journal of Biosciences | IJB |
ISSN: 2220-6655 (Print), 2222-5234 (Online)
http://www.innspub.net
Vol. 21, No. 2, p. 307-327, 2022

RESEARCH PAPER OPEN ACCESS

A Comparative study on the Knowledge, Attitude, and Practices of Mothers towards Children Immunization in Flora, Apayao, Philippines

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Key words: Mothers, Children immunization, Knowledge, Attitude, Practices.

http://dx.doi.org/10.12692/ijb/21.2.307-327 Article published on August 20, 2022

Abstract

Childhood immunization is a critical public health intervention to prevent childhood morbidity and mortality. However, UNICEF reported in 2020 that vaccination coverage in the Philippines had dropped dramatically; thus, this study aims to provide comparative data on mothers' knowledge, attitude, and practices towards children immunization in barangay Malubibit Norte having the highest data of fully immunized children and barangay Poblacion West with the lowest recorded data of fully vaccinated children. This study used a comparative research design to describe the respondents' profile, knowledge, attitudes, and practices on child immunization. Two hundred thirty-two (232) mothers were identified as respondents in this study by using stratified random sampling. It was discovered that in Barangay Poblacion West, the records of having the least number of fully immunized children were due to uncontrolled hindrances, which were the child is not feeling well during their scheduled vaccination and had a severe allergic reaction after vaccine administration. It was also found that the overall mean score of mothers KAP from the two barangays is knowledgeable about children immunization with a positive attitude and good practice. Level of knowledge when grouped to their profile, vaccine benefit was influenced by religion. The level of attitude and practices was influenced by marital status, educational attainment, attended seminars, nature of work, religion, source of income, type of family, comorbidities of the mother, maintenance medication, and compliance to medication. Findings also showed that there is a significant relationship between the Attitude and Practices of Mothers toward Child Immunization of both barangays, while there is no significant relationship between the Knowledge with the Attitude and Practices of the mothers toward Child Immunization of both barangays.

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Introduction

Childhood immunization is perhaps the most critical public health intervention available for preventing childhood morbidity and mortality. Immunizations are a crucial health benefit that protects vulnerable people from infections that can prevent with vaccines preventable diseases (VPD). In 1976, the World Health Organization established the Expanded Program on Immunization (EPI) to ensure that infants, teenagers, and mothers had access to regularly administered infant/childhood vaccines. BCG birth dose, Hepatitis B birth dose, Oral Poliovirus Vaccine, Pentavalent Vaccine, Measles Containing Vaccines (Anti-Measles Vaccine, Measles, Mumps, Rubella), and Tetanus Vaccine are among the vaccines covered by the EPI. In addition, in 2014, it included Pneumococcal Conjugate Vaccine 13 in the routine immunization of EPI. These vaccines shield children from illness and death, potentially saving up to three million lives annually, or more than five lives every minute of every day. Vaccines are both safe and efficient in the prevention of diseases (Madani, 2020). However, UNICEF reported on April 23, 2020, in recent years, vaccination coverage in the Philippines has dropped dramatically, from 87 percent in 2014 to 68 percent in 2019, exposing children to vaccine-preventable diseases like measles and polio. In a similar year, the latest measles outbreak in the Philippines showed a shocking 130 percent rise in cases in 2019. Furthermore, polio resurfaced in 2019, with 17 reported cases, and health experts fear that the number of claims will rise as halted the polio outbreak response due to COVID -19. Also, the vaccination program in the Philippines has come under the spotlight because of the Dengvaxia controversy, and the mess has led to more parents refusing to avail the government's various vaccination programs, according to DOH (2018).

The timeliness of immunizations, and receiving vaccinations at the earliest appropriate age is a fundamental public goal for individuals and communities to remain protected. Observed stopped or interrupted immunization for any reason poses an increasing number of vaccine-preventable infections and related deaths. Hence, WHO's Agenda 2030 (IA2030) lays out a bold, overarching global vision and plan for vaccinations and immunization for the years 2021–2030, to maintain and expand on hard-won progress by leaving no one behind in any circumstance or at any stage of existence. Also, the Department of Health (DOH) launched its immunization program against measles, rubella, and polio last February 1, 2021, covering regions in both Luzon and Visayas and scheduled to run until February 28, 2021. Secretary Francisco T. Duque called the Local Government Units, who have better access to their constituents, to pitch in and assure mothers that the health centers, as they comply with the minimum public health standards, as well as the protocols of the health center, are safe places where they can get their children vaccinated in lieu to challenge of Covid-19 (Pelayo, 2021). A well-performing implemented vaccination program should obtain high and equitable coverage. Global Vaccine Action Plan specified 2015 targets as 90% national coverage with DTP3 and at least 80% in all districts worldwide. However, many countries still fall short of these targets. Conducted studies revealed common factors that affect the performance of vaccination programs. According to Rainey *et al.* (2019), factors that emerged under-vaccination and no vaccination include deficiencies in the immunization delivery system, deficiencies in the immunization delivery system, and challenges with communication or information delivery, family characteristics, and parental understanding about vaccination. Poor access and distance from vaccination services, insufficient vaccine supply, health worker availability and knowledge, and missed vaccination opportunities (including non-specified missed opportunities, misuse of contraindications, lacking vaccination, vaccinator absence at the scheduled time for vaccinations, direct and indirect costs associated with vaccination, place of residence (living in rural or specific urban settings such as slums) are among the findings in relation to the immunization system. Furthermore, demonstrated differing populations' access to immunization programs to have an impact on their use. Also, Al-Taiar *et al.* (2010) conducted a

study in Yemen that found that greater geographical distance and driving time was linked to lower childhood immunization rates. Concerning this, the global immunization division of the Centers for Disease Control and Prevention (CDC) reported that the parental attitude and knowledge regarding immunization services were low, and parents have negative beliefs about measles and vaccination programs. Furthermore, Caingles (2011) revealed that parents in the Philippines still lacked knowledge concerning their children's vaccination. Therefore, the child's desire to be immunized is determined entirely by the vaccine's availability and affordability, as well as the parent's willingness and effort. Moreover, a study conducted by Mahalingam *et al.* (2014) found that there is a significant difference in mothers from rural and urban areas when it comes to their knowledge, attitude, and practices regarding vaccination. Hence, this study aimed to provide comparative data on mothers' knowledge, attitude, and practices towards children immunization in barangays Poblacion West and Malubibit Norte of Flora, Apayao having the highest and lowest recorded data of fully immunized children.

Materials and methods

Locale and duration of the study

This study was conducted in the Province of Apayao, specifically in the Municipality of Flora. The Municipal Health Office identified the two (2) barangays: Barangay Poblacion West having the least recorded number of Fully Immunized Children (FIC) and Barangay Malubibit Norte having the highest registered number of FIC.

Research design

This study utilized a combination of descriptive comparative research design. The descriptive research described the respondents' profile, knowledge, attitude, and practices on child immunization. Researchers utilized a comparative research type to determine the difference in the respondents' level of knowledge, attitude, and practices towards child immunization in the selected barangays of Flora, Apayao.

Sampling design

The researchers obtained the selected respondents of this study from the identified rural and urban barangays of Flora, Apayao, having recorded data of the highest fully immunized and highest non-fully vaccinated children retrieved from the Municipal Health Office. Respondents of this study are mothers who (a) are 18 to 45 years old, (b) residents for at least six months (c) have a child aged 0-5 years old regardless of the number of children or gravida. Stratified random sampling was employed in this study, where 232 respondents from the identified barangays having the highest and lowest recorded data of fully immunized children were selected to represent approximately 550 households.

The researchers used Slovin's formula to calculate the total number of respondents using the confidence level of 95%.

Data gathering procedure

The researchers prepared a combined self-constructed and a modified questionnaire. The questionnaire was then validated by five experts and tested for its reliability through pilot testing with ten respondents that are not included in the study and used Cronbach alpha as a measuring tool. The researchers sought permission from the Municipal Health Office of Flora and the Health Centers of Barangays Poblacion West and Malubibit Norte in gathering the necessary data needed in computing for the research sampling. Following approval of the proposal, the researchers sought permission and made arrangements to survey the Barangay Officials of the selected barangays. The researchers applied for ethical clearance in Region II Trauma and Medical Center and it was granted. The researchers passed another letter of request asking permission to conduct a survey given to the respondents who voluntarily agreed to participate in the study. The researchers gave every respondent informed consent to those mothers 18 to 45 years old, residents for at least six months on the said barangays, and have a child aged 0-5 years old regardless of the number of children. The researchers are required to adhere to all

preventive measurements, rules and comply with the IATF guidelines where the research is conducted, and no research activities should be undertaken if they impede emergency responses.

Data analysis

Microsoft Excel was used to tabulate the frequency and percentage distribution to describe the profile of the respondents and mean scores in the respondents' level of knowledge, attitude, and practices on child immunization. The significant difference in the attitude and practices of mothers in the two barangays with that of the profile variable was determined using a T-test while Chi-square was utilized for their knowledge. The association of the mother's knowledge of the two barangays with that of their attitude and practices was determined by Chi-square and T-test, respectively. SPSS software version 22 was used in the analysis.

Results and discussion

Table 1 shows that 147 or 63.36% of the total respondents came from Población West, while the remaining 85, or 36.64%, came from Malubibit Norte. Respondents' age ranges from 26 – 30, with a percentage of 27.16%, followed by ages ranging from 31 – 35 with 23.71%. On the other hand, the data revealed that the age range 16 – 20 has the least percentage of the respondents, which is only 5.60% of the total sample, implying that most of the respondents were in the middle stage of adulthood. According to Al – lela *et al.* (2014), mothers aged at delivery of 20 to 29 years had a higher percentage (60.5%) of adequate knowledge and practices than other groups. As reflected in the table 1, shows the Marital Status of the respondents, with 75% of the sample, being married. 16.81% live in, and 5.60% are single, while for Widowed and for separated, it is only 1.29%.

Table 1. Frequency distribution of respondent's demographic profile.

	Frequency	Percentage
Residence		
Poblacion West	147	63.36
Malubibit Norte	85	36.64
Total	232	100.00
Age		
16-20	13	5.60
21-25	48	20.69
26-30	63	27.16
31-35	55	23.71
36-40	34	14.66
41-45	19	8.19
Marital Status		
Single	13	5.60
Married	174	75.00
Widowed	3	1.29
Separated	3	1.29
Live in	39	16.81
Seminar Attended		
0	23	9.91
1-3	197	84.91
4-6	12	5.17
7-10	0	0

A study conducted by Al – lela *et al.* (2014) showed a significant association between knowledge and practices of immunization and marital status. This result is not surprising because one of the parents might provide the information to another parent and increase the source of information. In addition, married parents had a higher socioeconomic status than divorced or widowed parents. It is observed that

in seminars attended, most of the respondents, with 84.91%, have attended 1 to 3 a seminar related to child vaccination while 9.21% have no seminars attended while the remaining 5.17%% have 4-6 seminars attended. In the study conducted by Hu (2015), it was well reported that mothers' knowledge level had a significant influence on children's vaccination coverage rate and timeliness of vaccination worldwide.

This study indicated that one-hour education seminars given to caregivers in vaccination clinics were an effective and practical strategy to improve the knowledge level of vaccination.

Table 2. Frequency Distribution of Respondent's Socio-economic Profile.

	Frequency	Percentage
Educational Attainment		
No Formal Education	1	0.43
Primary level	0	0.00
Elementary level	1	0.43
Elementary graduate	14	6.03
Highschool level	28	12.1
High school graduate	79	34.1
Vocational graduate	3	1.29
College level	34	14.7
College graduate	67	28.88
Postgraduate	5	2.16
Nature of Work		
Government Employee	44	18.97
Business Owner	55	23.71
Farmer	16	6.90
Housemaid/House Helper	17	7.33
Others	100	43.10
Source of Income		
White Collar Job	46	19.83
Blue Collar Job	103	44.40
Self-employed	10	4.31
Unemployed	73	31.47
Ethnicity		
Ilocano	194	83.62
Isneg	16	6.90
Malaueg	0	0.00
Kalinga	3	1.29
Bontoc	0	0.00
Ibaloi	1	0.43
Itawes	7	3.02
Kankanaey	0	0.00
Others	11	4.74
Religion		
Roman Catholic	80	34.48
Born Again	24	10.34
Iglesia Ni Cristo	102	43.97
Jehovah's Witnesses	1	0.43
United Methodist	9	3.88
Baptist	5	2.16
Others	11	4.74
Mode of Transportation		
Private Car	38	16.38
Tricycle	46	19.83

Motorcycle	45	19.40
Commute	37	15.95
None	66	28.45
Household average monthly income		
Below P5000	85	36.64
P5,000 - P10,000	65	28.02
P10,001 - P20,000	44	18.97
P20,001 - P30,000	31	13.36
P30,001 - P40,000	3	1.29
P40,001 - P50,000	1	0.43
Above P50,001	3	1.29
Appliances found at home		
Mobile Phone	202	87.06
Television	174	75.00
Radio	74	31.90
Laptop/Computer Unit	77	33.19
Television Cable	73	31.47
Internet Provider	82	35.34
Organization Membership		
Yes	31	13.36
No	201	86.64

Table 2 shows the frequency distribution of respondents when grouped according to their socio-economic status. It shows that 34.1% of the respondents are high school graduates, followed by 67 or 28.88%, 34 or 14.7% are college-level, 28 or 12.1% are high school level, and 14 or 6.03% are elementary graduates. Only 5 or 2.16% of the respondents are postgraduate. A study result conducted by Kumar *et al.* (2013) showed that knowledge was significantly greater among mothers with a higher education level and among those who were older at the time of the child's birth.

Another study by Legesse *et al.* (2015) supported the findings that mothers' educational status is among the determinants of immunization completion. Those mothers or caregivers who attended secondary and above levels were two times more likely to complete their children's immunization than mothers unable to read and write. Thus, as the family's educational status improves, the family's health-seeking behavior may increase. This, in turn, may have a positive impact on child immunization. As also shown in the table the frequency of the nature of work, the highest percentage of the respondents have varied job titles with 43.10% followed by the business owner with 23.71%, a government employee with 18.97%, housemaid/house helper with 7.33% and farmer being the least with 6.90%. On the other hand, a high percentage of the respondents were unemployed, with 73 or 31.47%. For the source of income, 103 or 44.40% of the respondents fall under the blue-collar job category. 46 or 19.83% of the respondents fall under the white-collar job, and the remaining 10 or 4.31% are self-employed. The same result as the study of Kulintang (2017), the majority of the respondents were housewives (77%), followed by 10% government employees, and 9% self-employed. The rest of the respondents were privately employed (4%). When it comes to ethnicity, almost all the respondents are Ilocano, with 194 or 83.62. Regarding religion, 102 and 43.97% are Iglesia ni Cristo, and 80 or 34.48% are Roman Catholic. In a study conducted by Tumuhairwe (2016), it was important to note that the majority (83%) of the respondents agreed that child immunization was not prohibited in their religion. Tricycle and motorcycle were revealed as the everyday transportation of the respondents with 46 (19.83%) and 45 (19.40%) respondents, respectively. A study by Prabon (2020), those mothers living far from health clinics only need to pay for their transport to get to the clinic sites. Transportation is a problem in rural areas due to difficult terrain, poor conditions, and cost.

Table 3. Frequency Distribution of Respondents Clinical and Health.

	Frequency	Percentage
Disease Present		
Yes	8	3.45
No	224	96.55
Comorbidity		
Hypertension	25	10.78
Allergies	14	6.03
Asthma	14	6.03
Diabetes	1	0.43
None	173	74.57
Others	5	2.16
Maintenance Meds		
Yes	38	16.38
No	194	83.62
Food Supplement/Vit		
Yes	124	53.45
No	108	46.55
Child fully Vaccinated		
Yes	197	84.91
No	3	1.29
Ongoing	32	13.79

Most of the respondents were minimum wage earners. Low family incomes and limited parental education are problems many parents face and can adversely affect their immunization knowledge and practice and their ability to complete their children's vaccination. Lower family income could be a barrier to effective communication between immunization providers and parents. Similar to other studies in developing countries, these results show that mothers' knowledge, attitude, and practice positively correlate with families' monthly income (Al – lela *et al.*, 2014). Table 3 implies the frequency distribution of respondents when grouped according to their Clinical and Health profiles. Most of the respondents, 96.55%, have no disease at present. Most of the respondents, with 74.57% have no comorbidities. Furthermore, most of the respondents, with 83.62%, are not taking any maintenance medicine but most are taking food supplements and vitamins, 53.45%. Thus, this result implies that most mothers are healthy. Based on the data, most of the respondents, with 84.91%, have fully vaccinated children. 13.79% are ongoing, and only 1.29% are not fully vaccinated. This result implies that Flora is compliant with children's immunization; however, the non-fully vaccinated children must be followed up.

Table 4. Frequency Distribution of Respondents' Clinical and Health Profile regarding the Hindrances preventing Child's Vaccination.

Statements	Frequency	Percentage
1. I do not know the required vaccine for my child.	0	0
2. My child is not feeling well.	46	19.83
3. I did not know where to bring my child for vaccination.	0	0
4. Health facility is too far from our residence.	0	0
5. I did not have the gadget to contact the health worker in the clinic.	0	0
6. I could not contact any of the healthcare providers.	0	0
7. Transportation problem to reach the vaccination health facility.	0	0
8. The schedule of vaccination is not convenient for me.	0	0
9. No one could take care of my other children during the vaccination schedule.	0	0
10. I could not seek a leave of absence from my employer.	0	0
11. I do not have the information about the routine vaccination schedule.	0	0
12. I do not understand the real benefit of vaccines.	0	0
13. I am afraid about the vaccination of my children.	0	0

In terms of the frequency distribution of respondents' clinical and health profiles regarding the hindrances preventing child's vaccination, it shows in Table 4 the situation that hindrances the child's vaccination, and only 46 or 19.83% of the respondents mentioned that their 'child is not feeling well' hinders the vaccination of their children. This includes having cough, colds, fever, or diarrhea. Hussin *et al.* (2020) said that out of all respondents, 69 (22.5%) respondents also attributed it to their child's illness during their immunization schedule. This figure is nearly the same as that in the studies of Lim *et al.* wherein 22.6% of respondents had the same reason. However, it is lower than the study conducted by Azhar *et al.* wherein 38% of respondents mentioned that their child had a fever exceeding 38°C during the immunization period was their reason for default.

Table 5. Frequency Distribution of Respondents Health Seeking Behavior when a child is sick.

	Frequency	Rank
Person to whom you seek when a child is sick		
Pediatrician	148	1
Midwife	107	2
Friend	6	5
BHW	51	3
Relative	7	4
Neighbor	3	7
Traditional Healers	5	6
Others	0	
Institution confided problems when a child is sick		
Health Center	134	1
Hospital	92	3
Private Clinic	98	2
BHS	5	4
Sacred Places	4	5
None	0	
Others	0	
Platforms used in communication when the child is sick		
Face-to-Face	147	1
Goes to Health Center	118	2
Tele-Medicine	10	3
Source of Vaccine Information		
Attending Physician	97	2
Trainings	1	7
Friends	1	7
Neighbor	3	4
Relatives	2	5
Internet Sources	16	3
BHWs	128	1
Others	2	5

Table 5 implies that most of the respondents communicate face-to-face to the health care provider when their child is sick when it comes to platforms. Regarding the sources of information about vaccination, most of the respondents rely on the information from the BHWs. Abdullah *et al.* (2016) described the source where the respondents obtained their information about childhood immunizations. The top three sources were the doctor, nurses, and the internet. The majority of the respondents ranked sources of information by doctors and nurses as excellent or good. While for the source of information from the internet, most respondents ranked it as good or average. Deborah *et al.* (2005) reported that most parents made good decisions about immunization if they had enough access to information regarding vaccinations. Health professionals, family members, and media, including television, newspapers, and the

internet, were listed as their three most important sources of information about childhood vaccination (Allison *et al.*, 2011; Al-lela, Bahari *et al.*, 2014). The researchers found out that the mean average of both respondents' level of knowledge regarding vaccines can be given anytime showed a result of 2.13% for Poblacion East and 2.08% for Malubibit Norte which indicates that both barangay are slightly knowledgeable about it (Table 6). Meanwhile, results showed that respondents from both barangay are knowledgeable regarding on- a fully immunized child must have completed the doses before the 1st birthday of the child, and multi-dose of the same vaccines should be given at intervals which showed a mean average ranging from 2.58% to 3%. The majority of mothers are knowledgeable about their child's immunization schedule because their child's immunization card guides them.

Table 6. Level of mother's Knowledge towards children vaccination.

Barangay	Attitude towards children immunization	Score			Mean	Descriptive Value
		Yes	No	I don't know		
Poblacion West	1. Vaccines can be given anytime.	20	127	0	2.13	Slightly Knowledgeable
Malubibit Norte		7	78	0	2.08	Slightly Knowledgeable
Poblacion West	2. Multi-doses of the same vaccines such as Pentavalent Vaccine, Oral Polio Vaccine (OPV), Pnuemococcal Conjugate Vaccine and Measles Mumps Rubella should be given at intervals.	135	0	12	2.83	Knowledgeable
Malubibit Norte		75	0	10	2.76	Knowledgeable
Poblacion West	3. Bacille Calmette-Guérin (BCG) vaccine should be given at the earliest possible age after birth preferably within the first 2 months of child's life	138	0	9	2.88	Knowledgeable
Malubibit Norte		75	0	10	2.76	Knowledgeable
Poblacion West	4. Primary vaccination of Pneumococcal Conjugate Vaccines (PCV) consists of 3 doses with an interval of at least 4 weeks between doses plus a booster dose given 6 months after the 3rd dose.	135	0	12	2.84	Knowledgeable
Malubibit Norte		67	0	18	2.58	Knowledgeable
Poblacion West	5. Primary vaccination of Pneumococcal Conjugate Vaccines (PCV) consists of 3 doses with an interval of at least 4 weeks between doses plus a booster dose given 6 months after the 3rd dose.	138	0	9	2.88	Knowledgeable
Malubibit Norte		69	0	16	2.62	Knowledgeable
Poblacion West	6 First dosed of Measles-Mumps-Rubella (MMR) Vaccine can be administered to a child at a minimum age of 12 months and the second dose is usually given from 4-6 years of age but may be given at an earlier age with a minimum of 4 weeks interval between doses.	133	0	14	2.81	Knowledgeable
Malubibit Norte		78	0	7	2.84	Knowledgeable
Poblacion West	7. A fully immunized child must have completed the doses of BCG, Pentavalent, OPV, Hepatitis B, and Measles vaccines before the 1st birthday of the child.	143	4	0	2.97	Knowledgeable
Malubibit Norte		85	0	0	3	Knowledgeable
Poblacion West	8. Diseases can be prevented through Immunization	139	8	0	2.95	Knowledgeable
Malubibit Norte		85	0	0	3	Knowledgeable
Poblacion West	9. Children Immunization prevents disease and its complications.	140	7	0	2.95	Knowledgeable
Malubibit Norte		85	0	0	3	Knowledgeable
Poblacion West	10. The child's body develops protection against viruses or bacteria through Immunization.	142	7	0	2.95	Knowledgeable
Malubibit Norte		85	0	0	3	Knowledgeable
Poblacion West	11. Vaccination lowers the risk of a child's death or disease.	137	10	0	2.93	Knowledgeable
Malubibit Norte		76	2	7	2.81	Knowledgeable

Poblacion West	12. Do not vaccinate child when a severe allergic reaction occurs (e.g., anaphylaxis) after a previous dose of a vaccine component.*	136	0	11	2.85	Knowledgeable
Malubibit Norte		81	0	4	2.91	Knowledgeable
Poblacion West	13. Diarrhea is a contraindication for vaccination.	141	6	0	2.96	Knowledgeable
Malubibit Norte		79	6	0	2.93	Knowledgeable
Poblacion West	14. Do not give any vaccine to your child when he/she is severely sick.*	147	0	0	3	Knowledgeable
Malubibit Norte		85	0	0	3	Knowledgeable
Poblacion West	15. Children with delayed vaccination will be unprotected from the vaccine-preventable diseases at a time when they are most at risk.	134	1	12	2.83	Knowledgeable
Malubibit Norte		79	0	6	2.86	Knowledgeable
Poblacion West	16. Delays may contribute to diminished herd immunity or the indirect protection received by the unimmunized population when a large proportion is immunized.	147	0	0	3	Knowledgeable
Malubibit Norte		85	0	0	3	Knowledgeable
Poblacion West	17. Delayed vaccination increases the risk of failing to achieve full immunization of the child.	147	0	0	3	Knowledgeable
Malubibit Norte		85	0	0	3	Knowledgeable

Legend Knowledgeable- 2.34- 3.00; 1.67- 2.33; Slightly Knowledgeable -2 points; 1-1.66 -No knowledge at all.

Respectively, they are knowledgeable that children's immunization prevents disease, and its complications and that child's body develops protection against viruses or bacteria through immunization, can prevent that disease through immunization, and vaccination lowers the risk of a child's or disease death. Similar findings were found in a study conducted by Singh *et al.* (2019), the majority agreed that routine vaccination prevents children from serious microbiological infection and its complication. Respondents from both barangays are knowledgeable that diarrhea is a contraindication for vaccination, and that children who are severely sick and have severe allergic reactions prevent the child's vaccination. In a study conducted by Singh *et al.* (2019), it was subsumed that 37% of mothers believe that vaccination is contraindicated during common colds, ear, and diarrheal infections and becomes a reason for vaccine denial or delay.

The guide for contraindications to childhood vaccination suggests that vaccination delay based on misconceptions about contraindications puts an infant or a child at health risk. Respondents are knowledgeable that delays in the vaccine may contribute to diminished herd immunity, or the indirect protection received by the unimmunized population when a large proportion is immunized which may also be brought to increase the risk of failing to achieve full immunization of the child.

Table 7. Level of mothers' Attitude towards children immunization.

Barangay	Attitude towards children immunization	Score				Mean	Descriptive Value
		4	3	2	1		
Poblacion West	1. Children immunization is essential and more beneficial than harmful.	142	5	0	0	3.97	Strongly Agree
Malubibit Norte		81	4	0	0	3.95	Strongly Agree
Poblacion West	2. It is essential to comply with the recommended immunization schedule.	127	20	0	0	3.86	Strongly Agree
Malubibit Norte		78	7	0	0	3.92	Strongly Agree
Poblacion West	3. Even if my child seems to be healthy, he must be immunized.	137	10	0	0	3.93	Strongly Agree
Malubibit Norte		74	11	0	0	3.87	Strongly Agree
Poblacion West	4. I raise openly raise my concerns about vaccination with a healthcare provider.	128	19	0	0	3.87	Strongly Agree
Malubibit Norte		75	10	0	0	3.88	Strongly Agree
Poblacion West	5. Our religion does not restrict me from vaccinating my child.	1	146	0	0	3.02	Agree
Malubibit Norte		1	84	0	0	3.01	Agree
Poblacion West	6. I encourage other parents in our community	110	32	5	0	3.71	Strongly Agree

Malubibit Norte	to comply and complete all the recommended vaccines for our children	67	17	1	0	3.78	Strongly Agree
Poblacion West	7. I watch outside effects of vaccination and raise my concerns to the health worker when it worsens.	134	11	2	0	3.90	Strongly Agree
Malubibit Norte		70	15	0	0	3.82	Strongly Agree
Poblacion West	8. I am satisfied with the friendly environment in our vaccination facility.	116	30	1	0	3.78	Strongly Agree
Malubibit Norte		65	20	0	0	3.76	Strongly Agree

Legend: 1.0 – 1.49: Strongly Disagree; 1.50 – 2.49: Disagree; 2.50 – 3.49: Agree; 3.50 – 4.0: Strongly Agree.

In terms of the level of mothers' attitude toward children's immunization, Table 7 shows the level of the attitude of the respondents from both barangays significantly shows respondents' positive attitude. Similar findings were found in the study conducted by Alagsam *et al.* (2007); most parents agreed that children's vaccination is essential and children should be vaccinated regularly according to schedule. Parents strongly agreed that child immunization is not prohibited in religion, and the administration of vaccines is associated with side effects.

In terms of the mean average on the practices, Table 8 revealed that the mean values of practices from both barangays respectively strongly agreed that mothers should make sure that their children received adequate care and rest after immunization and that immunization cards must be used by the mothers to keep track of their children's immunization schedules to ensure completeness. Also, going to the health center during their children's immunization schedule is a must. The respondents from both barangays also strongly agree that the mother should ask health care work personnel for the following immunization schedule and follow their instructions, and both strongly agreed that mothers should make an effort to ensure that their children are fully immunized.

Data related to mothers' level of knowledge about their children's immunization were gathered and compared with their profile variables. Only the data that revealed significant differences were presented in the table.

Table 8. Mean average on the Practices.

Barangay	Practices on Vaccination	Score				Mean	Descriptive Value
		4	3	2	1		
Poblacion West	1. I make sure that my child receives adequate care and rest after Immunization	139	8	0	0	3.95	Strongly Agree
Malubibit Norte		76	9	0	0	3.89	Strongly Agree
Poblacion West	2. I use the immunization card to keep track of my child's immunization schedules to ensure completeness	127	20	0	0	3.86	Strongly Agree
Malubibit Norte		76	9	0	0	3.89	Strongly Agree
Poblacion West	3. I practice going to the health center during my child's immunization schedule.	133	12	0	0	3.86	Strongly Agree
Malubibit Norte		78	7	0	0	3.92	Strongly Agree
Poblacion West	4. I do ask the health care worker personnel for the following immunization schedule.	131	16	0	0	3.89	Strongly Agree
Malubibit Norte		69	16	0	0	3.81	Strongly Agree
Poblacion West	5. I follow the instructions of nurses/healthcare professionals when it comes to my child's Immunization.	136	11	0	0	3.93	Strongly Agree
Malubibit Norte		76	9	0	0	3.89	Strongly Agree
Poblacion West	6. I make an effort to ensure that my child is fully immunized.	136	11	0	0	3.93	Strongly Agree
Malubibit Norte		78	7	0	0	3.92	Strongly Agree
Poblacion West	7. Even though I missed the scheduled Immunization date, I continue to visit the health center.	30	3	114	0	2.43	Disagree
Malubibit Norte		9	10	66	0	2.33	Disagree

Legend: 1.0 – 1.49: Strongly Disagree; 1.50 – 2.49: Disagree; 2.50 – 3.49: Agree; 3.50 – 4.0: Strongly Agree.

Table 9 shows the comparison of the knowledge compared with the profile of the respondents. The researcher found out that the respondents' knowledge of vaccination benefits revealed that residence with a p-value of 0.0411 and religion with a p-value of 0.0365 has a significant difference compared to the respondents' knowledge regarding vaccination benefits.

In the study, Mahalingam *et al.* (2014) discovered a statistically significant difference between the area of living and immunization awareness score. When tested vaccine knowledge, it also showed that all mothers in the urban region were aware of childhood immunization, whereas 6.4 percent of rural moms were unaware of childhood vaccination, a statistically significant difference (p=0.027). In a separate study by Yousif *et al.* (2013), it was discovered that parental knowledge and attitude toward immunization are strongly linked to where they live. Meanwhile, the respondents' religious affiliation, as one of the socio-demographic characteristics of the respondents, was critical in the study since people's religious faith may influence how they see the importance and benefits of childhood immunization. According to previous findings from a comparative study done by Zagminas *et al.* (2007), most respondents disagreed and strongly disputed that child immunization is prohibited in their religion, while only a tiny number agreed.

Table 9. Level of Knowledge.

Knowledge	Profile	Chi Square	df	p
Vaccination Benefit	Residence	4.17	1	0.0411*
	Religion	11.88	5	0.0365*

*-significant at 0.05.

However, in the study by (Mwambete and Joseph, 2010), the analysis revealed that there were no significant (p>0.05) correlations between respondents' religion and parental immunization awareness, as well as no significant (p>0.05) relationships between respondents' religion and immunization perception.

It can be deemed in Table 10 that the practices and attitudes of the two barangays are in connection to their demographic profile. Based on the data presented above, marital status showed a significant difference in practice 7 of the mothers, which is "I only the continuation of visiting the health center upon missing the scheduled immunization."

As well for attitude 7, "watching outside effects of vaccination and raising concerns to the health worker when it worsens" has a significant difference in the marital status of the respondents with a p-value of 0.0109. The findings are similar to Al-lela *et al.* (2014), who revealed a p-value of 0.036 for a significant difference between immunization knowledge and practices and marital status. This result is unsurprising because one of the parents may share knowledge with another parent, expanding the number of information sources. Muathe *et al.* (2020) found that marital status was statistically substantially associated (p=0.046) with vaccine schedule adherence. Furthermore, in Chris-Otubor *et al.* (2013) study, the mothers' marital status had a substantial impact. Married women had considerably better immunization knowledge (p=0.001) than their single, divorced, widowed, or separated peers.

The educational attainment on its attitude 8 "only on the satisfaction with the friendly environments in the vaccination facility" showed a significant difference with a p-value of 0.0486. Regarding the relationship between mothers' educational attainment and their views, Yousif *et al.* (2013) found that parental knowledge and attitude regarding immunization were significantly connected to educational level (p value= 0.002) in their study. This implies that a mother's education is linked to a positive attitude toward child immunization.

Table 10. Attitude and Practices of the respondents with that of their Demographic Profile.

Marital Status	SS - Effect	df - Effect	MS - Effect	SS - Error	df - Error	MS - Error	F	p
Practice 7. Even though I missed the scheduled Immunization date, I continue to visit the health center	6.42	3	2.14	160.85	228	0.71	3.04	0.0300**
Attitude 7. I watch outside effects of vaccination and raise my concerns to the health worker when it worsens.	1.44	3	0.48	28.69	228	0.13	3.80	0.0109**
Educational Attainment								
Attitude 8. I am satisfied with the friendly environment in our vaccination facility.	2.04	5	0.41	40.21	224	0.18	2.27	0.0486**
Attended Seminar								
Practices 6. I make an effort to ensure that my child is fully immunized.	0.73	2	0.37	15.87	229	0.07	5.29	0.0057**

**-significant at 0.01.

For the attended seminars, practice 6, "making an effort to ensure that the child is fully immunized," is viewed as highly statistically different, having a p-value of 0.0057, which is less than 0.01. A study conducted by Efendi *et al.* (2020) revealed a significant difference between children who completed and uncompleted basic immunization in antenatal care. Children between 12 and 23 months of age whose mothers attended fewer than four antenatal visits in the lowest economic status and delivered at non-healthcare facilities were less likely to have a child who completed immunization compared to mothers who had 4 or more antenatal visits in higher economic status and delivered at the healthcare facility. In other words, those who attended the minimum standard of visit received a positive benefit or completed the immunization services. These align with the previous study in Ethiopia and Cameroon, which suggested that attending antenatal care more than three times was significantly associated with completed child immunization uptake (Russo *et al.* 2015; Travassos *et al.* (2015). In terms of the comparison of practices and attitude according to the socio-economic profile of the respondents, it shows in Table 11 that the attitude and practices only practice 3, 5, and attitude 5 has a significant difference in the nature of work or job title of the respondents. With a p-value of 0.0006, the respondents are 99% confident that "mothers make sure that my child receives adequate care and rest after Immunization," "practice going to the health center during my child's immunization schedule," and "follows the instructions of nurses/healthcare professionals when it comes to my child's Immunization" For the attitude, "our religion restricts me from vaccinating my child." According to Balbir Singh *et al.* (2019), occupation is one of the sociodemographic variables for assessing postnatal mothers' attitudes about childhood vaccination. In addition, Ahizih *et al.* (2017) revealed in their study that most of their respondents claimed that their occupations allow them to take their children for immunization. Only a few said that their occupations did not give them much time to take their children for immunization. Moreover, according to Jr. *et al.* (2021), this high compliance rate of the mothers may be attributed to the easy access to public health facilities (such as health centers) and free vaccines in these facilities. It was evident that employment status was significantly associated with mothers' compliance with childhood immunization. All of the non-compliant mothers were employed and tended to have a schedule conflict with their children's immunization. For the source of income, the data revealed that attitude 8, which pertains to "I am satisfied with the friendly environment in our vaccination facility," the researchers are 95% confident that it has a significant difference with the source of income. Following the findings above, Mereena and R (2014) found a significant relationship between mothers' attitudes toward their children's immunization and their monthly family income in their study. This claim was backed up by Al-Zahrani *et al.* (2013), who discovered that a high monthly income is associated with a negative attitude. They also discovered that parents with higher

incomes had more negative sentiments toward their children than parents with lower incomes. Having a high income is connected to decreased vaccination rates, consistent with previous findings. Because high-income parents can afford to treat their children and live close to medical facilities, this is the case. Some parents assume that limiting their children's exposure and adopting a healthy lifestyle can protect them. On the other hand, insufficient income has been related to a negative attitude in other research, as some low-income parents prefer to spend their money on necessary things.

Table 11. Atttiude and Practices with that of their Socio-economic profile.

Nature of work/Job title	SS - Effect	df - Effect	MS - Effect	SS - Error	df - Error	MS - Error	F	p
Practices 3. Center during my child's immunization schedule.	2.03	4	0.51	22.69	227	0.10	5.06	0.0006**
Practice 5. I follow the instructions of nurses/healthcare professionals when it comes to my child's Immunization	0.77	4	0.19	17.51	227	0.08	2.49	0.0443**
Attitude 5. Our religion restricts me from vaccinating my child.	0.23	4	0.06	1.75	227	0.01	7.55	0.0000**
Source of Income								
Attitude 8. I am satisfied with the friendly environment in our vaccination facility.	1.49	3	0.50	40.85	228	0.18	2.78	0.0420**
Ethnicity								
Attitude 5. Our religion restricts me from vaccinating my child.	0.23	4	0.06	1.75	226	0.01	7.51	0.0000**
Type of Family								
Practice 2. I use the immunization card to keep track of my child's immunization schedules to ensure completeness.	1.94	3	0.65	23.42	227	0.10	6.27	0.0004**
Attitude 6. I encourage other parents in our community to comply and complete all the recommended vaccines for our children.	2.02	3	0.67	54.40	227	0.24	2.81	0.0405**
Attitude 8. I am satisfied with the friendly environment in our vaccination facility.	3.06	3	1.02	38.68	227	0.17	5.99	0.0006**
Religion								
Practice 2. I use the immunization card to keep track of my child's immunization schedules to ensure completeness.	2.18	5	0.44	23.18	225	0.10	4.22	0.0011**
Attitude 2. It is essential to comply with the recommended immunization schedule.	1.75	5	0.35	15.69	225	0.07	5.00	0.0002**
Attitude 6. I encourage other parents in our community to comply and complete all the recommended vaccines for our children.	2.70	4	0.67	54.26	227	0.24	2.82	0.0259**
Attitude 8. I am satisfied with the friendly environment in our vaccination facility	2.12	4	0.53	40.23	227	0.18	2.99	0.0197**

As the source of income, the data under ethnicity also revealed a significant difference in "our religion restricts me from vaccinating my child" with a p-value less than 0.01. For the type of family, practices 2, which is about "using the immunization card to keep track of my child's immunization schedules to ensure completeness," with a p-value of 0.0004 is significantly different from the type of family the respondents have. In comparison to the attitude, attitude 6 and attitude 8, which are "I encourage

other parents in our community to comply and complete all the recommended vaccines for our children" and "I am satisfied with the friendly environment in our vaccination facility" with a p-value of 0.0405 and 0.0006 respectively, have a significant difference in comparison to the type of family. Singh *et al.* (2018) revealed that vaccination coverage rises when the number of family members increases, i.e., as we shift from a nuclear to a joint family. The study by Goyal *et al.* (2017) discovered that Teen from joint and three-generation households had higher immunization coverage than children from nuclear families. Meanwhile, respondents to Akwataghibe *et al.* (2019) reported a variety of influences outside the nuclear family that influenced immunization decisions: men were strongly influenced by their mothers, while women valued the advice of their fathers/fathers-in-law, who also happened to be community elders. In summary, even if women wanted to immunize their children, they couldn't if their husbands didn't agree, or if their husbands' mothers refused. Furthermore, the young women heeded the advice of their elders, which influenced their decision to immunize their children. However, according to Regmi (2010), in a joint family structure, even if the mother is busy, other family members like grandparents, aunties help the mother and bring the children for immunization. They even help in raising the child and not just in vaccination. If the mother has only one child and lives in a nuclear family, she comes in time to vaccinate her child. As well as there is a difference between women living alone or in a joint family. Women whose husbands live abroad and send money are financially independent, and others also help them. But it is a bit more difficult for women who are alone, and they don't get much support from the community. Also, based on the result, nearly half of non-compliant mothers receive the lowest range of monthly income while most of the compliant mothers receive a little higher than them.

Those families earning more may have the capability to bring their children to the health centers for immunization because transportation may be a factor for not complying with immunization among children scheduled every Wednesday (National Statistics Office, 2009). For religion, practices 2 and 3 which is "using the immunization card to keep track of my child's immunization schedules to ensure completeness," "following the instructions of nurses/healthcare professionals when it comes to my child's Immunization" and attitude 2 that "it is essential to comply with the recommended immunization schedule" have a p-value less than 0.01.

Table 12. Significant difference on the Attitude and Practices of the respondents with that of their Clinical and Health profile.

T-tests; Grouping: Have Maintenance? Group 1: Yes Group 2: No						
	No	Yes	t-value	df	p	
Practices6	3.84	3.94	-2.03	230	0.0432*	
Attitude5	3.95	4.00	-3.27	230	0.0012**	
T-tests; Grouping: Taking Food Supplement? Group 1: Yes Group 2: No						
Practices3	3.85	3.95	-2.32	230	0.0213*	
-tests; Grouping: Met hindrances? Group 1: No Group 2: Yes						
Practices3	3.93	3.80	2.72	230	0.0071**	
Practices5	3.89	3.98	-2.03	230	0.0433*	
Practices7	1.98	3.37	-14.47	230	0.0000**	
Vaccination Status	SS - Effect	df - Effect	MS - Effect	SS - Error	df - Error	MS - Error
Practices6	1.11	2	0.56	15.49	229	0.07	8.20	0.0004**

These results suggest that these three statements have a significant difference compared to religion. While for membership, practice 7 with a p-value of 0.0312 were recorded to be significantly different. When it comes to the relationship between mothers' religion and their practices, a study by Gentle (2019) found

that religion can impact mothers' attitude on immunization.

It is thought that mothers' religious views may influence their attitude about child immunization, either positively or negatively. Some religious beliefs may oppose immunization, so mothers who follow such religions may not want to take their children for immunization or to health facilities when they become ill; instead, they may prefer to consult their spiritual heads rather than seek help from medical experts. Meanwhile, Regmi (2010) showed that many researchers had studied the influence of religion and culture on perception and decision-making behavior. This study showed that similar trends existed in the past; however, with increasing knowledge and awareness of the community regarding the benefits of vaccination, there has been a substantial change in the perception of people, and religion does not alter the uptake of vaccination; especially showed the Muslim community to be proactive towards the vaccination program.

Table 13. Association between the respondent's knowledge, attitude and practices of vaccination.

Correlations				
	r(X,Y)	r^2	t	p
Attitude				
Practices	0.48	0.23	8.26	0.0000**
Knowledge(X)		Chi Square	df	p
Knowledge on Vaccination Benefit	Attitude	0.09456	1	0.7585
	Practices	0.22455	1	0.6356
Knowledge on Vaccination Schedule	Attitude	0.06695	1	0.7958
	Practices	0.15898	1	0.6901

**-significant at 0.01.

Moreover, Table 12 shows the comparison of practices and attitudes according to the Clinical and Health Profile. It was revealed that practice 7 and attitude 5 have a significant difference compared to comorbidities, with a p-value of 0.0108 and 0.0020, respectively. For Maintenance, only practices 6 and attitude 5 have a significant difference. For the practices under the taking medicine, only practice 3 with a p-value of 0.0213 made the researchers 95% confident that it has a significant difference compared to the taking of medicine. On the other, only practices 3, 5, and 7 have a significant difference compared to the met hindrances. And for practices under vaccination, the researchers are 99% confident that practice 6 with a p-value of 0.0004 has a significant difference.

In terms of association of the attitude and practices of the respondents regarding vaccination it can be deemed in Table 13 that with a p-value of less than 0.01, the researchers are 99% confident that their attitude and practices toward vaccination have a significant relationship with each other. On the other hand, the researcher found out that the knowledge has no significant relationship to that the attitude and practices of the respondents toward vaccination. Results are backed up by the study conducted by Almutari *et al.* (2021) that there was no association between the participating mothers' knowledge, attitude, and practice regarding vaccination ($p > 0.05$).

The p-value of the test was more than 0.05; thus, we accepted the null hypothesis and rejected the alternative one, denoting that there was not a significant association between KAP of the participating mothers regarding immunization.

Conclusion

Based on the study's findings, the researchers concluded that Malubibit Norte has the highest record of fully immunized children since mothers are

highly compliant and cooperative, especially in situations when they meet some hindrance such as when their child is not feeling well and thus ensure to bring their child to the health facility whenever resolved the child's sickness. On the other hand, it was discovered that Poblacion West recorded having the least number of fully immunized children due to uncontrolled hindrances, which were the child is not feeling well during their scheduled vaccination and had a severe allergic reaction after vaccine administration. Furthermore, results also revealed that mothers from the two barangays are knowledgeable about Immunization with a positive attitude and good practice. Findings also showed a significant relationship between the Attitude and Practices of Mothers toward Child Immunization of both barangays and that there is no significant relationship between the Knowledge with the Attitude and Practices of the mothers toward Child Immunization of both barangays.

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