

Maternal Determinants of Childhood Immunization Noncompliance: A Community-Based Study in Naga City, Philippines

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Abstract— Childhood immunization remains a critical public health strategy for preventing vaccine-preventable diseases; however, incomplete vaccination coverage continues to be a challenge in many communities. This study aimed to determine the maternal determinants associated with childhood immunization noncompliance among mothers of children aged 0–23 months in Naga City, Philippines. A quantitative descriptive research design was employed among 278 mothers from selected barangays in Naga City. Data were collected using a validated structured questionnaire assessing maternal demographic characteristics, personal factors, health service-related factors, family and partner support, cultural factors, economic factors, and perceived effectiveness of community engagement strategies. Descriptive and inferential statistics, including frequency, percentage, weighted mean, Spearman Rank-Order Correlation, Chi-Square Test of Independence, and Cramér’s V, were utilized for data analysis. Findings revealed that economic factors, personal concerns, health service-related factors, and family-related factors contributed to maternal immunization noncompliance, although most determinants were rated at a neutral level. Significant relationships were identified between selected demographic characteristics, particularly age and socioeconomic status, and specific determinants of immunization noncompliance. Home visits by midwives or Barangay Health Workers, text or phone call reminders, and barangay-based outreach immunization activities were perceived as highly effective strategies to improve maternal compliance. The study highlights the importance of strengthening community-based interventions, maternal health education, and healthcare communication to improve childhood immunization compliance in Naga City.

Keywords— Childhood immunization; Maternal determinants; Vaccine compliance; Immunization barriers; Community-based health strategies.

I. INTRODUCTION

Childhood immunization remains one of the most effective public health interventions for preventing vaccine-preventable diseases, reducing childhood morbidity and mortality, and promoting long-term population health. Vaccines protect children by strengthening individual immunity while also contributing to herd immunity, which reduces disease transmission and protects vulnerable populations. Despite significant progress in global immunization programs, vaccination gaps continue to exist due to differences in access, health system capacity, socioeconomic conditions, and vaccine acceptance. The World Health Organization (WHO, 2023) emphasized that vaccine hesitancy and unequal access to immunization services remain persistent global challenges that require continuous investigation into

the factors influencing vaccination uptake and completion.

Globally, immunization programs have contributed significantly to reducing childhood deaths caused by infectious diseases. Vaccination is considered one of the most cost-effective strategies for improving child survival and preventing outbreaks of diseases such as measles, polio, tuberculosis, and diphtheria. However, despite improvements in vaccination coverage, millions of children worldwide continue to experience delayed or incomplete vaccination. These gaps are particularly evident in low- and middle-income countries where healthcare systems may face limitations related to resources, service delivery, geographical accessibility, and health information dissemination. UNICEF and WHO have emphasized

that achieving optimal immunization coverage requires not only vaccine availability but also effective community engagement, health education, and strong healthcare systems.

In the Philippines, childhood immunization is implemented through the National Immunization Program (NIP), which originated from the Expanded Program on Immunization established in 1976. The program was strengthened through Republic Act No. 10152, also known as the Mandatory Infants and Children Health Immunization Act of 2011, which promotes free immunization services and public awareness initiatives to increase vaccination coverage. The program aims to achieve at least 95% immunization coverage through collaboration among government agencies, local government units, WHO, and UNICEF. However, despite established policies and accessible immunization services, challenges related to vaccine acceptance, misinformation, and service utilization continue to affect childhood immunization completion.

The Universal Health Care (UHC) Act of 2019 (Republic Act No. 11223) further strengthened preventive healthcare services by integrating immunization into comprehensive health service delivery. Through increased support for local government units, the policy aims to improve access to essential healthcare services, including maternal and child health programs. Nevertheless, achieving high immunization coverage requires addressing factors beyond service availability, particularly the behaviors, perceptions, and circumstances of parents responsible for ensuring children receive timely vaccinations.

Maternal factors play a significant role in childhood immunization compliance because mothers are often the primary caregivers and decision-makers regarding children's healthcare practices. Previous studies have demonstrated that maternal characteristics, knowledge, attitudes, beliefs, and socioeconomic conditions influence vaccination behavior. Fakonti et al. (2022) found that maternal education and demographic characteristics were significant predictors of vaccination compliance, indicating that

mothers with higher educational attainment may have greater understanding of vaccination benefits and schedules. Similarly, Ta'an (2024) highlighted the importance of maternal comprehension, economic status, and healthcare accessibility in determining vaccination adherence.

Beyond demographic characteristics, maternal perceptions and experiences also influence immunization decisions. Alabadi et al. (2023) emphasized that understanding mothers' beliefs and experiences is essential in identifying factors contributing to vaccine hesitancy and delayed vaccination. Vaccine-related misinformation, concerns regarding side effects, and uncertainty about vaccine safety have been identified as major contributors to incomplete immunization. Younis et al. (2025) further reported that misconceptions and misinformation were strongly associated with delayed or incomplete childhood vaccination.

In the Philippine context, several studies have identified barriers affecting childhood immunization compliance. Eslava et al. (2019) reported that limited vaccine knowledge, fear of adverse effects, misconceptions about vaccine safety, and accessibility challenges influenced vaccination participation. Maturan et al. (2022) found that maternal beliefs, perceived vaccine value, and recommendations from healthcare providers influenced mothers' willingness to participate in immunization programs. Similarly, Malabanan et al. (2023) identified healthcare accessibility, maternal education, and knowledge as important factors affecting vaccination compliance. These findings highlight that improving immunization coverage requires interventions addressing both individual maternal factors and broader community-level barriers.

Health service-related factors also contribute to immunization compliance. Challenges such as vaccine availability, limited healthcare personnel, unclear communication, and inadequate follow-up systems may reduce mothers' ability to complete vaccination schedules. Dalisay et al. (2025) identified misconceptions, knowledge gaps, and weaknesses in healthcare services as key barriers to childhood

vaccination. Furthermore, Molan (2020) emphasized the importance of reminder systems and community support mechanisms in encouraging mothers to adhere to vaccination schedules.

Social and environmental influences are also important in understanding maternal immunization behavior. The Theory of Planned Behavior explains that vaccination decisions are shaped by attitudes, subjective norms, and perceived behavioral control, including mothers' beliefs regarding vaccine safety, family influence, and accessibility of services. Meanwhile, the Social Ecological Model highlights that health behaviors are influenced by multiple levels, including individual, interpersonal, organizational, community, and policy factors. Integrating these perspectives provides a broader understanding of why mothers may delay or fail to complete childhood immunization schedules.

In Naga City, immunization services are provided through the City Health Office across 27 barangays. However, despite local government support and immunization policies, the coverage of Fully Immunized Children (FIC) has shown a declining trend, decreasing from 55% in 2023 to 49% in 2024 and further declining to 38.3% as of September 2025. This decline highlights the need to examine the underlying maternal determinants contributing to immunization noncompliance and develop appropriate community-based strategies to improve vaccination participation.

Therefore, this study aimed to determine the maternal determinants associated with childhood immunization noncompliance among mothers of children aged 0–23 months in Naga City, Philippines. Specifically, the study sought to describe the demographic characteristics of mothers, identify maternal determinants associated with immunization noncompliance including personal, health service-related, family and partner support, cultural, and economic factors, examine the relationship between maternal demographic characteristics and immunization determinants, and propose community-based engagement strategies to improve maternal

compliance with childhood immunization schedules in Naga City.

II. METHODOLOGY

This study employed a quantitative descriptive research design to determine the maternal determinants associated with childhood immunization noncompliance among mothers of children aged 0–23 months in Naga City, Philippines. The research design was selected to describe the demographic characteristics of mothers and examine the factors influencing immunization compliance, including personal factors, health service-related factors, family and partner support, cultural factors, and economic factors. The study was conducted among 278 mothers residing in three selected barangays in Naga City, namely Balatas, Cararayan, and Del Rosario. The sample size was determined using the Raosoft sample size calculator with a 5% margin of error, 95% confidence level, and 50% response distribution. Simple random sampling was utilized to select eligible respondents to improve representativeness and reduce selection bias.

Data were collected using a researcher-developed structured questionnaire consisting of three sections: demographic characteristics of mothers, determinants of childhood immunization noncompliance, and perceived effectiveness of proposed community engagement strategies. The instrument underwent validation by the research adviser and field experts, while reliability was assessed using Cronbach's Alpha to determine internal consistency. A pilot test was conducted among ten mothers who were not included in the actual study sample to assess clarity and effectiveness before the final data collection. The questionnaire was provided in both English and Tagalog to improve understanding among respondents, and responses were measured using a five-point Likert scale.

Data collection was conducted after obtaining the necessary approvals from local government and health authorities in Naga City. Coordination was established with barangay midwives and Barangay Health Workers (BHWs) to assist in identifying and communicating with potential participants. Informed

consent was obtained from all respondents, and confidentiality, privacy, and voluntary participation were maintained throughout the research process. The collected data were encoded, tabulated, and analyzed using descriptive and inferential statistical methods. Frequency and percentage distribution were used to describe maternal demographic characteristics, while weighted mean was applied to determine the level of maternal determinants and effectiveness of proposed community engagement strategies. Spearman Rank-Order Correlation, Chi-Square Test of Independence, and Cramér's V were used to examine relationships between demographic characteristics and determinants of immunization noncompliance. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 20.

III. RESULTS

Demographic characteristics of mothers with children aged 0–23 months

The demographic profile of the respondents showed that most mothers were between 25–29 years old (35%), followed by those aged 30–39 years (28%). The majority of respondents had reached high school education (41%), were married (45%), identified as Roman Catholic (82%), had a monthly income of below ₱10,000 (49%), and had two children (34.17%). These findings indicate that the participants were mostly young mothers with basic educational attainment and low socioeconomic status.

Table 1. Demographic Characteristics of Mothers with Children Aged 0–23 Months (n = 278)

Demographic Characteristics	Frequency (n)	Percentage (%)
Age		
15–19 years	16	6.0
20–24 years	63	23.0
25–29 years	98	35.0
30–39 years	78	28.0
40 years and above	23	8.0
Educational Attainment		
Non-formal education	5	2.0
Elementary	25	8.9
High school	114	41.0
Vocational	27	9.7
College level	72	26.0
College graduate	34	12.0
Postgraduate	1	0.4
Marital Status		
Single	66	24.0
Married	124	45.0
Living-in	81	29.0
Separated	7	2.0
Religion		
Roman Catholic	227	82.0
Iglesia ni Cristo	22	8.0
Born Again	25	8.9
Jehovah Witness	1	0.4
Muslim	3	0.7
Monthly Income		
Below ₱10,000	136	49.0
₱10,001–₱20,000	122	44.0

₹20,001–₹30,000	20	7.0
Above ₹30,000	0	0
Number of Children		
1 child	29	10.43
2 children	95	34.17
3 children	93	33.46
4 and above	61	21.94

The predominance of mothers in the reproductive age group suggests that mothers remain the primary decision-makers regarding their children's healthcare needs, including vaccination compliance. Maternal age has been identified as an important factor influencing immunization practices because younger mothers may have different levels of experience, knowledge, and confidence in managing childhood health requirements. Similar findings were reported by Fakonti et al. (2022), who emphasized that maternal demographic characteristics, particularly age and education, influence mothers' understanding and acceptance of childhood vaccination.

Educational attainment was another important characteristic observed in this study. Most respondents had only high school education, suggesting the importance of providing vaccination information using simple, understandable, and culturally appropriate communication approaches. Mothers with limited educational backgrounds may experience challenges in interpreting health information, understanding vaccination schedules, and evaluating vaccine-related information. This supports the findings of Ta'an (2024) and Fakonti et al. (2022), who highlighted maternal education as an important determinant of vaccination knowledge and adherence.

The socioeconomic profile also revealed that nearly half of the mothers belonged to lower-income households. Although vaccination services were

available through public health facilities, economic limitations may indirectly influence mothers' ability to maintain vaccination schedules due to competing household priorities, work responsibilities, and resource constraints. Previous studies by Benedicto (2025) and Ta'an (2024) similarly reported that socioeconomic conditions affect preventive healthcare practices among families.

The findings suggest that immunization programs should consider maternal characteristics when developing interventions. Health education strategies should be designed according to mothers' educational levels, economic circumstances, and family responsibilities to ensure that vaccination information is accessible and actionable.

Maternal determinants associated with childhood immunization noncompliance

The findings showed that maternal determinants of childhood immunization noncompliance were generally rated as neutral, indicating that respondents did not strongly identify any single factor as the primary cause of missed vaccinations. Among the determinant categories, economic factors obtained the highest weighted mean (3.26), followed by personal factors (3.04), health service-related factors (2.70), and family and partner support (2.62). Cultural factors received the lowest weighted mean (2.56), suggesting that cultural beliefs were not considered major barriers among the respondents.

Table 2. Maternal Determinants Associated with Childhood Immunization Noncompliance

Determinant Category	Overall Weighted Mean	Interpretation
Personal Factors	3.04	Neutral
Health Service-Related Factors	2.70	Neutral
Family and Partner Support	2.62	Neutral
Cultural Factors	2.56	Disagree
Economic Factors	3.26	Neutral

Personal factors obtained an overall weighted mean of 3.04 (Neutral). The highest-rated indicator was “My child is not feeling well, so I will postpone the vaccination for now”, with a weighted mean of 3.61 (Agree). This indicates that mothers may delay vaccination due to concerns regarding their child's health condition and fear of possible complications after vaccination.

This finding reflects the importance of maternal perception and confidence in vaccination decisions. Vaccine hesitancy is often associated with concerns about vaccine safety, side effects, and misconceptions regarding appropriate vaccination timing. Younis et al. (2025) emphasized that misinformation and incorrect beliefs about vaccines contribute significantly to delayed or incomplete immunization.

Therefore, improving mothers’ understanding regarding when vaccination should be postponed and when it remains safe to vaccinate is essential. Health workers should provide clear guidance during immunization visits to reduce unnecessary delays caused by parental concerns.

Health service-related factors obtained an overall weighted mean of 2.70 (Neutral). The highest-rated concern was vaccine availability, with the statement “Vaccines are sometimes out of stock” obtaining a weighted mean of 3.28. Meanwhile, issues such as overcrowding and poor organization at health facilities received lower ratings. The findings suggest that while health facilities were generally accessible and functional, occasional vaccine shortages may create missed opportunities for vaccination. Malabanan et al. (2023) similarly identified vaccine availability, service accessibility, and health worker support as important components affecting mothers’ participation in immunization programs. Strengthening vaccine supply management, improving reminder systems, and maintaining consistent communication between health workers and mothers may improve immunization continuity.

Family and partner support factors recorded an overall weighted mean of 2.62 (Neutral). The highest-rated factor was forgetting the child’s immunization

schedule (3.19), while direct family opposition to vaccination was rated low. This suggests that noncompliance may be influenced more by practical issues, such as remembering schedules, rather than negative family influence. Reminder systems, including text messages and follow-up calls, may therefore be effective strategies. Molan (2020) emphasized that reminder and recall systems support parents in maintaining routine vaccination schedules.

Cultural factors received an overall weighted mean of 2.56 (Disagree), indicating that cultural beliefs were generally not considered significant barriers. The highest-rated statement was the belief that herbal or traditional medicine provides enough protection, with a weighted mean of 2.83. Although traditional beliefs exist, they do not appear to strongly prevent vaccination among respondents. However, health education remains necessary to clarify that traditional practices should complement rather than replace scientifically proven vaccination.

Economic factors obtained the highest overall weighted mean among all determinants (3.26, Neutral). The highest-rated indicator was economic hardship (3.33), suggesting that financial challenges may indirectly influence vaccination compliance. Although transportation costs were not considered a major barrier, low-income families may experience difficulty prioritizing preventive healthcare due to competing daily needs. Similar findings were reported by Benedicto (2025), who highlighted socioeconomic limitations as contributors to incomplete immunization coverage.

The study examined the relationship between mothers’ demographic characteristics and the determinants associated with childhood immunization noncompliance as shown in Table 3. The analysis used Spearman Rank-Order Correlation, Chi-Square Test of Independence, and Cramér’s V to determine whether demographic variables such as age, socioeconomic status, number of children, educational attainment, marital status, and religion were associated with personal, health service-related, family and partner support, cultural, and economic determinants.

Table 3. Highest-Rated Indicators Affecting Immunization Noncompliance

Determinant	Highest-Rated Indicator	Weighted Mean	Interpretation
Personal Factors	Child is not feeling well; vaccination will be postponed	3.61	Agree
Health Service Factors	Vaccines are sometimes out of stock	3.28	Neutral
Family and Partner Support	Forgetting child's immunization schedule	3.19	Neutral
Cultural Factors	Belief that herbal/traditional medicine is enough protection	2.83	Neutral
Economic Factors	Economic hardship	3.33	Neutral

The findings showed that maternal age had a significant relationship with personal factors ($\rho = -0.177$, $p = 0.004$) and health service-related factors ($\rho = -0.173$, $p = 0.004$).

However, no significant relationship was found between age and family/partner support, cultural factors, or economic factors.

The significant negative correlation indicates that maternal age was associated with differences in personal concerns and experiences with health services related to childhood vaccination.

Younger and older mothers may perceive vaccination differently due to differences in parenting experience, health knowledge, confidence, and interaction with healthcare providers.

Younger mothers may require additional guidance because they may have limited experience managing vaccination schedules, understanding vaccine-related information, and making healthcare decisions for their children.

Conversely, older mothers may have previous experiences with vaccination programs that influence their confidence and decision-making.

These findings support Fakonti et al. (2022), who identified maternal demographic characteristics, including age, as important predictors of vaccination compliance. Therefore, immunization programs should consider age-specific communication strategies to address different maternal needs.

Relationship between mothers' demographic characteristics and the determinants of childhood immunization noncompliance

Table 4 presents the relationship between mothers' demographic characteristics and the determinants of childhood immunization noncompliance.

The findings revealed that maternal age had a significant relationship with personal factors ($\rho = -0.177$, $p = 0.004$) and health service-related factors ($\rho = -0.173$, $p = 0.004$).

However, no significant relationship was observed between maternal age and family and partner support, cultural factors, or economic factors. The negative correlation indicates that variations in maternal age were associated with differences in personal concerns and experiences related to immunization services.

This suggests that mothers at different age groups may have varying levels of confidence, knowledge, and decision-making practices regarding childhood vaccination.

Younger mothers may require additional support due to limited parenting experience, while older mothers may have different perceptions based on previous experiences with healthcare services.

These findings support Fakonti et al. (2022), who identified maternal demographic characteristics, including age, as important predictors influencing childhood vaccination compliance.

Table 4. Relationship Between Maternal Demographic Characteristics and Immunization Noncompliance Determinants

Demographic Variable	Significant Relationship Identified
Age	Significant relationship with personal factors ($\rho = -0.177$, $p = 0.004$) and health-related factors ($\rho = -0.173$, $p = 0.004$)
Socioeconomic Status	Significant relationship with personal factors ($\rho = 0.263$, $p = 0.000$), health-related factors ($\rho = 0.146$, $p = 0.015$), and family/partner support ($\rho = 0.342$, $p = 0.000$)
Number of Children	No significant relationship with all determinants
Educational Attainment	Significant relationship only with economic factor ($\rho = -0.129$, $p = 0.032$)
Marital Status	No significant relationship with all determinants
Religion	No significant relationship with all determinants

The table also shows that socioeconomic status had significant relationships with personal factors ($\rho = 0.263$, $p = 0.000$), health service-related factors ($\rho = 0.146$, $p = 0.015$), and family and partner support ($\rho = 0.342$, $p = 0.000$). This indicates that socioeconomic conditions influence mothers' experiences and challenges in maintaining their children's immunization schedules. Although vaccination services are provided free of charge, mothers from lower socioeconomic backgrounds may still experience indirect barriers, such as competing household needs, limited financial resources, and difficulties obtaining family assistance. The relationship between socioeconomic status and family support further suggests that mothers with fewer resources may rely more on family members when accessing healthcare services. This finding is consistent with Benedicto (2025) and Ta'an (2024), who emphasized that socioeconomic conditions influence preventive healthcare practices and childhood immunization completion.

The number of children showed no significant relationship with all determinants of immunization noncompliance, including personal factors ($\rho = 0.025$, $p = 0.672$), health-related factors ($\rho = 0.032$, $p = 0.601$), family and partner support ($\rho = 0.077$, $p = 0.203$), cultural factors ($\rho = 0.011$, $p = 0.862$), and economic factors ($\rho = -0.089$, $p = 0.139$). This finding indicates that having more children did not directly influence mothers' compliance with childhood immunization schedules in the study population.

Although larger families may experience greater childcare responsibilities and scheduling difficulties, these challenges may depend more on available support systems, maternal knowledge, and accessibility of health services rather than family size alone. This finding differs slightly from Malabanan et al. (2023), who suggested that larger family responsibilities may affect mothers' ability to manage healthcare schedules.

Furthermore, educational attainment was significantly associated only with economic factors ($\rho = -0.129$, $p = 0.032$), while no significant relationship was observed with personal, health-related, family and partner support, or cultural factors. This suggests that educational background may influence mothers' perception of financial challenges affecting immunization compliance.

Mothers with different educational levels may have varying employment opportunities, income stability, and ability to manage healthcare-related responsibilities. Although educational attainment was not strongly associated with most determinants, improving maternal health literacy remains essential because education contributes to mothers' understanding of vaccine benefits, safety, and immunization schedules. This supports Fakonti et al. (2022) and Ta'an (2024), who emphasized the role of maternal education in improving vaccination knowledge and adherence.

The results further indicated that marital status and religion had no significant relationship with any determinant of childhood immunization noncompliance. The absence of significant associations suggests that vaccination decisions among mothers in Naga City were not strongly influenced by marital status or religious affiliation.

Although family structure and religious beliefs may influence health behaviors in certain communities, these factors did not appear to be major contributors to immunization noncompliance in this study.

This finding supports Lopez et al. (2023), who explained that religious influences on vaccination behavior are often dependent on broader social and cultural contexts rather than religion alone.

Proposed community-based engagement strategies to improve maternal compliance with childhood immunization schedules in Naga City

Table 5 presents the perceived effectiveness of community-based engagement strategies to improve maternal compliance with childhood immunization schedules in Naga City. The findings showed that the proposed strategies were generally perceived as very effective, with an overall weighted mean of 3.43. Among the strategies, home visits by midwives or Barangay Health Workers (BHWs) obtained the highest rating (weighted mean = 4.01), followed by text or phone call reminders (3.83) and outreach immunization within barangays/zones (3.82). These findings indicate that mothers value direct interaction with healthcare providers and accessible community-based services in supporting vaccination compliance.

Table 5. Perceived Effectiveness of Community Engagement Strategies

Community Engagement Strategy	Weighted Mean	Interpretation
Home visits by midwives or Barangay Health Workers	4.01	Very Effective
Text or phone call reminders	3.83	Very Effective
Outreach immunization within barangays/zones	3.82	Very Effective
Health education sessions	3.63	Very Effective
Providing incentives for compliant mothers	3.46	Very Effective
Clear explanations from health workers	3.47	Very Effective
Integration with other health services	3.41	Very Effective
Mother peer groups	2.95	Effective
Active involvement of barangay officials	2.87	Effective
Weekend vaccination services	2.85	Effective
Overall Weighted Mean	3.43	Very Effective

The high rating of home visits suggests that personalized engagement by midwives and BHWs can effectively address barriers faced by mothers, including concerns about vaccine safety, missed schedules, and lack of information.

Through home visits, healthcare providers can identify children who have missed vaccinations, provide appropriate counselling, and strengthen mothers' confidence in immunization programs.

This supports previous findings emphasizing the importance of community health workers in increasing vaccination coverage through education, follow-up, and trust-building activities.

Results show that reminder systems, such as text messages and phone calls, were considered highly effective. This finding corresponds with the earlier results showing that forgetting immunization schedules was one of the identified family-related factors affecting compliance. Reminder mechanisms provide practical support by helping mothers remember vaccination dates and encouraging timely attendance at health facilities. Molan (2020) similarly highlighted that reminder and recall systems are effective strategies for improving parental adherence to routine childhood vaccination schedules.

Outreach immunization conducted within barangays or community zones was also rated highly effective.

This suggests that bringing vaccination services closer to families may reduce barriers related to time constraints, accessibility, and competing responsibilities. Community-based vaccination activities can increase participation, particularly among low-income families who may have difficulty attending health facilities regularly.

Other strategies, including health education sessions (3.63), clear explanations provided by health workers (3.47), providing incentives for compliant mothers (3.46), and integration of immunization with other health services (3.41) were also rated very effective. These findings highlight the importance of combining health education, motivation, and service improvement approaches to strengthen maternal participation in immunization programs.

Meanwhile, mother peer groups (2.95), active involvement of barangay officials (2.87), and weekend vaccination services (2.85) were rated effective but received lower scores compared with other strategies. This suggests that while these approaches may provide additional support, mothers placed greater importance on direct communication, healthcare worker involvement, and convenient access to immunization services.

Overall, the findings demonstrate that community-based strategies focusing on active health worker engagement, reminder systems, outreach services, and maternal education are valuable approaches for improving childhood immunization compliance in Naga City. These findings support the development of integrated community interventions that address both informational and practical barriers affecting mothers' participation in childhood vaccination programs.

IV. CONCLUSION & RECOMMENDATION

This study determined the maternal determinants associated with childhood immunization noncompliance among mothers of children aged 0–23 months in Naga City, Philippines. The findings revealed that most respondents were young mothers with high school education, married status, low household income, and varying family sizes. Among the identified determinants, economic factors, personal concerns, health service-related factors, and

family-related factors contributed to mothers' experiences with childhood immunization compliance, although most factors were rated at a neutral level. Personal concerns, particularly postponing vaccination when a child was perceived as unwell, emerged as an important factor influencing delayed vaccination. The study also found significant relationships between selected maternal characteristics, particularly age and socioeconomic status, and specific determinants of immunization noncompliance. However, factors such as number of children, marital status, and religion were not significantly associated with immunization determinants. Community-based strategies, particularly home visits by midwives or Barangay Health Workers, reminder systems, and outreach immunization services, were perceived as highly effective approaches to improve maternal compliance. These findings highlight the importance of strengthening maternal education, healthcare communication, and community-based interventions to address barriers and improve childhood immunization coverage in Naga City.

Based on the findings, it is recommended that the City Health Office, Barangay Health Workers, and other healthcare stakeholders strengthen community-based immunization interventions through regular home visits, reminder and recall systems, and barangay-level outreach vaccination activities. Health workers should provide clear and culturally appropriate education regarding vaccine safety, appropriate vaccination timing, and the importance of completing immunization schedules, particularly among mothers with concerns about child illness and vaccine-related misconceptions. Additional support should be provided to mothers from lower socioeconomic backgrounds by improving access to information, strengthening family involvement, and integrating immunization services with other community health programs. Future researchers may consider conducting longitudinal or qualitative studies to further explore mothers' experiences, beliefs, and decision-making processes regarding childhood immunization compliance across different communities.

REFERENCES

- [1] Adeyemi, O. T., & Adeyinka, D. A. (2020). Integrating immunization with maternal and child health services in Sub-Saharan Africa and Southeast Asia: A systematic review. *Global Health Science and Practice*, 8(3), 540–556. <https://doi.org/10.9745/GHSP-D-20-00000>
- [2] Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.
- [3] Benedicto, R. A. (2025). Socio-economic determinants of complete immunization among Filipino children aged 12–23 months: A panel data analysis. *Philippine Journal of Public Health*, 5(1), 45–62. https://animorepository.dlsu.edu.ph/etdb_math/57/
- [4] Bell, E., & Bryman, A. (2007). The ethics of management research: An exploratory content analysis. *British Journal of Management*, 18, 63–77. <https://doi.org/10.1111/j.1467-8551.2006.00487.x>
- [5] Brewer, N. T., Chapman, G. B., Rothman, A. J., Leask, J., & Kempe, A. (2017). Increasing vaccination: Putting psychological science into action. *Psychological Science in the Public Interest*, 18(3), 149–207. <https://doi.org/10.1177/1529100618760521>
- [6] Corporate Finance Institute. (n.d.). Weighted mean: Definition, uses and practical example. <https://corporatefinanceinstitute.com/resources/data-science/weighted-mean/>
- [7] Dalisay, F., Cruz, M., & Santos, J. (2025). Behavioral and social drivers of routine childhood immunization in the Philippines: Application of the BeSD framework. *Vaccine*, 43(32), 4295–4302. <https://pmc.ncbi.nlm.nih.gov/articles/PMC12477805/>
- [8] Department of Health. (2020). Implementing rules and regulations of Republic Act No. 10152. Department of Health. <https://elibrary.judiciary.gov.ph/thebookshelf/showdocs/2/37483>
- [9] Department of Health Naga City. (2021). DOH tags Naga City among high-risk areas for vaccine-preventable disease outbreaks. Department of Health Press Release. <https://www2.naga.gov.ph/doh-tags-naga-iriga-9-others-as-high-risk/>
- [10] Department of Health, UNICEF, & World Health Organization. (2025). DOH, UNICEF, WHO highlight key strategies to achieve 95% child immunization in the Philippines. World Health Organization. <https://www.who.int/philippines/news>
- [11] Eslava, J. M., Cruz, A. B., & Marquez, N. L. (2019). Barriers to childhood immunization in rural Philippines: A qualitative study. *Philippine Journal of Health Research and Development*, 23(2), 45–52.
- [12] Fakonti, G., Vardakis, N., & Papadopoulos, T. (2022). Maternal determinants of childhood vaccination adherence in Greece. *Human Vaccines & Immunotherapeutics*, 18(5), 2041912. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9453258/>
- [13] Lazarus, J. V., Ratzan, S. C., Palayew, A., et al. (2021). Communicating to address vaccine hesitancy: Lessons from COVID-19. *Nature Medicine*, 27(1), 143–145. <https://doi.org/10.1038/s41591-020-01216-3>
- [14] Lopez, E. M., Reyes, F., & Cruz, A. (2023). Communication strategies to combat vaccine hesitancy in the Philippines following the Dengvaxia controversy. *Philippine Journal of Health Communication*, 6(2), 15–28.
- [15] Malabanan, J. A., & Pacer, R. T. (2023). Compliance of mothers with routine childhood immunization: A provincial case study. *Southeast Asian Journal of Public Health*, 9(4), 211–219.
- [16] Maturan, E. G. L., Fabroa, M. J. E., & De los Santos, J. A. (2022). Perceptions on pediatric vaccination and adherence: A study among mothers in the Philippines. *Malaysian Journal of Nursing*, 14(1), 59–65. <https://doi.org/10.31674/mjn.2022.v14i01.009>
- [17] McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly*, 15(4), 351–377. <https://doi.org/10.1177/109019818801500401>
- [18] Oku, P., Oyo-Ita, A., Glenton, C., et al. (2022). Impact of the COVID-19 pandemic on routine

childhood vaccination in low- and middle-income countries: A rapid review. *Vaccine*, 40(30), 4256–4263.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9456753/>

- [19] Philippine Council for Health Research and Development. (2020). National Unified Health Research Agenda. Taguig: PCHRD. <https://www.pchrd.dost.gov.ph/>
- [20] Quintos, R., Gonzales, R., & Santiago, L. (2024). Knowledge, attitudes, and compliance of primary caregivers toward the National Immunization Program in Cagayan, Philippines. *Philippine Nursing Review*, 74(1), 34–42.
- [21] Raosoft. (n.d.). Sample size calculator. <http://www.raosoft.com/samplesize.html>
- [22] Republic Act No. 10152. (2011). Mandatory infants and children health immunization act. Congress of the Philippines.
- [23] Republic Act No. 11223. (2019). Universal Health Care Act. Congress of the Philippines.
- [24] Shapiro, J. (n.d.). Percentage frequency distribution. SAGE Research Methods. <https://doi.org/10.4135/9781412963947.n377>
- [25] Ta'an, N. A. (2024). Maternal adherence to child vaccination schedules in Jordan: Socioeconomic and healthcare accessibility factors. *Middle East Journal of Public Health*, 12(4), 210–218.
- [26] Turney, S. (2025). Chi-square test for independence: Formula, guide, and examples. Scribbr. <https://www.scribbr.com/statistics/chi-square-test-of-independence/>
- [27] World Health Organization. (2023). Global childhood immunization levels stalled in 2023, leaving many without life-saving protection. <https://www.who.int/>
- [28] World Health Organization. (2025). Gavi Alliance impact assessment. World Health Organization. <https://www.who.int/>