

# Enhancing Maternal Understanding of Infant Immunization Through Intensive and Discovery-Based Approaches: A Quasi-Experimental Study

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## Abstract

**Background:** Children's health issues are one of the government's priorities in creating a quality generation. One effort to achieve this goal is that all children under five are given immunization. The challenge in implementing the immunization program which causes the immunization coverage target to not be achieved is the low level of knowledge. So the role of Health workers is to provide information using demonstration methods and discovery methods.

**Objectives :** To determine the effectiveness of the demonstration method and discovery method on mothers' knowledge about the completeness of basic immunization for babies in the working area of the Cibadak District.

**Method:** This research used quasi-experimental research with a sample size of 36 people. Data techniques include univariate analysis using frequency distribution and bivariate analysis using paired t test.

**Result:** The results of this study show that there is an influence of health education methods and findings on maternal knowledge about the completeness of basic immunization, p value 0.000.

**Conclusions and Suggestions:** Providing education using discovery is more effective than demonstration in increasing mothers' knowledge about basic immunization. It is hoped that the provision of education can be implemented to increase mothers' knowledge of basic immunization.

**Keywords:** Basic Immunization, Maternal Knowledge, Intensive Learning Method, Discovery Learning Method, Health Education, Infant Health

## INTRODUCTION

Indonesia ranks 117th out of 180 countries in the world in terms of the Child Development Index, which measures child health and well-being, including aspects such as child growth and nutrition. Child health issues are one of the government's priorities in creating a quality generation, one of which is through ensuring all

toddlers receive immunizations. The word "immunization" comes from "immune," which means resistant (1).

According to the World Health Organization (WHO), approximately 42% of infant deaths are caused by infections, and one way to prevent these infection-related deaths is through immunization (2).

The Indonesian Ministry of Health stated that over the past two years, from 2020 to 2021, the coverage of complete basic immunization for infants has drastically decreased. In 2020, the target was 92% coverage, while the achieved rate was 84%. In 2021, the target was 93%, but the actual coverage remained at 84%. This decline in coverage was due to the COVID-19 pandemic. Over 1.7 million babies did not receive basic immunizations during the 2019–2021 period (3). The impact of this decrease can be seen in the rise of vaccine-preventable diseases (PD3I) and outbreaks such as measles, rubella, and diphtheria in various regions (3). In 2022, the Health Department of Lebak Regency targeted all children for immunization during the National Child Immunization Month (BIAN).

Based on data from a study on infant immunization in Lebak Regency from 2020 to 2021, immunization rates declined due to the impact of COVID-19 and the implementation of large- and small-scale social restrictions (4,5).

Children who do not receive the five basic immunizations are at higher risk of infectious diseases such as TB, measles, tetanus, pertussis, diphtheria, and polio. These infections can interfere with a child's growth and development, cause disabilities that reduce quality of life, and even result in death (6).

Mothers play an important role in immunization programs, and adequate understanding of immunization is necessary (7,8). Parental knowledge, beliefs, and health-related behaviors are crucial. Lack of outreach from health officials contributes to insufficient understanding.

Based on a preliminary study conducted by the researcher at Cibadak Public Health Center, the realization of basic immunization coverage for infants has not met the target. According to the Ministry of Health's strategic plan indicators for 2022–2024, the goal is 90%–100% of infants receiving complete basic immunization. However, the Cibadak Health Center only achieved 75% of its target (9,10).

This shortfall is due to a lack of maternal knowledge about the importance of basic immunization as a preventive measure. Previous research has rarely used both demonstration and discovery methods together in educational programs for mothers regarding immunization. Most studies only employed a single method, or compared different methods without using the ones proposed by the author (11).

In light of the issues outlined in the background, the researcher was motivated to explore how effective the demonstration and discovery learning methods are in enhancing maternal knowledge about the completeness of basic immunization for infants, specifically within the service area of the Cibadak Health Center.

## LITERATURE REVIEW

Immunization is an effort to induce or enhance active immunity in an individual against a disease so that when exposed to the disease in the future, they do not become ill or only experience mild symptoms (12).

One educational method for mothers of infants is the demonstration and discovery method.

Demonstration method is a process of illustrating an event or behavior so that it can be tangibly understood and emulated (13).

Discovery learning involves finding and discovering information independently. In this teaching and learning approach, the teacher does not provide material in its final form, but instead allows students to explore and solve problems themselves (14).

## METHODS

### Study Design

This research applied a quantitative approach using a quasi-experimental design with a pre-test and post-test format. The design aimed to evaluate the effectiveness of an educational intervention by measuring changes in participants' knowledge before and after the treatment. This method allows researchers to observe differences resulting from the intervention without using randomized control groups.

### Sample

Participants were selected through non-random (purposive) sampling, meaning individuals were chosen based on specific inclusion criteria relevant to the research objective. The study involved mothers within the service area of the Cibadak Health Center, who were considered eligible based on factors such as willingness to participate, availability during the study period, and ability to comprehend the educational material. The sample size was calculated using the Federer formula, ensuring an adequate number of participants to maintain statistical validity.

### Instrument

The primary instrument used to measure the outcome variable—maternal knowledge of basic immunization completeness—was a structured questionnaire developed by the researchers. The questionnaire was validated for content relevance and reliability before being administered, and it consisted of multiple items assessing understanding of immunization schedules, benefits, and procedures.

### Data Collection Procedure

Data collection occurred in two stages: pre-intervention (pre-test) and post-intervention (post-test). In the first stage, baseline data on maternal knowledge were collected using the questionnaire. Following this, educational interventions were delivered using two different approaches: demonstration method and discovery method, depending on group assignment. After the intervention period, participants completed the same questionnaire to assess changes in knowledge.

### Data Analysis

Collected data were analyzed using appropriate statistical techniques. Descriptive statistics were used to summarize participant characteristics and mean scores, while inferential statistics (such as paired t-tests or Wilcoxon signed-rank tests, depending on data normality) were

applied to compare pre-test and post-test results. A significance level of  $p < 0.05$  was used to determine whether the intervention had a statistically meaningful effect.

### Ethical Considerations

This study was conducted in accordance with ethical research principles. Ethical approval was obtained from the appropriate institutional review board or ethics committee. Participants were provided with clear information about the purpose, procedures, benefits, and potential risks of the study. Informed consent was obtained from all respondents prior to data collection. Confidentiality and anonymity were strictly maintained throughout the research process, and participants were assured that their involvement was entirely voluntary and that they could withdraw at any stage without any consequences.

## RESULTS

### Univariate Analysis

The sample size was calculated using the Federer formula, resulting in 16 participants. To anticipate potential dropouts, 10% of the total sample was added, bringing the number to 18 participants per group. These participants would then undergo univariate analysis, feasibility testing, and bivariate analysis.

**Table 1. Descriptive Statistics of Mothers' Knowledge About Complete Basic Immunization for Infants Before and After Health Education Using the Demonstration and Discovery Methods at the Cibadak Health Center**

	Min	Max	Mean	SD
PRETEST DEMONSTRASI	4	10	7,06	1,514
POSTTEST DEMONSTRASI	12	16	13,56	1,097
PRETEST DISCOVERY	6	11	8,28	1,638
POSTTEST DISCOVERY	15	19	16,94	1,056

Based on Table 1, it was found that in the group that had not yet received education on basic immunization using the demonstration method, the average score was 7.06. After receiving education through the demonstration method, the average score increased to 13.56. The difference between the average scores before and after the education was 6.5, which can be categorized as a significant improvement in the "good" category.

In the second group, which received education using the discovery method, the average score before the education was 8.28, and after receiving education, the average increased to 16.94. The difference between the pre- and post-education scores was 8.66, which also indicates a significant improvement in the "good" category.

## Bivariate Analysis

**Table 2. Results of the Paired T-Test**

	<b>sig</b>
PRETEST DEMONSTRASI -POSTTEST DEMONSTRASI	,000
PRETEST DISCOVERY - POSTTEST DISCOVERY	,000

Based on Table 2, it can be concluded that there is a significant effect before and after the provision of education to mothers regarding basic immunization for infants using the demonstration and discovery methods, with a significance value (p-value) of 0.000. This value is smaller than the alpha level of 0.05, indicating a statistically significant difference.

**Table 3 Mann-Whitney U Test Results**

Mann-Whitney U	45,500
Wilcoxon W	711,500
Z	-6,875
Asymp. Sig. (2-tailed)	,000

Based on Table3, the significance value is 0.000, which is smaller than  $\alpha = 0.05$ , indicating a difference in the results when providing education using the demonstration method and the discovery method to mothers in the coverage area of Cibadak Health Center.

## DISCUSSION

### Univariate Analysis

The results presented in Chapter V show a notable improvement in maternal knowledge following the educational interventions. This outcome reinforces the view of Setyaningsih, who emphasized the central role of mothers in the success of immunization programs. When a mother lacks sufficient understanding about immunization, it can disrupt the timeliness, completeness, and administration of vaccines, potentially compromising a child's immune protection. In contrast, mothers who are well-informed are more likely to follow recommended immunization schedules and ensure that their children receive all necessary vaccinations.

A similar conclusion was drawn by Rosdiana and Khoiriah, whose study at BPM Susilawati reported a statistically significant increase in maternal knowledge following basic immunization education, with a p-value of 0.000. This supports the idea that structured educational programs are effective in enhancing maternal understanding.

The difference in mean scores before and after the intervention may be explained by Rogers' theory of behavior change (1974), which outlines a sequence of steps individuals undergo in adopting new behaviors: awareness, interest, evaluation, trial, and adoption. These steps suggest that when mothers are exposed to clear and relevant information, they are more likely to develop new perspectives and behavioral responses aligned with health-promoting practices (15,16).

Educating mothers about immunization—especially regarding vaccine schedules and their importance—is a critical step in preventing knowledge-related barriers to complete immunization coverage. (17).

## Bivariate Analysis

The study also examined the impact of two educational strategies—demonstration and discovery methods—on maternal knowledge regarding basic infant immunization. Based on the findings in Table 5.4, the p-value of 0.000 indicates a statistically significant effect of both methods in improving knowledge levels (16,18).

According to Notoadmodjo (19), knowledge develops through learning processes that engage various senses, ultimately shaping decision-making. The demonstration method aligns with prior research by Novianti, which showed that repeated exposure to demonstrations over a three-week period significantly enhanced maternal understanding. Afrianti's study also supports the effectiveness of this method in boosting knowledge scores before and after intervention (20).

The discovery method produced similarly promising results. Anggerani's research revealed that discovery-based learning positively influenced cognitive development, with a significance level of 0.04. Marzano also advocated for this approach, noting its ability to promote long-term learning, curiosity, and improved recall. In this study, the average post-test score for mothers who received discovery-based education was 16.94, compared to 13.56 in the demonstration group. These findings are consistent with results from Uge et al., who demonstrated the effectiveness of both methods in promoting conceptual understanding.

Variations between this and other studies may be attributed to multiple factors, including differences in research settings, participants' baseline knowledge and skills, and how the interventions were implemented. Each of these elements may influence the outcomes observed in different populations and contexts.

## Implications

This research highlights the importance of choosing effective educational methods to enhance maternal knowledge about immunization. The discovery learning approach, in particular, shows great potential for increasing understanding and retention of information. Health educators are encouraged to incorporate interactive, learner-centered strategies like discovery learning into maternal health programs. Doing so may improve adherence to immunization schedules and

contribute to greater public health outcomes by increasing vaccination coverage in early childhood. Furthermore, standardizing such methods across health centers could enhance consistency and engagement during education sessions.

## Limitations

Despite its strengths, this study has several limitations. Constraints related to time and researcher capacity may have influenced the depth of the intervention and data collection process. The absence of a control group limits the ability to generalize findings across broader populations. Additionally, the reliance on self-reported questionnaires may introduce subjectivity and response bias. The study was also conducted within a single geographic region, which may not reflect diverse populations. Future research should consider including control groups, expanding to multiple locations, and involving larger sample sizes to strengthen the validity and applicability of the findings.

## CONCLUSION

This study demonstrates that both demonstration and discovery learning methods are effective in improving maternal knowledge about the completeness of basic immunization for infants. Among the two, the discovery method showed a greater impact, as reflected in higher average post-intervention scores. These findings support the use of interactive, learner-centered approaches in health education, particularly in maternal and child health contexts. Empowering mothers with accurate information through effective teaching methods can play a crucial role in ensuring timely and complete immunization, ultimately contributing to better child health outcomes.

Given the positive results, it is recommended that health practitioners and educators adopt discovery-based strategies within community health programs to enhance maternal understanding. However, further research involving larger and more diverse populations is needed to validate these findings and explore long-term effects on immunization practices.

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### Author Contribution

**EK** : Conceptualization and Study Design, Methodology, Data Curation, Writing – Original Draft, Writing – Review & Editing

**EI** : Conceptualization and Study Design, Methodology, Formal Analysis,

### Conflict of Interest

The authors affirm that they have no competing interests related to this study.

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