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Fishbone Diagram Analysis in the Implementation of Integrated Management of Childhood Illness (IMCI) in Indonesia

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A B S T R A C T

Integrated Management of Childhood Illness (IMCI) is an integrated and comprehensive approach to health service that focuses on reducing morbidity and mortality under-five children. This study aims to get an overview of IMCI implementation in Indonesia. The research uses a literature review method using a qualitative approach analysis, through a fishbone diagram that includes man, method, machine, material, and money. Articles were searched through databases like Google Scholar, Proquest, Scopus, Science Direct, Biomed Central, and Pubmed, with publication years 2016-2022. The challenges in implementing IMCI reported from the 8 articles were lack of training for IMCI officers; low compliance in both IMCI management and form filling; lack of support including supervision from the health office, financial, facilities, and infrastructure. The percentage coverage of puskesmas that implemented IMCI is quite good. However, there are still many under-five children whom IMCI has not served and its implementation has not been under IMCI guidelines. To improve the IMCI quality, it is necessary to conduct training and regular orientation as well as on-the-job training, supervision, monitoring and evaluation both internally and from the local health office periodically, provision of a support system includes facilities and infrastructure, medicine, and medical consumables.

Kata kunci:

manajemen terpadu balita sakit
MTBS

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A B S T R A K

Manajemen Terpadu Balita Sakit (MTBS) merupakan pendekatan komprehensif dan terintegrasi dalam pelayanan balita sakit yang berfokus untuk menurunkan kesakitan dan kematian pada balita. Tujuan penelitian adalah untuk mendapatkan gambaran implementasi MTBS di puskesmas di Indonesia. Penelitian menggunakan metode literature review melalui pendekatan kualitatif fishbone diagram dengan menganalisis komponen man, methode, machine, materials, and money. Penelusuran artikel melalui database Google Scholar, Proquest, Scopus, Science Direct, Biomed Central, and Pubmed yang terbit tahun 2016-2022. Dari 8 artikel yang direview menunjukkan masih kurangnya petugas MTBS terlatih; rendahnya kepatuhan petugas dalam tata laksana dan kelengkapan pengisian formulir MTBS; kuranganya dukungan dalam hal supervisi dari dinas kesehatan, dukungan dana, sarana dan prasarana. Pelayanan MTBS belum dilaksanakan secara optimal, meskipun cakupan puskesmas MTBS yang melaksanakan MTBS sudah cukup baik. Namun masih banyak balita sakit yang belum dilayani MTBS dan pelayanan belum sesuai dengan standar pedoman MTBS. Untuk meningkatkan kualitas pelayanan MTBS, perlu dilakukan pelatihan dan orientasi bagi petugas MTBS termasuk on-the-job training (kalakarya MTBS) di puskesmas, peningkatan supervisi fasilitatif, monitoring dan evaluasi secara berkala baik di internal puskesmas ataupun dari dinas kesehatan, penyediaan sarana dan prasarana penunjang, serta obat-obatan dan bahan medis habis pakai.

INTRODUCTION

In 2020, approximately 5 million children will die before their fifth birthday without increasing deaths caused by COVID-19 globally (UN IGME, 2021). Half of these deaths, around 2.4 million, occur in newborns and the causes of death are mostly preventable (UN IGME, 2021). Nevertheless, Indonesia continues to struggle with the issue of infant and under-five mortality. As reported by Indonesia Demographic and Health Survey/IDHS (2017), the Infant Mortality Rate (IMR) is 24 deaths per 1,000 live births and the Under-Five Mortality Rate (U5MR) is 32 per 1,000 live births (National Population and Family Planning Board (BKKBN), 2018).

If the cause of death can be found as early as possible and prevented from leading to death, the mortality rate for children under five can be decreased. There are management tools that can be used to detect illness in under-five children and provide health management to prevent under-five mortality in primary health care (*puskesmas*) namely Integrated Management of Childhood Illness (IMCI) (Nurmawati et al., 2018). IMCI is an integrated and comprehensive approach health service that focuses on the reduction of morbidity and mortality on under-five children, associated with the most common diseases in childhood (García Sierra & Ocampo Cañas, 2020). IMCI is implemented by improving the skills of health workers in dealing with sick toddlers, especially for midwives and nurses at the *puskesmas* (Suparmi et al., 2018).

More than 100 countries have adopted and implemented IMCI strategies, since they were first introduced in the middle of the 1990s, either as parts of the three components or as a whole (UN IGME, 2021). If IMCI is fully implemented, IMCI can reduce child mortality (WHO, n.d.). Several studies found that IMCI implementation led to marked improvements in the quality of child health services (Dalglish et al., 2018; Gera et al., 2016; Jacobs & Merson, 2018; Kilov et al., 2021; Rakha et al., 2013; Taneja et al., 2015). IMCI is also reported to reduce under-five mortality (Gera et al., 2016; Mupara & Lubbe, 2016; Rakha et al., 2013; Taneja et al., 2015). It was demonstrated by Gera et al. (2016) that the IMCI strategy was associated with a 15% reduction in child mortality when IMCI activities were fully implemented in health facilities and communities.

Indonesia has adopted IMCI since 1997. The guidelines were further developed and tested in several pilot studies (Titaley et al., 2014). IMCI has socialized and trained health workers in Indonesia. The IMCI guidelines were updated in 2015 and 2022 to accommodate changes in policies, programs, and scientific developments. The Health Facility Research (*Rifaskes*) in 2019 conducted by the National Institute of Health Research and Development, Ministry of Health, Republic of Indonesia, reported a higher coverage in 89.2% of *puskesmas* implementing IMCI. IMCI implementation varies between provinces, from the lowest in Papua (51.7%) to the highest in Bali (99.2%) (MoH Indonesia, 2019).

The increase in the coverage of health centers that implement IMCI is different from the under-five children covered by IMCI at 40.6% (MoH Indonesia, 2021). This is similar to the IMCI monitoring and evaluation conducted by the Directorate of Family Health, Ministry of Health, Republic of Indonesia, only 46% of children under five were taken care of with IMCI in 2017 (MoH Indonesia, 2021).

Reñosa M.D. et al. (2020) find that there are four main challenges in the implementation of IMCI. There are limited financial resources that are not sufficient to support the program activities, limitation of mentoring, training, and supervision, time required to complete the program for effective IMCI consultation, lack of planning and coordination between policymakers and IMCI implementers cause ambiguity of roles and accountability. Even though IMCI program can provide substantial benefits, more information is required for acceptance and implementation in primary healthcare settings (Reñosa et al., 2020).

Boschi-Pinto et al. (2018) mentioned that significant barriers to IMCI implementation at the national level were budget for training, mentorship, and supervision, cost or sustainability of activities, and availability of a dedicated budget line. In comparison, staff turnover, motivation, training budget, and mentorship and supervision were significant barriers reported at the regional or district level and facility level. Furthermore, high-mortality and low-income countries were more likely to report budgetary barriers related to training, and medicine procurement and supply chain at the national level (Boschi-Pinto et al., 2018).

This study aims to obtain an overview of the implementation of IMCI services in *puskesmas* using a fishbone diagram approach, which analyzes the components of man, method, machine, materials, and money in the implementation of IMCI. If the challenges and obstacles in the implementation of IMCI are known, it can be useful to improve health service quality and further program development.

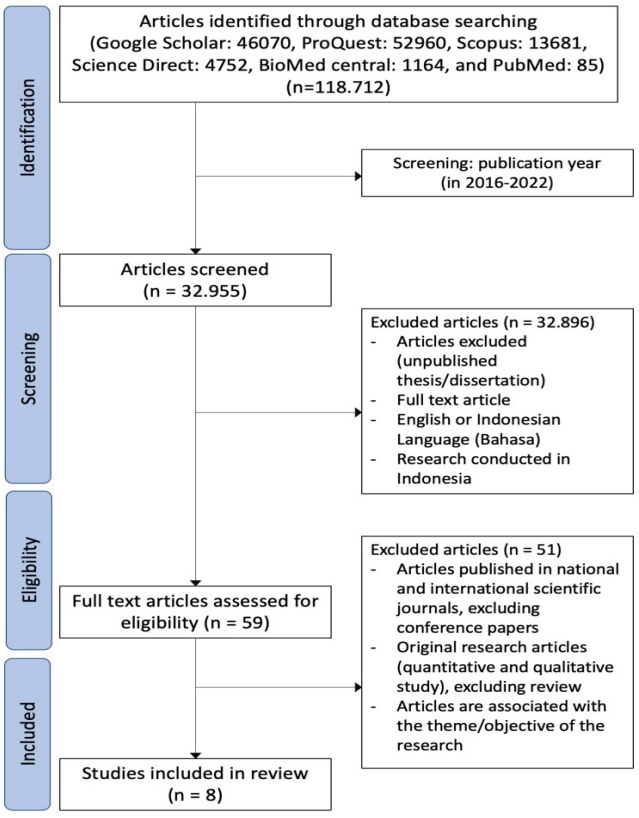

Figure 1. Flow Chart of Methods for Literature Search

METHODS

This research method is using a literature review with the keywords "*MTBS*", "IMCI", "*Manajemen Terpadu Balita Sakit*", and "Integrated Management of Childhood Illness"

through the database such as Google Scholar, Proquest, Scopus, Science Direct, Biomed Central, and Pubmed. Article searches are made between 2016 and June 2022. The inclusion criteria are research conducted in Indonesia, full text articles, and published in journals in English or Indonesian between 2016 - 2022. The exclusion criteria were articles including unpublished (thesis/dissertation), proceeding, and literature review/systematic review

All selected articles were then analyzed using a qualitative approach, by a fishbone diagram. Fishbone diagram analysis focuses on 5 (five) management tools: man, method, machine, material, and money.

RESULTS AND DISCUSSION

There has been thorough article research in this literature review. After the cleaning process, there are 8 articles have been found that are in line with the purpose of this research that can be analyzed (Table 1).

Table 1
Summary of the Literature of IMCI Implementation in Indonesia

No.	Research Title (Researcher, Year)	Research Method	Results
1	Evaluation of the Implementation of Integrated Management of Childhood Illness (IMCI) at the Sangurara Health Center in Palu City (Wartana & Herawaty, 2016)	• Research design: Qualitative • Informants: 3 people (Head of Public Health Center, PIC of Community Health Center IMCI Program, mother of toddler) • Data collection: In-depth interviews, direct observation, and documentation	The input for the implementation of IMCI at the Sangurara Health Center still lacks in terms of facilities and personnel, especially those who are trained in IMCI. The process of implementing IMCI does not have standardized officer compliance (SOP) and there is no IMCI service flow. The output in the implementation of IMCI for coverage has not reached the target of 50% of the service target for sick toddlers as much as 95%.
2	Evaluation of Integrated Management of Childhood Illness Implementation In Hospital In The Health Center of Sleman Special Region of Yogyakarta (Casnuri & Rahayu, 2020)	• Research design: Qualitative descriptive • Informants: 25 IMCI officers, 25 heads of *puskesmas*, and 1 section head of the district health office • Data collection: In-depth interviews	All puskesmas in Sleman District have implemented IMCI services according to service procedures with different achievements in each *puskesmas.* This is due to the irregularity of the officers in conducting data recapitulation. However, there are still officials who need to classify MCI implementations correctly. The achievement of the IMCI program in the Sleman District is 65.39%. The factors related to IMCI implementation were the number of trained and the quality of the competence of health workers, leadership support for the availability of facilities and infrastructure and financial support in increasing competence. However, some officers have never attended IMCI training.
3	Evaluation of the Implementation System for the Integrated Management of Childhood Illness at the North Jakarta Coastal District Health Center in 2015 (Mansur, 2017)	• Research design: Qualitative descriptive • Informants: MCH coordinator midwives, IMCI implementing officers, health department officers and cadres, and mothers of toddlers • Data collection: In-depth interviews, FGD	The input factors in the IMCI implementation system include human resources, they consider that although human resources are lacking because not all officers have received IMCI training, in implementing IMCI it continues to run well even though with a limited time, there are no special funds for the implementation of IMCI, facilities, and infrastructure for implementation. IMCI is prepared by the District Health Office and Community Health Center, as well as the method of implementing IMCI following the SOP, although not all officers use it in implementing the IMCI program in the North Jakarta District Health Center. Process factors in the IMCI implementation system have planning, organizing, mobilizing, and evaluating as well as monitoring. Output factors consist of parental satisfaction in receiving IMCI services provided and the coverage obtained by sub-district health centers in providing IMCI services.
4	Integrated Management of Childhood Illness Services (IMCI) at *Puskesmas* in Eastern Indonesia (Suparmi et al., 2018)	• Study design: Cross-sectional • Sample: 20 *puskesmas* officers, 40 patients under five, 200 forms of IMCI under five in the past week • Data collection:	Mostly *puskesmas* (80%) in the eastern region have implemented IMCI, but only 25% of them reach all under-five children. Mostly *puskesmas* (90%) have been trained for IMCI, but only 15% have been monitoring post-training. Only 25% of *puskesmas* received supervision from the District Health Office. The IMCI observations reported that the lowest score of IMCI implementation was counseling (25.8%) and the highest was diarrhea assessment (73.8%). The evaluation of

No.	Research Title (Researcher, Year)	Research Method	Results
		Interview with checklist form, observation of IMCI services, and document observation	filling out the IMCI form showed that the lowest score was in filling out feedings (30.4%) and repeat visits (30.8%). On the other hand, oral rehydration facilities for diarrhea are reported to be inadequate, being available in only 50% of *puskesmas*.
5	Study of Assessment and Implementation of Integrated Quality Activities for Childhood Illness at the Labuhan Rasoki Health Center, Padang Sidempuan City District in 2018 (Hasibuan et al., 2019)	• Research design: Qualitative • Informants: 7 IMCI *puskesmas* officers, 2 mothers of toddlers, 2 health cadres • Data collection: Observation, in-depth interviews	The implementation of MTBS has not been as expected. This is indicated by the flow of the IMCI implementation that is not following the IMCI module, the assessment and classification of sick toddlers are not carried out as a whole, follow-up for sick children is not carried out, there is still a lack of facilities, infrastructure and equipment for the implementation of IMCI and the lack of trained health workers, so there is no IMCI team.
6	Implementation of Integrated Management of Childhood Illness (IMCI) in Primary Health Service Facilities (*PUSKESMAS*) in Kupang Regency (Tat et al., 2021)	• Study design: Cross-sectional • Sample: 80 health workers • Data collection: Questionnaire	Factors that have a significant effect are the clarity of standards and goals (0.001); resources (0.005); communication between units (0.000), characteristics (0.000), socio-economic community (0.000), attitudes (0.000); availability of infrastructure (0.000) for the implementation of the IMCI program. There is clarity of IMCI standards and objectives for implementers (85%) which can affect the performance of officers. In the implementation of IMCI, it was also found that there was good communication between cross-programs at the puskesmas in the implementation of IMCI at 76.25%. Meanwhile, only 68.75% of respondents said that facilities and infrastructure were available in the implementation of IMCI.
7	Comparative Analysis of the Implementation of Integrated Management of Childhood Illness Services at *Puskesmas* in Kendari City (Mastuti et al., 2021)	• Research design: a case-control • Sample: 34 IMCI officers in 10 health centers (5 health centers implementing IMCI and 5 *puskesmas* not implementing IMCI) • Data collection: questionnaires, observations, and documentation	There was a significant difference between knowledge (p=0.031) and facilities (p=0.009), while there was no significant difference between attitudes (p=0.946) and leadership support (p=0.604) on the implementation of IMCI in health centers. Overall, only 26.5% of IMCI officers had received training, the remaining 73.5% had never received training. The research shows that 76.5% of respondents stated that they had complete facilities for IMCI with good categories. Only 8 respondents (23.5%) stated that the completeness of the IMCI facilities in their puskesmas was categorized as adequate. Most of the respondents stated that leadership support was in a good category (85.3%). Meanwhile, 5 respondents stated that leadership support was in the sufficient category (14.7%).
8	The Implementation of Integrated Management of Children Illness in Primary Health Community in Yogyakarta, Indonesia (Rahmah & Astuti, 2021)	• Research design: Descriptive research • Sample: 14 puskesmas • Data collection: Document observation	All *Puskesmas* already have IMCI officers. However, almost 100% of the *Puskesmas* do not have the allocation of funds for the IMCI implementation. Several *Puskesmas* have fulfilled the facilities and infrastructure, although they have not been implemented optimally. The implementation and follow-up stages of IMCI were not following the patient's needs during the examination. Many *Puskesmas* have provided IMCI services to more than 60% of children under five who come there. The implementation of IMCI does not require an allocation of funds. However, the budget is still needed by the Bantul and Yogyakarta Health Offices to carry out supervision and training activities for IMCI officers due to limitation of trained health workers. Many *Puskesmas* reported that the lack of trained health workers especially general practitioners and nurses.

One of the tools that can be used in the analysis of a qualitative approach is fishbone diagrams, also known as *Ishikawa diagrams* or *cause-and-effect diagrams*. The fishbone diagram is an analysis tool used to control the quality improvement or quality assurance programs through the identification of potential causes of a problem, including within a healthcare setting (Brown et al., 2018; Gartlehner et al., 2017; Kumar et al., 2022; Reilly et al., 2014; Spath & Patrice, 2009). Fishbone diagram analysis can use the 4M (Methods, Manpower, Materials, and Machinery) or 4P (Policies, Procedures, People, and Plant) approaches (Spath & Patrice, 2009). In other literature, the causes of problems are discussed using the 4M+1E approach (Man, Method, Material, Machine, and Environment) (MoH Indonesia, 2017). In this literature study, the analysis is using a fishbone diagram with a man, method, machine, material, and money approach.

Based on the results of a review of articles from 8 journals, the analysis results through a fishbone diagram are as follows.

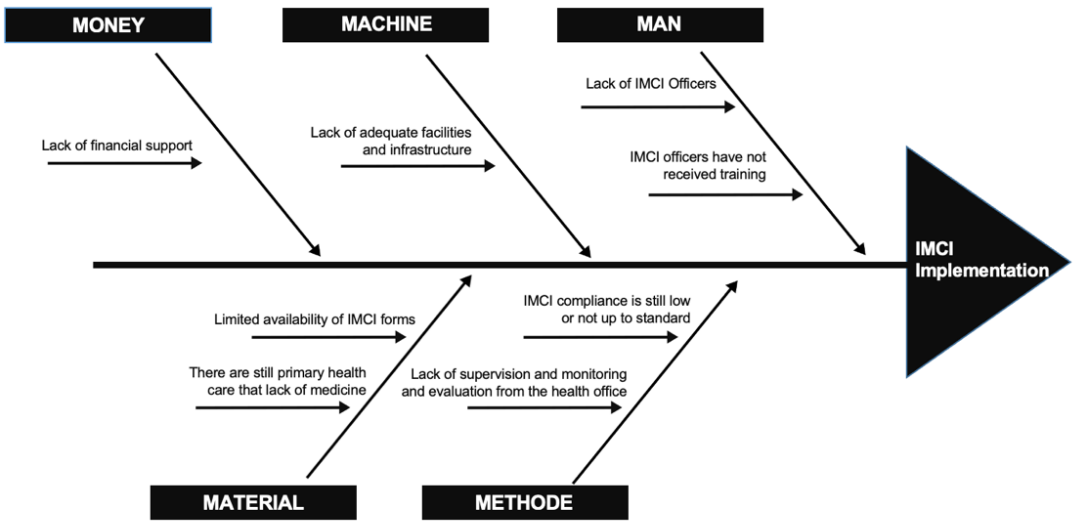

Figure 2
Fishbone Diagram Analysis of IMCI Implementation

Man

Of the eight articles analyzed, six articles describe the condition shortage of IMCI officers due to the gap between officers and patients, and there are still officers who have never received IMCI training (Casnuri & Rahayu, 2020; Hasibuan et al., 2019; Mansur, 2017; Mastuti et al., 2021; Rahmah & Astuti, 2021; Wartana & Herawaty, 2016). One of the reasons for the absence of trained IMCI officers at the puskesmas is that the trained officers have moved and are no longer on duty at the *puskesmas* (Hasibuan et al., 2019). It is different from Suparmi et al. (2018) research that around 90% of *puskesmas* located in the eastern region have received IMCI training (Suparmi et al., 2018). However, only 15% received post-training monitoring (Suparmi et al., 2018). To increase the capacity of officers, the Sleman District Health Center provides refreshing material for IMCI officers who have received training (Casnuri & Rahayu, 2020).

Improving the performance of *Puskesmas* health workers requires leadership from the head of the *puskesmas* who can support the implementation of IMCI by motivating staff/implementers and providing opportunities to participate in various activities (Casnuri & Rahayu, 2020). Meanwhile, Mastuti, et al. (2021) reported that the existence of good leadership supports the implementation of IMCI in Kendari City, but from the results of the same study, there was no effect of the leadership support on the implementation of IMCI (Mastuti et al., 2021).

METHODS

More than half (6 out 8) of the articles analyzed indicated that the implementation of IMCI was not following the standards or procedures/steps in the IMCI guidelines or chart (Casnuri & Rahayu, 2020; Hasibuan et al., 2019; Mansur, 2017; Rahmah & Astuti, 2021; Suparmi et al., 2018; Wartana & Herawaty, 2016). This is closely related to a large number of untrained health workers. Overall the officer's compliance score in implementing IMCI is still low at 50.9% (Suparmi et al., 2018). The low adherence scores were officer compliance in counseling patients (25.8%), action/treatment (37.6%), and fever assessment (37.8%) (Suparmi et al., 2018). This is consistent with Mansur H. (2017) that not all mothers of children under five (patients) are receive counseling and follow-up care. In addition, many mothers of toddlers do not understand the counseling provided by the officers (Hasibuan et al., 2019).

The officers' performance in the IMCI examination consists of completing the IMCI management form and classifying complaints of sick toddlers (Mansur, 2017). However, the officer's compliance score in filling out the IMCI form was still low at 55.0% (Suparmi et al., 2018). Scores for filling out the IMCI form were still low related to feeding (30.4%), repeat visits (30.8%), and nutritional status examination (33.8%) (Suparmi et al., 2018).

IMCI is carried out on all children under five who come to the sub-district health center in North Jakarta (Mansur, 2017). It is different in Suparmi, et al. (2018) that of 80% of *puskesmas* that implement the IMCI approach in the eastern

region, only 25% of *puskesmas* serve IMCI to all sick toddlers who come to the *puskesmas*.

In the implementation of IMCI, it is also requires more supervision from the health office. In the eastern region, only 25% of *puskesmas* are supervised by the health office (Suparmi et al., 2018). The study also found that only 15% of 90% of puskesmas that had been trained in IMCI received post-training monitoring from the health office (Suparmi et al., 2018). Evaluation of program implementation is necessary to continue to maintain and improve the quality of health services. The *puskesmas* regularly evaluate the implementation of IMCI within 1 month, 3 months, or 6 months, or when a problem arise (Casnuri & Rahayu, 2020).

Machine

Four of the eight articles indicated that there were limitations or lack of adequate facilities and infrastructure (Hasibuan et al., 2019; Rahmah & Astuti, 2021; Suparmi et al., 2018; Tat et al., 2021), such as oral rehydration therapy facilities (Rahmah & Astuti, 2021; Suparmi et al., 2018), timers or stopwatches with seconds needle (Hasibuan et al., 2019), and medical consumables (*BMHP*) which are insufficient and not available in the IMCI room, but are available in other rooms, such as the Emergency Room (Rahmah & Astuti, 2021), as well as the absence of a custom room for the IMCI polyclinic for examination of sick toddlers (Hasibuan et al., 2019; Rahmah & Astuti, 2021). From a study in Bantul District, only two puskesmas (28.6%) had the complete equipment (Rahmah & Astuti, 2021).

Meanwhile, another study states that the facilities and infrastructure for the implementation of IMCI are supported and provided by the health office and *puskesmas* because the resources in IMCI activities are included in the essential facilities of the *puskesmas* (Mansur, 2017), including the involvement or support of the leadership in providing facilities and infrastructure (Casnuri & Rahayu, 2020). Mastuti, et al. (2021) reported only 76.5% of respondents stated that the *puskesmas* had complete facilities for IMCI with good categories, while 23.5% of respondents stated that the completeness of the IMCI facilities in their *puskesmas* was categorized as sufficient (Mastuti et al., 2021).

Materials

Puskesmas in North Jakarta made a plan based on the previous year's medication needs and usage to accommodate the need for IMCI drugs. This also applies to the provision of IMCI forms (Mansur, 2017). However, based on the research of Suparmi, et al. (2018), there are still 20% of puskesmas do not have Oral Rehydration Solution (ORS) daily (Suparmi et al., 2018).

From the research of Suparmi, et al. (2018), there are 85% of health centers have IMCI guidelines or charts, and 90% of health centers have MCH Handbook (Suparmi et al., 2018). The availability of outpatient registration can also be explained by an adequate 85%, whereas only 55% of *puskesmas* have sufficient IMCI recording forms (Suparmi et al., 2018).

Money

Based on the research of Rahmah, et al. (2021) in Yogyakarta there has been no support from the Health Office in funding the implementation of IMCI. This lack of support is one of the factors hindering the implementation of IMCI because almost 100% of puskesmas do not have a budget allocation for implementing IMCI (Rahmah & Astuti, 2021). Meanwhile, according to research by Mansur (2017) considering that IMCI is a combination of various programs at the puskesmas, the budget comes from related programs, namely from the regional public service agency (BLUD puskesmas), and there is no specific allocation from the Health Office (Mansur, 2017).

CONCLUSIONS

The percentage coverage of *puskesmas* that implemented IMCI is quite good. However, there are still many under-five children whom IMCI has not served and its implementation has not been following the IMCI guidelines or chart procedures. The challenges in implementing IMCI were a lack of training for IMCI officers; low compliance in both IMCI management and form filling; lack of support including supervision from the health office, financial, facilities, and infrastructure. It requires to conduct training and regular orientation as well as on-the-job training for IMCI officers in *puskesmas,* supervision, monitoring, and evaluation both internally and from the local health office periodically, provision of support system includes facilities and infrastructure, medical devices, medicine and medical consumables such as IMCI forms, to improve the quality of IMCI services.

ETHICAL CONSIDERATIONS

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Conflict of Interest Statement

The authors have no conflicts of interest in the preparation of the manuscript.

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