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Knowledge and Attitude towards Childhood Vaccination of Indigenous Peoples in Cagayan, Philippines

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Abstract

Maternal vaccination knowledge and attitude are essential determinants of child immunization; thus, this study aimed to determine the indigenous mothers' (IM) knowledge and attitude toward childhood immunization. A descriptive survey design was employed through an interview-guided survey, key informant interviews, and focus group discussions. Results revealed that IMs have a moderate level of knowledge about childhood immunization (64.84%), specifically on vaccine adverse effects, vaccination schedules, and dosages. The IMs' moderately favorable attitude is attributed to the healthcare workers' open communication, motivation, and assistance. It was revealed that the level of knowledge and attitude of Yapayao and Malaueg mothers are not statistically associated. Therefore, women's empowerment and customized education must be initiated in Cagayan's indigenous communities to enhance compliance with childhood immunization.

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Introduction

Immunization is widely recognized as one of the most cost-saving public health interventions. All countries in the South East Asian Region give high importance to their national immunization programs (NIPs) (WHO-SEA, 2016). The World Health Organization (WHO) estimates that immunization prevents between 2 and 3 million deaths annually. The number of child deaths due to vaccine-preventable diseases decreased from 5.1 million in 1990 to 1.8 million in 2017. However, global vaccination coverage has slowed slightly over the past few years. In 2019, 14 million infants did not receive an initial dose of the diphtheria, tetanus, and pertussis (DTP) vaccine, while an additional 5.7 million infants were only partially vaccinated. This manifested a lack of access to immunizations and other health services.

Children in the Philippines have been exposed to vaccine-preventable diseases such as measles and polio due to a sharp decline in childhood immunization coverage from 87 percent in 2014 to 68 percent in 2019 (Nandi *et al.,* 2020). The recent measles outbreak in the Philippines in 2019 resulted in an overwhelming 130 percent increase compared to the same time in 2018 (Senthilingam, 2020).

In 2019, seventeen (17) polio cases reemerged in the country. The health experts were alarmed by its increasing rate as the polio outbreak response had to be suspended due to COVID-19 (Horton, 2021). The Department of Health (DOH) identifies vaccine hesitancy as one of the causes of the recent measles outbreak in certain regions. Unfortunately, most infant deaths were due to vaccine-preventable diseases, with approximately 30 million people comprising the indigenous population of South-East Asia. At the same time, 12 to 15 million indigenous peoples (10 to 20 percent of the total population) are in the Philippines (SOWIP II Health, n.d.).

Indigenous peoples (IP) have experienced much higher rates of vaccine-preventable diseases than non-indigenous people (Lama, 2016). In addition, IPs in Asia have higher malnutrition rates, infant mortality, and "diseases of the poor," namely undernutrition and infectious diseases. These adverse health problems have more likely incapacitated them and have shortened their life expectancy than non-indigenous peoples. However, one of the biggest obstacles to solving indigenous health problems is its indistinctness and obscurity in the national discourse.

Geographical barriers, language barriers, and negative vaccine publicity may also contribute to low vaccination rates, according to several studies (Bondy *et al.*, 2009; Aggarwal *et al.*, 2010; Abdulraheem *et al.*, 2011; Shamsul *et al.*, 2012; Omar *et al.*, 2017; Badjugar *et al.*, 2019; Quintos *et al.*, 2022). However, parents' misconceptions, misperceptions, and negative attitudes have been identified as causes of non-compliance with vaccines. Furthermore, maternal knowledge on childhood vaccination has been argued due to a lack of awareness even though it has been frequently referred to as one of the pillars of public and child health promotion. Hence, this study generally sought to determine the mother's knowledge and attitude towards childhood vaccination and their relationship.

Methodology

Research Design

A descriptive study was conducted to determine the knowledge and attitude toward children vaccination of indigenous mothers.

Locale of the Study

The study was conducted in the province of Cagayan, specifically in Geographically Isolated and Disadvantaged Areas (GIDA), with the highest number of indigenous groups of Malaueg, Yapayao, Itawes, Agtas, and Ybanag. The survey was conducted in the respondents' barangay health centers.

Respondents of the Study and Sampling

The IMs in the Malaueg, Yapayao, Itawes, Agta, and Ybanag communities were selected to provide data on knowledge and attitude towards vaccination. The mother-participants were those with child or children aged 0-5 years and residing in the area for at least one

year. A total of 235 participants were randomly selected through multi-stage proportionate stratified random sampling.

Research Instruments

The researchers constructed the self-made questionnaire and interview guide. All had undergone expert validation, localization, pre-testing (Cronbach's alpha=0.73), and pilot-testing procedures.

Data Collection Process

The translators and enumerators from the National Commission of Indigenous Peoples (NCIP-IKSP) team facilitated the Conference and Disclosure Agreement with the IP. They eliminated the communication barriers between the participants and the researchers. Research Ethics Clearance was sought from the Region 2 Trauma Medical Center after the NCIP clearance was granted. Permission to gather data was also sought from the heads of the barangay and municipal health officers before data collection commenced.

Since the research study was conducted during the COVID-19 pandemic, the research team strictly obeyed the Inter-agency Task Force (IATF) Protocols to ensure the health and safety of the respondents. The survey was done with the assistance of barangay health workers and tribal leaders. The respondents voluntarily approved informed consent after a thorough explanation made by the researchers about the nature and purpose of the study.

Data Analysis

Descriptive statistics were used for the variables relating to the socio-demographic profile, knowledge level, and data on attitude towards childhood vaccination. In addition, the independent samples t-test was used to test the difference between the two groups, while the analysis of Variance (ANOVA) for continuous variables and the Kruskal-Wallis test for categorical variables for more than two variables. These were analyzed using STATA version 17 at a 0.05 level of significance.

Results and discussion

Table 1 describes the characteristics of indigenous mothers. In terms of age, the majority of the respondents fall under the low-risk reproductive group (24-33 years old). However, a significant number of mothers are still sexually engaged and considered at high risk (28.09%) for ages 14 to 23, while 2.55% for ages 44 to 55. Regarding civil status, 51.06% (120 of 235) are single, although some live with their partners. Only a few mothers (5.11%) finished a college degree, while 8.09% of the mother-respondents have no formal education. Along religion, 42.98% of the mothers are Roman Catholic. However, it was noted that some were not baptized and just joined charismatic movements or praise and worship activities by some religious groups getting into their areas. Regarding the number of children, 59.58% of the mothers were reported to have 1-2 children, although 11.06% have 5 to 7 children. Their occupation status has been a reflection of their educational attainment, as 56.2 % are jobless. A significant portion of the respondents' partners is either construction workers or farmers, accounting for 50.21 % and 38.2 %, respectively. Consequently, most households with a monthly income of fewer than 10,000 pesos (92.34%) are considered economically poor. Table 1 also indicates that 39 out of the 135 mothers (16.60%) have non-fully immunized children.

The respondents are moderately knowledgeable about childhood vaccination, as shown in Table 2, with an average score of 64.84%. However, it can be gleaned from the results that they do not know much about vaccine-preventable diseases (5.27%). This can be attributed to the inadequate information about vaccine-preventable diseases, language barrier, lack of customized promotional/campaign materials, and media literacy. Albeit, there are existing Information Education Communication (IEC) materials written in the Philippine language (Filipino), they seem to be useless in as much that few of the IP mothers cannot read. Narratives of mothers were noted, "*I am illiterate, so I don't understand the content of the flyers. Only those who can read can understand the*

flyers. I hope they discuss with a video so everybody could better understand" (Agta Mother 3, 4, 15, Yapayao Mother 2, 5).

Although, it can be appreciated in the results that the indigenous mothers know very well about the roles of healthcare workers as vaccinators and have appreciated their efforts and commitment, especially in reminding the schedules and the other concerns about childhood vaccination. The finding was supported by the following experiences of indigenous mothers to quote, "*When our child was vaccinated, we were reminded of the next vaccination schedules. Moreover, the BHWs remind us too when they meet us around and they also visit us in our houses when the vaccination schedule is approaching." (Ybanag Mother 3, Itawes Mother 2, 3, 5, Agta Mother 1, 2, Malaueg Mother 8)".* Further, BHWs in Pamplona during the COVID-19 pandemic visited the homes of the Yapayaos to administer their children's vaccines. Aside from the usual method of verbalizing the details about the next vaccination activities, the HCWs also record the other health-related information in the vaccination cards. Gadgets facilitated communication and established a stronger linkage between mothers and the BHWs.

Table 1. Characteristics of indigenous mothers (n=235).

Variables	Frequency (%)
Age (in years)	
14-23	66 (28.09)
24-33	121 (51.49)
34-43	42 (17.87)
44-53	6 (2.55)
Civil Status	
Single	120 (51.06)
Married	115 (48.94)
Educational attainment	
No Formal Education	19 (8.09)
Elementary undergraduate	79 (33.62)
Elementary graduate	7 (2.98)
High School Undergraduate	49 (20.85)
Alternative Learning System Graduate	5 (2.13)
High School Graduate	34 (14.47)
College Undergraduate	28 (11.91)
Vocational School	2 (0.85)
College Graduate	12 (5.11)
Religion	
Roman Catholic	101 (42.98)
Born Again	27 (11.49)
Church of Christ	30 (12.77)
Others (Jehova's Witnesses, Igelisia Ni Cristo)	77 (32.77)
Number of children	
1-2	140 (59.58)
3-4	69 (29.36)
5-7	26 (11.06)
Employment	
Employed	103 (43.83)
Blue Collar	30 (12.80)
White Collar	3 (1.30)
Pink Collar	8 (3.40)
Red Collar	62 (26.40)
Not employed	132 (56.17)
Occupation of Partner	
Construction Workers	90 (38.30)
Farmers	118 (50.21)
None	20 (8.51)
Others (OFW, Laborer)	7 (2.98)
Average Monthly income, in pesos	
< 5,000	153 (65.11)
5,001-10,000	64 (27.23)
10,001-20,000	13 (5.53)
20,001 and above	5 (2.13)
Vaccination Status of Child/ren	
Fully immunized	196 (83.40)
Non-fully immunized	39 (16.60)

Further, the results reveal that IMs have excellent knowledge of the benefits of vaccination, vaccine management and their side effects, and vaccination schedules and their respective doses. Knowledgeable mothers do not feel anxious about vaccine side effects since they were informed about the expected vaccination effects on their children. Interviews with some respondents reveal that they just voluntarily subject their children to vaccination though unaware of the specific uses of the vaccines because they recognize that vaccines are commonly beneficial for their children.

Table 2. Level of knowledge on childhood vaccination of IMs in Cagayan.

PARAMETERS	Incorrect		Do not Know		Correct	
	Freq	%	Freq	%	Freq	%
Benefits of Vaccination						
Vaccines only prevent diseases, but they do not save lives.	48	20.4	27	11.5	160	68.1
Vaccination schedules ensure that children are protected at the right ages and right times.	6	2.6	16	6.8	213	90.6
Vaccination is one of most cost-effective public health interventions available for free to Filipinos.	7	3.0	19	8.1	209	88.9
AVERAGE SCORE:						82.53
Vaccination Schedules and Doses						
Vaccines can be given anytime.	67	28.5	46	19.6	122	51.9
Immunization card must be brought to child's vaccination visit.	7	3.0	18	7.7	210	89.4
The fully immunized child must have completed the doses of BCG, Pentavalent, OPV, Hepa B, and Measles vaccines before the 1st birthday of the child.	4	1.7	53	22.6	178	75.7
AVERAGE SCORE:						72.33
Vaccine-Preventable Diseases						
BCG helps prevent extra pulmonary meningitis.	0	0.0	226	96.2	9	3.8
Pentavalent vaccine protects your child against meningitis, diphtheria and whooping cough.	1	0.4	234	99.6	0	0.0
PCV can prevent infection of the lungs, sinus, ear, tissue covering of the brain and spinal cord.	0	0.0	234	99.6	1	0.4
MMR vaccine is used to prevent measles.	0	0.0	229	97.4	6	2.6
OPV prevents mumps.	4	1.7	230	97.9	1	0.4
The Hepa B vaccine is very safe and effective at preventing hepatitis B.	0	0.0	227	96.6	8	3.4
IPV is the only vaccine that provides your child with the best protection from polio.	0	0.0	229	97.4	6	2.6
AVERAGE SCORE:						5.27
Vaccine Administration						
Proceed very carefully when a child shows a compromised immune system.	60	25.5	23	9.8	152	64.7
If a child missed an immunization, he/she has to go back and restart vaccines all over again.	58	24.7	39	16.6	138	58.7
The next shot may be administered immediately after the initial dose so to save time and money rather than making another vaccination visit.	49	20.9	37	15.7	149	63.4
AVERAGE SCORE:						62.27
Management of Vaccine Side Effects						
Hot and cold compress is recommended to manage soreness and swelling at the injection site.	35	14.9	33	14.0	167	71.1
Give any vaccine to your child even when he/she is severely sick.	27	11.5	27	11.5	181	77.0
Paracetamol is given to a child with low-grade fever to manage vaccine side-effect.	14	6.0	4	1.7	217	92.3
AVERAGE SCORE:						80.13
Roles of the Healthcare Provider/Vaccinator						
Vaccination is given for free to all Filipinos by Rural Health Unit.	1	0.4	8	3.4	226	96.2
Good record keeping should be done by the healthcare providers to decrease the chances of children receiving extra doses of vaccines.	54	23.0	22	9.4	159	67.7
Generally, healthcare providers screen every patient before giving a vaccine dose to prevent serious adverse reactions.	6	2.6	11	4.7	218	92.8
AVERAGE SCORE:						85.56
TOTAL AVERAGE SCORE:						64.84

Table 3 shows that the general average score is 61.01%, meaning IP mothers have a moderately positive attitude towards childhood vaccination. They regard childhood vaccination as important and believe it is safe and effective. Such findings are reinforced by some of the accounts of the Ybanag

mothers to quote, *"My children do not get measles, and even if they get sick, the effect is just mild as they are protected by the vaccine" (Ybanag Mother 7, 3).*

Moreover, the respondents consider vaccines an essential requirement for children to protect them from adverse episodes of vaccine-preventable diseases because the healthcare workers, whom they believe are experts, strongly encourage them to comply with the vaccination requirement for their children. The IP mothers also have a very positive attitude towards vaccination because they can openly discuss concerns and issues with the healthcare workers. This factor made the IP mothers influenced other parents in the community to have their children get vaccinated. In fact, IP mothers reveal that they go together to the Municipal Health Office for vaccination.

Table 3. Attitude of IMs towards childhood vaccination.

	PARAMETERS	Disagree		Neutral		Agree	
		Freq	%	Freq	%	Freq	%
	Statements						
1.	Generally, the mandatory basic vaccines are safe and effective.	1	0.4	16	6.8	218	92.8
2.	It is better for my child to develop immunity from natural infections rather than from vaccines.	146	62.1	21	8.9	68	28.9
3.	In general, the use of alternative practices can eliminate the need for vaccination.	137	58.3	27	11.5	71	30.2
4.	I encourage other parents in our community to have their children vaccinated with all the recommended vaccines.	18	7.7	3	1.3	214	91.1
5.	Generally, a healthy lifestyle such as healthy nutrition and hygiene can replace the need for vaccination.	117	49.8	18	7.7	100	42.6
6.	Generally, I do what the healthcare providers recommend about vaccines for my child.	12	5.1	2	0.9	221	94.0
7.	The healthcare vaccination facility creates a friendly environment.	5	2.1	7	3.0	223	94.9
8.	Having my child vaccinated helps to protect the health of others in our community.	39	16.6	25	10.6	171	72.8
9.	I am able to openly discuss my concerns about vaccination with a healthcare provider.	19	8.1	3	1.3	213	90.6
10.	It is my right as parent to choose the type of vaccines for my child.	95	40.4	19	8.1	121	51.5
11.	Our religious, cultural or philosophical beliefs restricts me to vaccinate my child.	187	79.6	8	3.4	40	17.0
12.	Children receive too many vaccines.	152	64.7	21	8.9	62	26.4
	General Average Score						61.01%

On the contrary, a very remarkable response of the IMs which caused non-compliance to vaccination is religion, cultural practices, and philosophical beliefs that restrict them from subjecting their children to vaccination. Some of the narratives of mothers are *"Children are sick because we tend to disturb the dwarfs and fairies"* (*Agta Mother 9, 11*); "*I seek help with the faith healer or herbalist to treat my child's sickness. He examined my son and just said he has shingles (kulibra). I also applied coconut oil and my child was healed" (Agta Mother 11).*

Social and cultural misconceptions are a few barriers to achieving a positive attitude of mothers toward vaccinating their children (Bangura *et al.*, 2020). According to Ophori *et al.* (2013), ethnicity and religious belief of mothers affect their attitude toward childhood immunization. In this light, the value systems and level of trust in healthcare providers are essential to maternal decision-making about vaccination. Vaccination promotion should emphasize trust and public confidence, especially in health professionals (Benin, 2006), so that despite cultural beliefs and practices, reliance and obedience are still manifested.

The level of knowledge and attitude of mothers towards childhood vaccination is not significantly different when grouped according to socio-demographic profile variables except for Agtas'

monthly household income. The result of no difference is primarily due to the equal access to information of IP mothers through the professional efforts of the BHWs. The vaccination promotional/campaign materials distributed by the healthcare professionals were also revealed to be an effective mode to give wide-range and equal access to information. Moreover, digital information dissemination was also shown to be effective during the conversation with the mother-respondents to quote, *"I watched TV infomercials about children vaccination while cueing at the hospital when my child was vaccinated" (Yapayao Mother 1). "Sometimes I watch DOH infomercials on TV, and I also get a lot of information about vaccination. I like watching it to be more aware of the vaccines given to my child" (Itawes Mother 2).* It is noteworthy that well-educated mothers are more likely to recognize proper healthcare protocols better. Therefore, this gives the idea that highly educated mothers understand the importance of childhood vaccination better than mothers deprived of education who might have minor abilities to appreciate and utilize health-related information (Giannakou, 2021).

Table 4. Mothers' level of knowledge and attitude when grouped according to profile variables.

Indigenous group	Profile	p-value	
		Knowledge	Attitude
	Civil Status	.996	.110
	Educational Attainment	.167	.449
	Occupation	.189	.443
	Husband's Job	.335	.293
	Average Monthly Salary Income	.254	.504
Itawes			
	Civil Status	.926	.138
	Educational Attainment	.513	.090
	Religion	.345	.621
	Husband's Job	.560	.163
	Average Monthly Salary Income	.228	.259
Malaueg	Civil Status	.735	.070
	Educational Attainment	.566	.315
	Occupation	.612	.811
	Husband's Job	.166	.074
	Average Monthly Salary Income	.070	.838
Ybanag	Civil Status	.406	.144
	Educational Attainment	.299	.263
	Religion	.261	.923
	Occupation	.726	.337
	Husband's Job	.906	.255
	Average Monthly Salary Income	.090	.482
Agta	Civil Status	.688	.997
	Educational Attainment	.913	.604
	Religion	.281	.247
	Occupation	.323	.350
	Husband's Job	.850	.427
	Average Monthly Salary Income	.165	.005*

**significant at α=0.05.*

On the other hand, the significant difference in Agta mothers' attitudes when grouped according to average monthly salary income implies that those with a lower monthly salary income affect their attitude towards childhood vaccination. This result may be due to their job as farmers and laborers. They opt to toil their hands for hard labor to earn a living, even for a minimal income, instead of bringing their children to the health center during a scheduled vaccination. However, in some instances, they are well-interested in participating in the vaccination activities, particularly when they profit from the relief

goods and financial aid provided by the government or non-government organizations (NGOs) in time with the vaccination schedule; otherwise, they opt not to get down from the mountains or villages. Some children will also get the vaccines if the BHWs do vaccination directly to their respective communities. It is also believed that older mothers burdened with their farm work may be less willing to spend some time having their children immunized. This seemingly unresponsive attitude of the mothers towards vaccination could be associated with the number of household chores they perform at home (Power, 2020). On the other hand, some nursing mothers may not have time to bring their children for immunization at designated times and places. This suggests that when these conditions become routine, mothers get used to not taking their children for vaccinations (Fredrickson, 2004).

Conclusion

Generally, the indigenous mothers of Cagayan have a very good knowledge and attitude on children vaccination though factors like religion, culture, philosophical beliefs, and spouse's decisions restrict them to subject their children to vaccination. Considering that women are more docile than men in the indigenous communities in Cagayan, education, and empowerment remain an issue to be resolved to improve vaccination compliance for children. Hence, healthcare workers must intensify their information dissemination campaign on the importance of specific vaccines. Catch-up Immunization Program for the non-fully immunized children must be implemented.

The National Commission for Indigenous Peoples (NCIP) must collaborate with the Department of Health (DOH-R02) to make customized vaccination promotion/campaign materials using specific dialects. Moreover, the other relevant stakeholders such as NCIP, the Local Government Unit (LGU), and the Department of Social Welfare and Development (DSWD) must develop programmatic initiatives to encourage tribal leaders and their respective constituents to manifest trust and confidence toward healthcare professionals.

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