RESEARCH ARTICLE
Article URL: https://ojs.poltekkes-malang.ac.id/index.php/HAJ/index

Determinants of Vaccine Hesitancy Among Mothers of Children in Selected Rural Barangays

John Leones Damo [1(CA)], Angel Joy Acueza [2], Katherine Arellano [3]
[1] College of Health, University of Cagayan Valley, Philippines
[2] College of Nursing, Mary Hill College, Inc Lucena City, Philippines
[3] School of Nursing and Allied Health Sciences, St. Paul University, Philippines
Correspondence author email ([CA]): damojohn4@gmail.com

ABSTRACT

This study aimed to assess the level and determinants of vaccine hesitancy among mothers of children aged 0–5 years in selected rural barangays of Quezon. Using a quantitative descriptive–correlational design, the study examined relationships between vaccine hesitancy and socio-demographic, informational, and perceptual factors. A total of 102 mothers were recruited through stratified random sampling, and data were collected using a validated self-administered questionnaire. Findings indicated that 50% of respondents exhibited moderate vaccine hesitancy, while 27.5% had low hesitancy and 22.5% showed high hesitancy. The greatest concerns were related to vaccine safety and potential side effects, identifying safety apprehension as a primary driver of hesitancy. In contrast, strong trust in healthcare providers was associated with lower hesitancy, particularly regarding information sources. Chi-square analysis revealed significant associations between vaccine hesitancy and age group, educational attainment, and monthly income, with older mothers and those with lower education and income more likely to be hesitant. Furthermore, beliefs about vaccine effectiveness, concerns about side effects, trust in health workers, social media influence, and prior healthcare experiences were significantly related to hesitancy levels. These findings highlight the multifactorial nature of vaccine hesitancy and the need for targeted interventions to strengthen vaccine confidence in rural communities.

Keyword: Vaccine hesitancy; children; rural communities

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INTRODUCTION

Vaccination is widely recognized as one of the most effective and cost-efficient public health interventions for the prevention of life-threatening infectious diseases and the reduction of morbidity and mortality across populations worldwide (1). Through systematic immunization efforts, vaccines have significantly decreased the global burden of diseases such as measles, polio, diphtheria, and pertussis, contributing to improved child survival and overall population health. In low- and middle-income countries, immunization programs play a particularly critical role in protecting vulnerable

Submitted: 07 January 2026 Reviewed: 04 February 2026 Accepted: 26 February 2026
Doi: https://doi.org/10.31290/haj.v3i1.6151

populations, especially infants and young children, who are at increased risk of preventable illnesses and their complications (2).

In the Philippines, routine childhood immunization is implemented through the Expanded Program on Immunization (EPI), which provides free vaccines to children as part of the government's commitment to universal health coverage and disease prevention (3). Despite the availability of these free immunization services, vaccine hesitancy remains a persistent public health challenge. Vaccine hesitancy refers to delay in acceptance or refusal of vaccines despite availability of vaccination services and is influenced by factors such as complacency, convenience, and confidence (4). In recent years, concerns about vaccine safety, misinformation, mistrust in health systems, and sociocultural beliefs have contributed to declining immunization coverage in several regions of the country (5).

The problem of vaccine hesitancy is particularly pronounced in rural communities, where access to healthcare services, health education, and credible information sources may be limited. Rural areas often face structural barriers such as geographic isolation, transportation difficulties, shortages of healthcare workers, and inadequate health infrastructure, all of which can affect the delivery and utilization of immunization services (6). Moreover, exposure to misinformation through informal social networks or unverified media sources can strongly influence parental attitudes toward vaccination in these settings (7). These challenges underscore the need for context-specific research that explores the underlying factors contributing to vaccine hesitancy in rural populations.

Mothers play a central role in childhood immunization as primary caregivers and key decision-makers regarding their children's health. Their perceptions, beliefs, knowledge, and experiences significantly shape vaccination behaviors and uptake. Studies have shown that maternal confidence in vaccines, trust in healthcare providers, perceived risks and benefits of immunization, and previous experiences with health services are critical determinants of whether children receive recommended vaccines on schedule (8). Additionally, socio-demographic factors such as maternal age, educational attainment, income level, parity, and access to health information have been associated with variations in immunization acceptance (9).

Understanding vaccine hesitancy among mothers of young children is particularly important during the first five years of life, a critical period for growth, development, and protection against vaccine-preventable diseases. Delayed or incomplete immunization during early childhood increases the risk of outbreaks and undermines herd immunity, posing threats not only to individual children but also to the broader community (10). Therefore, identifying the specific factors that influence maternal vaccination decisions is essential for developing targeted interventions that address concerns, improve trust, and promote timely immunization.

This study is anchored in the principles of public health nursing, which emphasize health promotion, disease prevention, community participation, and evidence-based interventions (11). Public health nurses play a vital role in immunization programs by providing health education, counseling caregivers, addressing misconceptions, and facilitating access to vaccination services, particularly in

underserved communities. By engaging families at the community level, public health nurses are uniquely positioned to influence maternal attitudes and behaviors related to childhood immunization.

Specifically, this study aims to assess the level of vaccine hesitancy among mothers of children aged 0 to 5 years in selected rural barangays of Quezon, Quezon. It also seeks to identify the socio-demographic, informational, and perceptual factors that influence maternal vaccination decisions. By examining these determinants, the study intends to generate evidence that can inform culturally appropriate and community-based strategies to improve immunization coverage. The findings of this research are expected to contribute to the strengthening of public health nursing interventions, guide local health policy implementation, and support the design of targeted educational programs that address vaccine hesitancy and ultimately safeguard child and community health.

METHODS

This study employed a quantitative descriptive–correlational research design to determine the level of vaccine hesitancy and examine its associated determinants among mothers of children aged 0–5 years in selected rural barangays of Quezon, Quezon. This design was deemed appropriate as it allows for the systematic description of vaccine hesitancy levels and the analysis of relationships between socio-demographic factors and vaccine-related perceptions without manipulating variables. This study was conducted October 2025 to January 2026

A stratified random sampling technique was utilized to ensure proportional representation of respondents across the selected barangays. Each barangay served as a stratum, and respondents were randomly selected within each stratum. The target population consisted of mothers aged 15 years and above who had at least one child aged 0–5 years at the time of data collection.

The primary data collection instrument was a researcher-developed questionnaire, which was translated into Filipino (Tagalog) to enhance comprehension among respondents. The questionnaire consisted of two main sections a socio-demographic profile, which gathered data on age, educational attainment, employment status, income level, parity, and access to health services; and a set of Likert-scale statements designed to measure respondents' knowledge, attitudes, beliefs, and practices related to childhood vaccination and vaccine hesitancy.

To ensure the validity of the instrument, content validation was conducted by a panel of three experts in public health, nursing, and health education. The experts evaluated each item based on relevance, clarity, and appropriateness. The instrument obtained an overall Content Validity Index (CVI) of 0.90, indicating excellent content validity and confirming that the items were suitable for measuring vaccine hesitancy among the target population.

Prior to the actual data collection, the questionnaire was subjected to pilot testing among mothers with similar characteristics but who were not included in the main study sample. The pilot test aimed to assess the clarity, comprehensibility, and reliability of the instrument. The internal consistency

of the Likert-scale items was evaluated using Cronbach's alpha, which yielded a coefficient of $\alpha = 0.87$, indicating good reliability of the instrument.

Data were collected through self-administered questionnaires, with the researchers providing guidance and clarification as needed. Data collection was conducted in coordination with barangay health workers to facilitate access to respondents and ensure ethical and culturally appropriate procedures.

For data analysis, descriptive statistics such as frequency and percentage were used to summarize the socio-demographic characteristics of the respondents. The level of vaccine hesitancy was described using the mean and standard deviation. To examine the relationship between socio-demographic variables and vaccine hesitancy, the Chi-square test of independence was employed as the sole inferential statistical method. All analyses were performed at a 0.05 level of significance.

RESULT

Table 1. Level of vaccine hesitancy

Category	Frequency	Percentage
Low Hesitancy	28	27.5%
Moderate Hesitancy	51	50%
High Hesitancy	23	22.5%
Total	102	100%

Based on the results of the study involving 102 mothers of children aged 0–5 years in selected rural barangays, the overall level of vaccine hesitancy was found to be moderate, with a composite mean score of 3.09 on a 4-point Likert scale. Half of the respondents (50.0%) exhibited moderate hesitancy, indicating that although they are generally receptive to vaccination, they may still harbor doubts or concerns regarding vaccine safety and efficacy. A smaller proportion of respondents (27.5%) demonstrated low hesitancy, reflecting strong confidence in vaccines and likely adherence to recommended immunization schedules. Conversely, 22.5% of mothers exhibited high hesitancy, suggesting a tendency to delay or refuse vaccination due to misconceptions, fear of side effects, or limited access to accurate information.

Table 2. Socio-Demographic Profile of Respondents in terms of Age

Age Range	Frequency	Percentage
15-24 years old	18	17.6%
25-34 years old	42	41.2%
35-44 years old	25	24.5%
45-54 years old	12	11.8%
55 years old and above	5	4.9%
Total	**102**	**100%**

The data indicated that the majority of respondents were aged 25–34 years, representing 41.2% (n = 42) of the total 102 participants. This finding suggests that most mothers of children aged 0–5 years in rural barangays are within their prime childbearing and parenting years. The next largest group was aged 35–44 years, comprising 24.5% (n = 25), followed by those aged 15–24 years at 17.6% (n = 18),

reflecting a notable presence of younger mothers. Respondents aged 45–54 accounted for 11.8% (n = 12), while only a small portion, 4.9% (n = 5), were 55 years and older.

Table 3. Socio-Demographic Profile of Respondents in terms of Education

Educational Attainment	Frequency (f)	Percentage (%)
Elementary	15	14.7%
High School	45	44.1%
College	42	41.2%
Total	**102**	**100%**

The data indicate that the majority of the respondents have attained a high school level of education, comprising 44.1% (n=45) of the total participants. This is closely followed by those who have completed college education, representing 41.2% (n=42). A smaller portion of the respondents, 14.7% (n=15), have reached only the elementary level. These results suggest that most of the mothers of children aged 0–5 in the surveyed rural barangays possess at least a high school education, which may influence their access to health information and their decision-making regarding childhood vaccination.

Table 4. Socio-Demographic Profile of Respondents in terms of Monthly Income

Monthly Income (PHP)	Frequency (f)	Percentage (%)
Less than 10,000	46	45.1%
10,001 – 20,000	38	37.3%
20,001 and above	18	17.6%
Total	102	100%

The data showed that nearly half of the respondents (45.1%) have a monthly income of less than ₱10,000, while 37.3% earn between ₱10,001 and ₱20,000. Only 17.6% have a monthly income exceeding ₱20,001. This suggests that a significant proportion of mothers in rural barangays fall within the lower income brackets, which could potentially influence their healthcare decisions, including vaccine uptake

Table 5. Socio-Demographic Profile of Respondents in terms of Number of Offsprings

Number of Children	Frequency (f)	Percentage (%)
1-2 children	40	39.2
3-4 children	45	44.1
5 or more children	17	16.7
Total	**102**	**100**

Most respondents reported having 3 to 4 children (44.1%), followed closely by those with 1 to 2 children (39.2%). A smaller segment (16.7%) has five or more children. These figures suggest that a considerable number of mothers manage larger families, which may affect their healthcare priorities and potentially influence their perceptions and decisions regarding childhood vaccination.

Table 6. Domain-Specific Breakdown of Vaccine Hesitancy

Domain	Item Numbers	Mean Score	Interpretation
1. Beliefs & Knowledge About Vaccines	1–5	3.45	Moderate Hesitancy
2. Confidence & Concerns (Safety)	6–10	2.10	High Hesitancy (greatest concern)
3. Trusted Sources of Information	11–15	3.72	Low Hesitancy (good trust in health workers & professionals)
4. Actions & Behaviors Toward Vaccines	16–20	3.08	Moderate Hesitancy

The domain-specific analysis of vaccine hesitancy shows that the highest level of hesitancy is observed in the domain of Confidence and Concerns (Safety) with a mean score of 2.10, indicating that mothers are primarily worried about the safety and potential side effects of vaccines. This domain reflects the most significant barrier to vaccination. Meanwhile, the domain Trusted Sources of Information yielded the highest mean score of 3.72, signifying low hesitancy and suggesting strong trust in healthcare professionals and barangay health workers as reliable sources of vaccine-related information. The domains Beliefs and Knowledge About Vaccines (mean = 3.45) and Actions and Behaviors Toward Vaccines (mean = 3.08) reflect moderate levels of hesitancy, indicating that while some mothers are informed and proactive, others may still harbor doubts or inconsistencies in following vaccination schedules. Overall, concerns over safety appear to be the most significant driver of hesitancy in this population.

Table 7. Factors Associated with Vaccine Hesitancy

Predictor Variable	Mean	Chi-square (χ^2)	p-value	Decision	Interpretation
Age Group	3.11	9.47	0.023	Reject Ho	Significant
Educational Attainment	3.08	11.26	0.010	Reject Ho	Significant
Monthly Income	3.02	8.15	0.043	Reject Ho	Significant
Number of Children	3.12	3.56	0.169	Fail to Reject Ho	Significant
Belief in Vaccine Effectiveness	3.36	15.02	0.001	Reject Ho	Significant
Side Effects Concern	3.45	17.18	0.000	Reject Ho	Significant
Trust in Health Workers	3.27	12.89	0.004	Reject Ho	Significant
Social Media Influence	2.89	9.88	0.019	Reject Ho	Significant
Health System Experience	3.01	6.73	0.035	Reject Ho	Significant

Table 7 presents the statistical relationship between various socio-demographic and perceptual factors and vaccine hesitancy among mothers of children aged 0–5. The findings indicate that age group ($\chi^2 = 9.47$, $p = 0.023$), educational attainment ($\chi^2 = 11.26$, $p = 0.010$), and monthly income ($\chi^2 = 8.15$, $p = 0.043$) are all significantly associated with levels of hesitancy, suggesting that older mothers, those with lower educational levels, and those with less income tend to exhibit greater vaccine hesitancy. Meanwhile, number of children ($\chi^2 = 3.56$, $p = 0.169$) showed no significant association, implying that having more or fewer children does not strongly influence hesitancy.

Perceptual and informational factors such as belief in vaccine effectiveness ($\chi^2 = 15.02$, $p = 0.001$), concern about side effects ($\chi^2 = 17.18$, $p = 0.000$), trust in health workers ($\chi^2 = 12.89$, $p = 0.004$), and social media influence ($\chi^2 = 9.88$, $p = 0.019$) were all found to be significantly related to vaccine hesitancy. The strongest predictor was concern over side effects, followed closely by doubt in vaccine effectiveness, reinforcing that fear and misinformation are major drivers of hesitancy. Lastly, experience with the health system ($\chi^2 = 6.73$, $p = 0.035$) also significantly influenced hesitancy, indicating that negative interactions with health services may discourage mothers from fully participating in vaccination programs.

These results confirm that both socio-demographic characteristics and attitudinal factors play a substantial role in shaping vaccine behavior and hesitancy, and must be considered when designing targeted interventions.

DISCUSSION

This pattern of moderate to high hesitancy aligns with prior research indicating that parental vaccine hesitancy is common in both urban and rural areas of the Philippines, particularly following high-profile vaccine controversie (13). Reported that misinformation, concerns about vaccine safety, and lack of trust in the health system contributed to delayed or incomplete immunization among Filipino parents. Similarly, Ogalesco (14) found that maternal beliefs and fear of side effects were significant predictors of vaccine hesitancy in rural communities affected by outbreaks, highlighting the complex interplay of knowledge, attitudes, and socio-cultural factors in vaccination decisions.

Globally, these findings are consistent with systematic reviews showing that vaccine hesitancy is often concentrated in parents of young children, with concerns ranging from perceived risks to lack of adequate information about vaccines (17). The moderate level of hesitancy observed in this study may reflect a combination of awareness of vaccine benefits and lingering concerns or misconceptions that impede full acceptance.

The predominance of mothers aged 25–34 may also influence vaccine hesitancy, as age has been associated with variations in health knowledge, experience, and risk perception. Studies have shown that younger mothers may exhibit higher hesitancy due to limited experience or exposure to health education, whereas mothers in the 25–34 age group are more likely to engage with health services and exhibit moderate levels of vaccine acceptance (18). Older mothers (45 years and above) represented a small proportion of the respondents, reflecting the typical age of mothers with children under five.

From a nursing perspective, understanding the age profile is crucial for designing age-appropriate health education interventions. Younger mothers may require more detailed guidance on vaccine schedules and safety, while mothers in the 25–34 age range can be engaged as peer educators or community advocates to influence vaccine acceptance among younger or hesitant mothers.

Education plays a critical role in shaping health knowledge, attitudes, and behaviors, including vaccine decision-making. Studies have shown that higher educational attainment is positively associated with increased health literacy, better understanding of vaccine benefits, and reduced susceptibility to misinformation (18,19). Mothers with high school or college-level education are generally more capable of accessing, interpreting, and applying health information, which may influence their likelihood of vaccinating their children according to recommended schedules. Conversely, mothers with only elementary education may have limited access to or understanding of vaccine information, potentially contributing to higher levels of hesitancy (20).

In the context of this study, the relatively high proportion of mothers with secondary and tertiary education may help explain why moderate vaccine hesitancy was the most prevalent level observed. While education alone does not eliminate hesitancy—given that beliefs, social influences, and cultural factors also play significant roles—it provides a foundation for targeted health education and interventions.

Household income is a recognized determinant of health-seeking behavior and access to healthcare services. Studies have shown that lower-income families may face challenges in accessing health information and services, which can contribute to vaccine hesitancy or delayed immunization (10,11). Financial constraints may limit transportation to vaccination sites, reduce participation in health education programs, or amplify reliance on informal sources of information, all of which may affect vaccine acceptance. Conversely, mothers with higher income levels are generally better able to access healthcare resources and may have greater exposure to health education campaigns, which can increase vaccine confidence.

CONCLUSION

The findings of this study underscore that vaccine hesitancy is a multifactorial issue influenced by both socio-demographic and perceptual elements. Although mothers generally demonstrated a moderate level of vaccine hesitancy, concerns about side effects emerged as the most prominent barrier, coupled with lingering doubts about vaccine efficacy and misinformation from social media.

Crucially, age, education, and income levels significantly influenced hesitancy, suggesting that health education interventions should be tailored according to these variables. Strengthening trust in health workers, improving patient experiences in health centers, and countering misinformation—especially through community-based campaigns—are essential strategies for reducing vaccine hesitancy.

The study concludes that addressing both emotional and informational barriers is key to improving vaccine uptake in rural communities, and that targeted, culturally sensitive communication is necessary to build confidence in vaccination programs.

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