The Evaluation of the Application on Integrated Management of Childhood Illness (IMCI) Referred to Acute Diarrhea in Sick Children from 2 Months to 5 Years Old at Community Health Centers, Dili, Timor Leste

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Abstract:-

➢ *Objective*
To explore adherence to Integrated Management of Childhood Illness(IMCI)guidelines for assessment, classification, treatment, counselling and follow-upfor children under 5 years of age with acute diarrhoea.

➢ *Design*
This descriptive study used both quantitative and quantitative methods together, specifically a retrospective review of children's case files and interviews with health workers. Data were gathered using both methods concurrently. Quantitative data were analysed using descriptive statistics and interview data were incorporated in the findings to provide depth and explanations for interpreting the results.

➢ *Setting*
Health Services in one Municipality in Timor-Leste

➢ *Participants*
The IMCI trained heads of community health centresand IMCI facilitators in the municipality.

➢ *Main Outcome Measure(s)*
Adherence to the IMCI algorithm and guidelines for assessment, classification, treatment, counselling and follow-up for children under five year with acute diarrhea.

➢ *Results*
The study found high levels of adherence to the IMCI guidelines for assessment and classification of cases, but low levels of adherence to guidelines for treatment, counselling and follow-up of these children.Overall 61.7% of the case files showed adherence to guidelines. Explanations for non-adherence to guidelines were related to shortages of resources such as zinc tablets and a lack of mentoring, follow up training and supervision of health workers.

➢ *Conclusions*
The quality of IMCI case management for children with acute diarrhoea is hinderedby a lack of resources, increasing the risk of malnutrition and recurrence of diarrhoea in this already vulnerable population of children. System improvements can ensure appropriate resourcing and staff knowledge and skills for IMCI.

Keywords:- Children's Health Services, East Timor, Diarrhoea, Guideline Adherence, Quality of Health Care.
From the journal database:- Quality Management, guidelines, children, developing countries, primary care, digestive diseases.

I. INTRODUCTION

The Integrated Management of Childhood Illnesses (IMCI) strategy offers simple and effective methods to prevent and manage the most common childhood illnesses in children under five years old[1]. This strategy was first developed by the World Health Organisation (WHO) in 1995 to reduce high child mortality and morbidity rates caused by pneumonia, diarrhoea, malaria, measles and malnutrition[2]. Diarrhoea is a global health problem, causing high rates of child morbidity and mortality in developing countries as a result of poor environmental sanitation and hygiene, inadequate water supply, poverty and limited access to education[3,4]. Diarrhoea remains the 2nd most common cause of death in children under five(more than half a million children)[5], with 8% of all deaths for this population caused by diarrhoeain 2016[6].

In recognising the need to improve the health and well-being of children under five, the Timor-Leste government commenced IMCI in Ministry of Health (MoH) health services in 2001[7].By 2011, when IMCI was implemented in all services, the estimated under 5 child mortality rate had reduced from 108.7per 1000 LBin 2000 to 60 in 2011 and more recently reduced further to 49.7 per 1000 LBin 2016[8]. The MoH set a new goal to further reduce the under-five child mortality rate to27 per 1000 LB by 2030[9]. In 2010,

Diarrhoea was the cause of death for 8% of children aged under 5 years in Timor-Leste, compared to 14% in 2000 [10].Integrated Management of Childhood Illnessesresources include an algorithm and resources for case management of diarrhoea, which are evidence based and designed for primary care providers. IMCI processes for all presentations include elements of 1) assessment, 2) classification, 3) treatment identification, and 4) counselling and follow up which are adapted the child' spresenting condition[11,12].

When a child presents with diarrhoea, IMCI assessmentactivities result in documentation of the child's name, age, body weight, temperature, general danger signs such as lethargy or unconscious, then presence of a cough or breathing difficulties, and next the type and duration of diarrhoea, signs of dehydration and presence of blood in the stool[14].The three classification criteria for diarrhoea relate to the degree of dehydration of the child: severe dehydration, some dehydration, and no dehydration, which are documented on the case file[11,13]. Based on the result of classification, a treatment plan is selected. The principal treatment options for diarrhoea, according to the level of dehydration are: Plan A; treat diarrhoea at home, (b) Plan B; treat some dehydration with oral rehydration solution (ORS) at clinic over four hours (c) Plan C;Treat severe dehydration quickly by giving fluids IV or via nasogastric tube or if the child has other severe classification refer urgently to hospital giving ORS or breastfeeding on the way[13]. The presence of blood may indicate dysentery which requires specific treatment[13].

Counselling of the child's mother or caregiver is also essential to ensure they understand how to care for their childand when to return should the child's condition deteriorate.For children with a classification of no dehydration, the mother should be advised on how to mix ORS and zinc, to give extra fluids(as much as the child will take) and continue feeding and when to return for a follow-up visit or immediately if danger signs develop[11,13]. This element of the process should also be documented on the child's IMCI case file and the mother's advice card which is held by the mother or caregiver.

Previous studies have found that IMCI programs have the potential to improve child health outcomes, however factors that reduce efficacy include lack of mentoring, system support and follow up training for the primary care providers, lack of essential medications and supplies[14], staff beliefs that are contrary to the IMCI guidleines[15,16,17]and caregiver careseeking behaviour[18].

This study exploresadherence toIMCI case management process and guidelines for children under five presenting with acute diarrhoea to government health services linked to all three administrative posts in one of the municipalities in Timor-Leste where the IMCI program commenced in 2001. The reported prevalence of diarrhoea in this municipality was 14% (1,222 cases) of total cases (8,014 cases) in 2014 and 15% (1,175) from total cases (7,829) in 2015[19], similar rates to those recorded for the country in 2009[11].

Three community health centres (CHCs) in this municipality included 22 Health Posts, 26 SISca services(Integrated community health services), 24 Mobile Clinics, 134 Sucos (villages) and 23 Aldeias (neighbourhood associations)[20]with 124 health professionals, for a population of 73,000 people living in 12,800 households[21]. Thirty three health workers in this municipality received IMCI training when IMCI was introduced in 2001, including training of two facilitators.

Table 1: Type of health professionals by community health centre

Type of health professional	CHC 1	CHC 2	CHC 3	Total
Doctor	17	13	18	48
Nurse	11	10	17	38
Midwife	10	10	7	27
Pharmacist	2	2	2	6
Lab technician	2	1	2	5
Total	42	36	46	124

Source :HMIS, 2017

II. METHODS

This exploratory, descriptive study used both quantitative and qualitative methods in conjunction with each other to generate more-in-depth understanding of the quantitative results[22]. The two methodsincludeda retrospective review of randomly sampled case files and interviews with health professionals who had completed IMCI training.

From a total of 1,175 case files of children with diarrhoea who presented at the health services,in the municipality between January and December 2015[19], 20% (n=235) or every 5th casefilewasrandomly selected using a using systematic sampling[22]. The inclusion criteria for the files were all the sick children aged from 2 months to 5 years presenting at the health services in the municipality with acute diarrhoeafor less than 14 days at the time of the initial visit.

Table 2. Calculation of study cases by community health centre

Community Health Centres	No. of Cases	No. Cases to be included (n=) (20% of total cases)
1	334	67
2	232	46
3	609	122
Total	1,175	235

Ethical clearance was obtained from the Technical and Ethical Committee of the National Institute of Health for Ethical Review prior to data collection. Confidentiality was maintained throughout the study.

Data collected from the review of case files focused on IMCI processes namely, assessment, classification, treatment, and counselling and follow up for children under five presenting with acute diarrhoea?[11].Case file review data were coded on the basis of yes/no responses and entered into the statistic package for social sciences (SPSS) program and analysed using distribution frequency, percentage distribution and cumulative distribution[23]. Interviews with health professionals aimed to clarify possible errors or omissions in the specific case files. Data from these interviews were directly recorded in the data collection questionnaire form and field notes transcribed and stored on a computer.

A limitation of the retrospective case file review is reliance on the quality of documentation by health professionals of what occurred when the child was presented to a health service, rather than directly observing the clinical decision making and consequences of the actions taken at the time. This limitation was minimised to some extent by interviewing health workers to clarify and explain possible errors and omissions in the files. This strategy enriched the data by adding staff perspectives on IMCI that was not apparent in the files.

III.RESULTS

Results of the study are presented according to IMCI elements ofassessment, classification, treatment,and counselling and follow up.

➢ Assessment

All files (n=235) included the name and age of the sick child and most recorded signs of diarrhoea (97.4% n=229), danger signs (96.6%) and whether it was an initial or follow-up visit (98.7%). However, only 77.9 % (n=183) noted the duration of diarrhoea, 55.3% recorded the child's body weight and fewer files (32.3%) recorded the child's temperature. Overall more than 80% of the files adhered to the guidelines for assessment.(See Table 3 for all results)

Table 3: Adherence to guidelines for the assessment of children with acute diarrhoea

		Results of audit of assessment documentation					
		Adheres to guidelines		Does not adhere to guidelines		Total	
		F	%	F	%	n=	%
1.	Child's full name	235	100	-	-	235	100
2.	Child's age	235	100	-	-	235	100
3.	Body Weight	130	55.3	105	44.7	235	100
4.	Temperature	76	32.3	159	67.7	235	100
5.	Initial or Follow up visit	232	98.7	3	1.3	235	100
6.	General danger signs	227	96.6	8	3.4	235	100
7.	Duration of diarrhoea	183	77.9	52	22.1	235	100
8.	Signs of diarrhoea	229	97.4	6	2.6	235	100
	Mean		82.3		17.7		100

When asking the health professionals about the differences in documentation of the children's assessment, they demonstrated understanding of what was required but indicated that IMCI implementation was challenged due to limited availability of IMCI recording forms at each health facility. For example, one health professional said:

We run out the delivered format because they were very limited. We just used the registration book for recording patients' notes.

Another said: *this year, we only got a book from the Xefe*(manager) *but none have been provided for the Health Centre. More often, I send a request, but no action has been taken, therefore I just used the registration books only.*

They also reported a limited supply of scales, so staff were unable to weigh the children. Also there was a shortage of functioning thermometers, so staff were unable to record children's temperatures. They also reported that when there was only one staff member and there were many families presenting at the same time, they may not have time to conduct and record a full assessment.

IV. CLASSIFICATION

Most of the selected case files (92.3% n=217) were classifiedcorrectly in the category of no dehydration. Mostfiles adhered to the guidelines showing correct classification according to the assessment data. Some cases were classified incorrectly as some dehydration and no cases were classified as severe dehydration. Another example of an incorrect entry was a case where there was notation of blood in the diarrhoea, for a duration of less than 14 days,but was classified as no dehydration, and there was no evidence that the child was referred for specific treatment as per the guidelines.

The heads of the health services in the municipality had received IMCI training in the initial pilot program, but no training in monitoring and evaluation,though they were responsible for the quality of IMCIat a number of health services. Whenaskedif they had been briefed on how to respond when they found an incorrect classification in a child's file,one head explained:

The Classification n is a normal thing because we only look at the booklet chart. There has not been a refresher training provided by the national or district level for a long time and on our side nothing has been changed.When we commit any errors there is no briefing or supervision from the district or national level yet. The former leader of IMCI was better because he always provided us with briefing and supervision compared to current one.

➢ *Treatment Identification*

As most of the files showed that the children had been classified with no dehydration, the correct treatment was to treat the diarrhoea at home (plan A). Almost two thirds (n=155, 66%) of the children's files indicated that the caregiver had been given a treatment pack of ORSfor use at home. Only 27.8% were given the recommended zinc tablets for treatment at home. In 98.3% of cases (n=231) the file indicated that multivitamins had been provided for the child.

Table 4: Adherence to guidelines for treatment of children with acute diarrhoea

Treatment Item	Treatment plan					
	Adheres to guidelines		Does not adhere to guidelines		*Total*	
	n=	%	n=	%	n=	%
Plan A	155	66.0	80	34.0	235	100
Plan B	-	-	-	-		-
Plan C	-	-	-	-		-
Zinc	64	27.2	171	72.8	235	100
Multivitamin	4	1.7	231	98.3	125	100
Mean		31.6		68.4		100

Less than a third (31.6%) of the files documented treatment thatadhered to the IMCI guidelines. When asked about the low level of adherence to IMCI guidelines it was explained that health workers were unable to adhere to guidelines due to a lack of resources and substituted multivitamins, rather than not give the child anything.

➢ One IMCI facilitator said:
ORS and zinc are important but only one box was supplied. As soon as we finish them, the only alternative for us was to continue giving multivitamins to the children.

➢ Onehead of a CHC commented:
If ORS was not available, we just taught them how to make ORS by themselves

➢ And another confirmed there had been:
a limited stock of zincfor a long time as they had only been just sent one box and could only give a multivitamin to

the child. If ORS is available we give it, but if not available we can only teach them how mix it at home.

Counselling the caregiver on how to prepare ORs was another way to overcome the lack of resources at the health service.

➢ Counsellingand Follow Up Visit
The review found that almost 50% of the children's files (n=116) registered counselling on how to mix ORS, zinc and give extra fluids at home and follow-up on the mother advice card. Almost two thirds of the files (n= 150, 64%) indicated that the caregiver was given information on when to return for a follow-up visit. Less than 10% were given information on when to return immediately. Overall approximately 60% of the files did not adhere to the guidelines on the type of information to provide when counselling caregivers of children with acute diarrhoea.

Table 5: Adherence to guidelines on counselling and follow up visits for sick children with acute diarrhoea

Counselling Item	Counselling and follow up visits documented					
	Adheres to guidelines		Does not adhere to guidelines		Total	
	n=	%	n=	%	n=	%
Mix ORS, give zinc and extra fluids	116	49.4	119	50.6	235	100
When return immediately	21	8.9	214	91.1	235	100
When return for follow-up visit	150	63.8	85	36.2	235	100
Mean		40.7		59.3		100

There were difficulties for health workers in documenting advice on the mother advice card becausefew caregivers brought the card with them to the health service, and they had few cards to give out to the caregivers, as explained by one of the IMCI trained staff. There is:

Very limited use of the mother advice card. We request but they have not yet been delivered by national level so that only used for counselling and caregiver didn't bring it from home. If ORS is not available, we teach them to mix sugar and salt, how to make ORS at home.If a child hassevere symptoms we advise them to visit the health centre.

➢ Another IMCI trained explained

The majority the children visit here with classification of no dehydration so that only to teach them to give rice water,breasmilk and eating more. If zinc and ORS was avaiable we give but only counselling if not available. If the condition is improving must follow up after 5 days.

In summary, the retrospective review of the case filesfound high levels of adherence to the IMCI guidelines for assessment and classification of children presenting with acute diarrhoea, however case files showed low levels of adherence to guidelines for treatment, counselling and follow-up of these children.

Overall the review found that 61.7% of the files showed adherence to guidelines.

Table 6: Mean of adherence to guidelines for assessment, classification, treatment and counselling-follow up

n=235	∑ assessment	∑ Classification	∑ Treatment	∑ Counselling-Follow-up	∑ Mean
Mean	82.3	92.3	31.6	40.7	61.7

The data gathered through interviews with heads of health postsand IMCI facilitators in this municipality provided some explanations for 1) the lack of documentation due to a shortage of the IMCI records and mothers advice cards, and caregivers not bringing the mother's advice cards with them to the health centre. 2) errors in treatment due to a shortage of ORS and Zinc and if ORS or zinc is not available to give to the caregiver for the child, a belief that it is better to give multivitamins than nothing. 3) lack of documentation of children's weight and temperature due to shortage of working equipment and busy health services 4) Overall lack of adherence to guidelines due to a lack of supervision and follow up training.

V. DISCUSSION

This study is the first to examine adherence to IMCI guidelines in Timor-Leste, however some of the findings are consistent with previous studies on adherence to guidelines in a number of developing countries in Africa[16,17,18,24]and Bangladesh[15]. Common findings include the impact on adherence as a result of a lack of resources, in this case specifically zinc tablets, record cards, scales and thermometers and a lack of ongoing training, mentoring and system supports to ensure that all health workers are prepared and committed to implementation of the IMCI guidelines. While the acute diarrheapresentations in the sample of case files reviewed in this study were not severe, diarrhoea is a leading cause of malnutrition in children under five years old and each diarrhoeal episode, in turn, makes their malnutrition even worse[5]. Many of the children of Timor-Leste suffer malnutrition, with an estimated 58%of children under five being underweight in 2009-2010 health report (60% in rural areas compared to 49% in urban areas[10]and an estimated 50% with stunted growth in 2016[25].

The proportion of children under five in a number of developing countries who receive zinc for diarrhea is low or not recorded[15]. In Timor-Leste in 2009-2010, it was reported to be only 5.8%[15]. In the sample of case files in this study, the proportion was 27%. Zinc is a core component of the IMCI strategy, the tablets are not a costly item in developed countries, however, it can be costly in urban areas of developing countries and impossible to obtain in rural areas[15]. A lack of availability of zinc supplements at the health services has the potential to hinder children's recovery and wellbeing. Evidence shows that zinc supplements can reduce the severity (30% reduction in stool volume) and duration of diarrheaby 25% and reduce recurrence for up to 2-3 months after treatment[26,5]. Diarrhoea is a leading cause of malnutrition in children under five years old. Each diarrhoeal episode, in turn, makes their malnutrition even worse[5].Caregivers can be taught how to mix ORS at home with commonly available ingredients

of sugar and salt, whereas zinc tablets are not easily accessiblein Timor-Leste. There is a need for health departments to link with manufacturers and distributors of zinc and other essential preparations such as ORS and to develop responsive systems for the supply of these commodities according to need, including forecasts of seasonal needs and alert systems when supplies are low, so that there is a steady supply of zinc[15].

Limited availability of resources for assessing children such as scales and thermometers contributed to the number of IMCI assessment tasks completed during consultations. A lack of essential equipment has the potential to hinder assessment of weight loss and fever in small children. However, other studies have found that staff had weak beliefs in the IMCI approach preferring to use their own judgement based on experience, for example only half the participants were directly observed to take a child's temperature in a clinic in rural Tanzania, compared to the majority who did this in responding to a Vignette[16].

A lack of resources for documenting the IMCI processes also impacted on the quality of documentation and adherence to guidelines in this study. These resources provide prompts for staff who may not have received training or had training some time ago and has the potential to increase the risk of inappropriate assessments, classifications and subsequent treatment plans for children.At follow-up visits there may be inadequate documentation of the initial visit to inform the health worker.

This study has also identifieda need for ongoing supervision to improve the quality of IMCI case management in health services by effective monitoring and evaluation, providing individual feedback, and reporting at municipality and national levels. Other IMCI evaluations have also found a lack of supervision after the initial introduction[16]. Such supervision could ensure mentoring and refresher training is available for all IMCI health workers so they are able to introduce changing or additional related mechanisms for implementation based on national guideline. Other quality assurance mechanisms would also address resourcing to enable the IMCI strategy to be fully implemented and effective in all areas of Timor Leste.

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