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Key Barriers Affecting Implementation of Intergrated Management of New-Born and Childhood illnesses among Health workers in Lusaka and Chongwe, Zambia

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Abstract

Zambia adopted the Intergrated Management of Newborn and Childhood Illnesses (IMNCI) strategy in 1995 as a key strategy for addressing the high morbidity and mortality among under-five children. Despite its introduction, implementation of IMNCI has not been optimal as it can be seen from the 2018 Zambia's health facility assessment, which found that only 56% of health facilities did not meet the programmatic threshold of having at least 60% of health workers managing sick children trained in IMCI, and 20% of sick children were not accessed for cough, diarrhoea and fever and 56% for HIV infection. The purpose of this study was to explore barriers to implementation of the IMNCI strategy among primary healthcare workers at health facility level in Chongwe and Lusaka districts. Data were collected from observation of health workers during assessment of sick under five children, Key Informant Interviews with health workers, National and District Focal-point persons and Health facility assessment. The study revealed Health systems factors such as lack of supervision, training and mentorship, shortage of supplies and equipment, shortage of health workers and inadequate infrastructure; Health workers skills such as poor attitude, Lack of motivation, long duration and difficult steps for IMNCI assessment as barriers to health workers's adoption of IMNCI during assessment of sick children. Therefore, this study proposes the adoption of a holistic strategy for addressing the non-adherence to IMNCI protocols among health workers that encompasses health systems related factors and health workers skills, attitudes and practice.

Keywords: *Barriers, Health Facility, IMNCI Assessment, Resources, Skills, Under-five Children.*

Introduction

Every day, millions of children with potentially fatal illness are taken by their caregivers to be seen by health workers. In countries with a high burden of child mortality, a handful of conditions are responsible for these visits. Globally, over 80% of the under-five deaths are due to neonatal conditions and infectious diseases like pneumonia, diarrhoea, malaria, measles and meningitis, often compounded by malnutrition. Children brought for medical treatment, especially in the low and middle-income countries, often suffer from more than one condition. At the first level of Primary Health Care (PHC) services, diagnostic supports such as laboratory and radiology services are commonly limited or non-existent [1].

To improve access and quality of care for newborns and children under-five in PHC settings, World Health Organization (WHO) and United Nations International Children's Fund (UNICEF) in 1995 designated the

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Intergrated Management of childhood Illness (IMCI) strategy. The IMCI strategy aims at improving health workers skills, improving the health system and improving family and community practices. The aim is to strengthen prevention and management of common childhood illnesses, including in the newborn period, and support children's healthy growth and development [1, 2]. Since the introduction of IMCI in the mid 1990's, over 100 countries have adopted and implemented the strategy, either in part or all of its three components. Evidence suggests that if fully implemented, IMCI contributes to reduction in child mortality. A Cochrane review by Gera et al in 2016 found that the strategy was associated with a 15% reduction in child mortality when activities were implemented at scale in health facilities and communities [1].

In Zambia, IMCI strategy was introduced in 1995 after it was observed that more than two thirds of childhood deaths were due to five common conditions: respiratory tract infection, malaria, diarrhoea, malnutrition and measles. With the adoption of IMCI, the Country has recorded a drastic reduction in under five mortality rates from 197 death per 1,000 live births (1996) to 42 death per 1,000 live births [3]. Despite this improvement Under-five mortality rates in Zambia still remain unacceptably high beyond the Sustainable Development target of reducing child mortality to at least 25 or less deaths per 1000 live birth by 2030. Despite wide successes of IMCI in the last 25 years and the fact that most countries still consider IMCI an important and effective strategy to deliver lifesaving interventions, very few countries have achieved full expansion of IMCI implementation and coverage remains low [4, 5].

Statement of the Problem

In Zambia, Implementation of IMCI implementation has remained relatively low, while IMCI has been scaled up to nearly all the 116 districts in Zambia, only 45.3% of the districts meet the target saturation levels of having at least 60% of Health workers managing sick children trained in IMNCI, furthermore, at health facility level, and 56% of health facilities did not meet the programmatic threshold of having at least 60% of health workers managing sick children trained in IMCI [6].

Health workers shortages has compromised the implementation of IMNCI strategy especially at health facility level. Even in facilities with adequate numbers of staff, implementation of IMCI has not been optimal. The 2018 IMNCI health facility survey (2018) revealed that 20% of sick children were not assessed for cough, diarrhoea and fever and 56% of the children not correctly classified for HIV infection, and 53% did not have their weight checked against the growth chart. Lusaka province where Chongwe and Lusaka districts falls has also recorded drastic improvement in under five mortality from 174 deaths per 1,000 live births (1996) to 64 deaths per 1,000 population [3]. However, despite this improvement Under-five mortality rates still remain unacceptably high.

Rationale for the Study

Studies done globally and in Zambia have focused mainly on understanding barriers to implementation of the IMNCI strategy particularly focusing mainly on health system factors, and most of the studies have focused on health facility and Health workers's Assessment. Limited studies have been done to understand health workers and Health manager's perspectives on the barriers to implementation of IMNCI. Therefore, it will be good to understand the factors that impedes PHC workers from adhering to IMNCI protocols during assessment of under-five sick children at health facility level from the lens of health workers and health managers.

As Zambia accelerates towards the attainment of SDGs and Universal Health coverage, understanding and addressing these

challenges could greatly contribute to the country's efforts of reducing under-five morbidity and mortality, and thus help the country attain the SDG's target of reducing under five mortality to less than 25 death per 1,000 live birth by 2030. In Zambia reasons for non- adherence to IMNCI strategy have not fully been investigated. The study will therefore try to fill this gap in knowledge and generate knowledge that will be used by Programme managers and policy makers to design strategies that will support health facilities and health workers to fully implement the IMNCI strategy.

Literature Review

Global burden of under-five morbidity and mortality-According to the WHO (2023), more than 7.5 million children younger than age five living in low- and middle-income countries die every year. Globally, over 80% of the under-five deaths are due to neonatal conditions and infectious diseases like pneumonia, diarrhoea, malaria, measles and meningitis, often compounded by malnutrition. In 2021, 5 million children died globally before reaching their fifth birthday. Over half of these deaths, 2.7 million, occurred among children aged 1–59 months, while the remainder, 2.3 million, occurred in just the first month of life. The fact that 5 million children died in 2021 before turning 5 is alarming given the availability of knowledge and interventions to prevent these deaths [7].

Children continue to face widely differing chances of survival based on where they are born. Globally, the Under-five mortality rate fell to 38 deaths per 1,000 live births in 2021 from 93 death per 1,000 live birth in 1990. By contrast, children born in sub-Saharan Africa are subject to the highest risk of childhood death in the world with a 2021 under five mortality rates 74 deaths per 1,000 live births [7].

Childhood morbidity and mortality in Zambia: The situation in Zambia is no different from the globally picture, the Country has recorded a drastic reduction in under five mortality rates from 197 death per 1,000 live births (1996) to 42 death per 1,000 live births (2024)) [3]. However, despite this improvement Under-five mortality rates in Zambia still remain alarmly high far beyond the Sustainable Development target of reducing under-five child mortality to at least 25 or less deaths per 1000 live birth by 2030.

Zambia adopted the IMNCI strategy in 1995 as a key strategy for addressing high morbidity and mortality among under-five children as a result of preventative illness such as respiratory tract infections, malaria, diarrhoea, malnutrition and measles. Despite its introduction, Implementation of IMNCI has not been optimal as it can be seen from the Zambia's health facility survey that was conducted in 2018. In order to fully understand factors that hinders health workers' adherence to IMNCI protocols, factors were analysed at according to the IMNCI strategy's focusing on two main components namely; Health systems and Health workers skills.

Conceptual framework on factors influencing IMNCI implementation

The independent variable for this study is IMNCI implementation which is caused by the dependent variables see figure 1 below. The dependent variables for this study have a direct effect on independent variables and these include.

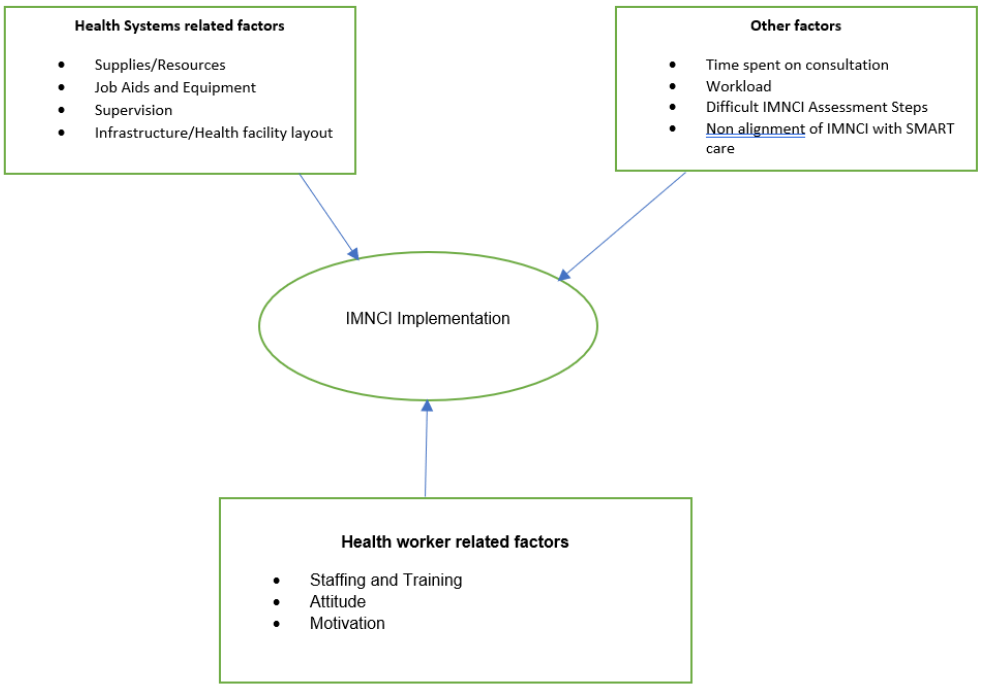

Figure.1. Conceptual Framework on Factors that Influence IMNCI Implementation, Adopted by the Researchers from Different Literatures [8].

Health Systems Related Factors

Shortage or Lack of resources and Materials-Lack of basic supplies, essential drugs and equipment needed to deliver care under IMNCI have been cited one of the barriers to the implementation of IMNCI among primary health care workers. Nurses felt that there was no point in assessing a child when they knew that the facility's medication was out stock [9, 10, 12-14].

Infrastructure/Health facility layout-Infrastructure is one of the barriers to implementation of IMNCI as it does not permit health care workers to practice IMNCI such as demonstrating giving of the 1st dose of treatment and also counselling of mothers. Vhuromu,2010 et al. (2009) revealed that clinics were very small and there were not enough rooms to allow for counselling of mothers of sick children and to implement the rehydration plan for a dehydrated baby according to IMCI. Facility's layout did not make it easy for health workers to apply IMCI steps and had limited space [5, 10, 15-16].

Health workers 's Skills and Practice

Inadequate skills in IMNCI among health workers attending to sick children in most health facilities has been sites as one of the main barriers to practicing IMNCI. A study done by [8] and [14] revealed that there were very few health workers trained in IMCI and that was the reason health workers were not carrying out all IMCI assessments. This was in part due to lack of trainers at the district level, and high turnover of health care workers which led to shortage of staff. It was common for IMCI trained staff to leave their places of work for better opportunities in other districts or organizations.

Pandya et al,2018 revealed that despite claims by health workers about practicing IMCI, he noted deviations from IMCI adherence benchmark at most facilities. Nurse practitioners preferred selectively focusing on the child's main complaint and symptom-based components of IMCI consultation. They tended to make a single diagnosis instead of completing the entire process (algorithm) and

providing treatment accordingly. The study noted that deviation was more frequently made by PCCD trained nurses who perceived the IMCI approach to be constraining and simplistic. These findings concur with other studies done by [12] in Ethiopia.

IMCI consultations were more time consuming and extended patient waiting times. Hence, to compensate, activities such as nutritional status classification, immunization, feeding assessment and counselling of the caregiver were curtailed. There was a general under-appreciation of the need to complete all aspects of the IMCI consultation (particularly preventive and promotive aspects) and its associated benefits (Pandya et al,2018). This finding is also supported by studies done by [8] and [15] which revealed that implementation of IMCI was seen to be time consuming and nurses felt that there was not enough time to implement IMCI. Nurses highlighted that they felt pressure to implement IMCI given the short time that they had and the number of patients they were supposed to see per day. Primary health care facilities had a relatively large number of patients seeking health care services and these high numbers result in long patient queues and all need to be assisted within the prescribed waiting time which further increases pressure on the nurses.

Research Objectives and Hypothesis

Research Objective

To explore barriers to implementation of the IMNCI strategy for addressing under-five morbidity and mortality among primary healthcare workers at health facility level.

Specific Objectives

1. To explore health workers experiences on barriers to implementation of IMNCI guidelines at health facility level.
2. To assess whether Health workers are well supported to effectively implement IMNCI protocols at health facility level.

Methodology and Design

An exploratory mixed methods design was employed. The study successively collected both quantitative and qualitative data. A sequential mixed method combined elements of qualitative and qualitative research in order to answer the study's research question in a single study or a program of inquiry. Mixed methods helped to gain a more complete picture than a standalone method.

The study population were Primary health care workers working in outpatient departments of selected health facilities of where referral to the next level was done for further management, the National IMNCI and District Health office IMNCI focal point persons in Lusaka and Chongwe districts. The two districts were purposively selected based on key characteristics such as population density and under-five attendance, and provided the researcher with both an urban and rural perspectives on barriers that hinder the full implementation of IMNCI strategy among health workers at primary health facility level.

The study was conducted in 15 IMNCI implementing health facilities in Lusaka and Chongwe districts. Convenience sampling was be done to choose 5 IMNCI implementing facilities out of the 40 Primary health facilities in Chongwe and 10 IMNCI implementing facilities out of the 93 health facilities in Lusaka. For the purposes of determining the sample size, Taro Yemene (1967) formula was used as follows:

$$n = N/1 + N(e)^2$$

$\boldsymbol{N}$ *is population of interest;*

$\boldsymbol{e}$ *is the acceptable margin of error* 0.05

$\boldsymbol{n}$ *is the sample size* n

$$= 50 \ / \ 1 + 50(0.05)^2$$

$$n \ = 44.44.$$

Therefore, the sample size was determined to be 45 (to the nearest whole number). However, 46 IMNCI trained Health workers stationed at selected PHC sites and actively involved in the management of sick children were purposively selected. For qualitative (IDI), 10 health

workers were purposively selected from the 10 health facilities (7 in Lusaka and 3 in Chongwe) out of 15 health facilities, and three Health managers were interviewed one at National level and 1 from each from the two District health offices.

For Quantitative data, the study employed in-depth interview (IDI). An in-depth interview guide was used to probe participants on barriers to implementation of IMNCI from the perspective of health workers at health facility level, to Managers at District health office and National level. The IDI was administered to 10 purposively sampled health workers from 10 health facilities and 2 District Health offices Managers and 1 IMNCI National Focal point person. Quantitative data was collected through Health worker's checklist. A Health worker's checklist was administered to each of the 46 study participants while a Health facility assessment tool was administered in all the 15 selected health facilities.

Qualitative data analysis was done through Thematic analysis of transcribed data, this involved familiarizing with data, creating initial codes, looking for themes, reviewing recurrent themes and defining and labeling theme. The recurring themes related to experiences of health workers on barriers to implementation of IMNCI were identified through this process. Quantitative data was analysed using Stata version 17.0. Microsoft excel was used to generate tables and graphs and percentages for easy data interpretation.

Results

Socio-demographic characteristics of the study Population - A total of 46 health workers were observed during the study. Among the study population, males constituted the majority of respondents (58.7%). The research results showed that the majority of health workers (54.4%) were young professionals aged 20-34, with a higher proportion aged 45 years old (28.2%) or older. In terms of experience, results showed an almost equal distribution between those with fewer than 5 years (41.3%) and those with over 10 years (41.3%). Further, slightly more than half of the health workers received pre-service training (54.4%), while the remainder were trained in-service (Table 1).

Table 1. Distribution (n, %) of Surveyed Participants based on Selected Demographic Information

Background characteristics	**Frequency (n)**	**Percent (%)**
Age		
20-34	25	54.4
35-44	8	17.4
45 and above	13	28.2
Sex		
Male	19	58.7
Female	27	41.3
Years of Practice		
Less than 5 years	19	41.3
5-9 years	8	17.4
10 Years and Above	19	41.3
Training status		
In-service	21	45.6
Pre-service	25	54.4
Total	**46**	**100.0**

The main themes and sub themes that emerged from analysis of In-depth interviews of health care workers, District and National IMCI focal person are captured in Table 2 below.

Table.2. Theme and Sub Themes

Theme	**Sub theme**	
Theme 1. Health workers's experience with implementation of IMNCI	1.1 IMNCI a good strategy for assessing sick under five children	.1.1 IMNCI as a Good Strategy
	1.2 Difficult IMNCI assessment steps during assessment of sick under five children	1.2.1 Difficult IMNCI assessment steps
	1.3 Duration for assessment of Children under-five child using IMNCI protocol	1.3.1 Duration for Assessment
	1.4 Demotivation for Health workers to using IMNCI	1.4.1 Demotivation for Health workers
	1.5 Barriers to Implementation of IMNCI	1.5.1 Barriers to IMNCI
	1.5.1 Infrastructure/Health facility layout	1.5.1.1. Infrastructure/Layout
	1.5.2 Staffing and Trainings in IMNCI	1.5.1.2 Staffing and Training
	1.5.3 Poor Attitudes towards IMNCI	1.5.1.3. Poor Attitude
	1.5.4 Non-Alignment of the Smart Care system with IMNCI protocols 1.5.5 Lack of Mentorship and Supportive supervision	1.5.1.4 Non-Alignment of Smart Care with IMNCI 1.5.1.4. Mentorship and Supervision
Theme 2. Resourcing and equipping of health facilities for effective implementation of IMNCI	2.1 Lack of Job Aids, tools and supplies	2.1.1 Lack of Job Aids Equipment and Supplies

Theme 1. Health workers's experience with implementation of IMNCI guidelines

Sub theme - IMNCI a good strategy for assessing sick under five children

Majority of participants indicated that IMNCI was a very good strategy for assessing sick children, as it enabled them to holistically look at the entire child as opposed to focusing only on problems that their mothers shared.

> *"IMNCI allows us to holistically look at the entire child as opposed to focusing only on problems that their mothers present to us at Outpatient department"* (**IDI Participant no.9**)

Other participants indicated that it helped to uncover problems which mothers could not ordinarily share.

"A sick child is seen holistically even for symptoms that the caretaker could have not mentioned" **National IMNCI focal point person**.

The IMNCI approach guided health workers on how to go about with the assessment process and selection of drugs as it provided a step by step assessment process which helped health workers to easily classify children and manage them accordingly.

"The use of IMNCI in the assessment of children under five is good especially for us who do not have laboratories and medical officers on duty, IMNCI helps us to easily classify children and manage them accordingly" **(IDI participant no.3)**

District focal point persons and National focal point person also indicated that IMNCI was a very good strategy in that its improved case management skills for childhood illnesses among health care workers which consequently contributed to provision of quality health care for under five children, and a reduction in morbidity and mortality among under five children.

"Implementation of the IMNCI strategy has contributed to improved case management practices among health workers for sick children that present at OPD for various illness. This has consequently led to improved quality of care and a reduction in morbidity and mortality among under-five children" **District focal point Person no.2**

"Yes – because it is a proven strategy that contributes reducing morbidity and mortality of children due to common causes of childhood illnesses" ***National IMNCI focal point person***

Results from the study also showed that IMNCI contributed to child's health growth and development through reducing child mortality and morbidity, and promoting improved child health outcomes

"IMNCI contributes to child's healthy growth and development" ***National IMNCI focal point person***

Findings from observations of IMNCI trained health workers during the study were somewhat different. This can be seen from findings below.

General Danger Signs- Results in Figure 2 below indicate that only 67% (n=31) of health workers checked for General danger signs in sick children. 33% missed, and let children go home. Out of the 31 health workers that checked for GDS, only 26% (N=8) checked for all the 4 General Danger Signs while 74% partially checked for GDS.

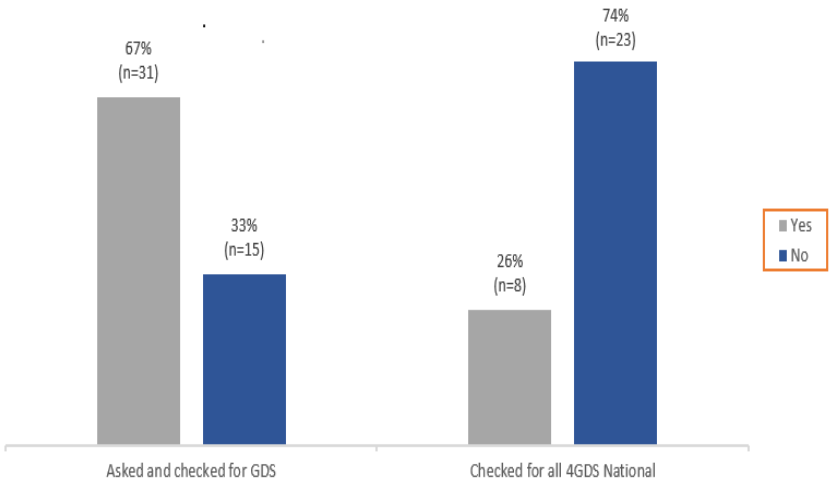

Figure 2. Percentage Distribution of Health Worker Practices in General Danger Signs Assessment

Cough or Difficult Breathing

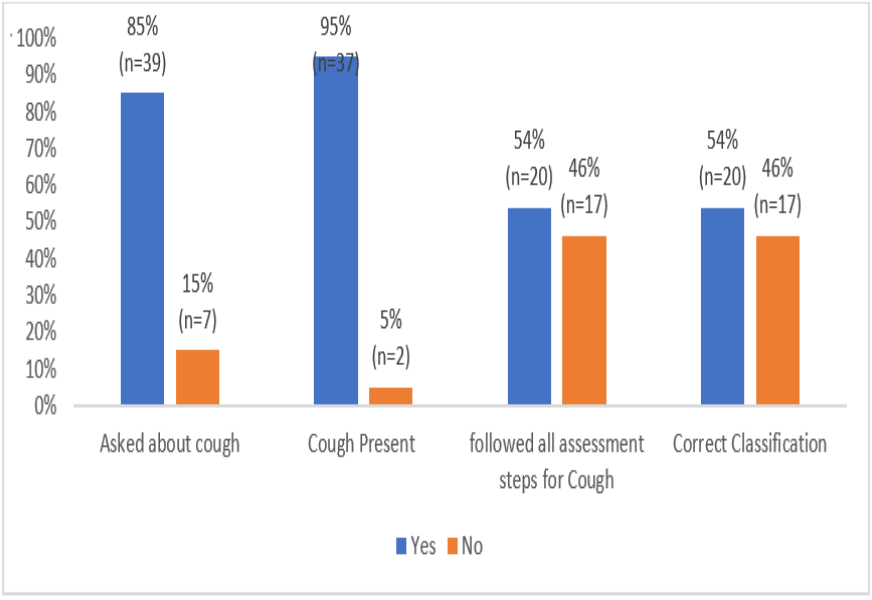

Figure 3. Percentage Distribution of Assessment and Classification of Cough and Difficulty breathing

Figure. 3 above shows that of the 37 (95%) that reported the presence of cough, only 20 (54%) followed all the assessment steps for Cough and Difficult breathing and classified the children correctly while 17 (46%) did not follow all assessment steps for Cough and difficult breathing and thus did not classify the children correctly.

Diarrhoea

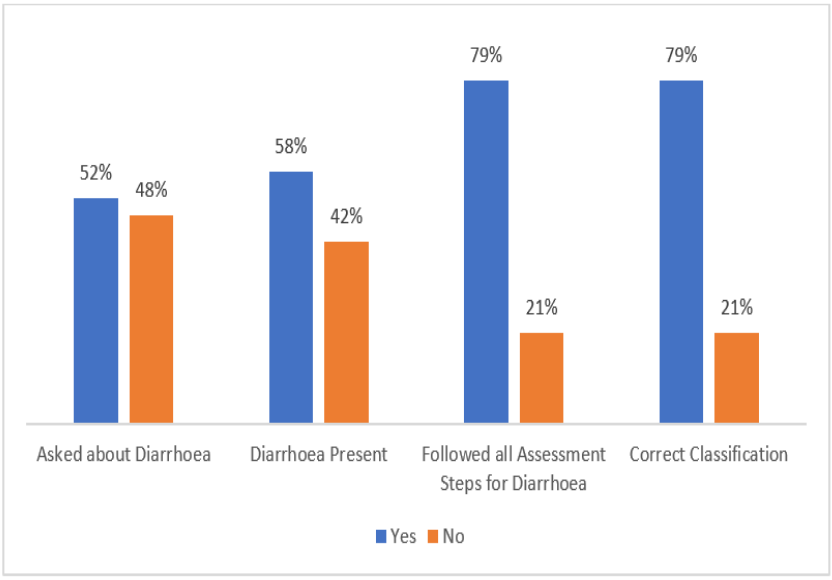

Figure 4. Percentage Distribution of Assessment and Classification of diarrhoea

Figure. 4 above shows that 58% (n=14) of the 24 health workers that asked for diarrhoea found presence of diarrhoea while 42% (n=10) did not. Of the 58% (n=14) health workers that found presence of diarrhoea in children during assessment, only 11 health workers (79%) followed all assessment steps and classified and treated children appropriately while 23% (n=3) did not.

Fever

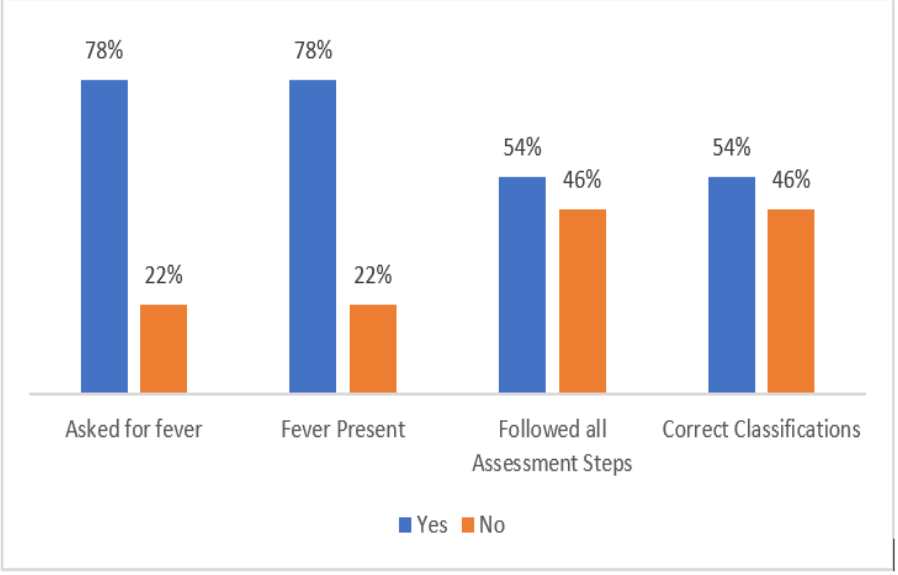

Figure 5. Percentage Distribution of Assessment and Classification of Fever

As shown in Figure 5, Of the 28 (78%) of the health workers that found fever, 15 (54%) correctly followed all assessment steps for fever, classified and identified treatment for fever accordingly. This shows that nearly half the cases were mis-classified and treated in-correctly.

Malnutrition and Anaemia- Figures 6 and 7 below shows glaring findings, only 15% of health workers undressed children to look for signs of Acute malnutrition and anaemia, of the 7 health workers that undressed children to check for signs of acute malnutrition and check for palmer pallor none followed all assessment steps for malnutrition and Anaemia.

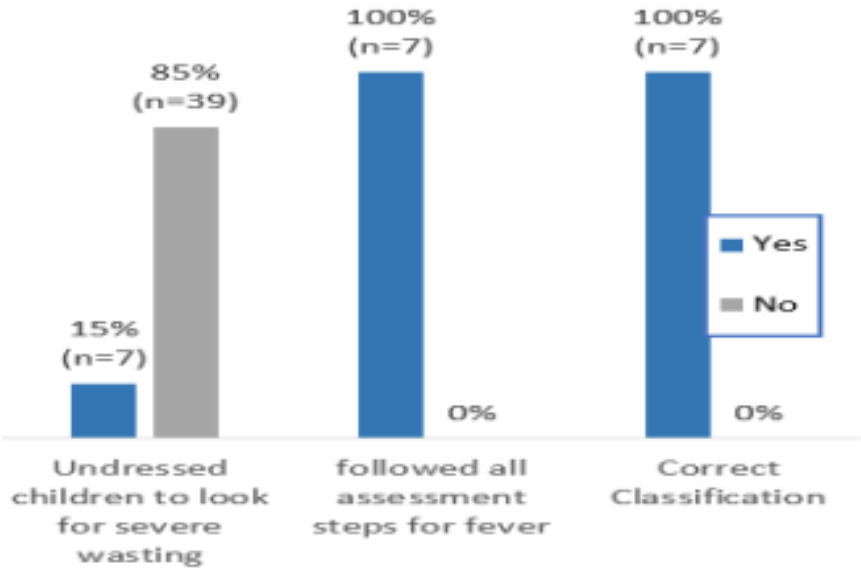

Figure 6. Percentage Distribution of Assessment and Classification of Malnutrition

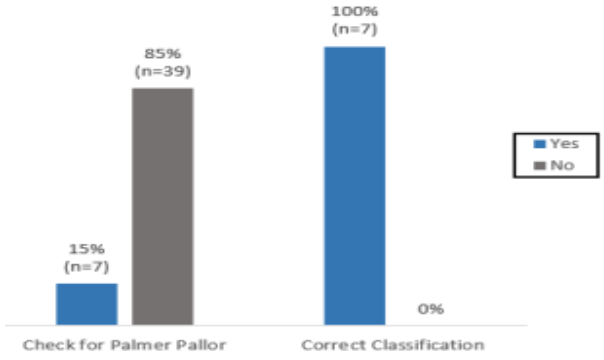

Figure 7. Percentage Distribution of Assessment and Classification of Anaemia

All Main Symptoms Cough, Diarrhoea and Fever-In terms of checking for all three main symptoms only 28% (n=13) of 46 health workers checked for all there 3 main symptoms namely Cough, diarrhoea and Fever in all children that they assessed as shown in figure .8 below.

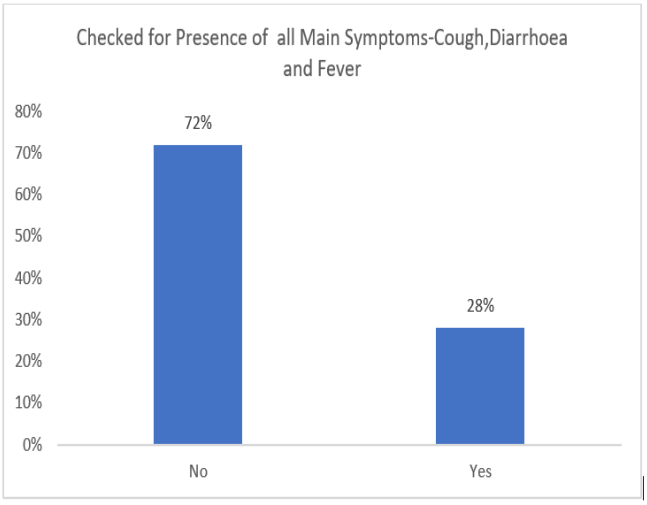

Figure 8. Percentage of Health Workers who checked all the three main Symptoms during Assessment

Difficult IMNCI assessment steps-Figure 9 below shows assessment steps that participants found challenging to undertake when assessing children include; checking for immunisation status, assessment of ear infection; performing Rapid Diagnostic Test (RDT) on every child that comes with fever, assessment of nutrition and checking for the child's HIV status as most of Health workers focused on assessment of main symptoms and identifying treatment which they deemed important. while majority indicated that they did not find any assessment difficult to undertake.

"Checking for Immunisation status, I find it to be a challenge, some parents do not bring their children's under-five cards and furthermore in most cases they do not have full information on their children immunisation status. In as much as you would want to assess the immunisation without an under-five card there is nothing you can do" (**IDI Participant no.4**)

"Not really. However, we have challenges like on the laboratory investigations, because according to IMCI, every child that comes with fever is supposed to do a Rapid Diagnostic Test for Malaria (RDT). But looking at the supplies, it is not possible to RDT on every child as RDTs are not always available. At times, RDT is reserved for

children with history of having travelled outside of Lusaka as they were a common belief among health workers that Lusaka does not have Malaria" (**IDI Participant no.8**)

"From my observation, most health workers find assessment of nutrition and checking whether the Child has been exposed for HIV or not difficult to do. This is mainly because they rush through the process and focuses on areas that they deem to be important such as checking for main symptoms and treatment". **District focal Point No.1**

Our findings from observation of participants aligns with health workers responses only 42% checked for Immunisation status 56% under five cards, 24% vitamin A status, 11% assessed for feeding problems in children under 2 years and 0% for TB (as shown in figure. 8 below) including those assessment steps on malnutrition and anaemia already shown above in figure 6 and 7.

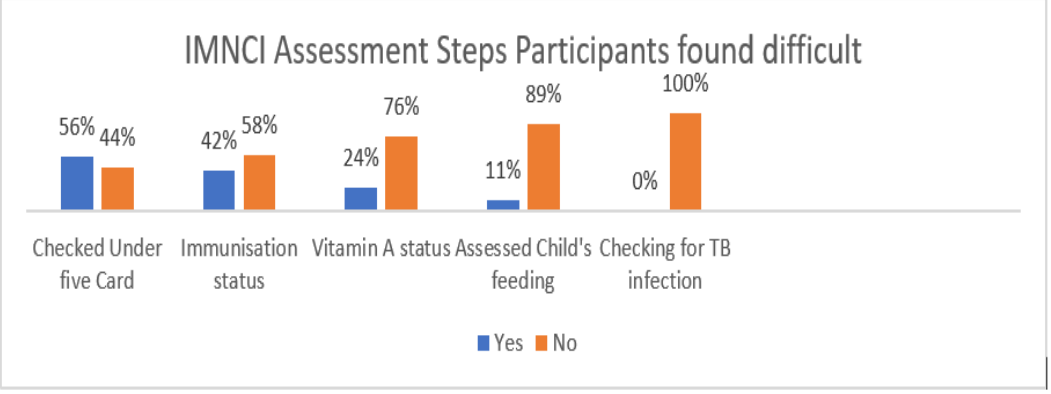

Figure 9. Percentage Distribution of Key IMNCI Assessment Steps that Health Workers found Difficult to Assess

Duration for assessment of children under-five child using IMNCI -Responses were varied, some participants indicated that the process took longer especially if a child presented with more than one symptom as it required them to assess all parameters that related to the various symptoms that the child presented with. Others indicated that took more than 10 to 25 mins especially if everything was in place while others felt that it depended on the condition of the sick child, as some children required to go to the laboratory for a Rapid Diagnostic Test for fever, and others indicated that it took them 10 to 15 minutes.

"I will not lie to you. It takes longer when using IMNCI, especially if a child is presenting with more than one complaint. For example, if the child has got a fever, a cough, and maybe an ear problem. It means you have to assess all those parameters one by one. Despite this we try by all means to use IMNCI when assessing children" (**IDI Participant no. 1)**

*"Approximately less than 25 minutes to access each child***"** (**IDI Participant no.5**)

"it depends on the condition of the sick child for me it takes me approximately 10 to 15 minutes. If they go to the Laboratory for RDT, it might take me longer" (**IDI Participant no.7**)

Demotivation for Health workers to using IMNCI-The study revealed factors that demotivates health workers from practicing IMNCI, some of the factors that came out from the study included heavy workload especially in situations where health workers were alone on duty, and when children presented with multiple symptoms, health workers tended to use shortcuts in order to manage the workload.

"*What demotivates me, at times, it's the workload especially, in situations when I am alone on duty and you have a child that*

presents with multiple symptoms, we tend to do shortcuts in assessment in order to manage number of children that presents on that particular day. However, when there are enough personnel on duty I always try by all means to follow the IMNCI assessment steps during assessment of children. In addition, some assessment steps can be quite lengthy". (**IDI Participant no.2**)

Participants revealed that the referral system also demotivated them from practicing IMNCI in that whenever the referred children to the next level of care, the ambulance delayed and only came when they had stabilized the children and discharged them to go home.

"The referral system is another factor that demotivates me from following the IMCI approach, as it not okay or sufficient, for example you call an ambulance like in the morning at eight hours. And then the ambulance comes at 20 hours evening when you've already stabilized the patient and the patient is now fit to go home. This makes me to manage such cases at the facility than referring". (**IDI Participant no.6**)

Other participants indicated that they tried by all means to follow IMNCI guidelines during the assessment of children but were limited by the large number of children that presented that their facilities. In addition, the issue of health workers attending to a mix of adults and children also demotivated them from using the IMNCI approach.

"*Yes, we try by all means to use IMNCI guidelines to access all children at present at our facility, we are limited by the large number of children that come ups for assessment and furthermore, we see a mix of patients both children and adults" (**IDI Participant no.2**)*

Barriers to Implementation of IMNCI

Inadequate Infrastructure-Inadequate infrastructure came out as one of the major barriers that prevented health workers from practicing IMNCI, in most cases there were no rooms specifically designated for assessment of children, which made it difficult for health workers to set up screening rooms with supplies and equipment for assessing sick children such as clean drinking water and equipment for measuring weight, height and temperature respectively.

"Not having a room specially for seeing sick children because of inadequate rooms acts as a barrier to practicing IMNCI. Use of room also used by adults makes it difficult to set up a room for IMCI assessment for example, ensuring that there are supplies for assessing drinking in sick children and also equipment such as weighing scales, Height board and thermometers for measuring weight, height and temperature respectively" (**IDI Participant no.7**)

Using same rooms for seeing children and adults made it difficult for health workers to practice IMNCI as job aids such as Chart booklets which are used as reference materials are often misplaced and could not be located during assessment of children

"Not having a room specially for seeing sick children makes it difficult for me to practice IMCI. You find IMCI job aids like chart booklets are misplaced and you cannot locate them when you want to refer to them when assessing a sick child. We had photocopied a Chart booklet, and placed it in one of the rooms that we use to see both adult and children. The Chart booklet could not be located even up to this time". (**IDI Participant no.9**)

Staffing and Training in IMNCI- Inadequate Staffing levels came out as one of the barriers to implementation of IMNCI. Most facilities are not adequately staffed and later one those trained in IMNCI. This makes it difficult for staff to practice IMNCI.

"One of the barriers is staffing, you find that maybe in a Shift, if we do not have enough staff dedicated to assessment of children, staff end up seeing both adults and children, and also because of the high

volume of patients, staff tends to rush through the assessment process when seeing sick children. As I am the Paediatric nurse, when I am around, I am able to see all sick children but the problem comes when I am off duty or not working on a particular day" (**IDI Participant no.10**)

"Due to work overload, trained staff end up compromising and fail to adhere to IMNCI guidelines, and most health facilities were not well staffed due inadequate funded positions in most of the health facilities." **National IMNCI Focal Person**

Trainings on IMNCI have not been held in a long time, in some cases as far back as 2018, and this coupled with the high transition rate of health workers due to retirement, resignations, promotions and death have hampered implementation of IMNCI.

"Most of the trained IMNCI Health workers have retired and left a void in staffing levels trained in IMCI and this has affected the implementation of IMNCI. (**IDI Participant no.4**)

"For our District, the last training was held in 2018 and from that time we haven't had any training. This has been difficult as most of the trained health workers have since retired, some have resigned and other died. This has left a gap in the implementation of IMNCI at health facility level". **District focal point person no. 1**

"*I can't remember when we last had an IMNCI training in our District, and over the years we have received a lot of new staff that are not trained in IMNCI. This has contributed to the inadequate implementation of IMNCI at health facility level and among health workers*". **District focal point person no. 2**

This is supported by results from health facility assessment -figure 9 and 10 below, none of the health facilities met the WHO goal of having at least 60% of Health Care workers managing sick children trained in IMNCI, and all sick children were not attended to by IMNCI trained staff.

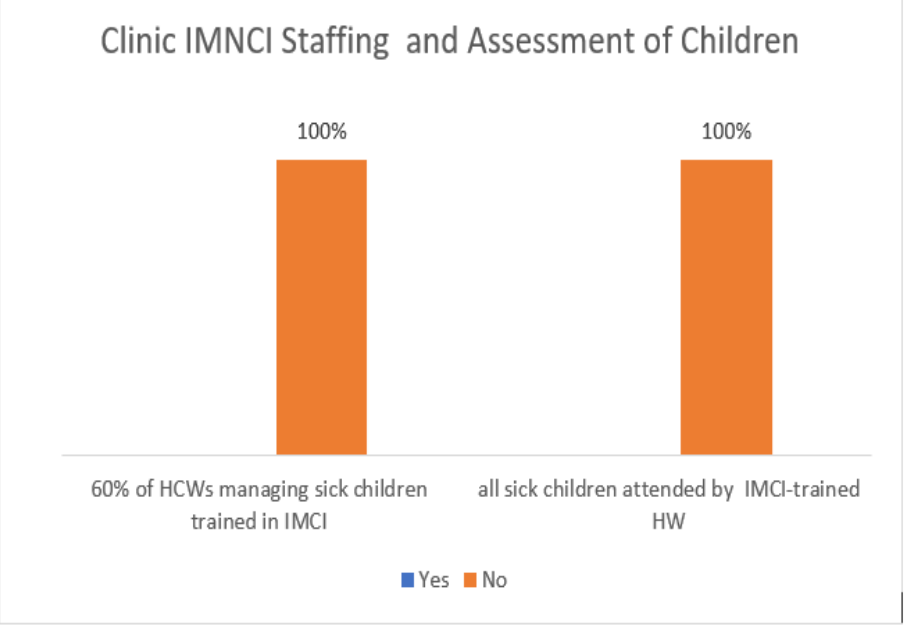

Figure 10. Percentage Distribution of Health Facility with 60% of IMNCI Staffing Managing Sick Children and Sick Children attended by IMNCI Trained Health workers

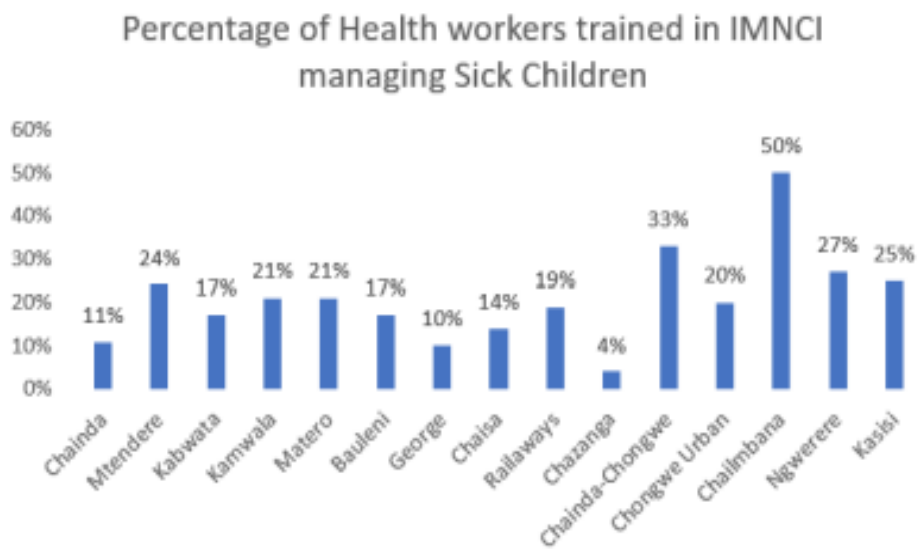

Figure 11. Percentage Distribution of Health Workers Trained in IMNCI Managing Sick Children across the Sampled Health facilities

Poor Attitude of Staff towards IMNCI- Poor attitude of some staff working at OPD particularly doctors who were not supportive of IMNCI came out strongly as they saw it as a basic approach for managing sick children, and thus discouraged other health workers from practicing IMNCI.

"Medical Doctors are not supportive of IMNCI because they see as an approach not suited for them, thus they are not supportive of the IMNCI approach, and this discourages others from practicing IMNCI".

District focal Point no. 2

Non-Alignment of the SMART CARE system with IMNCI Assessment Process- Non-alignment of the SMART care system- an electronic health record initiative designed to enhance child health services, particularly with primary health care setting, often impedes health workers from using the IMNCI assessment process. As SMART care system is not configured according to the IMNCI algorithm.

"One of the barriers is that the SMART care system which we use for all patients including children is not configured accordingly to IMNCI, and this presents a challenge for us to use the IMNCI strategy in terms of assessment, classification and treatment" (**IDI Participant no.10**)

"Our Health facility has completely gone digital through the SMART care system, but one major problem that we have noticed is that the SMART care has not been organized according to IMNCI assessment steps, and this presents a challenge for us when it comes to assessing sick under-five children using the IMNCI approach. (**IDI Participant no.4**)

Lack of mentorship and Supportive supervision visits on IMNCI-Lack of Mentorship emerged as one of the impediments and this acted as one of the barriers that prevented health workers from implementation IMNCI, participants were not provided with on-going mentorship so that they stayed acquainted with latest trends or developments in IMCI. Some participants had not had any mentorship from the time they were trained, some as far as 2008, this made it difficult for them to adhere to IMNCI.

"There has never been any mentorship from the time I came on transfer from Kitwe where I did my initial IMNCI training. I just use the knowledge and skills that I acquired from my initial training in 2008. This knowledge I have may be outdated and may affect my work. There is need for on-going

mentorship so that we remain abreast of the changes" (**IDI Participant no.3**)

Some participants indicated that they informally got updates about the recent changes in IMNCI assessment steps from friends, for example, the change of "chest indrawing Pneumonia from Severe Pneumonia" to Just "Pneumonia".

"I have never been mentored from the time I was trained, and I have not experienced any mentorship like it happens with other programmes. I recently learnt about the changes in assessment of Cough and difficultly where a child with Chest - indrawing is no longer classified as Severe Pneumonia, but Pneumonia, and managed at home is" (**IDI Participant no.1**)

This lack of mentorship on IMNCI was attributed to a focus on other well-funded programmes such as HIV, Malaria, Immunisation and this acted as a barrier to implementation of IMNCI.

"We have seen a lot of focus on other programmes for example, HIV, TB, Malaria, Immunisation, and men health, where there was a lot of focus and we tend to also focus on these programmes as keep us constantly updated and connected" (**IDI Participant no.5**)

Results from the study showed that supportive supervision was intergrated with other programmes, was not frequently conducted and when it was conducted it was not targeted. Participants felt these visits were not beneficial for the IMNCI as there was little or no focus on IMNCI. Results from Health facility assessment concurs with findings from IDI as figure 12 below shows, none of the 15-health facility (n=0/15) had received at least one supervisory visit that included observation of health workers assessing sick children. Furthermore, none of the 15-health facility had conducted a review meeting on IMNCI in the last 6 months.

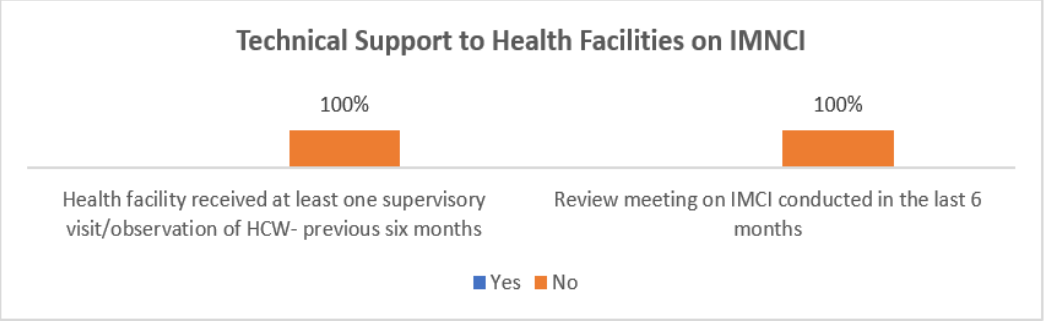

Figure 12. Percentage Distribution of Health Facilities where Technical Support to Health Facilities on IMNCI and Review Meeting was Conducted in the Last Six Months

Theme 2. Resourcing and equipping of health facilities for effective implementation of IMNCI

Lack of Job Aids, Equipment and Supplies-The study revealed lack of Job Aids and inadequate equipment and supplies in nearly all facilities visited.

"*We also do not have Job Aids like chart booklets, wall charts and timers*". (**IDI Participant no.3**)

"*Some Job Aids such as wall Charts, we last saw them at the training*". (**IDI Participant no.10**)

"*Yes, we do have some Job aids such as chart booklets though old one with some pages missing. I think the one that we have is for the year 2008, and I feel is now outdated as over the years a lot of things have changed".* (**IDI Participant no.3**)

"*The facility does not IMNCI wall charts and Chart booklets for reference during the assessment of children. The only IMCI wall charts available are only diarrhoea done by JICA. Also, in screening rooms, there is no*

water and cups for us to use during assessment of children to enable us determine whether the child is drinking normally or poorly" (**IDI Participant no.9**)

The other finding that came out was the lack of equipment specifically designated for IMCI such as Thermometers, weighing scales

"No equipment designated for IMCI such as Thermometers, weighing scales. Supply of drugs for sick children (IMCI) have not been consistent and thus we have to ask mothers to go and buy" (**IDI Participant no.4**)

Inconsistent supply of drug also come out of the study as one of the barriers to implementation of IMNCI and this prompted health workers to provide mothers with prescriptions for them to go and buy, in most cases mothers or caretaker were unable to buy and this led to children getting worse at home.

*"The other problem is limited supplies and medicines which prompts us to prescribe drugs for mothers to buy at the nearest drug store for a child that may need an antibiotic like a child classified with Pneumonia. Mothers at time do not have money to buy medicines and end up just staying with the child at home and only come back to the health facility when the condition gets worse" (**IDI Participant no.4**)*

From the health facility assessment, none of the health facilities (n=0/15) had supplies for assessing dehydration such as water, cup, spoon in their screening rooms. This could affect the health workers's ability to assess for dehydration. On drug availability, the assessment found contrary findings, all health facilities (n=15) had drugs for all the main childhood diseases. On the reported drug stock outs, it could be as a result of occasional supply chain challenges at various levels.

Discussion

In this article the investigator discusses barriers to implementation of the IMNCI strategy for addressing under-five morbidity and mortality among primary healthcare workers at health facility level under Specific objectives for the study, emerging themes and sub theme.

Theme 1. Health workers's experience with implementation of IMNCI

IMCI a Good Strategy for assessing sick under five children-The Study revealed that IMNCI was a very good strategy for assessing sick under five children especially for health facilities that do not have laboratory facilities and Medical doctors as it guided frontline health workers during the assessment of sick children on all major symptoms, classification of main symptoms and selection of drugs. IMNCI promoted a holistic approach to assessment and management of sick children, and referral of very sick children to the next level of care. Holistic assessment of children helps health workers to uncover problems which mothers do not usually share with health workers, and this consequently leads to improved case management skills for childhood illnesses [5, 10, 19-20]. Despite the overwhelming commendation by participants of IMNCI as a good strategy, the study noted contrasting findings from observations of IMNCI of participants as they assessed sick children. Their knowledge on the benefits of IMNCI did not translate into action, ensuring that they follow all IMNCI assessment steps each time they were assessing sick under-five children.

Only 67% (n=31) of health workers checked for General danger signs in sick children, 33% (n= 15) were missed and let to go home. This inconsistency in checking for general danger signs among children has a potential risk of missing out on under-identifying severe illnesses and could potentially lead to worse health outcomes. Our findings are similar with findings from other studies, in a study by [21] only 33.6% of the health workers assessed all the four General Danger signs. For Cough and Difficult in Breathing, only 20 (54%) of the 37 health workers followed all the assessment

steps and classified the children correctly for Cough and difficulty in Breathing while 17 (46%) did not and thus did not classify the children correctly. This lack of detailed assessment of children for Cough and difficulty in breathing could hamper accurate classification and appropriate management of cough and difficult breathing and thus might result in a lot of pneumonia cases being missed, and in some case might lead to deaths.

Our findings differ from a study in done in south Africa where 52.9% of children were correctly classification for Cough and difficult breaking [22]. For diarrhoea, 48% (n=22) did not ask for presence of diarrhoea and could have missed some cases of diarrhoea. Of the 58% (n=14) health workers that found presence of diarrhoea in children during assessment, only 11 health workers (79%) followed all assessment steps and classified and treated children appropriately while 23% (n=3) did not. This shows that health workers could be missing out a lot of diarrhoea cases, and also mis-classifying and mis-treating diarrhoea cases. Our findings differ from a study done [21] where majority of caretakers (86.5%) signs and symptoms for diarrhoea were only elicited in only 55%. For fever, Of the 28 (78%) that found fever, only 15 (54%) correctly followed all assessment steps, classified and identified treatment for fever accordingly. This finding is quite worrisome as nearly half the cases were mis-classified and mis-treated. This could also be contributing to a lot of children dying from untreated malaria or other undetected causes of fever and demonstrates a very a serious gap in the management and treatment of fever among health workers. Assessment of Malnutrition and Anaemia, however revealed glaring findings, only 15% of health workers undressed children to look for signs of Acute malnutrition and anaemia, but sadly did not all assessment steps, and consequently ended up not correctly classifying children for Malnutrition and Anaemia. This also demonstrates a clear gap in the management of children under five as many cases of acute malnutrition could be going undetected and thus contributing to children poor outcomes. Our findings are in contrast with findings from a study done in Ethiopia where 62.4% of the participants consistently checked for palmar pallor in children that presented at OPD [23].

In terms of checking for all three main symptoms, only 28% (n=13) of 46 health workers checked for all there 3 main symptoms namely Cough, diarrhoea and Fever in children during our observation. This is quite worrying as these symptoms are a major contributor to Zambia's high under-five mortality, also clearly shows a major gap in the assessment process among health workers as a lot of children could potentially be going home with some main symptoms undetected which may result in these symptoms getting worse and contributing to poor health outcomes among under five children. Our findings resonate with similar studies [9, 25]. Our findings are also in contrast with findings from the study done in Namibia, Kenya, Tanzania and Uganda national survey [24] and a Nigeria study that found the rate for assessing all three of the IMCI main symptoms of cough/difficult breathing, diarrhoea, and fever to be higher [26].

Difficult IMNCI assessment steps during assessment of sick under five children- IMNCI assessment steps that participants found challenging to undertake when assessing children include; checking for immunisation status, assessment of ear infection; performing Rapid Diagnostic Test (RDT) on every child that comes with fever, assessment of nutrition and checking for the child's HIV status as most of Health workers focused on assessment of main symptoms and identifying treatment which they deemed important Others did not find any assessment step difficult as all IMNCI assessment steps were considered as straight forward and easy to follow. This may potentially result in most children going home with undetected illnesses which might lead

complications. Our findings are in contrast with [5] and [23] which revealed a different dimension.

Duration for assessment of Children under-five child using IMNCI -Findings were varied and could be grouped into three categories, the first category indicated that the process took longer especially if a child presented with more than one symptom as it required health workers to assess all parameters related to the various symptoms, second category indicated that the assessment process did not take more than 10 to 25 mins especially if everything was in place while third category felt that it depended on the children required to go for laboratory investigations. Our findings correspond with findings from other studies which found the IMNCI approach time consuming and adversely affecting health workers' practice [5, 10-11, 23], Like in our study, the other studies found the IMNCI consultations contributed to longer waiting times for patients [23, 27].

Demotivation for Health workers to using IMNCI-Heavy workload especially in situations where a health worker was alone on duty came out as one of the factors that demotivated health workers, the other one was the poor referral system to the next level of care which prompted them to resort to generic way of attending to children. This finding resonates with other studies where referral acted as a deterrent to practicing IMNCI [5, 15]. Attending to a mix of adults and children also demotivated participants from using the IMNCI approach as it required them to constantly switch their mindset from screening adults to assessment of sick children, this consequently make them to resort to shortcuts in the assessment of children. These findings align with [23]'s study in Ethiopia.

Barriers to Implementation of IMNCI guidelines

Inadequate Infrastructure- Infrastructure was one of the major barriers to practicing IMNCI among health workers as in most cases there were no rooms specifically designated for assessment of children that presented at OPD, which made it difficult for health workers to set up screening rooms with supplies such as clean drinking water and equipment such as weighing scales, Height board and thermometers for measuring weight, height and temperature respectively to support the IMNCI assessment process. Use of same rooms for seeing children and adults made it difficult for health workers to practice IMNCI as IMNCI job aids such as Chart booklets and laminated recording forms which are used as reference materials were usually misplaced and could not be located whenever they were needed by health workers during assessment. Our findings are supported by findings from similar studies [5, 10, 15-17, 27] found the facility as a challenge for practicing IMNCI.

Staffing and Training in IMNCI-Most facilities were not adequately staffed and later on those trained in IMNCI. This made it difficult for staff to practice IMNCI, thus tended to rush through the process. Our study found that most IMNCI trained staff had retired or left to take up other job opportunities, and this has created a void in the implementation of IMNCI. It also emerged, that trainings on IMNCI had not been held in a very long time, in some cases as far back as 2018, and this coupled with the high transition rate of health workers due to retirement, resignations, promotions and death has contributed to inadequate application of the IMNCI strategy. Our findings collaborate with other studies [10, 26]. From our Study found none of the health facilities met the WHO goal of having at least 60% of Health Care workers managing sick children trained in IMNCI, and all sick children attended to by IMNCI trained staff. Our study findings are similar to other studies that found less 60% of health workers managing sick children [8].

Poor Attitude of Staff towards IMNCI- Some staff working at OPD particularly doctors

were not supportive of IMNCI as they saw IMNCI as a basic approach for managing sick children, and this discouraged other health workers from practicing IMNCI. If IMNCI was to be implemented successfully there will be need for all cadres to support the implementation of the IMNCI strategy and also to appreciate that it meant for frontline health workers in settings with limited diagnostic capacity and highly qualified staff such as Doctors. Our findings are consistent with findings from [10].

Lack of mentorship and supportive supervision: The Study highlighted that Health workers were not provided with on-going mentorship to enable them stay acquainted with latest trends or developments in IMCI and adhere to IMNCI. Health workers felt that there were a lot of focus on other well-funded programmes such as HIV, VMMC Men's health and TB in terms of mentorship as opposed to IMCI. Lack of mentorship among health workers on IMNCI clearly presents a lost opportunity for health workers to learn new practical skills and gain confidence in the application of IMNCI guidelines. Our findings are confirmed by [11] which highlighted lack of mentoring as one the healthcare support system factors that could lead to lack of full implementation of IMCI by the health care workers.

Theme 2. Resourcing and equipping of health facilities for effective implementation of IMNCI

Lack of Job Aids, Equipment and Supplies-Lack of Job Aids such as Wall Charts, Chart booklets and timers to refer to, and inadequate equipment such as Thermometers, weighing scales, and in consistent supply of drugs for use during assessment of children by health workers in facilities came out strongly as one of the barriers to practicing IMNCI. The health facility assessment revealed that none of the health facilities (n=0/15) had supplies for assessing dehydration such as water, cup, spoon in their screening rooms. This could affect the health workers' ability to assess for dehydration. However, the health facility assessment found contrary findings, all health facilities (n=15) had drugs for all the main childhood illnesses. On the reported drug stock outs by health workers, it could be as a result of periodic supply chain challenges at various levels. These findings resonate with [8-15, 23, 28] 's studies which found lack of Job aids and supplies as a barrier to implementing IMCI among health workersThe study revealed Health systems factors such as lack of supervision ,training and mentorship, shortage of supplies and equipment, shortage of health workers and inadequate infrastructure, and Health workers skills such as poor attitude, Lack of motivation, long duration for assessing children using IMNCI, and difficult steps for IMNCI assessment as barriers to health workers's adoption of IMNCI during assessment of sick children at the health facility.

Limitations

This study utilized a mixed methodology approach, providing a more comprehensive understanding of the research problem. It was, however, limited to healthcare workers, two districts namely Chongwe and Lusaka, and 15 facilities across the two districts and thus findings from this study could not be extrapolated to other districts of Zambia or beyond since they could be difference in a way primary health care services are provided. However, findings from this study could help Chongwe and Lusaka districts and Zambia as a whole to better understand k**ey** Barriers that prevents health workers from practicing the Intergrated Management of New-Born and Childhood illnesses strategy.

The study has highlighted Health workers skills and practices, and Health system factors that could be common beyond the two districts. Furthermore, the study focused solely on barriers to implementation of IMNCI and did

not look at enablers for adopting and use of IMNCI during the assessment of sick under five children by health workers in Zambia. There will be need to explore further the enablers for adoption and practice of IMNCI, it may be possible that the use of Key Informant Interviews might have made health workers to exaggerated their responses. However, this limitation may also have been addressed by observation of health workers as they assessed under five children at Out Patient Department using the IMNCI approach.

Conclusion

The purpose of this study was to explore barriers to implementation of the IMNCI strategy for addressing under-five morbidity and mortality among primary healthcare workers at health facility level in Chongwe and Lusaka districts. From the study, it has been concluded that that non-adherence of health workers to IMNCI guidelines during assessment of Children under five in Lusaka and Chongwe, Zambia could be attributed to some Health systems related factors such shortage of supplies and equipment, inadequate staffing, non -alignment of Smart Care system with IMNCI assessment protocols, inadequate infrastructure; Health workers skills such as poor attitude, Lack of motivation, long duration for IMNCI assessment, difficult IMNCI assessment steps , and lack of training and mentorship. In Zambia, currently there is limited information on the barriers to adoption of IMNCI during assessment of under five children at Outpatient departments from the perspective of Health workers and managers, therefore this study provides insights and recommendations on implementation of IMNCI from the perspective of health workers that this will information policy and future IMNCI programmes and support, and consequently enhance provision of health care for under five children in Zambia

This study also proposes the adoption of a holistic strategy for addressing the non-adherence to IMNCI protocols by health workers, and this strategy should encompass health system related factors, Health workers skills and practices and other factors at health facility so that health workers are adequately supported to adhere to IMNCI guidelines and protocols as they attend to sick children. Providing an enabling environment such as good infrastructure, essential drugs, equipment and supplies, improved staffing, continuous mentorship and training will greatly motivate health workers to practice IMNCI at health facility. This will consequently help to improve the quality of health care provided to children and help the country in its aspirations to attain the SDG target of reducing under-five mortality rate to 25 deaths per 1,000 population by 2030.

Data Availability

Data supporting the conclusions of this article are available by request to Baleke Ngambi. The raw data that support the findings of this study will be made available to researchers upon request from corresponding Author.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Authors ‘s Contribution

Baleke Ngambi wrote the research proposal, developed the questionnaire, collected data, analysed the data and wrote the paper and interpreting of the findings as well as participating on the preparation of the manuscript. Pamela Mwansa reviewed and provided input towards the research proposal, supervised the data collection, contributed to the interpretation of the findings, reviewed the paper and participated on the preparation of the manuscript. All authors read and approved the

final manuscript.

Ethical Approval

Ethical clearance was obtained from University of Zambia Biomedical Research Ethics Committee (UNZABREC) (Approval no. REF. No. 5794-2024) and National Health Research Authority (NHRA) (ref no. NHRA-1576/20/09/2024). The study was also cleared by Lusaka and Chongwe District Health office. Participants were explained about the study and got their consent to participate in the study.

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