published: 1 Oktober 2026
doi: 10.21070/midwiferia.v12i2.1822

Determinants of IMCI Implementation in Primary Health Care: A Literature Review

Oktaviani Zebua[1], Isyos Sari Sembiring[2] Astaria Ginting[3], Siti Nurmawan Sinaga[4], Rini Susanty[5]
[1,2,3,4,5]STIKes Mitra Husada Medan
*Email: oktavianzebua728@gmail.com

OPEN ACCESS
ISSN 2548-2246 (online)
ISSN 2442-9139 (print)
Received: 17 Jun 2026
Accepted: 17 Sep 2026
Published: 1 Okt 2026
Citation: Oktaviani Zebua (2026) Determinants of IMCI Implementation in Primary Health Care : A Literature Review
Midwiferia Jurnal Kebidanan. 12:2. doi: 10.21070/midwiferia.v12i2.1822

ABSTRACT

Introduction *Integrated Management of Childhood Illness (IMCI) is a strategy developed by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) to improve child healthcare quality and reduce morbidity and mortality among children under five years of age. However, IMCI implementation in primary healthcare settings remains influenced by various individual, organizational, resource-related, operational, and health system factors. This literature review aimed to identify and synthesize the determinants influencing IMCI implementation.*

Methods *This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines. Literature searches were conducted in Google Scholar, PubMed, Scopus, and ScienceDirect using keywords related to IMCI implementation and determinants. A total of 86 records were identified, with 72 records remaining after duplicate removal. Following title, abstract, and full-text screening, 34 articles met the eligibility criteria and were included in the review. Study selection was conducted by the primary reviewer and reviewed with research supervisors, with disagreements resolved through discussion and consensus. Methodological quality was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist. Twenty-eight studies were appraised and classified as high quality, while six non-primary research articles were excluded from JBI assessment.*

Result *Five determinant categories were identified: individual healthcare worker factors, organizational factors, resource availability factors, health system factors, and operational factors. Knowledge, IMCI training, clinical competence, supervision, leadership support, medicine availability, policy support, financing, workload, and digital health technologies were identified as key determinants.*

Discussion and Conclusion *Strengthening these factors may improve IMCI implementation, service quality, and child health outcomes.*

Keywords: *IMCI, primary health care, child health services, healthcare workers, implementation determinants*

INTRODUCTION

Under-five mortality remains a major public health challenge worldwide, particularly in low- and middle-income countries. Although substantial progress has been made in reducing child mortality over recent decades, preventable and treatable conditions such as pneumonia, diarrhea, malaria, malnutrition, and neonatal complications continue to contribute significantly to morbidity and mortality among children under five years of age. Improving the quality of child healthcare services is therefore considered a critical strategy for reducing childhood illness and mortality globally [1]. Although substantial progress has been made in reducing child mortality over recent decades, improving the quality of child healthcare services remains a critical strategy for further reducing childhood illness and mortality through evidence-based interventions and strengthened primary healthcare services [2].

To improve the quality of child healthcare services, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) developed the Integrated Management of Childhood Illness (IMCI) strategy [2]. IMCI integrates promotive, preventive, curative, and rehabilitative interventions through comprehensive assessment, disease classification, appropriate treatment, caregiver counseling, and timely referral of severe cases. Previous studies have demonstrated that effective implementation of IMCI contributes to improved quality of care and better child health outcomes in primary healthcare facilities [3].

Midwives play a strategic role in IMCI implementation because they are among the healthcare professionals who most frequently provide services for sick children in primary healthcare settings [3]. Effective implementation of IMCI by midwives can improve diagnostic accuracy, case management, early identification of danger signs, and the overall quality of child healthcare services. Consequently, understanding the factors that influence IMCI implementation is essential for strengthening child health programs and improving health outcomes among children under five years of age [4].

Previous studies have identified several determinants influencing IMCI implementation. Individual factors such as knowledge, clinical competence, work experience, and participation in IMCI training programs have consistently been associated with adherence to IMCI guidelines and quality of service delivery [5]. Healthcare workers who receive adequate training generally demonstrate better

performance in assessing, classifying, and managing childhood illnesses compared to those who have not received similar training [6].

In addition to individual factors, organizational and health system determinants also influence the successful implementation of IMCI. Supportive supervision, leadership commitment, monitoring systems, availability of clinical guidelines, essential medicines, and healthcare facility readiness have been reported as important enabling factors [7]. Conversely, inadequate supervision, shortages of trained personnel, and limited healthcare resources may hinder the consistent application of IMCI in routine clinical practice [8].

Recent advances in digital health technologies have created new opportunities to strengthen IMCI implementation. Electronic clinical decision support systems, digital IMCI applications, and electronic diagnostic tools have been reported to improve healthcare workers' adherence to clinical algorithms, enhance documentation quality, and support clinical decision-making [9]. Nevertheless, challenges such as high workload, inadequate infrastructure, and resource constraints continue to affect IMCI implementation in many settings [10].

Although numerous studies have investigated factors affecting IMCI implementation, the available evidence remains fragmented across different countries and healthcare contexts. Existing studies have primarily focused on specific determinants, such as healthcare worker competence, supervision, or resource availability [11]. However, these studies have not provided a comprehensive understanding of how multiple determinants interact to influence implementation outcomes in primary healthcare settings. Furthermore, findings from individual countries may not be directly applicable to other healthcare systems because of differences in organizational structures, resources, and service delivery models [12].

Previous evidence syntheses have also been limited in scope. For example, Reñosa et al. conducted a scoping review examining challenges faced by healthcare workers in implementing IMCI; however, the review did not specifically explore the multidimensional determinants of IMCI implementation in primary healthcare settings or the role of midwives as key implementers of child healthcare services [11]. To the best of our knowledge, no previous literature review has comprehensively synthesized the determinants of IMCI implementation in primary healthcare settings using a framework

that integrates individual, organizational, resource, operational, and health system factors.

Therefore, this literature review aims to identify, categorize, and critically evaluate the determinants affecting the implementation of Integrated Management of Childhood Illness (IMCI) in primary healthcare settings. Specifically, this review synthesizes evidence related to healthcare worker factors, organizational factors, resource availability, operational factors, and health system factors influencing IMCI implementation. The findings are expected to provide evidence-based recommendations for policymakers, healthcare managers, and healthcare professionals to strengthen IMCI implementation and improve the quality of child healthcare services.

METHODS

This literature review was conducted following the Preferred Reporting Items for Literatur Review and Meta-Analyses (PRISMA) 2020 guidelines to ensure transparency, reproducibility, and methodological rigor. The review aimed to identify, analyze, and synthesize scientific evidence regarding the determinants influencing the implementation of Integrated Management of Childhood Illness (IMCI) in primary healthcare settings.

A comprehensive literature search was performed using four electronic databases: Google Scholar, PubMed, Scopus, and ScienceDirect. These databases were selected because they provide extensive coverage of peer-reviewed literature related to child health, primary healthcare, implementation science, health systems, and healthcare workforce performance. The literature search was conducted between April and June 2026.

The screening and study selection process was conducted by the primary reviewer using the predefined inclusion and exclusion criteria. Titles and abstracts of all retrieved records were initially screened to identify potentially relevant studies, followed by full-text assessment of eligible articles. To enhance the reliability of the selection process, screening decisions and eligibility assessments were reviewed and discussed with the research supervisors. Any uncertainties regarding study inclusion were resolved through discussion and consensus. This procedure was implemented to minimize selection bias and improve the transparency of the review process.

The search strategy was developed using a combination of Medical Subject Headings (MeSH) terms and free-text keywords relevant to the objectives of the review. Boolean operators (AND, OR) were applied to refine the search process and maximize

the retrieval of relevant studies. The search terms included: ("Integrated Management of Childhood Illness" OR IMCI OR IMNCI) AND ("midwife" OR midwives OR "healthcare worker" OR nurse) AND ("primary health care" OR primary healthcare OR "community health center" OR primary care) AND (implementation OR determinants OR barriers OR facilitators OR adherence). In addition to database searching, manual searches of reference lists from relevant articles were conducted to identify potentially eligible studies that were not captured through electronic database searches.

The inclusion criteria were: (1) studies discussing the implementation of Integrated Management of Childhood Illness (IMCI) or Integrated Management of Neonatal and Childhood Illness (IMNCI); (2) studies identifying determinants, barriers, facilitators, or factors influencing IMCI implementation; (3) quantitative, qualitative, mixed-methods, program evaluation, systematic review, scoping review, and literature review studies; (4) articles available in full-text format; (5) articles published in English or Indonesian; and (6) studies published between 2014 and 2025. Although priority was given to studies published within the last five years, several older studies were retained because they provide foundational evidence regarding IMCI implementation and remain highly relevant to current practice and policy development.

The exclusion criteria included duplicate records, conference abstracts without full papers, editorials, commentaries, letters to editors, inaccessible full-text articles, and studies that did not focus on IMCI implementation or determinants influencing implementation in primary healthcare settings.

To assess the methodological quality of the included studies, a critical appraisal was conducted using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist according to the respective study designs. Analytical and descriptive cross-sectional studies were assessed using the 8-item JBI checklist, qualitative studies using the 10-item checklist, quasi-experimental studies using the 9-item checklist, mixed-methods studies using the 8-item checklist, and systematic reviews and meta-analyses using the 11-item checklist. Each criterion was scored as "Yes" (1 point) or "No/Unclear/Not Applicable" (0 points). Studies achieving a score of at least 70% of the total applicable items were classified as high quality. Of the 28 studies assessed using the JBI tool, all were categorized as high quality and were included in the final synthesis. Six articles, consisting of narrative reviews, literature reviews, a scoping review, a study protocol, and

a letter to the editor, were not subjected to JBI appraisal because these publication types are not covered by the applicable JBI critical appraisal checklists.

The article selection process was conducted in several stages following the PRISMA 2020 guidelines. Initially, a total of 86 records were identified through database searching, including Google Scholar (n = 42), PubMed (n = 18), Scopus (n = 16), and ScienceDirect (n = 10). After removing 14 duplicate records, 72 articles remained for title and abstract screening. During this stage, 38 articles were excluded because they did not meet the inclusion criteria, were not directly related to determinants of IMCI implementation, or focused primarily on clinical outcomes rather than implementation factors. Consequently, 34 full-text articles were retrieved and assessed for eligibility.

Following full-text assessment, all 34 studies met the predefined inclusion criteria and were included in the final literature review synthesis. Although a substantial body of literature on IMCI exists, many publications focus on clinical effectiveness, disease-specific outcomes, or broader child health interventions rather than factors influencing implementation. Therefore, only studies directly relevant to determinants of IMCI implementation were retained for review.

Data extraction was conducted using a standardized extraction form developed by the researchers. Information extracted from each study included author(s), year of publication, country of study, study objectives, research design, participant characteristics, determinants influencing IMCI implementation, and key findings. The extraction process was conducted systematically to ensure consistency and facilitate comparison across studies.

The included studies were analyzed using a thematic synthesis approach. Findings from individual studies were reviewed, compared, categorized, and synthesized according to similarities in reported determinants influencing IMCI implementation. The identified determinants were subsequently grouped into five major themes: (1) individual healthcare worker factors, (2) organizational factors, (3) resource availability factors, (4) health system factors, and (5) operational factors. This approach enabled the identification of recurring patterns across different countries and healthcare settings, thereby providing a comprehensive understanding of the factors influencing IMCI implementation in primary healthcare facilities.

The study selection process is illustrated in Figure 1 using the PRISMA 2020 flow

diagram. The diagram presents the identification, screening, eligibility assessment, and inclusion stages to ensure transparency and reproducibility throughout the review process.

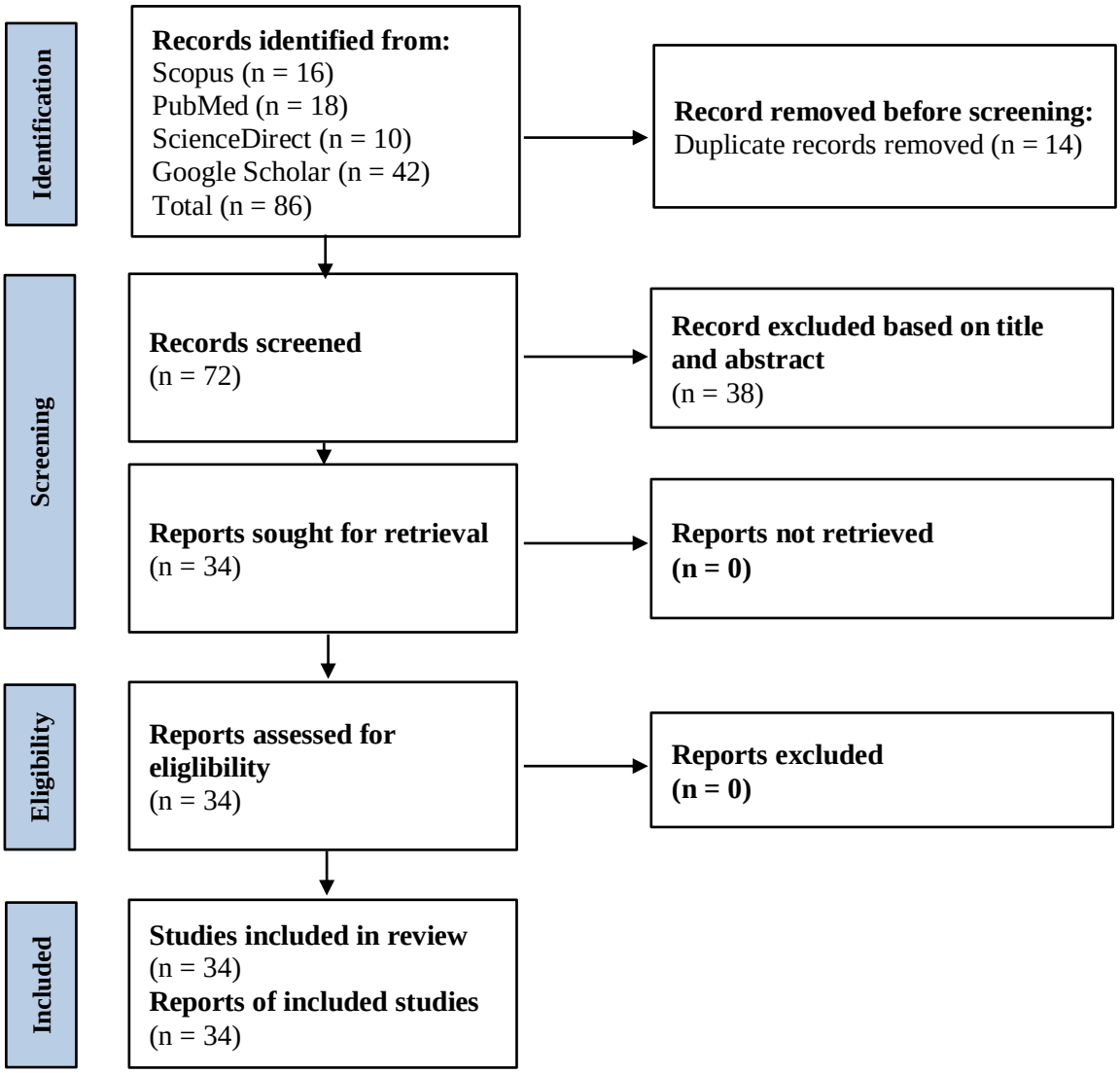


Figure 1. Study Identification and Inclusion Process Based on PRISMA 2020 Flow Diagram.

RESULTS

A total of 86 records were identified through database searching and manual reference screening. After removing 14 duplicate records, 72 articles remained for title and abstract screening. Following the screening process, 38 articles were excluded because they did not meet the predefined inclusion criteria. Consequently, 34 full-text articles were assessed for eligibility and included in the final synthesis.

The included studies were published between 2014 and 2025, with most studies

published between 2020 and 2025. Earlier studies were retained because they provided foundational evidence regarding IMCI implementation, health system readiness, and determinants of implementation that remain relevant to current practice. The studies originated from various countries, including Indonesia, Ethiopia, Tanzania, Malawi, Nigeria, South Africa, Zambia, Nepal, Bangladesh, Colombia, Burkina Faso, and several multinational settings. Various study designs were represented, including cross-sectional studies, qualitative studies, mixed-methods studies, implementation research, program evaluations, systematic reviews, scoping reviews, literature reviews, and randomized trials.

Across different geographical and healthcare contexts, the included studies consistently reported that healthcare worker capacity, organizational support, resource availability, health system readiness, and operational conditions significantly influenced the implementation of IMCI in primary healthcare settings.

Table 1. Presents The Characteristics Of The 34 Studies Included In This Review.

Author (Year)	Country	Sample	Design	Main Findings	Determinant
Abayneh et al. (2020)	Ethiopia	762 children aged 2 months–5 years	Pre-post Interventional Study	Training, supervision, and provision of essential materials significantly improved IMCI assessment, classification, treatment, and follow-up.	Training, supportive supervision, essential drugs and materials
Schmitz et al. (2022)	Nigeria	Children 2–59 months presenting with an acute illness	Cross-sectional Study	Adherence to IMCI guidelines was influenced by implementation-related challenges.	Training, supervision, workload
Amalia & Hadi (2023)	Indonesia	5 Included studies	Literature Review	Several health system factors affected IMCI implementation.	Leadership, supervision, infrastructure
Haryanti et al. (2023)	Indonesia	IMCI implementers	Qualitative Study	Multiple barriers and facilitators affected implementation.	Training, supervision, organizational support
Belete et al. (2024)	Ethiopia	417 healthcare workers	Mixed-methods Study	IMNCI utilization was associated with training, chart booklet use, and drug availability.	Training, chart booklet use, drug availability

Bernasconi et al. (2024)	Multinational	44 included studies	Systematic Review & Meta-analysis	Digital technologies improved IMCI adherence and quality of care.	ICT support, digital tools
Boschi-Pinto et al. (2018)	Global	95 countries	Survey Study	Broader IMCI implementation was associated with better child health outcomes.	Implementation coverage, health system support
Carai & Weber (2021)	Global	Not reported	Review Article	Primary healthcare remains a key strategy for child survival and prevention.	Primary healthcare strengthening
Carter et al. (2024)	Multinational	11,159 consultations	Cross-sectional Study	Facility readiness was associated with improved quality of care.	Facility readiness, resources
Curran et al. (2021)	South Africa	96 Healthcare workers and managers	Process Evaluation	Successful implementation depended on organizational readiness.	Organizational support, system readiness
Daka et al. (2023)	Ethiopia	workers' consultations of sick 2–59 months old children	Implementation Study	Quality improvement interventions enhanced IMCI performance.	Training, supervision, quality improvement
Drown et al. (2024)	Ethiopia	Community health program participants	Implementation Research	Community-based programs improved service utilization.	Community engagement, program support
Fekadu et al. (2024)	Ethiopia	20 Healthcare workers	Qualitative Study	Resource limitations constrained implementation.	Resource availability, access barriers
García Sierra & Ocampo (2020)	Colombia	18 municipalities	Cross-sectional Study	Implementation varied according to local contextual factors.	Organizational support, governance
Rahmah & Astuti (2022)	Indonesia	Primary healthcare facilities	Program Evaluation	Operational and management barriers affected implementation.	Management support, operational resources
Huda et al. (2024)	Bangladesh	Health facilities	Implementation Research	Facility-based IMCI strengthened pneumonia management.	Service readiness, training
Jensen & McKerrow (2022)	South Africa	Primary healthcare facilities	Observational Study	Electronic decision-support improved IMCI adherence.	Digital decision-support
Kilov et al. (2021)	Malawi	47 facilities; 531 healthcare	Mixed-methods Study	Knowledge and implementation improved with refresher	Refresher training, equipment,

		workers		training.	drug availability
Kiplagat et al. (2014)	Tanzania	95 healthcare workers	Cross-sectional Study	Lack of training and supervision were major barriers.	Training, supervision, essential medicines
Lubis et al. (2025)	Indonesia	Healthcare workers	Cross-sectional Study	Organizational and resource factors influenced implementation.	Organizational support, resources
Mekie et al. (2024)	Ethiopia	10 Included studies	Systematic Review & Meta-analysis	Community case management improved with stronger health systems.	Training, health system support
Morikawa (2021)	Global	Not reported	Letter to the Editor	Highlighted unresolved challenges in IMCI implementation.	Technology adoption, training
Pinto et al. (2023)	Indonesia	Children with diarrhea	Observational Study	IMCI recommendations were inconsistently applied.	Guideline adherence
Rahman et al. (2021)	Bangladesh	Health facilities	Health Service Analysis	Service readiness improved pneumonia management.	Facility readiness
Reñosa et al. (2020)	Global	24 included studies	Scoping Review	Multiple implementation barriers were identified.	Funding, training, workload, coordination
Riri et al. (2022)	Zambia	Community case management implementers	Qualitative Case Study	Both barriers and facilitators affected implementation.	Training, supervision, community support
Sarrassat et al. (2021)	Burkina Faso	Health facilities and providers	Cluster Randomized Trial	Digital IMCI tools improved diagnostic accuracy.	Digital innovation
Amachree & Eleke (2022)	Nigeria	Healthcare workers	Observational Study	Electronic clinical decision-support strengthened implementation.	Digital support systems
Setiaasih et al. (2025)	Indonesia	Primary healthcare providers	Mixed-methods Study	PHC readiness influenced implementation performance.	PHC readiness, organizational support
Subedi et al. (2024)	Nepal	Policymakers, managers, and providers	Implementation Study	Governance and contextual factors shaped outcomes.	Governance, resources, context
Tshivhase et al. (2020)	South Africa	Professional nurses	Qualitative Study	Workload and resource constraints hindered implementation.	Workload, resources
Wahyudi et	Indonesia	8 Included	Literature	IMCI implementation	Training,

al. (2021)		studies	Review	remained below expected standards.	competence, readiness
Beynon et. al. 2024 (2024)	Multinational	Planned implementation sites	Mixed-method Evaluation Protocol	Protocol designed to evaluate digital IMCI decision-support tools.	Digital tools, decision support
Amalia & Sabarinah (2023)	Indonesia	8 Included studies	Literature Review	Fishbone analysis identified several barriers affecting IMCI implementation in Indonesia.	Training, supervision, infrastructure, human resources

Quality Assessment of Included Studies

The methodological quality of the included studies was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist according to the design of each study. Of the 34 articles included in this review, 28 studies were eligible for methodological appraisal because they were primary research studies, systematic reviews, scoping reviews, implementation studies, or intervention studies. The remaining six articles, consisting of literature reviews, a narrative review, a study protocol, and a letter to the editor, were not subjected to JBI appraisal because they did not meet the criteria for primary research studies.

The appraisal results indicated that all 28 appraised studies met the criteria for high methodological quality. The scores ranged from 7/8 to 10/11 depending on the JBI checklist applied to each study design. These findings suggest that the evidence synthesized in this review was methodologically robust and suitable for identifying determinants influencing IMCI implementation in primary healthcare settings.

Table 2. Summary of Quality Assessment of Included Studies

Quality Category	Number of Studies	Percentage (%)
High Quality	28	100
Moderate Quality	0	0
Low Quality	0	0
Total Appraised Studies	28	100

Note**:** Six articles (narrative reviews, literature reviews, a study protocol, and a letter to the editor) were not subjected to JBI appraisal because they were not primary research studies.

The five determinant categories identified in this review were generated through

a thematic synthesis process. Findings extracted from the included studies were systematically reviewed, coded, and compared to identify recurring concepts related to IMCI implementation. Determinants with similar characteristics and roles in influencing implementation outcomes were subsequently grouped into broader themes through iterative comparison across studies. This process resulted in five major determinant categories: individual healthcare worker factors, organizational factors, resource availability factors, health system factors, and operational factors. The thematic categorization provided a structured framework for synthesizing evidence from studies conducted across diverse healthcare settings and research designs.

The synthesis findings revealed that IMCI implementation is influenced by multiple interconnected factors. Based on the thematic synthesis of the included studies, the identified determinants were categorized into five major themes: individual healthcare worker factors, organizational factors, resource availability factors, health system factors, and operational factors.

Determinants of IMCI Implementation

The synthesis findings revealed that IMCI implementation is influenced by multiple interconnected factors. Based on thematic synthesis of the included studies, the identified determinants were categorized into five major themes: individual healthcare worker factors, organizational factors, resource availability factors, health system factors, and operational factors.

Table 3. Synthesis of Determinants Influencing IMCI Implementation

Determinant Category	Specific Determinants	Influence on IMCI Implementation	Supporting Studies
Individual Factors	Knowledge, IMCI training, clinical competence, work experience, motivation	Improve adherence to IMCI guidelines, assessment accuracy, disease classification, and case management quality	[5], [6], [13], [14], [15]
Organizational Factors	Supervision, leadership support, monitoring and evaluation, managerial commitment	Strengthen compliance with IMCI protocols and support continuous quality improvement	[10], [16], [17], [18], [19]
Resource Availability Factors	Essential medicines, equipment, clinical guidelines, infrastructure, logistics	Facilitate comprehensive implementation and improve service readiness	[7], [8], [20], [21], [22], [23].
Health System	Policy support, financing,	Enhance sustainability and	[1], [11],

Factors	referral systems, program integration, coordination	scalability of IMCI programs across healthcare settings	[12], [24], [25]
Operational Factors	Workload, staffing levels, consultation time, digital technologies, electronic decision-support systems	Influence implementation efficiency, service quality, and adherence to IMCI algorithms	[6], [26], [27], [28], [29]

Individual Determinants

Individual healthcare worker factors emerged as the most frequently reported determinants of IMCI implementation. Adequate knowledge of IMCI guidelines, participation in IMCI training, clinical competence, work experience, and professional motivation were consistently associated with better adherence to IMCI protocols and improved quality of child healthcare services [13]. Healthcare workers who received formal IMCI training generally demonstrated greater confidence and competence in assessing, classifying, and managing childhood illnesses [6]. Clinical competence was also reported to improve the accuracy of assessment and classification of sick children according to IMCI standards [5].

Several studies highlighted that insufficient knowledge and limited training opportunities contributed to inconsistent implementation of IMCI guidelines [15]. Work experience and previous exposure to IMCI programs were associated with better implementation performance and compliance with IMCI standards [14]. Conversely, regular capacity-building activities and continuing professional development programs were associated with improved implementation performance and higher compliance with IMCI standards [6]

Organizational Determinants

Organizational factors played a critical role in supporting successful IMCI implementation. Regular supervision, leadership commitment, monitoring systems, and supportive management practices contributed to improved compliance with IMCI guidelines and enhanced service quality [10]. Healthcare facilities with structured supervisory systems generally demonstrated better implementation performance than those without routine supervision [17]. Leadership commitment and supportive management practices contributed to stronger implementation of IMCI activities and improved service delivery [18].

Strong organizational commitment facilitated coordination among healthcare workers, improved accountability, and supported continuous quality improvement

initiatives [12]. Monitoring and evaluation activities were also important for identifying implementation gaps and informing corrective actions at the facility level [30]. Implementation experiences from primary healthcare facilities also highlighted the importance of organizational support in maintaining adherence to IMCI protocols and sustaining program performance [16].

Resource Availability Determinants

Resource availability was identified as a major determinant of IMCI implementation. Six studies identified resource-related factors as important determinants of IMCI implementation. Adequate supplies of essential medicines, equipment, and facility resources were associated with improved quality of care and IMCI implementation [7]. Knowledge and resource availability were identified as important factors supporting the implementation of IMCI services in healthcare facilities [8]. The availability of medicines and facility readiness contributed to strengthening integrated management of childhood illness services [20].

Implementation research demonstrated that adequate infrastructure, equipment, and operational resources facilitated successful facility-based IMCI implementation [21]. Higher levels of health post readiness were associated with improved support for integrated primary healthcare services and IMCI implementation [22]. Conversely, barriers to healthcare resources and limited access to health services reduced the ability of healthcare workers to consistently implement IMCI recommendations in routine practice [23].

Health System Determinants

Health system factors included policy support, financing mechanisms, referral systems, program integration, and intersectoral coordination. Strong policy commitment was associated with improved implementation and long-term sustainability of IMCI programs across different healthcare settings [1]. Sustainable financing mechanisms were identified as important components for maintaining IMCI activities and supporting health system performance [25].

Several studies emphasized the importance of integrating IMCI within broader maternal and child health programs to strengthen continuity of care and improve service delivery [12].Effective referral systems and coordination between different levels of healthcare services were also identified as important contributors to successful

implementation [31]. Budget constraints, competing healthcare priorities, and weaknesses in health system governance were frequently reported as barriers to IMCI implementation, particularly in low-resource settings [11].

Operational Determinants

Operational factors referred to routine service conditions that directly influenced IMCI implementation. High workloads were frequently reported as barriers to effective IMCI implementation because they limited healthcare workers' ability to conduct comprehensive assessments and follow recommended clinical procedures [10]. Limited consultation time reduced opportunities for healthcare workers to complete all IMCI assessment, classification, counseling, and documentation processes according to established guidelines [26].

Shortages of healthcare personnel and competing service demands further constrained the consistent application of IMCI protocols in routine clinical practice [27]. Recent advances in digital health technologies were identified as promising facilitators of IMCI implementation [9]. Electronic decision-support systems improved healthcare workers' adherence to IMCI clinical algorithms and strengthened decision-making processes during patient management [27]. Mobile-based IMCI applications and digital documentation tools enhanced documentation quality and supported more standardized service delivery [26]. Digital innovations also supported supervision, monitoring, and reporting processes, thereby improving efficiency and consistency in the delivery of child healthcare services [27].

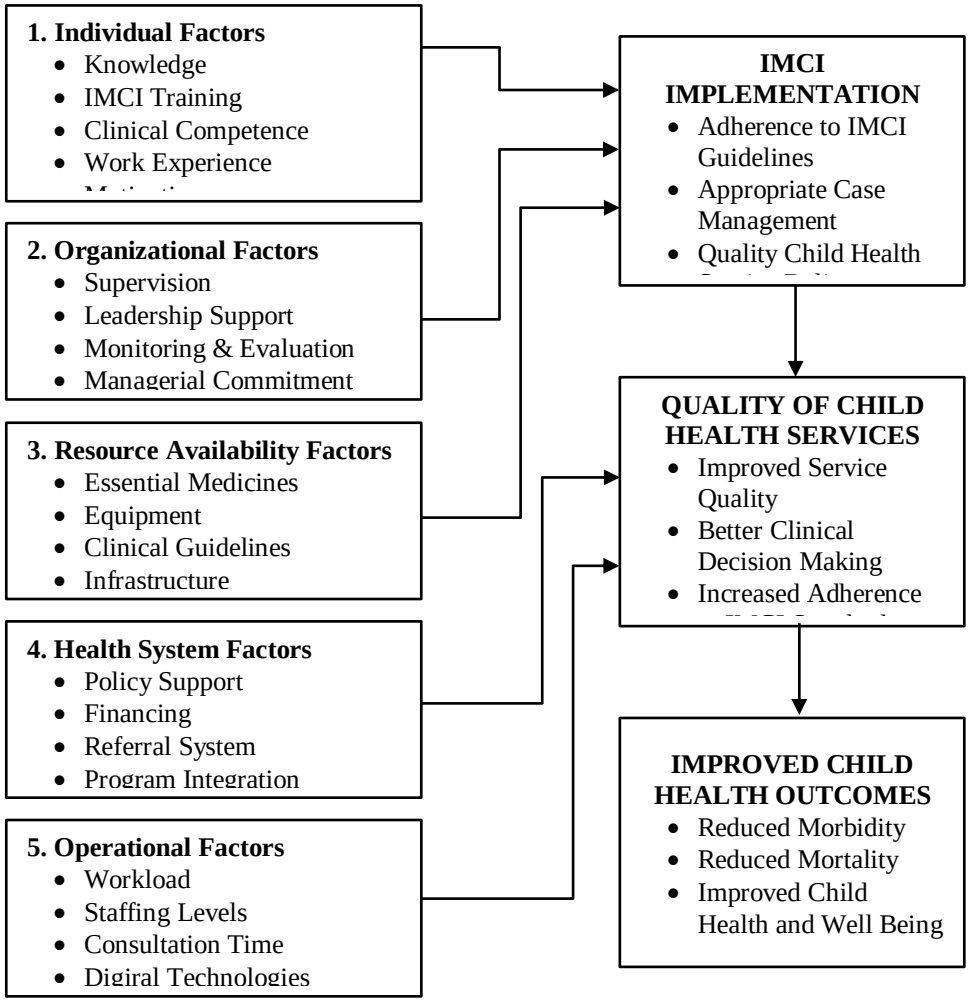
Conceptual Framework of Determinants Influencing IMCI Implementation

The synthesis findings suggest that IMCI implementation is influenced by interactions among individual, organizational, resource-related, health system, and operational factors. Individual competencies and training directly affect healthcare workers' ability to deliver IMCI services, while organizational support, supervision, and monitoring create enabling environments for implementation. Resource availability and health system readiness contribute to program sustainability, whereas operational factors influence the efficiency and consistency of service delivery. Collectively, these determinants affect the quality of IMCI implementation and ultimately contribute to improved child health outcomes.

Based on the thematic synthesis of the included studies, a conceptual framework

was developed to illustrate the relationships among the identified determinants, IMCI implementation, service quality, and child health outcomes. The framework was interpreted using the Donabedian Model and the WHO Health System Building Blocks framework. According to the Donabedian Model, resource availability, organizational support, and health system factors represent structural components, while individual healthcare worker factors and operational factors influence the implementation process. These factors subsequently affect service quality and child health outcomes. Furthermore, the WHO Health System Building Blocks framework provides a basis for understanding the roles of leadership and governance, health workforce, financing, service delivery, and access to essential medicines in supporting effective and sustainable IMCI implementation [32], [33].

Figure 2. Conceptual Framework of Determinants Influencing IMCI Implementation.



Source: Developed by the authors based on the Donabedian Model (McCullough et al., 2023) and the WHO Health System Building Blocks Framework (WHO, 2023).

DISCUSSION

The findings of this review indicate that IMCI implementation is a complex and multidimensional process influenced by factors operating at individual, organizational, resource, operational, and health system levels. The interaction among these determinants affects healthcare workers' ability to adhere to IMCI protocols, maintain service quality, and sustain implementation over time. These findings suggest that strengthening IMCI implementation requires a comprehensive approach that simultaneously addresses workforce capacity, organizational support, resource readiness, and broader health system conditions.

Previous studies have demonstrated that healthcare facility readiness and resource availability are important prerequisites for effective IMCI implementation and quality child healthcare services [7]. Similarly, digital innovations and electronic decision-support systems have been reported to strengthen adherence to IMCI protocols and improve the consistency of clinical decision-making processes [27]. These findings support previous global evidence indicating that effective IMCI implementation requires both competent healthcare providers and supportive health system environments.

Individual Factors

Individual healthcare worker factors emerged as one of the most frequently reported determinants of IMCI implementation. Knowledge, training, clinical competence, work experience, and motivation were consistently associated with better adherence to IMCI guidelines and improved quality of child healthcare services [2]. Healthcare workers who received IMCI training generally demonstrated greater confidence and competence in assessing, classifying, and managing childhood illnesses [5]. Clinical competence was also reported to improve the accuracy of assessment, classification, and management of sick children according to IMCI standards [34]. Similar findings have been reported in Ethiopia, Malawi, and Tanzania, where trained healthcare workers showed significantly higher compliance with IMCI protocols compared to untrained providers [5], [8], [14]. The importance of healthcare worker competence and training has also been highlighted in studies examining factors affecting IMCI implementation in different healthcare settings [18].

These findings can be explained through the Donabedian Model, in which healthcare worker competence represents an important process component directly

influencing the quality of healthcare delivery. Without adequate knowledge and skills, healthcare workers may not be able to apply IMCI algorithms correctly, resulting in variations in clinical decision-making and service quality. Therefore, strengthening healthcare worker capacity through training and supportive learning opportunities may contribute to improved implementation performance and better child health outcomes [33].

Variations were also observed across countries. Studies from Ethiopia, Malawi, and Tanzania consistently emphasized training and competency as the primary determinants of IMCI implementation. In contrast, studies conducted in Indonesia highlighted not only training but also organizational support and supervision as important contributors to implementation success. These differences may reflect variations in health workforce capacity, health system maturity, and availability of continuing professional development programs across countries

Organizational Factors

Organizational factors also played a critical role in determining implementation success. Regular supervision was repeatedly identified as a facilitator of IMCI implementation because it reinforced adherence to IMCI guidelines and supported service quality improvement [10]. Supportive supervision also provided opportunities for continuous feedback and professional development among healthcare workers implementing IMCI services [14]. Leadership support, monitoring, and evaluation were important organizational mechanisms for strengthening IMCI implementation and maintaining program performance [16].

Variations in organizational determinants were observed across different countries. Studies conducted in Indonesia highlighted the importance of supervision, monitoring, evaluation, and managerial commitment in supporting IMCI implementation [30], [13]. Similarly, studies from South Africa emphasized leadership support and supportive supervision as essential mechanisms for maintaining adherence to IMCI protocols and improving service quality [10], [24]. In Ethiopia, organizational support was frequently linked to healthcare worker performance improvement and implementation sustainability [17]. Meanwhile, studies from Nigeria reported that continuous mentoring and supervision were important for overcoming implementation-related challenges among healthcare workers [15]. These findings indicate that although

organizational support is universally important, the specific organizational priorities vary according to local health system contexts and workforce needs.

These findings are consistent with WHO recommendations emphasizing supportive supervision as an essential strategy for maintaining quality child healthcare services. Within the WHO Health System Building Blocks framework, leadership and governance constitute key components that influence service delivery performance and program sustainability. Healthcare facilities with strong managerial commitment and routine monitoring systems were more likely to demonstrate consistent implementation of IMCI protocols than facilities with weak organizational support.

Resource Availability Factors

Resource availability emerged as another major determinant of implementation. Shortages of essential medicines, medical equipment, clinical guidelines, and healthcare infrastructure significantly limited healthcare workers' ability to implement IMCI effectively [21]. The availability of resources and facility readiness were important factors supporting adherence to IMCI recommendations and the delivery of comprehensive child healthcare services [9]. Inadequate access to essential supplies and operational resources reduced the effectiveness of IMCI implementation in routine clinical practice [26]. Even when healthcare workers possessed adequate knowledge and training, implementation remained challenging in settings where basic resources were unavailable [12]. This finding supports the structural dimension of the Donabedian Model, which emphasizes the importance of healthcare infrastructure and resource availability as prerequisites for quality healthcare services. Similar challenges have been reported in several low- and middle-income countries where supply chain limitations and inadequate facility readiness continue to hinder effective IMCI implementation [24].

The manifestation of resource-related determinants varied across healthcare settings and countries. Studies from Ethiopia reported that limited access to medicines, diagnostic tools, and healthcare infrastructure reduced the ability of healthcare workers to implement IMCI effectively [23]. In Malawi, knowledge gaps were accompanied by shortages of essential resources required to support IMCI service delivery [8]. Similarly, implementation research conducted in Bangladesh identified the availability of medicines, equipment, and facility support as important determinants of successful IMCI implementation [21]. In Nepal, facility readiness and resource constraints were

highlighted as key contextual factors influencing implementation outcomes [12]. In contrast, studies conducted in Indonesia focused more on health facility readiness and the integration of primary healthcare services rather than severe shortages of basic resources [22]. These findings suggest that the relative importance of resource determinants varies according to local health system capacity and resource availability. This variation indicates that resource-related barriers are highly context dependent and may require different implementation strategies across countries. In lower-resource settings, ensuring the availability of medicines, equipment, and infrastructure may be the primary priority, whereas in relatively better-resourced settings, strengthening service readiness and optimizing resource utilization may be more important for improving IMCI implementation. Therefore, interventions aimed at strengthening IMCI should be tailored to local health system needs rather than applying a uniform approach across different contexts.

Health System

Health system factors were also consistently associated with implementation outcomes. Policy support was identified as an important factor contributing to the sustainability and effectiveness of IMCI programs across different healthcare settings [7]. Financing mechanisms played a critical role in supporting program implementation, workforce capacity, and the availability of essential healthcare services [24]. Program integration, referral systems, and health system coordination contributed to improved continuity of care and strengthened IMCI implementation at different levels of healthcare delivery [27].

These findings align closely with the WHO Health System Building Blocks framework, particularly the domains of leadership and governance, financing, service delivery, and health information systems. Strong policy commitment enables governments and healthcare organizations to allocate resources, support workforce development, strengthen referral systems, and maintain monitoring mechanisms necessary for successful implementation. Conversely, inadequate financing frequently limits the scale and sustainability of IMCI programs, particularly in resource-constrained settings [25]. Weak governance structures have also been reported as barriers to effective IMCI implementation and long-term program sustainability [11].

In Nepal, governance and contextual adaptation were highlighted as important

determinants of implementation outcomes [12]. In Ethiopia, stronger community-based health system support was associated with improved implementation performance [25] Meanwhile, studies from Indonesia emphasized integration of IMCI within broader primary healthcare programs. These findings suggest that health system determinants vary according to governance structures and service delivery models.

Operational Factors

Operational factors represented practical challenges affecting routine service delivery.High workloads were frequently reported as barriers to effective IMCI implementation because they limited healthcare workers' ability to conduct comprehensive assessments and follow recommended clinical procedures [28]. Limited consultation time reduced opportunities for healthcare workers to complete all recommended IMCI assessment, counseling, and documentation procedures [35]. Shortages of healthcare personnel and competing service demands further constrained the consistent application of IMCI protocols in routine clinical practice [19].

Several recent studies highlighted the potential benefits of digital innovations, including electronic clinical decision-support systems and mobile-based IMCI applications [6]. Digital tools were reported to improve adherence to clinical algorithms and support more accurate clinical decision-making processes [17]. The use of electronic systems also strengthened documentation quality and facilitated more standardized service delivery [36]. Digital innovations further supported supervision, monitoring, and reporting processes, thereby improving efficiency and consistency in the delivery of child healthcare services [31]. The increasing adoption of digital health technologies may therefore provide an important opportunity to strengthen IMCI implementation, particularly in settings experiencing workforce shortages and increasing service demands.

Although the included studies consistently identified training, supervision, and resource availability as important determinants of IMCI implementation, some variations were observed across healthcare settings. Studies conducted in low-resource environments frequently emphasized shortages of medicines, infrastructure, and financing as primary barriers to effective implementation [12]. Limited healthcare resources and inadequate facility readiness were also reported as significant challenges affecting the sustainability of child healthcare programs in resource-constrained settings [24]. In contrast, studies conducted in relatively stronger health systems focused more on

organizational support, workforce capacity, and service quality improvement as key determinants of implementation success [10]. Continuous quality improvement initiatives and organizational strengthening strategies were identified as important mechanisms for enhancing IMCI implementation and service performance [17]. These differences suggest that the relative importance of specific determinants may vary according to local contexts, health system capacity, and resource availability. Consequently, implementation strategies should be adapted to local conditions rather than relying on a uniform approach across different settings.

The findings of this review have important implications for healthcare practice and policy. Strengthening IMCI implementation requires comprehensive interventions addressing multiple levels simultaneously. Policymakers should prioritize regular IMCI training, supportive supervision, adequate financing, and the integration of IMCI into broader maternal and child health programs. Healthcare managers should ensure the availability of essential medicines, equipment, and clinical guidelines while strengthening monitoring and evaluation systems. Furthermore, investments in digital health technologies may improve implementation efficiency and support healthcare workers in applying IMCI protocols consistently.

This review has several limitations. The included studies were conducted across diverse countries and healthcare systems, which may limit direct comparability between findings. Variations in study design, outcome measures, and implementation contexts may also contribute to heterogeneity across studies. In addition, several included articles consisted of literature reviews and non-primary research publications that were not subjected to JBI methodological appraisal. Despite these limitations, the review provides a comprehensive synthesis of current evidence regarding determinants influencing IMCI implementation in primary healthcare settings.

Overall, the findings indicate that successful IMCI implementation requires coordinated efforts across individual, organizational, resource-related, operational, and health system domains. Addressing these determinants simultaneously may strengthen implementation fidelity, improve the quality of child healthcare services, and ultimately contribute to better child health outcomes.

CONCLUSIONS

This literature review identified and synthesized five interrelated determinants

influencing the implementation of Integrated Management of Childhood Illness (IMCI) in primary healthcare settings: individual healthcare worker factors, organizational factors, resource availability, health system factors, and operational factors. Healthcare worker competence and training, supportive supervision, essential resources, health system support, and operational conditions emerged as the most consistent determinants. These findings highlight the multidimensional nature of IMCI implementation, emphasizing its role not only as a clinical intervention but also as a health system strategy requiring coordinated support across multiple levels. Healthcare managers should prioritize continuous training, supportive supervision, monitoring and evaluation, and the availability of essential medicines, equipment, and clinical guidelines, while policymakers should strengthen financing, workforce development, governance, and IMCI integration into maternal and child health programs. Digital decision-support systems and other health technologies may further enhance implementation efficiency and guideline adherence. Future research should evaluate digital IMCI interventions, context-specific implementation strategies, and the long-term effects of organizational and health system strengthening. Addressing these determinants comprehensively may improve IMCI implementation, enhance the quality of child healthcare services, and ultimately contribute to better child health outcomes

ACKNOWLEDGMENT

The authors would like to express their gratitude to all researchers and institutions whose scientific publications served as the primary sources for this literature review. The findings and scientific evidence generated through these publications provided valuable contributions to the synthesis and interpretation of the review results. The authors also appreciate all individuals and organizations that provided support, encouragement, and constructive feedback throughout the preparation of this manuscript. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.The authors declare that there are no conflicts of interest regarding the preparation and publication of this article.

AUTHOR CONTRIBUTIONS

First Author: Conceptualization, methodology, literature search, data extraction, data analysis, and original draft preparation. Second Author: Literature search, data validation, data analysis, and manuscript revision. Third Author: Interpretation of findings, critical literature review, and manuscript editing. Fourth Author: Methodological validation, scientific content review, and manuscript revision. Fifth Author: Supervision, final validation, manuscript review, and approval of the final version for publication. All authors have read and approved the final version of the manuscript.

REFERENCES

[1] C. Boschi-Pinto *et al.*, "Global implementation survey of Integrated Management of Childhood Illness (IMCI): 20 years on," *BMJ Open*, vol. 8, no. 7, pp. 1–9, 2018, doi: 10.1136/bmjopen-2017-019079.

[2] T. Wahyudi, E. K. Utomo, F. N. Sani, S. Lastianingsih, P. Azali, and D. Agustinaningrum, "Integrated Management Chilhood Illness (IMCI) in Primary Health Care: Literature Review," *Sci. Technol.*, vol. 1, no. 1, pp. 77–79, 2021, doi: 10.47701/icohetech.v1i1.1090.

[3] R. Rahmah and Y. Astuti, "The implementation of integrated management of children illness in primary health community in yogyakarta, indonesia," *Open Access Maced. J. Med. Sci.*, vol. 9, no. T4, pp. 315–318, 2021, doi: 10.3889/oamjms.2021.5808.

[4] D. O. Amalia and E. N. Hadi, "Determinants of an integrated management of childhood illness program implementation in Indonesia," *BKM Public Heal. Community Med.*, vol. 39, no. 03, p. e6974, 2023, doi: 10.22146/bkm.v39i03.6974.

[5] M. Abayneh, T. Gebremedhin, E. Dellie, C. T. Tsehay, and A. Atnafu, "Improving the Assessment and Classification of Sick Children according to the Integrated Management of Childhood Illness (IMCI) Protocol at Sanja Primary Hospital, Northwest Ethiopia: A Pre-Post Interventional Study," *Int. J. Pediatr. (United Kingdom)*, vol. 2020, no. 2020, p. 12, 2020, doi: 10.1155/2020/2501932.

[6] A. A. Belete, Y. Agumas, A. K. Tsehay, and H. M. Ayele, "Utilization of the Integrated Management of Newborn and Childhood Illness (IMNCI) protocol and associated factors among health care workers in health centers of South Gondar Zone, Northwest Ethiopia: an institution-based mixed study," *Front. Heal. Serv.*, vol. 4, no. April, pp. 1–10, 2024, doi: 10.3389/frhs.2024.1364661.

[7] E. D. Carter *et al.*, "Association between sick child facility readiness and quality of care at the individual and facility level in five low- and middle-income countries," *BMC Health Serv. Res.*, vol. 24, no. 1, 2024, doi: 10.1186/s12913-024-11772-9.

[8] K. Kilov *et al.*, "Integrated Management of Childhood Illnesses (IMCI): A mixed-methods study on implementation, knowledge and resource availability in Malawi," *BMJ Paediatr. Open*, vol. 5, no. 1, 2021, doi: 10.1136/bmjpo-2021-001044.

[9] A. Bernasconi, M. Landi, C. S. Yah, and M. A. B. van der Sande, "Information and Communication Technology to Enhance the Implementation of the Integrated Management of Childhood Illness: A Systematic Review and Meta-Analysis," *Mayo Clin. Proc. Digit. Heal.*, vol. 2, no. 3, pp. 438–452, 2024, doi: 10.1016/j.mcpdig.2024.06.005.

[10] C. Jensen and N. H. McKerrow, "The feasibility and ongoing use of electronic decision support to strengthen the implementation of IMCI in KwaZulu-Natal, South Africa," *BMC Pediatr.*, vol. 22, no. 1, pp. 1–10, 2022, doi: 10.1186/s12887-022-03147-y.

[11] M. D. Reñosa, S. Dalglish, K. Bärnighausen, and S. McMahon, "Key challenges of health care workers in implementing the integrated management of childhood illnesses (IMCI) program: a scoping review," *Glob. Health Action*, vol. 13, no. 1, 2020, doi: 10.1080/16549716.2020.1732669.

[12] R. K. Subedi *et al.*, "Integrated Management of Childhood Illness implementation in Nepal: understanding strategies, context, and outcomes," *BMC Pediatr.*, vol. 23, no. Suppl 1, pp. 1–19, 2024, doi: 10.1186/s12887-023-03889-3.

[13] K. M. Lubis and F. Widyaningsih, "The Factors Associated with the Implementation of Integrated Management of Sick Children (IMCI) by Health Workers," *J. Kesmas Gizi*, vol. 8, no. 1, pp. 298–306, 2025, doi: 10.35451/cc03w272.

[14] A. Kiplagat, R. Musto, D. Mwizamholya, and D. Morona, "Factors influencing the implementation of integrated management of childhood illness (IMCI) by healthcare workers at public health centers & dispensaries in Mwanza, Tanzania," *BMC Public Health*, vol. 14, no. 1, pp. 1–10, 2014, doi: 10.1186/1471-2458-14-277.

[15] D. M. Amachree and C. Eleke, "Adherence and Implementation-related Challenges of Integrated Management of Childhood Illness Guidelines among Nurses at Health Centers in Port Harcourt, Nigeria," *Int. J. Med. Heal. Dev.*, vol. 27, no. 3, pp. 244–250, 2022, doi: 10.4103/ijmh.IJMH_35_21.

[16] J. Pinto, Y. Peristiowati, Y. Puspitasari, I. Indasah, A. Pinto, and O. M. G. M. Gusmão, "The Implementation of Integrated Management of Childhood Illness (IMCI) in Sick Children from 2 Months up to 5 Years Age Old with Diarrhea in Community Health Center," *J. Community Engagem. Heal.*, vol. 6, no. 2, pp. 100–105, 2023, doi: 10.30994/jceh.v6i2.533.

[17] D. W. Daka, M. A. Wordofa, D. Berhanu, L. Å. Persson, and M. Woldie, "Quality of sick child management by health extension workers: role of a complex improvement intervention," *BMC Health Serv. Res.*, vol. 23, no. 1, pp. 1–17, 2023, doi: 10.1186/s12913-023-09131-1.

[18] A. M. García Sierra and J. A. Ocampo Cañas, "Integrated management of childhood illnesses implementation-related factors at 18 colombian cities," *BMC Public Health*, vol. 20, no. 1, pp. 1–10, 2020, doi: 10.1186/s12889-020-09216-0.

[19] R. Curran *et al.*, "Addressing the quality of paediatric primary care: health worker and caregiver perspectives from a process evaluation of PACK child, a health systems intervention in South Africa," *BMC Pediatr.*, vol. 21, no. 1, pp. 1–12, 2021, doi: 10.1186/s12887-021-02512-7.

[20] A. E. Rahman, S. Mhajabin, D. Dockrell, H. Nair, S. El Arifeen, and H. Campbell, "Correction to: Managing pneumonia through facility-based integrated management of childhood management (IMCI) services: an analysis of the service

availability and readiness among public health facilities in Bangladesh (BMC Health Serv Res, (2021), 21, (6," *BMC Health Serv. Res.*, vol. 21, no. 1, pp. 1–13, 2021, doi: 10.1186/s12913-021-06898-z.

[21] F. A. Huda, K. Mathewos, H. R. Mahmood, O. Faruk, L. R. Hirschhorn, and A. Binagwaho, "Examining the implementation of facility-based integrated management of childhood illness and insecticide treated nets in Bangladesh: lessons learned through implementation research," *BMC Pediatr.*, vol. 23, no. Suppl 1, pp. 1–15, 2024, doi: 10.1186/s12887-023-04389-0.

[22] R. Setiaasih, D. K. Sunjaya, Y. Sofiatin, I. Afriandi, L. Hilfi, and D. M. D. Herawati, "Readiness of health posts for primary health care integration in Indonesia: a mixed-methods study," *BMC Public Health*, vol. 25, no. 1, 2025, doi: 10.1186/s12889-025-22520-x.

[23] H. Fekadu, W. Mekonnen, A. Adugna, H. Kloos, and D. Hailemariam, "Barriers to equitable healthcare services for under-five children in Ethiopia: a qualitative exploratory study," *BMC Health Serv. Res.*, vol. 24, no. 1, pp. 1–14, 2024, doi: 10.1186/s12913-024-11074-0.

[24] L. Tshivhase, M. M. Madumo, and I. Govender, "Challenges facing professional nurses implementinthe integrated management of childhood illness programme in rural primary health care clinics, Limpopo Province, South Africa," *South African Fam. Pract.*, vol. 62, no. 1, pp. 1–6, 2020, doi: 10.4102/safp.v62i1.5060.

[25] M. Mekie *et al.*, "Utilization of integrated community-based case management of childhood illness and associated factors in Ethiopia: a systematic review and meta-analysis," *Ital. J. Pediatr.*, vol. 50, no. 1, pp. 1–12, 2024, doi: 10.1186/s13052-024-01702-0.

[26] S. Sarrassat, J. J. Lewis, A. S. Some, S. Somda, S. Cousens, and K. Blanchet, "An Integrated eDiagnosis Approach (IeDA) versus standard IMCI for assessing and managing childhood illness in Burkina Faso: a stepped-wedge cluster randomised trial," *BMC Health Serv. Res.*, vol. 21, no. 1, pp. 1–19, 2021, doi: 10.1186/s12913-021-06317-3.

[27] T. Schmitz *et al.*, "Effectiveness of an electronic clinical decision support system in improving the management of childhood illness in primary care in rural Nigeria: An observational study," *BMJ Open*, vol. 12, no. 7, pp. 1–11, 2022, doi: 10.1136/bmjopen-2021-055315.

[28] M. J. Morikawa, "Unresolved issues in implementing integrated management of childhood illness (IMCI) approach," *Int. J. Heal. Policy Manag.*, vol. 10, no. 5, pp. 293–294, 2021, doi: 10.34172/ijhpm.2020.89.

[29] F. Beynon *et al.*, "The Tools for Integrated Management of Childhood Illness (TIMCI) study protocol: a multi-country mixed-method evaluation of pulse oximetry and clinical decision support algorithms," *Glob. Health Action*, vol. 17, no. 1, 2024, doi: 10.1080/16549716.2024.2326253.

[30] F. Haryanti, I. S. Laksanawati, E. Arguni, S. A. Widyaningsih, N. A. Ainun, and N. Rastiwi, "Evaluation of the Implementation of Integrated Management of Childhood Illness in Special Region of Yogyakarta Province, Indonesia," *Open Access Maced. J. Med. Sci.*, vol. 10, no. B, pp. 570–575, 2022, doi: 10.3889/oamjms.2022.8670.

[31] L. Drown *et al.*, "Reducing the equity gap in under-5 mortality through an innovative community health program in Ethiopia: an implementation research study," *BMC Pediatr.*, vol. 23, no. Suppl 1, pp. 1–14, 2024, doi: 10.1186/s12887-

023-04388-1.

[32] World Health Organization, *Operational framework for building climate resilient and low carbon health systems*. 2023. [Online]. Available: https://iris.who.int/bitstream/handle/10665/373837/9789240081888-eng.pdf

[33] K. McCullough, L. Andrew, A. Genoni, M. Dunham, L. Whitehead, and D. Porock, "An examination of primary health care nursing service evaluation using the Donabedian model: A systematic review," *Res. Nurs. Heal.*, vol. 46, no. 1, pp. 159–176, 2023, doi: 10.1002/nur.22291.

[34] D. O. Amalia and S. Sabarinah, "Fishbone Diagram Analysis in the Implementation of Integrated Management of Childhood Illness (IMCI) in Indonesia," *J. Aisyah J. Ilmu Kesehat.*, vol. 8, no. 1, pp. 397–404, 2023, doi: 10.30604/jika.v8i1.1672.

[35] J. V. Riri, A. Silumbwe, C. Mweemba, and J. M. Zulu, "Facilitators and barriers to implementation of integrated community case management of childhood illness: a qualitative case study of Kapiri Mposhi District," *BMC Health Serv. Res.*, vol. 22, no. 1, pp. 1–11, 2022, doi: 10.1186/s12913-022-07867-w.

[36] S. Carai and M. W. Weber, "Primary health care for children - evidence for prevention," *BMC Pediatr.*, vol. 21, no. Suppl 1, pp. 1–2, 2021, doi: 10.1186/s12887-021-02787-w.