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Community empowerment model for integrated management of childhood illness: Reducing the morbidity and mortality rates of children through local wisdom

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Abstract

The Integrated Management of Childhood Illness (IMCI) model is an approach to reducing morbidity and mortality in children under five, particularly in developing countries. Timor Leste faces significant challenges with child illness and toddler mortality. This study aimed to assess the effectiveness of a Community-Integrated Management of Childhood Illness (C-IMCI) model in improving child health outcomes in the municipalities of Aileu and Liquiçá, Timor Leste. A quantitative research method was employed using a quasi-experimental study design. The study included 120 participants, selected using non-probability sampling with a convenient sampling approach. Data were analyzed using SPSS version 26. The study results showed differences between the intervention and control groups after the implementation of the C-IMCI module. Significant improvements were found in the intervention group, with reductions in symptoms such as diarrhea, vomiting, and lethargy ($p < 0.05$). Health workers in the intervention group demonstrated increased knowledge of IMCI practices. This result suggested that the C-IMCI module has the potential to bridge gaps in healthcare access and improve health survival rates in Timor Leste. Policymakers and healthcare workers could, therefore, adopt this approach to enhance IMCI implementation and achieve sustainable health outcomes.

Keywords: Community empowerment, IMCI, Matan-dook, Morbidity and Mortality rate.

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1. Introduction

Integrated Management of Childhood Illness (IMCI) is essential to prevent mortality rates among five-year-olds in sub-Saharan African and South Asian countries, with approximately 11 million deaths annually due to diarrhea, pneumonia, measles, malnutrition, and issues related to newborn care [1]. The implementation of IMCI in Timor Leste was initiated by the Ministry of Health [2], but the quality of its execution was hampered by a lack of resources, increasing the risk of malnutrition and diarrhea among children. The health system can be improved by deploying trained personnel with adequate knowledge and skills to provide optimal health services [3].

Timor-Leste, through the Ministry of Health, has implemented IMCI across all basic healthcare facilities. Between 2000 and 2016, the mortality rate of children under 5 years of age decreased significantly, from 108.7 per 1,000 live births (LB) in 2000 to 60 per 1,000 LB in 2011 and further to 49.7 per 1,000 LB in 2016 [4]. The Ministry has set a goal in the National Health Planning Goals to reduce the under-five mortality rate from 61 to 27 per 1,000 live births. However, the results of the population census in 2022 show that neonatal mortality, which refers to deaths occurring before the age of 28 days, is 33 per 1,000 live births [4], as presented in Figure 1.

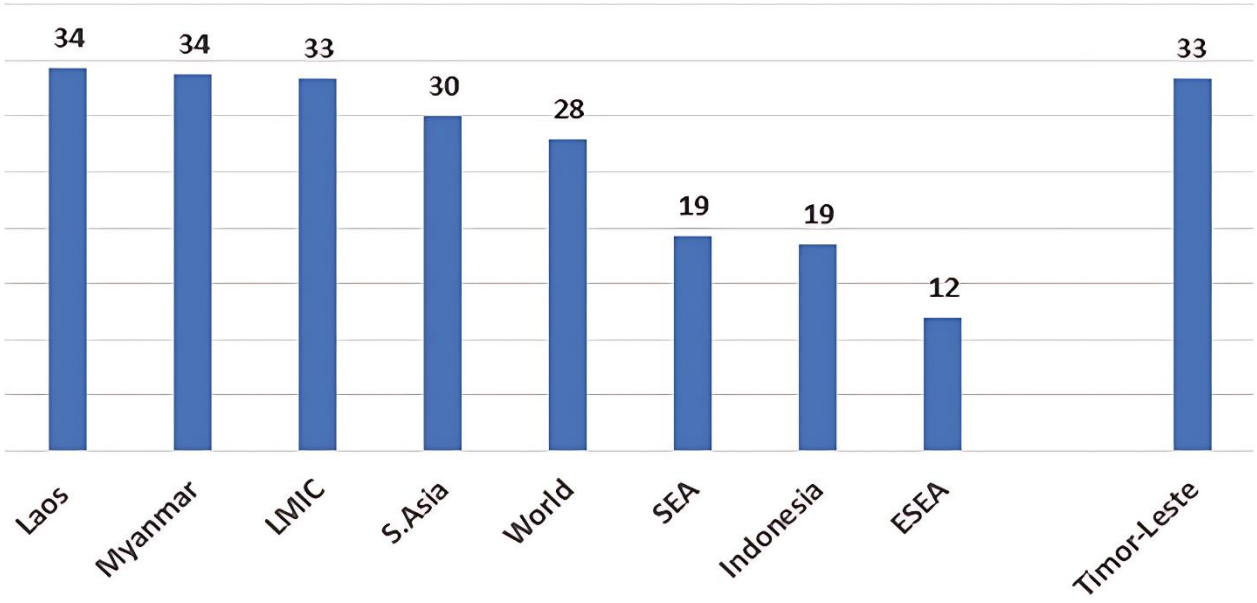

Figure 1.
Infant and toddler mortality rates based on the population census in Timor-Leste in 2022.
Source: INETI [4].

The IMCI indicator shows four main diseases mostly suffered by children under five years old: pneumonia, malaria, diarrhea, and malnutrition. The number of cases handled by the IMCI program is limited to the municipalities of Aileu, Baucau, Bobonaro, Covalima, Manatuto, Oecusse, and Viqueque. Only 10.1% of children under five years of age receive treatment through the MTBS program, 4.7% in the city of Madya Lautem, and 21.2% in Oecusse [5]. According to the Ministry of Health of Timor-Leste, less than 10% of children under 5 years of age in the municipalities of Aileu, Baucau, Bobonaro, Covalima, Manatuto, Oecussi, and Viqueque received treatment, despite an increase in cases. However, there was a decrease in the mortality rate for children under five from 115 per 1,000 in 2003 to 64 per 1,000 in 2010, and also a reduction in the infant mortality rate, from 83 per 1,000 in 2003 to 45 per 1,000 in the same year [5].

Pinto [3] reported that only 61.70% of health workers correctly adhered to the MTBS guidelines for assessment, classification, treatment, counseling, and follow-up in Liquiça municipality, while the rest failed to follow the guidelines provided by the Timor Leste health ministry. Subsequent research in Aileu municipality showed that 70.64% of health workers had followed the MTBS guidelines [6]. According to data from the World Health Organization (WHO) in Timor-Leste, 47.1% of children under five in Timor-Leste suffer from malnutrition problems caused by unsafe food. Other serious consequences of congenital diseases include kidney and liver failure, brain and nerve disorders, reactive arthritis, cancer, and death. Furthermore, Soares and Moniz [7] suggested that the highest problems of malnutrition and child mortality are listed in the municipalities of Ermera and RAEOA (Special Administrative area of Oeccuse Ambeno). Data shows that 57% of newborns are not given exclusive breast milk, causing children to experience malnutrition.

The problems that occur in the community include the lack of compliance among health workers and insufficient community cooperation regarding the issue. Therefore, community-based IMCI activities aim to foster a relationship between health workers and the community. The goal is to support and improve family and community practices in home care for toddlers to ensure child survival, reduce pain levels, and promote practices that enhance child development [8].

Public health promotion is highly necessary and related to IMCI, considering that the success of IMCI is also influenced by health promotion factors. The health promotion strategy is a way to achieve the vision and mission of health promotion effectively and efficiently in the form of advocacy, atmosphere building, community empowerment and partnerships [9].

Health promotion is a revitalization of health education in the past, where the concept of health promotion is not only a process of public awareness in terms of providing and increasing knowledge in the health field but also an effort to bridge behavior change in society and in the organization and environment [10]. IMCI combines a preventive and health promotion approach in addition to focusing on curative aspects. An important part of IMCI is informing parents or companions of toddlers about good health practices. IMCI requires collaboration between various health professions, community participation, and a holistic approach [11].

According to Pinto [3] there is still a lack of regular monitoring, evaluation, and supervision from district-level authorities and the Ministry of Health. Therefore, health workers are not motivated to implement IMCI. Pandya, et al. [12] demonstrated that obstacles to IMCI implementation include the inability of trained nurses and the lack of coordination at diverse levels of health facilities. Correspondingly, Boschi-Pinto, et al. [13] found that IMCI is suitable to be implemented in developing countries because there is still a shortage of health workers. IMCI aims to improve the ability of health workers and strengthen the health service system through training. However, there is a lack of support for health facilities, including the absence of essential tools such as recording forms, chart books, wall charts, ARI timers, and oral corners. Often, there is only one IMCI implementer available, accompanied by a nursing assistant, who must simultaneously provide consultations for newborns (up to 59 months) as well as children aged 6 to 15 years [14].

Family and community practices in the implementation of IMCI are essential to obtain the maximum impact of implementation strategy. It is necessary to have the requirement that the three components above run in a proper balance. When one of the components does not run properly, it could result in disappointment. IMCI in health centers should be further enhanced by facilitative supervision by the health officer and health center authority leaders. Traditional medicine systems are different from modern ones, but they are equally required by the community in either urban or rural areas. Rural people who are sick generally ask for help from traditional medicine. If the traditional healer can't cure it, they go to the doctor. Meanwhile, urban people typically go to modern medicine. If they are not recovered, they seek traditional medicine [15].

One of the local wisdoms in Timor Leste is matan-dook, which is one of the methods or tools of healing. The process, practice, and purpose of matan-dook align with pastoral counseling [16]. Pastoral counseling has an important role in times of crisis or misfortune in human life, whether the crisis is personal, affecting individuals in the community, or societal, which brings about social change. Pastoral counseling is a healing and growth method that helps to recover from problems [17]. Within the belief system of the people of Timor Leste, everything happens for a reason so the *matan-dook* ritual is carried out to find the cause. Once the cause is identified, they will immediately find a solution to get out of the ongoing crisis. Sin is often viewed as the cause of various ongoing events or crises. If the sin has been acknowledged and forgiven, it is believed that the problems subside, and their life conditions will return to normal [18]. Certain cultural values align with Christian principles so that they can coexist harmoniously without conflicts. However, some cultural values cannot be dialogued with Christian teachings [16].

Matan dook is a tradition or habit carried out in ritual practices to discern truth from falsehood. This custom is typically performed for *doku manu tolun* (turning chicken eggs), *sukat ai ka surik* (measuring wood or keris), *sukat liman fukun* (measuring through the fingers), *hare manu aten no ain* (looking at the heart and legs of the chicken), and many more. Considering that Timor Leste has many different tribes, languages, and traditions, it can be practiced according to their respective beliefs to confirm whether a situation is right or wrong. However, what is considered right and good is practiced according to one's own beliefs and consciousness, and this practice is always done in a symbolic or sacramental manner. Additionally, this practice aims to prevent psychological and physical illness.

Some family bring their children to *matan dook* because the community's trust in the tradition is stronger than their trust in the health workers. Therefore, many individuals seek treatment from local traditional leaders compared to health workers. As stated by Clinebell [19] pastoral counseling is therefore required to improve traits and is indispensable during a time of crisis or when a problem hinders an individual's growth [19]. Based on this concept, pastoral counseling is an essential instrument to help individuals experiencing a crisis or problem, as well as to help them improve and solve their problems. This study aims to address these traits by evaluating the effectiveness of C-IMCI module designed to enhance healthcare workers' understanding, improve community participation, and integrate culturally relevant practices.

2. Materials and Method

This research employed a quantitative approach with a quasi-experimental study. It utilized a descriptive design with a cross-sectional approach. The sampling technique in this study was convenience sampling, involving 120 local people from six subdistricts in Aileu and Liquiça municipalities of Timor-Leste. Data were collected using a questionnaire, where incorrect answers were scored one and correct answers were scored two. The data were analyzed using SPSS version 26.

This research used a quasi-experiment with a pre-test-post-test control group design involving one type of treatment. In this model, before treatment began, both groups were given an initial test or pretest to measure initial conditions. Furthermore, the experimental group received treatment, while the comparison group did not. After completing the treatment, both groups were given another test, the post-test. The experimental group consisted of families whose children were taken for treatment to Matan-Dook before going to a health facility, while the non-experimental group comprised families who took their children to the Community Health Center to be treated with IMCI procedures in the two municipalities.

2.1. Research Results

The study's results evaluated the effectiveness of the "Community-Based Integrated Management of Childhood Illness" (C-IMCI) module in reducing childhood morbidity and mortality rates in the municipalities of Aileu and Liquiçá. A comprehensive analysis was conducted using descriptive statistics and differential tests to compare outcomes between the intervention and control groups before and after the module's implementation.

2.2. Pre-Implementation Module

Before implementing the C-IMCI module, a pre-implementation test was conducted to compare between the intervention and control groups. The descriptive analysis results (Table 1) indicated no significant differences between the two groups' family understanding of IMCI implementation. Key indicators of child health conditions, such as vomiting, lethargy, diarrhea, and difficulty breathing, resulted in p-values > 0.05. It confirms that the groups were statistically similar before the treatment.

Table 1.
Difference test of children's conditions before module implementation.

Children's condition	Intervention group (n = 60)	Control group (n = 60)	p-value	Significance
Inability to drink	38 (63.3%)	47 (78.3%)	0.530	Insignificant
Convulsions	35 (58.3%)	48 (80%)	0.877	Insignificant
Vomiting	42 (70%)	45 (75%)	0.759	Insignificant
Lethargy (Unconsciousness)	17 (28.3%)	14 (23.3%)	0.808	Insignificant
Difficulty in breathing	20 (33.3%)	15 (25%)	0.576	Insignificant
Fever	10 (16.7%)	10 (16.7%)	0.486	Insignificant
Diarrhea (≥3 times/Day)	9 (15%)	11 (18.3%)	0.231	Insignificant
Swollen ears	13 (21.7%)	16 (26.7%)	0.808	Insignificant

These findings are fundamental because they ensure that any observed post-implementation differences can be attributed to the module's effects. Additionally, family understanding of IMCI-related interventions, such as recognizing and responding to severe symptoms (e.g., dehydration or fever), was also not significantly different between the groups before being given the module, as shown in Table 2.

Table 2.
Difference test of children's actions before module implementation.

Children's action	Intervention group (n = 60)	Control group (n = 60)	p-value	Significance
Inability to drink, seizures, vomit, and lethargy	48 (80%)	44 (73.3%)	0.524	Insignificant
Difficulty in breathing	49 (81.7%)	48 (80%)	0.755	Insignificant
Fever	53 (88.3%)	44 (73.3%)	0.804	Insignificant
Diarrhea (≥3 times/Day, with blood)	51 (85%)	50 (83.3%)	0.564	Insignificant
Dry and skinny appearance	55 (91.7%)	49 (81.7%)	0.524	Insignificant
Swollen legs	50 (83.3%)	49 (81.7%)	0.878	Insignificant

2.3. Post-Implementation Test

Following the implementation of the C-IMCI module, improvements were observed in both family understanding of IMCI practices and child health in the intervention group compared to the control group. The differential test results demonstrated statistically significant changes ($p < 0.05$) in key indicators of child health. For example, the proportion of children unable to drink or suck decreased dramatically in the intervention group, improving from 22% before the module to 78% after implementation. Correspondingly, substantial reductions were noted in the prevalence of vomiting and lethargy, with healthcare workers showing an increased ability to identify and respond to these symptoms effectively.

Furthermore, cases of diarrhea and difficulty breathing, two critical contributors to childhood morbidity and mortality, decreased significantly in the intervention group compared to the control group. Diarrhea cases showed a significant improvement ($p = 0.028$), and the difficulty in breathing was reduced ($p = 0.018$). These results confirmed the module's effectiveness in empowering healthcare workers with the knowledge and skills required to recognize and manage symptoms.

Table 3.
Difference test of children's conditions after module implementation

Children's condition	Intervention group (n = 60)	Control group (n = 60)	p-value	Significance
Inability to drink	13 (21.7%)	47 (78.3%)	0.015	Significant
Convulsions	19 (31.7%)	48 (80%)	0.013	Significant
Vomiting everything	10 (16.7%)	45 (75%)	0.018	Significant
Lethargy (Unconsciousness)	9 (15%)	14 (23.3%)	0.019	Significant
Difficulty in breathing	13 (21.7%)	15 (25%)	0.018	Significant
Fever or chills	2 (3.3%)	10 (16.7%)	0.028	Significant
Diarrhea (≥3 times/Day)	3 (5%)	11 (18.3%)	0.028	Significant

These results demonstrate that the module significantly increased healthcare workers' ability to identify, manage, and prevent severe symptoms. The increase in skills improved child health.

2.4. Impact on Family Understanding

The post-implementation evaluation also shows significant improvements in family understanding of IMCI principles and practices. Table 4 suggests that families in the intervention group were better equipped to recognize the importance of early intervention, proper hydration, and timely care-seeking behaviors.

Table 4.
Difference test of children's actions after module implementation.

Children's action	Intervention group (n = 60)	Control group (n = 60)	p-value	Significance
Inability to drink, seizures, vomit, and lethargy	45 (75%)	16 (26.7%)	0.015	Significant
Difficulty in breathing	49 (81.7%)	48 (80%)	0.059	Insignificant
Fever	50 (83.3%)	44 (73.3%)	0.058	Insignificant
Diarrhea (≥3 times/day, with blood)	54 (90%)	50 (83.3%)	0.079	Insignificant
Dry and skinny	55 (91.7%)	49 (81.7%)	0.053	Insignificant
Swollen legs	57 (95%)	49 (81.7%)	0.132	Insignificant
Wounds or infections	17 (28.3%)	48 (80%)	0.034	Significant
Yellowish skin	18 (30%)	39 (65%)	0.038	Significant

The improvements in family understanding directly contributed to reduced morbidity and mortality rates in the intervention group. For example, the ability of healthcare workers to identify the need for immediate medical attention improved. The improvement reduced delays in treatment and prevented complications.

3. Discussion

3.1. Effectiveness of the C-IMCI Module in Improving Healthcare Workers' Understanding of IMCI Principles

The effectiveness of the C-IMCI module in improving the understanding of local wisdom regarding C-IMCI principles is supported by the findings of this study and prior research. In this study, a significant decrease in symptoms such as vomiting, diarrhea, and difficulty breathing was observed in the intervention group, with p-values consistently below 0.05. The improvement indicates that the module can effectively empower local wisdom with the knowledge and skills required to identify and address common childhood illnesses effectively.

This finding supports the previous research on the role of community involvement and education in enhancing childhood illness management at the local level. Referred to Mukunya, et al. [20] demonstrated in Northern Uganda that increased caregiver knowledge of C-IMCI practices could significantly reduce stunting and wasting [20]. Correspondingly, Nguyen, et al. [21] found that training health workers in C-IMCI protocols improved case identification and management [21]. The findings from Madagascar by Kitamura, et al. [22] also support the need for continuous health worker training and community engagement to sustain health interventions effectively [22].

Further, the cost-effectiveness of the C-IMCI approach can improve health outcomes in resource-limited settings. Evaluations by Lal, et al. [23] and Rakha, et al. [24] found that IMCI interventions, including community-based components, significantly reduced under-five mortality rates and improved nutritional status at a fraction of the cost of conventional healthcare approaches [23, 24]. The findings demonstrate that the C-IMCI module can effectively improve child health outcomes through a combination of education, training, and community engagement.

3.2. Family Understanding of IMCI Implementation

Enhancing family understanding of IMCI implementation can improve child health outcomes. This study demonstrated significant improvements in healthcare workers' knowledge and practices in the intervention group after the implementation of the C-IMCI module. Families became more proficient in recognizing danger signs in children, such as diarrhea, difficulty breathing, and lethargy. These findings agree with the IMCI strategy developed by WHO and UNICEF, that families play a role in reducing childhood morbidity and mortality through active participation in preventive care and treatment.

Research supports the importance of family involvement in IMCI success. Zulaikha, et al. [25] noted that effective IMCI implementation depends on family cooperation, alongside supportive healthcare facilities and proactive health workers [25]. Education and communication strategies built for families empower healthcare workers to adhere to IMCI protocols and trust the healthcare system. According to Mabuza, et al. [26] community health workers (CHWs) bridge gaps between families and healthcare providers Mabuza, et al. [26]. Adekanye and Odetola [27] reported that families with a better understanding of IMCI guidelines were more likely to recognize symptoms early [27].

Also, Cuenca-Sánchez, et al. [28] argued that healthcare professionals' ability to manage family expectations and emotions during education sessions initiates collaboration, trust, and empowerment [28]. These factors contribute to following IMCI practices and strengthened family engagement. By integrating CHWs and healthcare professionals into the IMCI framework, this collaborative approach ensures that families are well-informed and active healthcare workers in their children's healthcare.

3.3. Cultural Relevance and Community Engagement

Cultural relevance and community engagement are important for successfully implementing the IMCI strategy. This study integrated local cultural practices, such as the *matan-dook* tradition, into the design of the C-IMCI module. The integration led to great acceptance and trust within the community. The module effectively bridged gaps between traditional beliefs and modern healthcare practices by addressing the socio-cultural dynamics that influence health behaviors. Families participating in the intervention were more engaged in health-promoting behaviors and demonstrated improved adherence to IMCI guidelines.

Community health workers (CHWs) play a role in fostering culturally relevant health practices. Acting as trusted intermediaries, they provided education about recognizing signs and symptoms of childhood illnesses while ensuring health messages tailored to the community's values and beliefs. This approach supports Frank, et al. [29] that CHWs promote timely healthcare-seeking behaviors through culturally appropriate communication. Similarly, McDonald and Trenholm [30] noted that CHWs' cultural and social proximity to the community builds trust and improves the effectiveness of health interventions [30].

The integration of local traditions into health interventions also demonstrated the importance of respecting community norms. For instance, incorporating elements of traditional healing, such as *matan-dook*, can build cooperation from families and reinforce the need for medical care. Witham, et al. [31] reported that blending indigenous practices with modern health programs improved engagement and acceptance [31]. Also, partnerships with community leaders and local organizations facilitated participation [32]. This cultural approach strengthens community trust in healthcare and empowers families to take an active role in managing childhood illnesses and building sustainability.

4. Conclusion

This study demonstrated the effectiveness of the Community-Based Integrated Management of Childhood Illness (C-IMCI) module in improving child health and reducing morbidity and mortality rates among children under five in the municipalities of Aileu and Liquiçá. Significant improvements were observed in healthcare workers' knowledge and practices, particularly in recognizing and managing symptoms such as vomiting, diarrhea, and difficulty breathing. The intervention group showed a decrease in critical symptoms compared to the control group. Furthermore, the integration of culturally relevant practices, such as matan-dook, improved community acceptance and engagement. These findings support the importance of community-based and culturally integrated strategies in achieving ideal health for children.

The findings of this study inspire implications for policymakers and healthcare practitioners. For policymakers, the success of the C-IMCI module suggests the integration of community-based approaches into national healthcare strategies to address childhood morbidity and mortality effectively. The cultural adaptability of the module also shows the potential for implementation in other regions with similar socio-cultural contexts. These approaches can strengthen trust in healthcare systems, improve treatment adherence, and reduce delays in seeking medical attention.

The sample size of this study is limited to 120 healthcare workers across two municipalities, which might restrict the generalizability of the findings. Additionally, the reliance on self-reported data may cause bias in evaluating healthcare workers' understanding and practices. Future research should focus on scaling up the C-IMCI module to larger and more diverse populations to evaluate applicability and sustainability. Longitudinal studies are recommended to assess the long-term impact of the intervention on child health and caregiver behavior. Furthermore, exploring the integration of advanced tools, such as digital health technologies and mobile applications, could enhance healthcare workers' accessibility to IMCI resources and improve real-time monitoring. Finally, research into cost-effectiveness analysis could inspire policymakers to ensure that such interventions are impactful and economically viable.

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