**ORIGINAL ARTICLES**

# Knowledge, attitude, and practices of mothers with children under 1-year-old regarding post-vaccination care and related factors in Quang Ngai City, Quang Ngai province, 2023

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## ABSTRACT

**Objectives:** Describe the knowledge, attitudes, and practices of mothers with children under one year of age on post-vaccination care and some related factors in Quang Ngai City, Quang Ngai province, in 2023.

**Methods:** A cross-sectional study, interviewing 345 mothers with children under 1-year-old in 08 communes and wards of Quang Ngai City, Quang Ngai province, from February to April 2023.

**Results:** Good knowledge achieved by mothers of children under one year of age on childcare after vaccination was 62.0%. Good attitude and good practice of mothers on childcare after vaccination reached the rate of 89.0% and 74.0%, respectively. The study found an association between the mothers' good knowledge, attitudes and educational level of mothers (OR=2.49 (1.58-3.91)), the mothers whose children experienced adverse events after immunization (AEFI) (OR=2.57 (1.52-4.33)) or had siblings who had experienced AEFI have significantly better knowledge of post-vaccination care (OR=3.74 (1.41-9.95)), the number of communication channels also have positive influence to mother's knowledge (OR=2.60 (1.23-5.52)).

**Conclusions:** Diversify forms of communication and further promote the role of health workers in providing knowledge about the benefits of vaccination and how to detect and treat AEFI, focusing on mothers with low levels of education.

***Keywords:*** *Knowledge, attitude, practice, adverse events after immunization.*

## INTRODUCTION

The vaccine in immunization is considered safe, but the risk of adverse events after immunization (AEFI) is a medical abnormality that includes manifestations at the injection site or at occurs after vaccination (1).

AEFI often occurs within the first 24 hours following vaccination and healthcare workers contribute significantly to vaccine safety monitoring by being vigilant in recognizing and reporting AEFI. Besides healthcare workers, mothers play a vital role in early detection, prevention, and management, reducing the consequences of AEFI. Mothers need to monitor their children after vaccination to promptly identify any abnormal symptoms or mild common reactions and quickly recognize dangerous signs for timely intervention, avoiding unfortunate complications and risks (2) A study conducted by Pham Thi Ngoc in Hai Phong City in 2021 yielded results: There were still 12.7% of mothers who did not keep their children for enough 30 minutes

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at the immunization site to monitor AEFI and observe their children at home for 24 hours after injection; 1.3% of mothers returned home right after vaccination (3).

Therefore, the study was conducted to find out the knowledge, attitude, and practice of mothers with children under 1 year of age on taking care of children after vaccination and some related factors to the practice of mothers in Quang Ngai City, Quang Ngai province in 2023.

## METHODS

**Study design**: A cross-sectional study.

Study subjects: Mothers with children under 1-year-old in 08 communes and wards in Quang Ngai city.

Selection criteria: Mothers of children under one year of age were vaccinated with at least 01 dose of vaccine and agreed to participate in the study.

Exclusion criteria: Mothers unable to understand and answer interview questions.

**Study site and time:** This is carried out from September 2022 to June 2023 in Quang Ngai city.

**Sample size and sampling:**

**Sample Size:** Formula for calculating sample size for estimating a proportion with absolute precision.

$$n = Z^2_{(1 - \alpha/2)} \frac{p(1-p)}{d^2}$$

n: is the sample size to be investigated; p: As the percentage of mothers with good knowledge and practice of taking care of their children properly after vaccination, p = 0.358 (refer to the study of author Nguyen Thanh Trung in 2016) (4); d: As absolute precision, choose d=0.055; Take α= 0.05 (95% confidence), Z = 1.96. The formula returned n = 292 mothers, we collected 345 valid questionnaires.

**Sampling method:** multi-stage sampling method.

The data collection process included 2 stages. In the first stage, two center wards were chosen randomly (representative of the urban and rural areas). In the second stage, we made a list of all the children under 1-year-old and selected subjects in the study sample by single random method.

**Data collection:** The self-administered questionnaire includes the following: Knowledge consists of 8 sentences (30 points): Each correct answer is 01 point; knowledge is achieved when ≥ 15 points. Attitude consists of 06 sentences (30 points) based on the Likert Scale, which divides mothers' attitudes into five response levels. Post-injection includes strongly agree (5 points), agree (4 points), do not know (3 points), disagree (2 points), and strongly disagree (1 point). Rating: Good attitude ≥ 23 points (≥ 75%). The practice consists of 02 questions, 1 point for each correct idea, and 2 points achieved when answering both questions correctly.

**Data analysis:** Data entry using Epidata 3.1 software and processing on SPSS 20.0 software. Statistical analysis used $\chi 2$ test and odds ratio (OR) to compare the proportions at the significant level $p<0.05$.

**Ethical approval:** The study was conducted after the official Decision No. 02/2022/YTCC-HD3 of the Chairman of the Ethics Committee – Hanoi University of Public Health. When the study is finished, the results will help the locality to have appropriate management activities in vaccination work.

## RESULTS

**General information about research subjects**

345 mothers participated in this study; 62.6% had a high school diploma, college and university degrees, and above. Housewives accounted for 40.6%; the rest were civil servants and other occupations such as construction, trading, and freelance workers. The majority of the respondents were above 30 years old (56.8%), lived in urban areas (61.4), and had more than two children so far (68.2%). 34,5% were under six months old.

**Knowledge, attitude, and practice of mothers regarding post-vaccination care**

**Table 1. Percentage of mothers with correct knowledge about common signs, severe reactions and the consequences of severe responses after vaccination (n=345)**

| Knowledge | | Frequency (n) | Percentage (%) |
|---|---|---|---|
| **Common signs of reactions after vaccination** | Mild fever | 307 | 89.0 |
| | Hypothermia | 35 | 10.1 |
| | Swelling and pain at the injection site | 182 | 52.8 |
| | Mild fussiness | 225 | 65.2 |
| | Vomiting | 34 | 9.9 |
| | Ulcer | 52 | 15.1 |
| **Signs of severe reactions after vaccination** | High fever (> 39ºC) | 256 | 74.2 |
| | Prolonged crying for more than 30 minutes | 161 | 46.7 |
| | Convulsion | 243 | 70.4 |
| | Vomit/Low milk intake or refusal to breastfeed | 170 | 49.3 |
| | Difficulty breathing, cyanosis | 261 | 75.7 |
| | Rash, bleeding, allergic reactions | 126 | 36.5 |
| **Consequences of severe reactions after vaccination** | Causing long-lasting consequences | 102 | 29.6 |
| | Life threatening | 114 | 33.0 |
| | Disability, weakened health | 248 | 71.9 |
| | Dead | 172 | 49.9 |

Table 1 shows that more than 50% of mothers knew that the common manifestations of post-vaccination reactions were swelling and pain at the injection site, mild fussiness, fever; fever was the most known 89% of mothers. Shortness of breath/cyanosis, very high fever, and convulsions are the most well-known manifestations of severe reactions after vaccination by mothers (75.7%, 74.2%, and 70.4%, respectively). Severe post-vaccination reactions that were life-threatening and fatal for infants were the most well-known by mothers (72% and 50%),

In general, the majority of mothers with good knowledge of AEFI achieved, accounting for 62.0%.

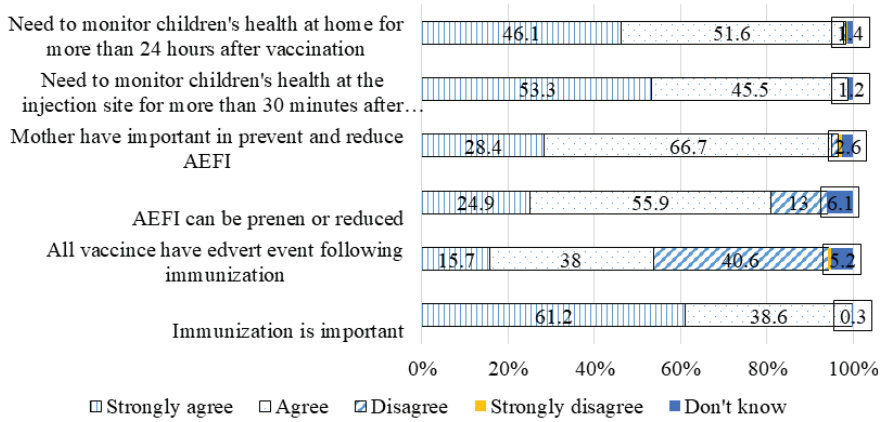


**Figure 1. Percentage of mothers' attitudes about childcare after vaccination**

In figure 1, 89% of mothers have a good attitude about AEFI, which: The results in the above table show that 61.2% of mothers mother confirm vaccination is very necessary, and 38.6% of mothers agree that vaccination is important. 15.7% and 38% of women strongly agree and agree that all vaccines have side effects or adverse reactions after vaccination respectively. 55.9% of mothers said that the reaction is preventable after vaccination, but 13% thought it could not be prevented. Commenting on their role in preventing and managing post-injection AEFI, 28.4% of mothers confirmed that it is very important, and only 2.6% think their role is not important. Regarding the necessity of monitoring children after vaccination at vaccination centers for 30 minutes after vaccination, 53.3% of mothers strongly agree, and 45.5% of mothers agree. Continuing to monitor at home for at least 24 hours has the strong agreement of 46.1% of mothers and the agreement of 51.6% of mothers. A total of 97.4% of mothers either agree or strongly agree with the idea of monitoring the child for at least 30 minutes at the vaccination center and continuing to monitor at home for at least 24 hours after vaccination.

**Table 2. Mother's practice on keeping immunization records and providing information to health workers before vaccination.**

| Information | | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Keep your child's immunization record | Have | 337 | 97.7 |
| | Have not | 8 | 2.3 |
| Provide health workers with information about the child | Child's current health | 321 | 93.0 |
| | Child's medical history | 207 | 60.0 |
| | Child's birth history | 149 | 43.2 |
| | History of drug/vaccine allergy | 216 | 62.6 |
| | Reaction occurred in previous vaccination | 213 | 61.7 |

Table 2 shows most mothers kept their children's immunization records (97.7%). When asked about the child's health status before vaccination, mothers tended to talk about the child's current health the most (93.0%), followed by the history of drug / vaccination allergy (62.6%), history of reactions occurring in previous injections (61.2%) and medical history of children (60%).

**Table 3. Mother's practice on childcare after vaccination**

| Information | | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Monitoring children after vaccination at CHC | < 30 minutes | 51 | 14.8 |
| | ≥ 30 minutes | 294 | 85.2 |
| Reasons for monitoring children at the injection site for <30 minutes (n=51) | Busy don't have enough time | 39 | 76.5 |
| | There are no seats | 4 | 7.8 |
| | Don't know that need to stay 30 minutes to monitor the child | 6 | 11.8 |
| | Seeing that the child has no unusual problems | 42 | 82.4 |
| Monitor children's health at home | < 24 hours | 64 | 18.6 |
| | ≥ 24 hours | 281 | 81.4 |
| Reasons for monitoring children's health at home < 24 hours (n=64) | Do not have time | 53 | 82.8 |
| | Don't know what to follow | 1 | 0.4 |
| | Seeing that the child has no abnormal problems | 49 | 92.5 |
| Caring for children with fever (n=205) | Wear loose, airy clothes | 123 | 60.0 |
| | Use fever-reducing medicine when you have a fever | 119 | 58.0 |
| | Wipe/apply with warm water | 133 | 64.9 |
| | Using folk medicine, traditional medicine | 8 | 3.9 |
| | Give your child more water and milk to drink/feed | 101 | 49.3 |
| | Do nothing | 2 | 1.0 |
| Take care of children when there is swelling, redness, pain at the injection site (n=194) | Hot compress | 23 | 11.8 |
| | Cold compress | 37 | 19.1 |
| | Clean the injection site well with clean water | 76 | 39.2 |
| | Do not apply, or put anything on the injection site | 104 | 53.6 |
| | Do nothing | 52 | 26.8 |

In this table, after vaccination, 85.2% of mothers let their children stay at the monitoring station for 30 minutes or more. About 14.8% of mothers let their children go home before 30 minutes, because they don't see any problems with their children (82.4%) and don't have enough time (76.5%). After returning home, 18.5% of mothers did not monitor their children for more than 24 hours; the main reason was that 92.5% did

not see any abnormalities in the child, and 82.8% did not have time. When the child has a fever, most mothers wipe with warm water 64.9%, wear loose and airy clothes 60.0%, and use antipyretic drugs 58.0%. Up to 53.6% of mothers do not apply or put anything on the injection site.

In general, most mothers had good practice in monitoring their children after vaccination (74.2%), in which: 85.2% of mothers followed their children after vaccination at CHSs at least. 30 minutes and 81.4% of mothers had their health status monitored at home for 24 hours or more.

**Some related factors to the practice of mothers on taking care of children after vaccination.**

**Table 4. Relationship between education level, child's characteristics, number of media methods, and mothers' knowledge about AEFI**

| Characteristic | | Mother's knowledge about AEFI | | OR (95% CI) | p |
|---|---|---|---|---|---|
| | | Good n (%) | Inappropriate n (%) | | |
| Academic level | From high school and up | 152 (70.4) | 64 (29.6) | 2.49 (1.58-3.91) | < 0.001 |
| | Below high school | 63 (48.8) | 66 (51.2) | | |
| Children who have AEFI | Have | 79 (76,7) | 24 (23.3) | 2.57 (1.52-4.33) | < 0.001 |
| | Have not | 136 (56.2) | 106 (43.8) | | |
| Children with siblings who have AEFI | Have | 28 (84.8) | 5 (15,2) | 3.74 (1.41-9.95) | 0.005 |
| | Have not | 187 (59.9) | 125 (40,1) | | |
| Methods of communication that mother accessed | 1 | 35 (38,4) | 56 (61,6) | 1 | < 0.001 |
| | 2 | 38 (43,2) | 50 (56,8) | 1.22 (0.67-2.21) | 0.04 |
| | 3 | 26 (61,9) | 16 (38,1) | 2.60 (1.23-5.52) | 0.013 |
| | 4 | 116 (93,5) | 8 (6,5) | 23.2 (10,1-53,29) | < 0.001 |

Table 4 shows a positive relationship exists between the mother's education level and the knowledge about vaccination and childcare after vaccination (p<0.001) with OR=2.49.

The mother of the child or the child's brother/ sister who has AEFI has good knowledge of taking care of the child after vaccination achieved higher than the other group with OR = 2.57 and OR= 3.74, respectively.

*The more media a mother has access to information from, the better her knowledge will be. Mothers access to 04 information froms are 23.2 times more likely to have good knowledge of taking care of the child after vaccination than those who have access to only 01 source of information (p<0.001).*

## DISCUSSION

### Knowledge, attitude, and practice of mothers regarding post-vaccination care

Regarding common reactions, the study found that most mothers know that mild fever is a common reaction in children after

vaccination (89.0%); mild crying and swelling at the injection site are also known by many mothers (65.2% and 52.8%, respectively). A study conducted by Nguyen Thi Nga in 2018 in Hai Duong province yielded similar results, with 90.0% of mothers being aware of fever, 92.5% knowing about mild crying, and 88.3% recognizing swelling and pain at the injection site as common signs of post-vaccination reactions (5). These symptoms are typically mild and self-resolving.

Regarding severe reactions after vaccination, the majority of mothers knew signs such as difficulty breathing and cyanosis (75.7%); high fever (74.2%); and seizures (70.4%). Previous studies by various authors have also reported high proportions of participants mentioning these reactions, including Pham Thi Ngoc in 2020 with high fever (54.7%) and seizures (46.9%) (3); and Nguyen Van Son in An Giang in 2020 with high fever (85.3%), prolonged crying (55.1%), seizures (73.7%), and decreased or refusal to breastfeed (50.9%) (6).

This knowledge is crucial for mothers to recognize early signs of severe reactions, allowing for timely intervention and promptly bringing the child to healthcare facilities to minimize life-threatening risks. In cases where families identify the symptoms late or respond late when the adverse events have progressed severely, emergency care and treatment become challenging and can even lead to mortality.

When asked about the consequences of severe reactions after vaccination, 71.9% of mothers responded that it could pose a threat to the child's life; 49.9% expressed fear of the child's possibility of death, while 29.6% and 33.0% mentioned long-term consequences or the potential for illness, disability. The consequences of severe reactions after vaccination are important to mothers' knowledge. It helps them understand the potential risks that their child may face, enabling them to adopt a positive attitude and engage in better practices in monitoring adverse events following immunization.

The overall findings reveal that 62.0% of mothers have achieved satisfactory knowledge in monitoring adverse events following immunization (AEFI). This proportion is similar to the results reported by Nguyen Thanh Trung in 2016 (64.2%), higher than the study conducted by Pham Thi Ngoc in 2020 (24.9%), and lower than the findings of Dang Thi Mai Khoi in 2021 (74.3%) (3, 4, 7). These results indicate that there are still significant gaps in mothers' general knowledge of AEFI, highlighting the need for coordinated measures to provide information to mothers effectively.

The overall assessment shows that 89.0% of mothers have a good attitude about AEFI; this result is higher than the study of author Dang Thi Mai Khoi in 2021 (78.7%) (7). When the mother has a good attitude, the mother will strictly follow the health worker's instructions to prevent AEFI.

The rate of practicing post-vaccination care by mothers in our study was 74.2%. This rate is lower than that reported by Nguyen Thanh Trung in 2016 (85.2%), but higher than the studies conducted by Pham Thi Ngoc in 2020 and Dang Thi Mai Khoi in 2021, which had rates of 18.4% and 66.2%, respectively (3, 4, 7). An essential aspect of post-vaccination care practice is keeping immunization records. The research results showed a high rate of keeping immunization records for children (97.7%). Individual immunization records are vital in tracking vaccine doses and the child's immunization history and monitoring the long-term immune status against vaccine-preventable diseases. Furthermore, personal immunization records serve as useful communication tools to provide knowledge about vaccination.

Providing information about the child's medical and vaccination history to healthcare providers (HCP) before immunization is crucial to ensure vaccination safety. The research shows that 93.0% of mothers provided HCP with information about the child's current health status; 62.6% listed medications or vaccines to which the child had previously been allergic, and 61.7% mentioned the child's reactions to previous vaccinations. A study by Nguyen Thanh Trung in Thanh Hoa in 2016 has slightly lower results, with rates of 79.7%, 16.3%, and 33.1%, respectively (4). The difference rates between studies relate to the different vaccines used in each period, and there was a switch of 5 in-1 vaccine from Quivaxem to Combefive and SII, which have different rates of AEFI.

The percentage of mothers who followed up with their children after vaccination at the health station for at least 30 minutes was relatively high (95.2%), higher than the research results of Nguyen Thanh Trung in 2016 (88.9%). 81.4% of mothers monitor their children's health at home for 24 hours or more, lower than the research results of Nguyen Thanh Trung (93.7%) (4).

The percentage of mothers who monitor their children's health at home for less than 24 hours accounts for 16.6%. Others did not follow up with children sufficiently because they were busy and found that the child did not show any abnormality (1.4%).

**Some related factors to practice of mothers on taking care of children after vaccination.**

This study found an association between the educational attainment group and mothers' knowledge. Mothers with an education from high school or higher are 2.49 times more likely to have better knowledge than those with less than a high school education. Vanlalduhsaki's study in 2021 in India also found similar results (8). Mothers with a high level of education can easily access new sources of knowledge and need to learn information about health in general, as well as issues related to vaccination in particular.

A positive relationship exists between the child and the younger siblings with AEFI and the mother's knowledge of post-vaccination care. Accordingly, mothers of children or children's siblings who have experienced AEFI are 2.57 and 3.74 times more likely to have achieved knowledge, respectively, than the other mothers. Research by author Dang Thi Mai Khoi in 2021 also found a relationship between children who had normal reactions after vaccination and the practice of caring for children after vaccination (7) . Thus, mothers with children or siblings who have had AEFI will have more experience in handling these situations which lead to better knowledge than the other group.

There is a relationship between some communication methods and access to knowledge about post-injection childcare. Mothers with access to information from three communication methods have 2.60 times more knowledge than mothers with access to less than two methods. Research by Nguyen Thanh Trung in 2016 also found associations between some forms of communication and mothers' knowledge (4). This shows the importance of increasing the frequency and combining different forms of communication for health education about vaccination.

There were some limitations in this study. The reference source is still limited. Furthermore, the questionnaire is a bit long, leading to the feeling of boredom, discouraging toward the end of the questionnaire and recall bias should be taken into account. Finally, because of the shortage of 5-in-1 vaccine for the expanded immunization programmer, the number of parents who come to the healthcare center for their child's vaccination decreased therefore the sample size was affected.

## CONCLUSION

The percentage of mothers with good knowledge, positive attitude, and good practice towards detecting and managing adverse events after immunization (AEFI) are 62.0%, 89.0%, and 74.2%, respectively. However, there are still significant gaps in mothers' knowledge of AEFI, necessitating coordinated measures to provide information to mothers effectively. A considerable proportion of mothers still practice incorrectly by neglecting to monitor the child for 30 minutes and 24 hours after vaccination, mishandling the injection site and incomplete management of fever.

Mothers with higher educational levels, mothers with children who have experienced adverse events after immunization (AEFI), and mothers with siblings who have experienced AEFI, as well as those who have access to multiple communication channels, are factors that are related to mothers' knowledge, attitudes in caring for children after vaccination.

There is a need to enhance the dissemination of vaccination knowledge through various media channels such as television and radio. Additionally, it is important to improve the professional competence of vaccination staff at the community level regarding vaccination issues.

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