



## MATERNAL KNOWLEDGE AND BEHAVIOR IN RELATION TO COMPLIANCE WITH COMPLETE BASIC IMMUNIZATION AMONG CHILDREN UNDER FIVE: A LITERATURE REVIEW

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### ABSTRACT

Compliance with complete basic immunization among children under five remains a public health concern, with maternal knowledge and behavior identified as important influencing factors. This literature review aimed to synthesize quantitative evidence on the association between maternal knowledge and behavior and compliance with complete basic immunization among under-five children. A systematic literature review was conducted following PRISMA guidelines. Searches were performed in PubMed, ScienceDirect, and Google Scholar for open-access articles published between 2020 and 2025. A total of 1,012 articles were identified; after removing 300 duplicates, 712 articles were screened by title and abstract. Of these, 521 articles were excluded, and 191 were assessed for full-text eligibility, with 171 articles unavailable in full text. Twenty articles underwent full assessment, and 16 cross-sectional studies met the inclusion criteria based on study design, participant characteristics, and data completeness. Methodological quality was evaluated using the JBI Critical Appraisal Checklist, and data were synthesized using a quantitative narrative approach. The majority of studies reported a significant association between maternal knowledge and behavior and compliance with complete basic immunization, although adjustment for confounding variables was limited. Maternal knowledge and behavior are closely associated with immunization compliance. Further longitudinal and intervention-based studies are recommended to strengthen causal evidence.

Keywords: basic immunization; cross-sectional studies; immunization compliance; maternal behavior; maternal knowledge

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### INTRODUCTION

Basic immunization is widely recognized as one of the most effective and cost-efficient public health interventions for preventing childhood morbidity and mortality. Global health organizations consistently emphasize that achieving complete basic immunization coverage among children under five substantially reduces the incidence of vaccine-preventable diseases and their associated complications (Cahyanti et al., 2024). Despite the expansion of national immunization programs, disparities in coverage persist across regions, particularly among vulnerable populations (Handriana & Putra, 2025). Incomplete immunization among under-five children suggests the presence of multifactorial determinants, extending beyond health system performance to encompass household-level cognitive and behavioral factors, with mothers serving as the primary decision-makers in child healthcare (Ariescha & Ariani, 2024). Accumulating evidence indicates that maternal knowledge regarding immunization schedules, benefits, and safety plays a critical role in shaping risk perception and intention to utilize immunization services. Concurrently, maternal behavior including health-seeking practices, consistency in attending scheduled immunization visits, and responses to vaccine-related information or misinformation significantly influences adherence to complete basic immunization. Although existing studies generally report associations between maternal knowledge, behavior, and immunization status, findings remain heterogeneous in terms of effect size, measurement indicators, and the sociocultural and health system contexts in which they are situated (Qintharina et al., 2024; Nurul Hidayah et al., 2024).

Previous literature has often examined these dimensions in isolation, focusing either on maternal knowledge or attitudes without integrating knowledge and behavior as interrelated determinants. Furthermore, several studies rely on cross-sectional designs with limited sample sizes and lack explicit grounding in health behavior theories, thereby constraining causal interpretation, generalizability, and the development of evidence-based interventions. To date, a comprehensive synthesis that systematically maps the relationship between maternal knowledge and behavior and compliance with complete basic immunization among under-five children across diverse contexts and study designs remains limited (Sapuroh & Sholihah, 2023; Widadi & Kurniasih, 2025). Therefore, this literature review aims to integrate and synthesize contemporary scientific evidence on the association between maternal knowledge and behavior and compliance with complete basic immunization among children under five. This synthesis is expected to clarify key determinants, identify existing knowledge gaps, and provide a robust evidence base for the development of more effective community-based educational strategies and immunization interventions.

## **METHOD**

This study employed a systematic literature review to synthesize scientific evidence on the association between maternal knowledge and behavior and compliance with complete basic immunization among children under five. The review process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Literature identification yielded 1,012 records from multiple databases, including PubMed (n = 186), ScienceDirect (n = 116), and Google Scholar (n = 710). After removing 300 duplicate records, 712 articles underwent title and abstract screening. Of these, 521 articles were excluded for failing to meet the inclusion criteria, resulting in 191 articles assessed for full-text eligibility. However, 171 articles were unavailable in full-text format. Consequently, 20 articles were evaluated in detail against predefined inclusion and exclusion criteria. Following systematic assessment, 16 studies met the eligibility requirements and were included in the final synthesis.

A comprehensive search was conducted across reputable international and national databases, including PubMed, Scopus, Google Scholar, and open-access nursing journal portals. The search strategy combined controlled vocabulary (MeSH terms) and free-text keywords using Boolean operators: “maternal knowledge” OR “mother’s knowledge” AND “behavior” OR “practice” AND “complete basic immunization” OR “full immunization coverage” AND “under-five children” OR “toddlers” AND “compliance” OR “adherence”. Search limits were applied to articles published between 2020 and 2025, written in English or Indonesian, available as open-access, and reporting primary research findings. The research question was structured using the PICO framework: Population mothers with children under five years of age; Interest/Exposure maternal knowledge and behavior related to basic immunization; Comparison different levels of knowledge or behavior or no comparator; Outcome compliance with or completeness of basic immunization. This framework guided study selection and data extraction to ensure alignment with the review objectives.

## **RESULT**

Table 1.  
PICO Framework

Component	Description
P (Population)	Mothers with children under five years of age (0–59 months)
I (Interest / Exposure)	Maternal knowledge and behavior related to complete basic immunization (knowledge, attitudes, practices, and decision-making)
C (Comparison)	Different levels of maternal knowledge and/or behavior (low vs. high) or no comparison group
O (Outcome)	Compliance with or completeness of basic immunization among children under five

### Inclusion and Exclusion Criteria

The inclusion criteria were: (1) original quantitative studies with a cross-sectional design; (2) study participants comprising mothers with children aged 0–59 months; (3) primary variables including maternal knowledge and/or behavior related to basic immunization; (4) outcomes reporting immunization compliance or completeness; (5) traceable and appropriate statistical analyses; and (6) availability of full-text open-access articles. Studies were excluded if they were reviews, editorials, case reports, or protocols; lacked numerical data on immunization compliance; involved irrelevant populations (e.g., adolescents or healthcare workers); employed unclear or unreported measurement instruments; or demonstrated very low reporting quality.

### Data Extraction and Synthesis

Data were systematically extracted, including information on authorship, publication year, study objectives, design, sample characteristics, measurement instruments, immunization compliance indicators, key findings, and policy implications. Due to substantial heterogeneity in study designs, outcome indicators, and measurement methods, a meta-analysis was not conducted. Instead, findings were synthesized narratively, emphasizing consistency, variability of results, and identified research gaps.

The PRISMA 2020 flow diagram was used to illustrate each stage of the study selection process, ensuring methodological transparency, scientific accountability, and the integrity of the review.

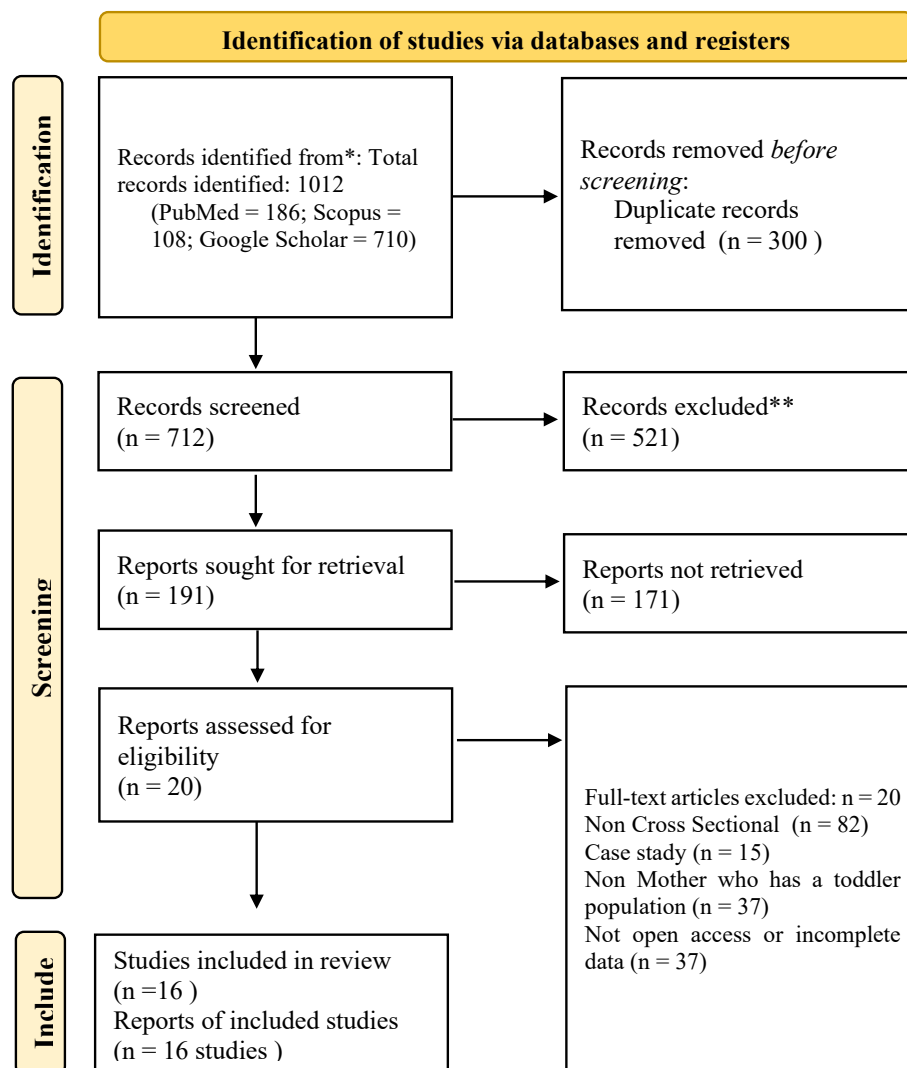


Figure 1. PRISMA Flow Diagram (2020)

Table 2.  
Quality Assessment of Included Studies

No.	Author (Year)	Clear Inclusion Criteria	Study Subjects & Setting Described	Valid & Reliable Exposure Measurement	Objective/Standardized Outcome	Confounding Factors Identified	Strategies to Address Confounders	Appropriate Statistical Analysis	Conclusions Supported by Data	Overall Quality
1	Elbert et al. (2023)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Good
2	Fauzi et al. (2024)	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes	Moderate
3	Kaminy a Zai & Sinaga (2024)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Moderate
4	Qinthari na et al. (2024)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Good
5	Mamahit et al. (2025)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Moderate
6	Arsyila Putri et al. (2024)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Moderate
7	Herlina et al. (2024)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Good
8	Yuliarti et al. (2022)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Good
9	Utami & Basri (2023)	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes	Moderate
10	Putri et al. (2022)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Good
11	Upi & Enung (2024)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Moderate
12	Sholeh & Oktarina (2024)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Moderate
13	Mustika et al. (2023)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Good
14	Abdullah (2025)	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes	Moderate
15	Wibowo et al. (2020)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Moderate
16	Saipullah et al. (2024)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Moderate

The synthesis of the 16 included studies revealed a consistent pattern indicating that higher levels of maternal knowledge particularly regarding the benefits, schedules, and safety of immunization were associated with increased likelihood of compliance with and completeness of basic immunization among children under five. Maternal behavior, including information-seeking practices, adherence to scheduled immunization visits, and decision-making processes, emerged as a critical mediator linking knowledge to immunization outcomes. Moreover, family support and access to reliable information sources, such as healthcare professionals and primary healthcare

facilities, were found to strengthen this association. In contrast, misinformation, concerns about adverse effects, and access-related barriers tended to attenuate the relationship between maternal knowledge, behavior, and immunization compliance.

Table 3.  
Characteristics and Main Findings of the Included Studies

No.	Study Title	Author (Year)	Objective	Design	Sample Size	Main Findings	Identified Gaps	Country
1	Mothers' Knowledge, Attitude, and Behavior Regarding Child Immunization and Its Association with Immunization Status During the COVID-19 Pandemic	Elbert et al. (2023)	To assess the association between maternal knowledge, attitude, and child immunization status during the pandemic	Cross-sectional	196	Maternal knowledge, attitude, and behavior were associated with child immunization status	Pandemic-specific context limits post-pandemic generalizability	Indonesia
2	Maternal Knowledge, Motivation, and Family Support in Relation to Complete Basic Immunization Practices	Fauzi et al. (2024)	To examine maternal knowledge, motivation, and family support related to immunization behavior	Cross-sectional	72	Knowledge, motivation, and family support influenced immunization behavior	Limited focus on immunization completeness	Indonesia
3	Maternal Knowledge and Attitude and Their Association with Complete Basic Immunization	Kaminyza & Elvipson Sinaga (2024)	To analyze the relationship between maternal knowledge, attitude, and immunization completeness	Cross-sectional	42	Significant association between maternal knowledge/attitude and immunization completeness	Small sample size	Indonesia
4	Relationship Between Maternal Knowledge, Attitude, and Action and Children's Basic Immunization Status	Qintharina et al. (2024b)	To evaluate the relationship between maternal knowledge, attitude, action, and immunization status	Cross-sectional	52	All three maternal domains were associated with immunization status	Limited sample detail reporting	Indonesia
5	Maternal Knowledge and Completeness of Basic Immunization Among Under-Five Children	Mamahit et al. (2025)	To assess the relationship between maternal knowledge and immunization completeness	Cross-sectional	62	Maternal knowledge was associated with immunization completeness	Behavioral aspects not explicitly examined	Indonesia
6	Maternal Knowledge, Information Sources, and Family Support in Relation to Immunization Compliance	Arsyilaputri et al. (2024)	To examine the influence of knowledge, information sources, and family support on immunization compliance	Cross-sectional	35	Maternal knowledge and family support were associated with immunization compliance	Limited differentiation of maternal behavior	Indonesia
7	Influence of Maternal Knowledge and	Herlina et al. (2024)	To analyze the influence of maternal	Cross-sectional	58	Maternal knowledge and attitude influenced	Small sample size	Indonesia

No.	Study Title	Author (Year)	Objective	Design	Sample Size	Main Findings	Identified Gaps	Country
	Attitude on Basic Immunization Coverage		knowledge and attitude on immunization coverage			immunization coverage		
8	Maternal Knowledge and Attitude in Relation to Timeliness of Basic Immunization During the COVID-19 Pandemic	Yayu Yuliarti et al. (2022)	To assess maternal knowledge and attitude related to immunization timeliness during the pandemic	Cross-sectional	56	Knowledge and attitude were associated with immunization timeliness	Pandemic-focused context	Indonesia
9	Maternal Knowledge and Immunization Behavior in Primary Healthcare Settings	Utami & Basri (2023)	To analyze maternal knowledge and immunization behavior	Cross-sectional	81	Maternal knowledge influenced immunization behavior	Sample description requires clarification	Indonesia
10	Maternal Knowledge and Attitude Toward Basic Immunization During the COVID-19 Pandemic	Putri et al. (2022)	To assess maternal knowledge and attitude related to immunization provision	Cross-sectional	99	Knowledge and attitude were key factors in immunization provision	Pandemic-limited scope	Indonesia
11	Maternal Knowledge and Completeness of Basic Immunization Among Infants Aged 0–11 Months	Upi & Enung (2024)	To examine the association between maternal knowledge and immunization completeness	Cross-sectional	86	Maternal knowledge significantly affected immunization completeness	Attitude and behavior not explicitly assessed	Indonesia
12	Maternal Knowledge and Compliance with Basic Immunization	Sholeh & Oktarina (2024)	To determine the relationship between maternal knowledge and immunization compliance	Cross-sectional	69	Maternal knowledge was associated with immunization compliance	Behavioral dimensions not explicitly measured	Indonesia
13	Maternal Knowledge and Attitude and Their Relationship with Complete Basic Immunization	Mustika et al. (2023)	To analyze maternal knowledge and attitude in relation to immunization completeness	Cross-sectional	288	Maternal knowledge and attitude significantly influenced immunization completeness	Full dataset accessibility limited	Indonesia
14	Maternal Knowledge Regarding Immunization of One-Year-Old Children	Abdullah (2025)	To assess maternal knowledge of immunization among one-year-old children	Cross-sectional	160	Maternal knowledge levels varied considerably	No direct assessment of behavior or compliance	Iraq
15	Maternal Knowledge and Attitude Toward Basic	Wibowo et al. (2020)	To describe maternal knowledge and attitude	Cross-sectional	91	Knowledge and attitudes varied; improvement needed	Immunization behavior/compliance not assessed	Indonesia

No.	Study Title	Author (Year)	Objective	Design	Sample Size	Main Findings	Identified Gaps	Country
	Immunization Among Under-Five Children		toward immunization					
16	Maternal Knowledge and Family Support in Relation to Complete Basic Immunization	Saipullah et al. (2024)	To examine maternal knowledge and family support related to immunization completeness	Cross-sectional	100	Maternal knowledge and family support influenced immunization completeness	Maternal behavior not comprehensively evaluated	Indonesia

## DISCUSSION

The synthesis of the 16 included studies demonstrates that maternal knowledge is a key determinant of compliance with complete basic immunization among children under five, both directly and indirectly through the formation of attitudes and behaviors. This finding is consistent with health behavior theories, which posit that knowledge serves as a fundamental prerequisite in health-related decision-making processes, including decisions regarding adherence to childhood immunization schedules (Saipullah Saipullah et al., 2024; Wibowo et al., 2020). Nearly all reviewed studies reported a significant association between maternal knowledge levels and child immunization status, indicating that inadequate health literacy remains a major barrier to achieving optimal immunization coverage.

Beyond knowledge, maternal behavioral dimensions encompassing attitudes, motivation, and observable actions also played a substantial role in immunization compliance. Studies integrating knowledge and attitudinal components consistently showed that mothers with positive perceptions of immunization benefits and safety were more likely to complete their children’s basic immunization schedules dasar (Abdullah, 2025; Mustika et al., 2023). These findings align with the Health Belief Model, which emphasizes perceived benefits, perceived barriers, and individual beliefs as critical drivers of preventive health behaviors.

However, the reviewed literature also suggests that adequate knowledge does not always translate into compliant behavior. Several studies reported persistently low immunization compliance despite sufficient maternal knowledge, primarily due to external factors such as limited access to healthcare services, insufficient family support, and low trust in the healthcare system (Sholeh & Oktarina, 2024; Upi & Enung, 2024). This reinforces the notion that immunization behavior results from a complex interaction between individual-level cognitive factors and broader social and environmental contexts.

The COVID-19 pandemic provides additional insight into the vulnerability of immunization systems. Studies conducted during the pandemic reported declines in immunization timeliness and completeness, even when maternal knowledge levels remained relatively adequate (Putri et al., 2022; Utami & Basri, 2023). These findings highlight how structural barriers such as mobility restrictions, fear of infection, and disruptions in healthcare services can weaken the relationship between knowledge and behavior. This observation is consistent with reports from the World Health Organization and UNICEF documenting global declines in immunization coverage during the pandemic due to health system disruptions (WHO, 2021; UNICEF, 2022).

From a methodological perspective, the predominance of cross-sectional designs across all included studies limits the ability to draw causal inferences. Furthermore, many studies did not explicitly identify or control for important confounding variables, such as maternal education level, socioeconomic status, and geographic access to healthcare facilities, all of which are known to influence immunization compliance (Yayu Yuliarti et al., 2022). These limitations underscore the

need for future research employing longitudinal designs and more robust multivariable analytical approaches.

### **Theoretical Implications**

The findings of this literature review reinforce health behavior theories, particularly the Knowledge Attitude Practice (KAP) Model and the Health Belief Model (HBM), which conceptualize knowledge as a primary cognitive determinant shaping health-related attitudes and behaviors. The consistent association between maternal knowledge and immunization compliance underscores the continued relevance of health literacy enhancement as a core strategy in promotive and preventive interventions. Nevertheless, the synthesis also indicates that knowledge alone is insufficient to fully explain immunization behavior. Therefore, reliance on a single theoretical framework may be inadequate, and integrating psychosocial and structural factors into health behavior models is essential for developing more comprehensive conceptual frameworks.

### **Implications for Nursing Practice and Public Health**

From a practical standpoint, these findings emphasize the strategic role of healthcare professionals particularly community nurses and midwives in improving immunization compliance through structured, continuous, and context-sensitive health education. Educational interventions should not be limited to increasing factual knowledge but should also aim to foster positive attitudes and strengthen maternal trust in the safety and benefits of immunization. Culturally sensitive therapeutic communication tailored to family and community contexts may enhance the effectiveness of educational strategies.

Additionally, family involvement, especially that of partners and close family members, should be considered an integral component of immunization promotion strategies. Several studies included in this review suggest that family support can strengthen the link between maternal knowledge and immunization behavior, although this variable has not been comprehensively examined across all studies.

### **Health Policy Implications**

At the policy level, the findings support the strengthening of family- and community-based immunization programs. Policies aimed at improving immunization coverage should not focus solely on service availability but also on the quality and continuity of health education provided to mothers. Experiences during the COVID-19 pandemic demonstrate that service disruptions can substantially reduce immunization compliance, even when maternal knowledge is relatively high. Therefore, immunization policies should be more adaptive, including the reinforcement of alternative service delivery models and the use of digital platforms for education, reminders, and appointment tracking.

### **Limitations of the Reviewed Literature**

Several limitations of the reviewed literature should be considered when interpreting the findings. First, the predominance of cross-sectional designs precludes definitive conclusions regarding causality between maternal knowledge, behavior, and immunization compliance. Second, most studies were conducted in Indonesia, which may limit the generalizability of the findings to other countries or healthcare systems. Third, not all studies adequately identified or controlled for confounding variables, such as socioeconomic status, maternal education, and healthcare access, which may influence observed associations. Additionally, heterogeneity in measurement instruments for maternal knowledge and behavior may have contributed to variability in study outcomes.

## CONCLUSION

This literature review consistently demonstrates that maternal knowledge and behavior play crucial roles in compliance with complete basic immunization among children under five. The majority of analyzed studies confirm that mothers with higher levels of knowledge are more likely to exhibit positive attitudes and behaviors, which in turn contribute to improved completeness and timeliness of childhood immunization. These findings highlight maternal cognitive and behavioral factors as key determinants of the success of basic immunization programs and underscore the importance of integrated educational, behavioral, and structural interventions to enhance immunization coverage.

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