COMPLIANCE WITH INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS (IMCI) AMONG HEALTH WORKERS IN SELECTED PHCs AT ABAKALIKI METROPOLICS OF EBONYI STATE: A QUANTITATIVE STUDY.

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Abstract

Background Integrated Management of Childhood Illness (IMCI) is a strategy developed by WHO and UNICEF that aims to reduce childhood mortality, illness, and disability and to improve growth and development of under-five.

Purpose This study examined compliance with IMCI among healthcare workers in Selected PHCs of Ebonyi State Nigeria.

Methods The study utilizes cross-sectional designs using Non-probability convenience sampling technique to enrolled 84 healthcare workers who consented to the study. A standardized 52-item questionnaire and overt observational technique were used for data collection. Descriptive statistics were employed to analyze the data using SPSS version 25 (IBM SPSS Statistics 25 and the Fisher's exact test). The study was conducted in 24 selected Primary Healthcare Centres in Abakilik Ebonyi State).

Results The results revealed moderate knowledge levels among respondents (score 68.6%)**.** The perceived compliance results shows high (91.2%) adherence to IMCI with a mean of 3.73 ± 0.51. The analysis revealed that age, level of education, years of experience, employment status and training status had a statistically significant association with perceived compliance to IMCI protocols ($\chi^2 = 9.817, p<0.05$). Observed compliance with IMCI shows moderate **(**58.7%**)** compliance.

Conclusion Compliance with IMCI was moderate among healthcare workers. However, training and refresher training, supportive supervision, mentorship and retaining experienced staff will improve compliance with IMCI.

Keywords: *Compliance, health worker, IMCI, under-five mortality.*

Introduction

About 7.6 million children died before reaching their fifth birthday in lower and middle income country [**32, 7, 6, and 27]**. In Nigeria, the under-five mortality rate was documented to be approximately 110 deaths per 1,000 live births in 2023-2024, according to Nigeria Demographic and Health Survey [19]. This rate varies significantly across regions, with the North West having the highest rate at 140 deaths per 1,000 live births, and south west having the lowest at 42 deaths per 1,000 live births [**2, 20]**. Although the rate has decreased over the years, but it is still one of the highest in the world [**35, 3, 34]**, it however falls short of the Sustainable Development Goals target of less than 12 under-5 mortality per 1000 live births [**1]**.

In Ebonyi state, a study in Mile four Mission Hospital reported an under-five mortality rate of 142 deaths per 1,000 live birth [**16]**. The main causes of death in this region include severe malaria, malnutrition, pneumonia, measles, and diarrhoea with complications [**2, 27]**. Although neonatal disorders and birth complications have recently come to the fore, among these reasons, deaths due to infections are still high in low and middle income countries [8**]**. World Health Organization (WHO), and United Nations International Children's Fund (UNICEF) in 1990s came up with integrated management of Childhood Illness (IMCI) to reduce Under-five mortality and morbidity which are associated with the major causes of illness in children under 5 years [**5, 27]**.

The integrated management of childhood illness (IMCI) measures includes; improving health workers case management skills, perinatal care and vaccination, access to drugs, food and clean water [12**]**. IMCI aims to reduce preventable mortality, minimize illness and disability, and promote healthy growth and development of children under five years of age [10]. The approach focuses on the major causes of deaths in children through improving case management skills of health workers, strengthening the health system, and addressing family and community practices [1]. Over 100 countries, including Nigeria, have adopted IMCI, which is a set of integrated guidelines or treatment rather than separate treatment for each illness that can affect a child [35].

IMCI has the following components which includes; improvement of the case management skills of health personnel, improvement of the health system support, and improvement of community and family practices [32, 12]. A central component that will be used in this study is the improvement of the case management skill of health workers. This component is chosen because an 11-days in-service training course for Health Care Workers (HCWs) on IMCI clinical guidelines was organized in 2021 by integrated health programme IHP under USAID in Ebonyi Sate and Kogi States respectively because of the high infant mortality rate in the two state. The 11-days course duration was recommended by the WHO, who developed IMCI [35]. In some countries, the course has been shortened to reduce training costs and the time HCWs are away from their clinics during training [26, 31]. The high prevalence of under-five mortality in Nigeria may connote ineffectiveness in IMCI implementation and compliance among Health care workers in the region [35].

Primary Health care(PHC) in Ebonyi State was significantly boosted in 2015 when Ebonyi State Primary Health Care Development Agency was established [24].This was developed to provide healthcare services to individuals especially under-five children. Regardless of all these efforts, the challenges of providing care to children under-five years remained difficult, particularly in the face of childhood illnesses such as Diarrhea, Acute Respiratory Infection, Malaria, Measles and Malnutrition [27].

Considering the under-five mortality rate in Ebonyi State as noted by [16], it suggests that progress is being made, but there is still much work to be done to ensure the health and well-being of children in Ebonyi State. Abakaliki in Ebonyi state is an urban metropolis in southern Nigeria, and it has no recent study in the past five years that examined the primary healthcare providers' IMCI-related knowledge and its compliance. Furthermore, based on the observations from the researchers' experiences as master Trainer of PHWs in Ebonyi State, PHWs at selected PHCs healthcare facilities appeared to diagnose rather than categorize children using the IMCI criteria presented in the IMCI child booklet. The researcher observed that despite their training on IMCI guideline, Primary health care workers does not comply with the IMCI guidelines.

Aim of the study

This study examine the compliance to the Integrated Management of Childhood illness among health workers in selected primary healthcare in Ebonyi state, Nigeria.

Study objective

To explore the compliance to the Integrated Management of Childhood illness among health workers in selected primary healthcare

METHOD

Research design

A cross-sectional design and overt observational method was employed among consenting respondents (Healthcare workers) in the selected primary healthcare centers between 1st June and 7th July 2025.

Setting

This study was conducted in all the 24 selected Primary Healthcare Centres (PHCs) in Abakaliki Metropolis Ebonyi State. They include the primary healthcare centres at Abakpa ward facility

Ndiegu urban, Azuiyiokwu ward facility MCH. Azuiyiudele ward facility MCH Ekeaba, Azumini-azugwu ward facility Unagboke H/C, Ndiegu ward facility Onuebonyi MGDs, Timber shade ward Timbershade h/c, Izziunuhu ward facility Mphc Nkwegu. Amagu-enyigba ward facility Obulechi H/C, Edda ward Azuofia-edda H/C, Okpuitmo Ndiebor ward facility Gmelina H/C, Okpuitom Ndiebor ward facility okpanku HC, Amachi-Ndiebor ward facility Ndiofu MDGs and Amachi Ndiegu ward facility Akpa in Abakaliki metropolis. The Abakaliki metropolis comprises of two blocks with one under Abakaliki Local Government Area and the other under Ebonyi Local Government Area. The metropolis is not entirely urban; some parts are still rural and are mainly occupied by indigenes. The combined populations of both LGAs as at 2006 census were 276,909 (NPC, 2006). There are 63 public primary health centres and 41 registered private health centres in the two LGAs with 24 selected for NGOs supports (Abakaliki selected PHCs 14 while Ebonyi LGA has 10 selected). The health centres have all cadres ‘of health workers which includes; Visiting Doctors, Nurses, Midwives, community Health officers, Community Health Extension worker, JCHW and Volunteers health workers. The primary Health Care Centres manage cases ranging from delivery services, IMCI services, postnatal services, family Planning Services and other health services. The PHCs is open for 24hours services to the people.

Population of the Study

The target population of the study included Health workers who are working in 24 selected Primary Healthcare Centers (PHCs) which amounted to 108 healthcare workers. Those who were excluded from the study were Health workers who are on sick leave, maternity leave and causal leave and those who are not be willing to participate

Sample Technique

The study employed non- probability sampling technique to enrol 99 healthcare workers who consented to participate in this study.

Sample Size

The sample size was 99 respondents from the study group who consented to participate in the study

Instrument for Data Collection

A standardized instrument adapted from Integrated Management of Child Health (IMCI) Pre-Service Education Question Bank (WHO-EM/CAH/193/E) 54-item questionnaire and adapted observational checklist with 16 items was used for data collection from consenting respondents. The questionnaire consisted of three Appendix (A, B and C), where Appendix A elucidated the demographic characteristics of the respondents and Appendix B assessed the IMCI knowledge while Appendix C assessed Perceived compliance with IMCI while Appendix D used checklist for the observed compliance with IMCI.

Procedure for Data Collection

The data collection procedure began with meeting the officer in-charge of each health centre, explaining the aim of this study, thereafter potential participants were approached individually during break time and explained the study in detail to gain informed consent. Questionnaire was administered to respondents through face-to-face contact. To quantify knowledge, 1 point was assigned to each correct response and 0 point for incorrect or I do not know' responses. Then total the score for an overall knowledge assessment; and a score<50% was considered poor knowledge,

and ≥50% was considered good knowledge. The scoring and interpretation of observed compliance with IMCI was scored as 0= Not done, 1=done, but not correctly, 2=done correctly.

Method of Data Analysis

Frequency and percentage were employed as descriptive statistical techniques. Frequency and percentages were used to summarize the questionnaire items. To test the difference perceived Compliance with IMCI and Socio-demographic variables, the Fisher's exact test was employed at a 0.5 significance level. The data were analysed with the aid of Statistical Products and Service Solutions version 25 (IBM SPSS).

Limitations of the Study

The researcher encountered the following constraints during the course the study;

1. The study only collected data from PHC facilities in the Abakaliki Metropolis. Therefore, these findings cannot be generalized to other PHC facilities across the State especially those in rural areas. Future research could explore compliance and factors influences it in the rural health facilities.
2. This quantitative study employed a cross-sectional design, which means that causal relationships among the variables of interest could not be evaluated. Future studies using a longitudinal design would provide a better understanding of the interrelationships between variables over time and identify causal implications.
3. The study was self-sponsors, the finance burden possess a barrier to the researcher

Results

A total of 99 participants from the study population were used to assess the compliance with IMCI Among health care workers.

Table 1 summarized the Socio-demographic variables of the participants and showed that the majority of the respondents were aged 25-30 (53.8%), with CHEW (56.3%), 6-10years of work experience (35.0%), gender (86.3%) female, employment status (85.0%) and training status (33.2%) had training in the last 5years.

Table 1: Socio-demographic variables of the participants

Socio-demographic Variables	Frequency (n=80)	Percentage (%)
Age (years)		
Under 25	5	6.3
25-35	43	53.8
36-45	22	27.5
Above 45	10	12.5
Gender		
Male	11	13.8
Female	69	86.3
Level of Education		
Nursing Diploma	8	10.0
Bachelor of Nursing	8	10.0
CHO	4	5.0
CHEW	45	56.3
JCHEW	8	10.0
Others	7	8.8
Years of experience in healthcare		
0-5	27	33.8
6-10	28	35.0
11-15	15	18.8
16 and above	10	12.5
Employment status		
Permanent	68	85.0
Retired	1	1.3

Volunteer	9	11.3
Student	2	2.5
Training on IMCI		
In the last five years and above	27	33.8
In the last three years	23	28.8
In the last six months	11	13.8
No training	19	23.8
Have you had any supportive supervision after the last training		
Yes	49	61.3
No	31	38.8
If yes, how often (n=49)		
Last 6 months	27	55.1
2 years	14	28.6
Five years and above	8	16.3

Table 2: Knowledge of healthcare workers regarding Integrated Management of Childhood Illnesses (IMCI)

Knowledge of Healthcare Workers on IMCI	Frequency (n=80)	Percentage (%)
Which of the following are among the 5 main causes of mortality in under-five children in the country? **		
Diarrhoeal diseases	72	90.0
Pneumonia	34	42.5
Road traffic injuries	9	11.3
Malnutrition	33	41.3
AIDS	11	13.8
For which of the following settings are the IMCI guidelines suitable for use? **		
Inpatient ward of a district hospital	14	17.5
Outpatient department of a hospital	14	17.5
First-level health facilities	64	80.0
Inpatient ward of a specialized hospital	15	18.8
Which of the following age groups do the IMCI clinical guidelines address?		
Birth up to 5 years	74	92.5
1 week up to 5 years	5	6.3
2 months up to 6 years	1	1.3
Which of the following actions does a pink-coded classification requires? **		
Give pre-referral treatment	19	23.8
Give medicines for home care	4	5.0
Advise mother when to return immediately	4	5.0
Refer urgently to hospital	58	72.5
Which of the following actions does a green-coded classification requires?		
Give pre-referral treatment	13	16.3
Advise mother on home care	63	78.8

Advise mother on antibiotic treatment	4	5.0
Which of the following colour-coded classification rows for fever of the IMCI chart booklet would apply to a 5-month-old child with fever and stiff neck?		
Pink colour-coded row	55	68.8
Yellow colour-coded row	21	26.3
Green colour-coded row	4	5.0
Which of the following colour-coded rows of the IMCI chart booklet applies to a 42-month-old child with diarrhoea who has sunken eyes, is thirsty and has no other problems?		
Pink colour-coded row	43	53.8
Yellow colour-coded row	26	32.5
Green colour-coded row	11	13.8
Which of the following colour-coded rows of the IMCI chart booklet applies to a 42-month-old child with diarrhoea who has sunken eyes, is thirsty and has no other problems?		
Antibiotics for pneumonia	33	41.3
Immunization	17	21.3
Prompt treatment of malaria	26	32.5
Exclusive breastfeeding	3	3.8
Treatment of tuberculosis	1	1.3

**Multiple options allowed

Table 3 summarized Perceived compliance with Integrated Management of Childhood Illnesses (IMCI) among healthcare workers. The perceived compliance data suggest that healthcare workers generally report high adherence to IMCI protocols across the main assessment domains, with a mean of means of 3.73 ± 0.51, indicating that, on average, most tasks are performed “always” or “sometimes

Table 3: Perceived compliance with Integrated Management of Childhood Illnesses (IMCI) among healthcare workers

Items	A	S	R	N	Mean	Sd
Danger signs						
Do you ask whether the child is able to drink/breastfeed	71	5	0	4	3.79	0.69
Do you ask whether the child vomits everything	68	5	7	0	3.76	0.60

Do you about recent convulsions	59	15	3	3	3.63	0.74
Do you observe whether the child convulses	58	17	1	4	3.61	0.76
Do you observe whether the child is lethargic/unconscious	63	9	6	3	3.65	0.77
Cough/ breathing difficulties						
Do you ask about cough	72	4	1	2	3.81	0.64
Do you ask about difficulty breathing	71	6	1	2	3.82	0.57
If cough/difficulty breathing are present, do you determine duration of cough/difficulty breathing?	68	5	5	2	3.74	0.69
If cough/difficulty breathing are present, do you count the number of breaths per minute?	67	6	4	3	3.71	0.73
If cough/difficulty breathing are present, do you look for chest in drawing?	69	8	0	3	3.79	0.63
If cough/difficulty breathing are present, do you listen for stridor or "wheeze" breathing.	69	6	3	2	3.77	0.64
Fever/ history of fever						
Do you ask about current fever?	70	6	3	1	3.81	0.55
Do you ask about history of fever?	74	3	2	1	3.88	0.49
If fever or history of fever is present, do you determine duration of fever?	69	6	0	5	3.74	0.76
If fever or history of fever > 7 days is present, do you ask whether the child has had a fever every day?	68	6	5	1	3.76	0.62
If fever or history of fever is present, do you ask whether the child's urine is dark or not abundant?	60	16	2	2	3.68	0.65
If fever or history of fever is present, do you ask about abnormal bleeding?	50	21	5	4	3.46	0.83
If fever or history of fever is present, do you ask about history of measles in the past 3 months?	61	11	7	1	3.65	0.70
If fever or history of fever is present, do you take the child's temperature?	69	7	3	1	3.80	0.56
If fever or history of fever is present, do you perform a rapid diagnostic test?	71	4	0	5	3.76	0.75
If fever or history of fever is present, do you look for neck stiffness?	64	10	4	2	3.70	0.68
If fever or history of fever is present, do you take the child's pulse?	66	9	3	2	3.74	0.65
If fever or history of fever is present, do you look for cold hands or feets?	65	12	0	3	3.74	0.65
If fever or history of fever is present, do you look for jaundice or redness in the eyes?	67	9	2	2	3.76	0.62
If fever or history of fever is present, do you look for general rash (undress the child)?	66	7	7	0	3.74	0.61
Diarrhea						
Ask about diarrhea	71	4	0	5	3.76	0.75
If diarrhea is present, do you determine duration of diarrhea?	64	8	1	7	3.61	0.89
If diarrhea is present, ask whether there is blood in the stool.	65	11	3	1	3.75	0.59
If diarrhea is present, do you offer water to the child?	63	12	3	2	3.70	0.66
If diarrhea is present, do you pinch the skin of the abdomen?	67	10	2	1	3.79	0.54
Anemia/ Nutrition						
Look for palmar pallor	63	13	2	2	3.71	0.64
Look for serve and visible weight loss	64	11	2	3	3.70	0.70
Do you measure the height of the child?	66	12	0	2	3.77	0.57
Do you measure the weight of the child?	63	12	3	2	3.70	0.66
Do you measure the perimeter of the child's arm circumference?	60	15	4	1	3.67	0.63
Mean of means					**3.73**	**0.51**

A – Always S – Sometimes R – Rarely N – Never sd – standard deviation

Table5: summarized the Association between socio-demographic variables and perceived compliance with IMCI among Health workers in selected PHCs of Ebonyi State. The analysis revealed that age, educational level, employment status, years of experience and training **status** had a statistically significant association with perceived compliance to IMCI protocols ($\chi^2 = 9.817, p<0.05$)

Table 4: Association between socio-demographic variables and perceived compliance with IMCI among Health workers in selected PHCs of Ebonyi State

Socio-demographic Variables	Perceived Compliance with IMCI		χ2	P-value
	Poor	Good		
Age (years)				
Under 25	3(60.0)	2 (40.0)	9.817*	0.010
25-35	3 (7.0)	40(93.0)		
36-45	1 (4.5)	21(95.5)		
Above 45	0 (0.0)	10 (100)		
Gender				
Male	2(18.2)	9 (81.8)	1.421*	0.233
Female	5 (7.2)	64(92.8)		
Level of Education				
Nursing Diploma	0 (0.0)	8 (100)	12.300*	0.010
Bachelor of Nursing	1(12.5)	7(87.5)		
CHO	0 (0.0)	4 (100)		
CHEW	1 (2.2)	44(97.8)		
JCHEW	3(37.5)	5(62.5)		
Others	2(28.6)	5(71.4)		
Years of experience in healthcare				
0-5	6(22.2)	21(77.8)	6.710*	0.040
6-10	1 (3.6)	27(96.4)		
11-15	0 (0.0)	15 (100)		
16 and above	0 (0.0)	10 (100)		
Employment status				
Permanent	2 (2.9)	66(97.1)	16.579*	0.001
Retired	0 (0.0)	1 (100)		
Volunteer	4(44.4)	5(55.6)		
Student	1(50.0)	1(50.0)		

Training on IMCI				
In the last five years and above	2 (7.4)	25(92.6)	3.918*	0.240
In the last three years	1 (4.3)	22(95.7)		
In the last six months	0 (0.0)	11 (100)		
No training	4(21.1)	15(78.9)		
Have you had any supportive supervision after the last training				
Yes	2 (4.1)	47(95.9)	3.452*	0.102
No	5(16.1)	26(83.9)		
If yes, how often (n=49)				
Last 6 months	2(7.4)	25(92.6)	1.101*	0.679
2 years	0(0.0)	14 (100)		
Five years and above	0(0.0)	8 (100)		

*Fisher's exact test used

Table 5: Observed compliance with Integrated Management of Childhood Illnesses (IMCI) among healthcare workers from the observational checklist

Items	0	1	2	%IMCI Standard
Assessment				
Check all danger signs	0	11	13	77.1
Ask if the child has cough or difficulty in breathing	1	8	15	79.2
Ask if the child has fever/ history of fever	0	7	17	85.4
Ask if the child has diarrhoea	1	4	19	87.5
Check for anaemia	6	10	8	54.2
Check if the child is malnourish	5	11	8	56.3
Ask if child has an ear problem	19	3	2	14.6
Check immunization and Vitamin A status of the child	0	0	24	100.0
Ask about other problems	13	7	4	31.3
Average Total				**65.0**
Classification				
General danger sign	1	14	9	66.7
Cough or difficulty in breathing	2	9	13	72.9
Diarrhoea	1	6	17	83.3
Ear problem	18	1	5	22.9
Fever (including measles)	0	7	17	85.4
Malnutrition	9	11	4	39.6
Anaemia	4	15	5	52.1
Average Total				**60.4**

Identification of feeding problems				
Ask about breastfeeding, other food or fluid, if feeding changed during illness	3	8	13	70.8
Identify feeding problem	17	7	0	14.6
Average Total				**42.7**
Treatment (given or identified)				
Identify pre-referral treatments	18	4	2	16.7
Prescribe identified treatment	1	1	22	91.7
Average Total				**54.2**
Counselling				
Give mother feeding counselling relevant to the child's age	0	5	19	89.6
Advise to give child extra fluid and continue feeding during illness	1	2	21	91.7
Explain when to return immediately	2	0	22	91.7
Explain reason for referral and gives a referral note	15	0	9	37.5
Teach mother to give oral drugs	1	3	20	89.6
Teach mother to treat local infection	16	3	5	27.1
Average Total				**71.2**
Average Grand Total				**58.7**

0 – Not done 1 – Done, but not correctly 2 – Done correctly

Discussion

Participant's demographic variables

Findings from this study revealed that most of the respondents (53.8%) were within the age range of 25-35 years; this could be a result of this age range consisting of the middle-aged and working class health sector in Nigeria. This findings is in line with the findings in the study conducted by [5] which revealed that respondent's gender were predominantly female (86.3%). This aligns with the general pattern in nursing and community health officers.

Educational qualifications, it shows that CHEWs formed the largest category (56.3%) followed by Nurses. This may be because many Nurses may not like to work in the PHCs because of poor

remuneration and no recreational activities among others. This may also lead to poor compliance with IMCI guidelines. This findings contradicts the findings in the study conducted by [5, 6, 7], where majority of health workers were SJCHEW and Nurses. The respondents' years of experience shows that 6-10years (35.6%) dominate indicating that there are full compliance with IMCI guidelines. Majority of the participant were permanent staff (85.5%). This may be because of the recent employment by IMPACT project in Ebonyi State Primary health care. This findings contradicts the findings in the study conducted by [9] which shows that PHCs where dominated by volunteers.

Also, supportive supervision, 61.3% of the respondents have received training while 38% had not received any training. This result shows a gap in post-training reinforcement. There are need for follow up supervision by state primary health care. This findings is similar to the studies conducted by [5,1].

Knowledge of healthcare workers regarding Integrated Management of Childhood Illnesses (IMCI)

This study revealed moderate (68.8%) knowledge levels among health workers, with strong performance in identifying target age groups and the use of IMCI colour codes for some severe illnesses, but notable gaps in recognizing all major causes of under-five mortality, the range of IMCI interventions, and consistent application of case-based classifications. The knowledge gaps, particularly in pneumonia, malnutrition, and preventive interventions, could directly affect compliance with IMCI guidelines. This finding is perhaps because healthcare workers reported lack of training and refresher training on IMCI for the past few years. This finding is in line with

the results of a Malawian study conducted by [14] that found IMCI knowledge to be inadequate (4 out of 10; score 40%).

This study found that knowledge of IMCI among respondents without IMCI training was inadequate (11 out of 24 items; score 45.8%). This finding was in line with the results of a Malawian study conducted by [14] that found IMCI knowledge to be inadequate (4 out of 10; score 40%). The proximity in findings could be linked to the design applied in the study. Furthermore, the findings is also in line with findings in [6, 7] which revealed that knowledge of IMCI among respondents without IMCI training was inadequate (score 45.8%, criterion 70%). However, the findings of this study contradicts the results of study conducted by[18] which found that health workers knowledge of IMCI is high but there are poor compliance by HWs to IMCI in Burundi.

Perceived compliance with Integrated Management of Childhood Illnesses (IMCI) among healthcare workers

The perceived compliance data suggest that healthcare workers generally report moderate (58.7%) adherence to IMCI protocols across the main assessment domains, with a mean of means of 3.73 ± 0.51, indicating that, on average **(**58.7%**),** most tasks are performed “always” or “sometimes. This result is disturbing in that if around half of the participants applied the IMCI guidelines, it would suggest that some children do not get the expected quality of care. Considering that 11 days training was conducted in 2021 by USAID in IMCI guidelines, one would expect all the participants to be proficient in IMCI guidelines applications. This findings is in line with [6, 7] where the study revealed that about one in every two of the participants adhered completely to all steps of the IMCI guidelines.

However, [17] which reported poor adherence to IMCI. The participants seemed inclined toward diagnosing clients based on general problem- solving principles for the client management rather than the IMCI guidelines. For danger sign assessment, the highest reported compliance was in asking whether the child is able to drink/breastfeed (mean = 3.79), followed closely by asking about vomiting everything (3.76). Furthermore, slightly lower scores were observed for checking lethargy/unconsciousness (3.65) and observing convulsions (3.61), suggesting that while danger sign screening is common, and some critical neurological assessments may be less consistently performed. This result may be because some of the participants reported that they have not received training on IMCI while those that have received needs refresher training. This findings is in line with the findings in the study conducted by[14,10]. This similarities may be because, both study participants have adequate knowledge of IMCI guidelines.

In the cough/breathing difficulties section, compliance was strong, with the highest scores in asking about difficulty breathing (3.82) and cough (3.81). Objective measurements such as counting breaths per minute (3.71) and looking for chest in-drawing (3.79) were also well-reported, showing that respiratory assessments are generally well-integrated into practice. This findings is similar to the findings in the study conducted by[6,7] which found that one in every 10 (9.9%) of the healthcare workers adhered to all the steps of the IMCI guidelines during client/patient care. The similarity in findings could be linked to the dissimilarity in the sampling method utilized for the study.

High compliance was noted for asking about history of fever (3.88), taking temperature (3.80), and performing rapid diagnostic tests (3.76). However, important differential diagnostic questions – such as asking about abnormal bleeding (3.46) and history of measles in the last three months

(3.65) had lower mean scores, suggesting that some symptom inquiries related to severe febrile illnesses may be inconsistently applied. Majority of the respondents were able to ask about history of fever and other differential diagnosis. This results may be associated to supportive supervision done by USAID IHP before leaving the State. The findings is similar with the findings of [10], where respondent reported full compliance in assessment of fever.

Association between socio-demographic variables and perceived compliance with IMCI among Health workers in selected PHCs of Ebonyi State

The study found no significant association between gender ($p>0.05$) and compliance. This suggests that both male and female healthcare workers are equally capable of adhering to IMCI guidelines. Furthermore, the study found no significant association between IMCI training ($p>0.05$) or supportive supervision ($p>0.05$) and perceived compliance. This result is particularly noteworthy as training is a cornerstone of IMCI implementation. This finding may be due to several reasons, including a potential self-reporting bias, where participants might perceive their compliance to be high regardless of their training history. The study by [25] also found no statistically significant association between nursing characteristics and IMCI compliance. Additionally, the cluster randomized trial (2022) found that while mobile health interventions improved supportive supervision and treatment, these changes were not statistically significant, which may offer a partial explanation for the non-significant findings this present study.

Observed compliance with Integrated Management of Childhood Illnesses (IMCI) among healthcare workers from the observational checklist

The observed compliance with Integrated Management of Childhood Illnesses (IMCI) guidelines is moderate at 58.7%, with notable variations across different components. While healthcare workers show strengths in certain areas, significant gaps remain in others, particularly in assessment and classification. The findings align with existing research that highlights both the positive impact of IMCI training and the persistent challenges in its consistent application. Healthcare workers demonstrate high compliance in several areas, including checking immunization and Vitamin A status (100%), asking about diarrhoea (87.5%) and fever (85.4%), as well as treatment prescription (91.7%). Counselling components, such as advising on fluids/feeding (91.7%) and explaining when to return (91.7%), also show strong adherence. Whereas Compliance is very low for asking about ear problems (14.6%) and other problems (31.3%). This poor assessment translates into low classification rates for ear problems (22.9%) and malnutrition (39.6%). Furthermore, there is a disconnection between asking about feeding history (70.8%) and identifying actual feeding problems (14.6%). Finally, identification of pre-referral treatments (16.7%) and counselling on referral reasons (37.5%) and local infection treatment (27.1%) were poorly executed.

The overall compliance of 58.7% observed in the table is similar to the 58% high-level implementation reported by [4] in Ethiopia. This indicates a general trend of moderate adherence rather than full, consistent application of IMCI protocols. The data shows that while certain components like treatment and counselling are performed well, others like comprehensive assessment are neglected.

Implications of the findings

The main aim of integrated management of childhood illness was to improve under-five health and well-being and it has been proved to be very effective in reducing under-five mortality as seen in the present study, and should be encouraged. The results of this study will be useful for other researchers working in primary health care centers on child morbidity and mortality. In addition, it will be useful in formulating policies to help reduce under-five mortality in Nigeria and globally.

Conclusion

In this study, IMCI level of knowledge was moderate, although the study recorded moderate perceived and observed compliance among healthcare workers. There was statistical significant association between perceived compliance and socio-demographic variables of the respondents. In addition to training and frequent re-fresher IMCI training for healthcare providers, retaining of experienced staff, mentorship and supervision should be explored.

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Authors' contributions

SNO conceived and designed the study. SNO, OCC and MU collected the data, and analysed the data. SNO, MU and NS provided the statistical support. SNO and OCC wrote the initial draft of

the manuscript. SNO and NS critiqued the initial draft and modified it. SNO reviewed and revised the main manuscript. All others reviewed the manuscript.

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Data availability

Data are available from request but will soon be deposited in public domain

Declarations

The author have nothing to declare

Ethical clearance

This study followed the Helsinki Declaration guidelines for studies involving humans. It was given ethical approval by the Ebonyi State Ministry of Health through the Directorate of Health Research and Ethical Committee on May 26th, 2025 (EBSHREC/0015) and Ebonyi state University Research and ethical committee (EBSHREC/004).

Consent to participate

All the Participants in this study were given an informed consent to participate in the study following description of the aim and design of the study by the researcher.

Consent for publication

Not applicable to the manuscript.

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Reference

1. Abubakar, F. O., Yakubu, P., Mohammed, B., Ifeoma, S., Ismaila, P., & Ogunyemi, A. (2023). imci intervention strategy awareness amongst port primary healthcare providers : investigative study. Top Academic Journal of Nursing Sciences; ISSN: 2994-0826 Impact8(3), 3–12.
2. Adedini, S.A., Adebayo, A.C., Afolabi, O.T. (2025). decomposing the gap in under-five mortality determinants between the low-and high-risk regions of Nigeria. PunMed journal 23(4),12-45

3. Adedokun, S. T., & Yaya, S. (2020). Childhood morbidity and its determinants: evidence from

31 countries in sub-Saharan Africa. BMJ Global Health, 5(10), e003109. https://doi.org/10.1136/bmjgh-2020-003109

4. Abebe, A. M., Kassaw, M. W., & Mengistu, F. A. (2019). Assessment of Factors Affecting the Implementation of Integrated Management of Neonatal and Childhood Illness for Treatment of under Five Children by Health Professional in Health Care Facilities in Yifat Cluster in North Shewa Zone, Amhara Region, Ethiop. *International Journal of Pediatrics (United Kingdom)*, *2019*(Imci). https://doi.org/10.1155/2019/9474612

5. Afolalu, T. (2020). Factors influencing the implementation of integrated management of childhood illnesses in selected health centres. International Journal of Family Medicine and Primary Care, 1(6), Article ID 1027.

6. Amachree, D., & Eleke, C. (2022). Adherence and Implementation-related Challenges of Integrated Management of Childhood Illness Guidelines among Nurses at Health Centers in Port Harcourt, Nigeria. *International Journal of Medicine and Health Development*, *27*(3), 244. https://doi.org/10.4103/ijmh.ijmh_35_21

7. Amachree, D. M., & Eleke, C. (2022). Knowledge Concerning IMCI İntervention Strategy among Trained And Untrained Healthcare Providers in Port Harcourt Primary HealthcareCentres. *International Journal of Nursing*, *9*(1), 25–31. https://doi.org/10.15640/ijn.v9n1a3

8. Belete, A. A., Agumas, Y., Tsehay, A. K., & Ayele, H. M. (2024). Utilization of the Integrated Management of Newborn and Childhood Illness (IMNCI) protocol and associated factors

among health care workers in health centers of South Gondar Zone, Northwest Ethiopia: an institution-based mixed study. *Frontiers in Health Services*, *4*(April), 1–10. https://doi.org/10.3389/frhs.2024.1364661

9. Ejidike, A. (2020). integrated management of childhood illness a to for reducing under-five mortality. International journal of Nursing 8(4)23-34

9. Duke, E. S., Ezenwa, B. N., Roberts, A., & Ekanem, E. E. (2020). Mothers' knowledge of danger signs in childhood illnesses: the integrated management of childhood illness (IMCI) strategy in Alimosho area of Lagos State, Nigeria. *Pan African Medical Journal One Health*, *2*(Imci). https://doi.org/10.11604/pamj-oh.2020.2.8.23512

10. Khatun, M. A., Saha, A. K., Aktar, S., & Hasin, F. (2021). Knowledge on integrated management of childhood illness among health and family planning field workers. *Asian Journal of Medical and Biological Research*, *7*(1), 56–63. https://doi.org/10.3329/ajmbr.v7i1.53309

12. kumar, S.G, purushottam. L., Amit,U., Akash K.P. (2021) impact of Integrated Management of childhood Illness (IMCI)Training on case Identification and Management Skills Among Undergraduate Medical Students in a Developing Country: A case-control Study. journal og Medical Education 34(4):3434

13. Khatun, A., Saha, K., Aktar, S., & Hasin, F. (2021). Knowledge on integrated management of childhood illness among health and family planning field workers. Asian Journal of Medical and Biological Research, 7(1), 56-63.

14. Kilov, K., Hildenwall, H., Dube, A., Zadutsa, B., Banda, L., Langton, J., & King, C. (2021). Integrated Management of Childhood Illnesses (IMCI): a mixed-methods study on implementation, knowledge and resource availability in Malawi. BMJ Paediatrics Open, 5(1), e001044.

15. Meno, F., Makhado, L., & Matsipane, M. (2019). Factors inhibiting implementation of Integrated Management of Childhood Illnesses (IMCI) in primary health care (PHC) facilities in Mafikeng sub-district. International Journal of Africa Nursing Sciences, 11(1), Article ID 100161

16. Mouneke,U.V, Ibekwe,R.C., Eke, C.B., Ibekwe M.U., Chinawa J.M (2024). under-fiver mortality rate at Mile Four Hospital Abakaliki, Ebonyi State. journal of paediatrics. 40(3) 259-263

17. Mansoor, G. F., Chikvaidze, P., Varkey, S., Higgins-Steele, A., Safi, N., Mubasher, A., Yusufi, K., & Alawi, S. A. (2017). Quality of child healthcare at primary healthcare facilities: a national assessment of the Integrated Management of Childhood Illnesses in Afghanistan. International Journal for Quality in Health Care : Journal of the International Society for Quality in Health Care, 29(1), 55–62. https://doi.org/10.1093/intqhc/mzw135

18. Mushelenga, E. (2021). Namibian Primary Health Care nurses' perceptions on factors influencing the successful implementation of the Integrated Management of Neonatal and Childhood Illness (IMNCI). December. https://scholar.sun.ac.za

19. National Demographic Health Survey, Nigeria (2024). under-five mortality rate in Nigeria. a

news fact on channel Television.

20. Olawade, D.B, Aderonke, O., Aderinto, N, Adebayo A. D, Deborah, T.E, Lin, J. (2025). factors contributing to under-5 child mortality in Nigeria: A narrative review. PubMed jorunal 3:104(1): e41142.

21. Omobowale, O., & Owoaje, E. (2023). A Qualitative Exploration on Knowledge of Community-Integrated Management of Childhood Illnesses among Community Resource Persons and Primary Health Care Workers in Oyo State, Nigeria. *East African Scholars Journal of Medical Sciences*, *6*(03), 88–93. https://doi.org/10.36349/easms.2023.v06i03.003

22. Pinto, J., Peristiowati, Y., Belo, O. da S., Tilman, C. B., Carvalho, J. G. de, Costa, Z. X. da, & Perreira, A. G. (2023). Health Promotion Strategy in the Implementation of Integrated Management of Childhood Illnesses (IMCI): A Systematic Reviews. Jurnal of Paedatrics and Child Health, 59(1), 267–281. https://doi.org/10.1111/jpc.23589

23. Reñosa, M., Dalglish, S., & Bärnighausen, K. (2020). Key challenges of health care workers in implementing the integrated management of childhood illnesses (IMCI) program: a scoping review. Global Health Action, 13(1), Article ID 173266

24. State Ministry of Health. (2019). Ebonyi state health facility census. government printer.

25. Steinhardt, L. C., Onikpo, F., Kouamé, J., Piercefield, E., Lama, M., Deming, M. S., & Alexander K. Rowe, A. K. (2019). Predictors of health worker performance after Integrated Management of Childhood Illness training in Benin: a cohort study. BMC Health Services Research, 15 (276):1-11.

26. SHOPS PLUS, USAID, Abt Associates. 2020. "How well do health facilities adhere to Integrated Management of Childhood Illnesses (IMCI) guidelines? Preliminary Finding

27. Tshivhase, L., Madumo, M. M., & Govender, I. (2020). Challenges facing professional nurses implementinthe integrated management of childhood illness programme in rural primary health care clinics, Limpopo Province, South Africa. South African Family Practice, 62(1), 1–6. https://doi.org/10.4102/safp.v62i1.5060

28. USAID Assist Project. "Assessment of Quality of Reproductive, Maternal, Newborn, Child and Adolescent Health Care in Uganda and Kenya," 2020. https://pdf.usaid.gov/pdf_docs/PA00WKCF.pdf.

29. United Nations Children's Fund. (2016). Integrated Management of Childhood Illness (IMCI) in the 21st Century. Integration into health systems. UNICEF: New York.

30. United Nations Children's Fund (2016). Integrated Management of Childhood Illness (IMCI) in the 21st century: a review of the scientific and programmatic evidence. New York: UNICEF

31. USAID&MoH (2017). Module 2: Assess and Clasify the sick child aged 2 months up 5 years. Dili: Taliti;

32. UNICEF, World Health Organization (WHO) (2020), World Bank Group, United Nations, "Level and trends in child mortality," 2021. https://childmortality.org/wp-content/uploads/2021/12/UNICEF-2021-Child-Mortality- Report.pdf.

33. Venkatachalam, J., Kumar, D., Gupta, M., & Aggarwal, A. K. (2019). Knowledge and Skills

of Primary Health Care Workers Trained on Integrated Management of Neonatal and Childhood Illness: Follow-up Assessment 3 years after the training. Indian Journal of Public health, 55 (4): 298-302. Retrieved from: http://www.ijph.in/temp/IndianJPublicHealth554298-8207098_224750.pdf.

34. Yuliarni, E., Siregar, N., & Sukmawati, Y. (2021). An Overview of the Knowledge and Motivation of IMCI Staff Regarding the Implementation of IMCI at the Lubuk Buaya Public Health Center, Padang. *Basic and Applied Nursing Research Journal*, *2*(1), 12–16. https://doi.org/10.11594/banrj.02.01.03

35. World Health Organization, (2022). Child mortality (under-five) in the glob