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Utilization of Integrated Management of Childhood Illness (Imci) Protocols Among Health Workers and Healthcare Users Ofprimary Health Care Centres in Benin City, Nigeria

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UTILIZATION OF INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS (IMCI) PROTOCOLS AMONG HEALTH WORKERS AND HEALTHCARE USERS OF PRIMARY HEALTH CARE CENTRES IN BENIN CITY, NIGERIA

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ABSTRACT

Background: Integrated Management of Childhood Illness (IMCI) is a World Health Organization strategy designed to reduce under-five morbidity and mortality through the integrated management of common childhood illnesses. Despite its proven effectiveness, the utilization of IMCI services remains suboptimal in many primary healthcare settings. This study assessed the determinants of IMCI service utilization among Primary Health Care (PHC) users and health workers in Benin City, Nigeria.

Methods: A descriptive cross-sectional study was conducted among 384 respondents selected using a multistage sampling technique. Data were collected using a structured questionnaire and analysed with the Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize the data, while multiple linear regression identified predictors of IMCI service utilization at a 5% level of significance ($p < 0.05$).

Findings: Respondents demonstrated moderate awareness of IMCI services (cluster mean = 2.92), availability of IMCI provisions (cluster mean = 2.72), accessibility of IMCI services (cluster mean = 2.88), and utilization of IMCI services (cluster mean = 2.88). Multiple linear regression analysis revealed that the model was statistically significant ($R = 0.621$; $R^2 = 0.386$; Adjusted $R^2 = 0.382$; $F(4,379) = 135.420$; $p < 0.001$). Availability of IMCI provisions was the strongest predictor of utilization ($\beta = 0.326$; $B = 0.274$; $p < 0.001$), followed by accessibility ($\beta = 0.278$; $B = 0.211$; $p < 0.001$), and awareness ($\beta = 0.214$; $B = 0.162$; $p < 0.001$). Collectively, these variables explained 38.6% of the variation in IMCI service utilization.

Conclusion: Awareness, availability, and accessibility significantly influence the utilization of IMCI services in Primary Health Care centres. Strengthening community awareness, ensuring continuous availability of IMCI commodities, improving service accessibility, and enhancing the quality of care through regular training and supportive supervision are essential for increasing IMCI utilization and improving child health outcomes.

Keywords: Utilization, Integrated Management of Childhood Illness (IMCI), Protocols, Health Workers, Healthcare Users, and Primary Health Care Centres.

INTRODUCTION

Childhood morbidity and mortality remain critical public health challenges across Sub-Saharan Africa, with preventable and treatable infectious diseases accounting for the vast majority of deaths among children under five years of age [1]. In Nigeria, the exceptionally high burden of paediatric conditions like pneumonia, malaria, malnutrition, and diarrhoea continuously threatens under-five survival rates which places immense pressure on a decentralized health system striving toward Universal Health Coverage [2]. Globally, Nigeria and India alone account for approximately 40% of all childhood deaths driven by severe respiratory conditions [3]. To combat this vulnerability at the community level, the World Health Organization (WHO) and UNICEF pioneered the Integrated Management of Childhood Illness (IMCI) strategy which is an evidence-based clinical framework designed to scale up diagnostic accuracy, ensure rational antibiotic use, and combine assessment, classification, treatment, and caregiver counselling into a single clinical encounter [4]. Primary Health Care (PHC) centers serve as the frontline of defence and the primary point of contact within the Nigerian health sector [5]. Frontline workers such as nurses and midwives, community health extension workers (CHEWs) rely heavily on these standardized, color-coded clinical algorithms to effectively triage paediatric patients [6,7]. In recent years, Nigeria has aggressively pushed to modernize child health monitoring as seen in the adaptation of peripheral blood oxygen saturation (SpO2) via pulse oximetry as a mandatory vital sign within its national health management systems [7]. This policy movement has been heavily bolstered by large-scale domestic public health investments, such as the WHO-TY Danjuma Foundation partnership launched in June 2025, which specifically focused on training frontline healthcare workers in clinical IMCI protocols across vulnerable communities in states like Taraba, Enugu, and Edo [8]. Concurrently, digital health interventions, such as the Electronic Integrated Management of Childhood Illness (eIMCI) app and clinical decision-support tools, have been developed to transition clinical teams away from cumbersome paper algorithms to robust electronic health record workflows [9]. Despite these domestic policy developments, targeted donor funds, and modern technological frameworks, the actual utilization and baseline implementation of IMCI protocols remain profoundly suboptimal across many local government jurisdictions in Nigeria [9]. Quantitative implementation assessments within Nigerian PHCs show that even when clinical staff have undergone formal 5-day IMCI certification training, their practical knowledge of core algorithms such as recognizing chest indrawing or identifying dangerous dehydration remains critically deficient which often fluctuate at or below a 50% adequacy score [6]. Consequently, healthcare workers frequently bypass full clinical assessment trees which results in poor triage quality that heavily undercuts the cost-effectiveness of linked treatments like oxygen and first-line antibiotics [3]. These gaps are routinely exacerbated by geographic barriers, fragmented facility layouts, high patient volumes, and severe systemic shortages that limit the availability of continuous, competency-based supportive supervision [4,10]. Evaluating the localized utilization of these clinical tools is critical and understanding how frontline dynamics impact adherence can guide targeted institutional reforms and policy corrections [11].

Consequently, this study evaluates the utilization of IMCI protocols among health workers and healthcare users in selected primary health care centres within in Benin City, Nigeria, to isolate localized knowledge gaps, systemic hurdles, and provider behaviours affecting paediatric health outcomes in the state.

METHODOLOGY

Research design

The descriptive cross-sectional survey design was adopted for this study.

Study setting

The study was conducted in Benin City, Nigeria.

Study duration

The period of study lasted from December 2025 to March 2026.

Study Population

The population of the study comprised two groups. The groups are Primary Health Care (PHC) users and Primary Health Care (PHC) workers. PHC users are adult male and female residents of Benin City who accessed services such as immunization, maternal and child health, outpatient care, and preventive health services. The total population of PHC users was unknown due to fluctuating daily attendance. While PHC workers included nurses, Community Health Extension Workers, Community Health Officers, Health Records Officers, and Environmental Health Officers in the selected PHC facilities, whose population was obtained from official staff records and attendance registers.

Inclusion Criteria

The study included Primary Health Care users and health workers aged **17 years and above** in the selected facilities in Benin City who were present during the period of data collection and willing to participate in the study.

Sample Size

The sample size for the study consisted of 384 respondents.

Sample Size Determination

Sample Size for Primary Health Care Users

Since the exact population of Primary Health Care users in Benin City is not known, the Cochran formula for determining sample size for an unknown or infinite population was used.

$$\boldsymbol{n = \frac{Z^2 pq}{e^2}}$$

Where:

Z = 1.96 at 95 percent confidence level

p = 0.5

q = 1 − p = 0.5

e = 0.05 margin of error

Substituting the values:

$$\boldsymbol{n = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.05)^2}}$$

$$\boldsymbol{n = \frac{3.8416 \times 0.25}{0.0025}}$$

$$\boldsymbol{n = \frac{0.9604}{0.0025}}$$

$$\boldsymbol{n = 384.16}$$

The minimum required sample size was therefore approximated to 384 respondents.

Sample Size for Primary Health Care Workers

The total number of Primary Health Care workers across the selected facilities is known from official staff records. From the total computed sample size of 384 respondents, one hundred and ninety-two respondents representing 50 percent were allocated to Primary Health Care workers. The remaining one hundred and ninety-two respondents representing 50 percent were allocated to Primary Health Care users. Thus, the total sample size for the study comprised 384 respondents which is made up of 192 Primary Health Care users and 192 Primary Health Care workers.

Sample and Sampling Technique

A multistage sampling technique was adopted for the study.

Stage One involved stratification of Primary Health Care facilities. All the known Primary Health Care facilities in Benin City were stratified based on their respective wards.

Stage Two involved the selection of facilities. Using simple random sampling through the balloting method, one Primary Health Care facility was selected from each ward to ensure representativeness. A total of twenty Primary Health Care facility was selected for the study.

Stage Three involved the selection of respondents. For Primary Health Care users, a systematic sampling technique was employed. Based on daily attendance flow, every 9th user was selected until the allocated sample size of 192 was achieved across the selected facilities.

For Primary Health Care workers, simple random sampling technique was used to select one hundred and ninety-two from the list of eligible nurses, Community Health Extension Workers, Community Health Officers, Health Records Officers, and Environmental Health Officers in the selected facilities.

This approach ensured fair representation of both service users and healthcare providers.

Instrument for Data Collection

Data were collected using a structured questionnaire and an observation checklist. The structured questionnaire was developed specifically for this study based on the study objectives, research questions, and relevant literature on Integrated Management of Childhood Illness (IMCI), primary healthcare service utilization, and child health services. The questionnaire was not adopted, reproduced, or directly adapted from any previously published questionnaire. The questionnaire consisted of five sections. Section A assessed the demographic characteristics of respondents; Section B assessed awareness of IMCI services; Section C assessed the availability of IMCI provisions; Section D assessed accessibility of IMCI services; and Section E assessed utilization of IMCI protocols. The questionnaire items were measured using a four-point Likert scale ranging from Strongly Agree to Strongly Disagree. The English-language version of the study questionnaire is provided as Supplementary File 1. An observation checklist was also used to objectively assess the availability of infrastructure, equipment, drugs, staffing levels, and utilities within the selected Primary Health Care facilities.

Validity of Instrument

To ensure that the research instrument adequately measured the study variables, the questionnaire was subjected to face and content validity. The draft questionnaire, together with the study objectives, research questions, and hypotheses, was submitted to four independent experts: two senior lecturers in the Department of Public Health Science and one specialist in Health Services Management in addition to the research supervisor, for critical review.

Reliability of Instrument

The reliability of the questionnaire was established through a test–retest procedure. A pilot study was conducted among Primary Health Care users and Primary Health Care workers in Ovia North-East and Ovia South-West Local Government Areas, which were not included in the main study. The questionnaire was initially administered to 20 Primary Health Care users and 10 Primary Health Care workers. After a two-week interval, the same questionnaire was re-administered to the same respondents under similar conditions.

The data obtained from the pilot administration were analysed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Cronbach's Alpha was used to assess the internal consistency of the questionnaire items. A reliability coefficient of 0.70 or above was considered acceptable which indicated that the instrument demonstrated adequate internal consistency and was suitable for use in the main study.

Method of Data Collection

Data were collected through onsite administration of the validated questionnaire. The researcher, assisted by two trained research assistants, visited the selected Primary Health Care facilities to administer the questionnaires to eligible respondents. Before data collection, the research assistants were adequately trained on the purpose of the study, administration of the questionnaire, obtaining informed consent, maintaining confidentiality, and ensuring uniformity in the data collection procedure. Respondents were provided with appropriate explanations and clarifications where necessary without influencing their responses.

The completed questionnaires were retrieved immediately after completion and checked for completeness to minimize missing responses. In addition to the questionnaire administration, an observation checklist was completed at the selected Primary Health Care facilities. The checklist was used to directly assess and document the availability and physical and operational conditions of relevant Primary Health Care facilities and services. The use of the observation checklist alongside the questionnaire provided an objective means of complementing and validating information obtained from respondents.

Method of Data Analysis

Data collected were analysed using the Statistical Package for the Social Sciences version 26.0 Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize respondents' characteristics and study variables.

Results

SECTION A: Socio-demographic information

Table 1: Socio-demographic information of Respondents

SN	Variables	Options	Responses
1.	Respondent Category	PHC Users	192
		PHC Staff	192
2.	Gender	Male	162
		Female	222
3.	Age	17 Years	24
		18–29 Years	96
		30–39 Years	118
		40–49 Years	86
		50 Years and Above	60
4.	Marital Status	Single	148
		Married	196
		Divorced	20
		Widowed	20
5.	Educational Level	No Formal Education	36
		Primary	74
		Secondary	142
		Tertiary	132

Authors' Field Work, 2025.

Table 1 presents the socio-demographic characteristics of the respondents. The table shows that 192 respondents (89.3%) were Primary Health Care (PHC) users, while 192 respondents (10.7%) were PHC staff. With respect to gender, 162 respondents (42.2%) were male, while 222 respondents (57.8%) were female. In terms of age distribution, 24 respondents (6.3%) were 18 years, 96 respondents (25.0%) were between 18 and 29 years, 118 respondents (30.7%) were between 30 and 39 years, 86 respondents (22.4%) were between 40 and 49 years, while

60 respondents (15.6%) were 50 years and above. Regarding marital status, 148 respondents (38.5%) were single, 196 respondents (51.0%) were married, while 20 respondents (5.2%) each were divorced and widowed. Concerning educational qualification, 36 respondents (9.4%) had no formal education, 74 respondents (19.3%) had primary education, 142 respondents (37.0%) had secondary education, and 132 respondents (34.4%) possessed tertiary education.

SECTION B: Awareness of IMCI Services

Table 2: Awareness of IMCI Services

S/N	Statement	SA	A	D	SD	Mean	Remark
1	I am aware of the IMCI services provided in this PHC.	156 (40.6%)	138 (35.9%)	54 (14.1%)	36 (9.4%)	3.08	High
2	I know the days and times when IMCI services are offered.	128 (33.3%)	146 (38.0%)	64 (16.7%)	46 (12.0%)	2.93	Moderate
3	The PHC provides adequate information on available IMCI services.	102 (26.6%)	154 (40.1%)	74 (19.3%)	54 (14.1%)	2.79	Moderate
4	I have received training or sensitization on IMCI.	116 (30.2%)	142 (37.0%)	72 (18.8%)	54 (14.1%)	2.83	Moderate
5	I know how to access IMCI services in this PHC.	134 (34.9%)	148 (38.5%)	60 (15.6%)	42 (10.9%)	2.97	Moderate
	Cluster Mean	**127 (33.1%)**	**146 (38.0%)**	**65 (16.9%)**	**46 (12.0%)**	**2.92**	**Moderate**

Source: Field Survey, 2025.

Cut-off Mean Decision Rule: 2.5

Responses were measured on a four-point Likert scale coded as Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). The cut-off mean was calculated as follows:
Cut-off mean = (4 + 3 + 2 + 1) ÷ 4 = **2.50**.

Table 2 presents respondents' perceptions regarding awareness of PHC services. On average, 33.1% of the respondents strongly agreed and 38.0% agreed with the awareness statements, while 16.9% disagreed and 12.0% strongly disagreed. The cluster mean score of 2.92 indicates a moderate level of awareness of Primary Health Care services among respondents in in Benin City.

SECTION C: Availability of IMCI Provisions

Table 3: Availability of IMCI Provisions in Selected Primary Health Care Centres

S/N	Statement	SA	A	D	SD	Mean	Remark
1	Essential drugs are usually available when needed.	94 (24.5%)	148 (38.5%)	82 (21.4%)	60 (15.6%)	2.72	Moderate
2	The facility has adequate IMCI equipment.	88 (22.9%)	136 (35.4%)	96 (25.0%)	64 (16.7%)	2.64	Moderate
3	Skilled health workers trained on IMCI are available.	102 (26.6%)	142 (37.0%)	86 (22.4%)	54 (14.1%)	2.76	Moderate
4	IMCI services are regularly provided.	128 (33.3%)	154 (40.1%)	60 (15.6%)	42 (10.9%)	2.96	Moderate
5	Maternal and child health services required for IMCI are readily available.	120 (31.3%)	158 (41.1%)	58 (15.1%)	48 (12.5%)	2.91	Moderate

6	The facility has adequate consultation rooms and space for IMCI services.	72 (18.8%)	124 (32.3%)	110 (28.6%)	78 (20.3%)	2.49	Low
7	Laboratory services required for IMCI are available.	84 (21.9%)	132 (34.4%)	98 (25.5%)	70 (18.2%)	2.60	Moderate
8	IMCI guidelines and health education materials are available.	90 (23.4%)	146 (38.0%)	86 (22.4%)	62 (16.1%)	2.69	Moderate
	Cluster Mean	**97 (25.3%)**	**143 (37.2%)**	**85 (22.1%)**	**60 (15.6%)**	**2.72**	**Moderate**

Source: Field Survey, 2025.

Cut-off Mean Decision Rule: 2.5

Table 3 shows respondents' perceptions regarding the availability of PHC services. On average, 25.3% of respondents strongly agreed and 37.2% agreed that essential PHC resources and services are available, while 22.1% disagreed and 15.6% strongly disagreed. The cluster mean score of 2.72 indicates a moderate level of availability of PHC services in in Benin City.

SECTION D: Accessibility of IMCI Services

Table 4: Accessibility of IMCI Services

S/N	Statement	SA	A	D	SD	Mean	Remark
1	The IMCI service point is within a reasonable distance.	146 (38.0%)	154 (40.1%)	52 (13.5%)	32 (8.3%)	3.08	High
2	Transportation to access IMCI services is easy and affordable.	132 (34.4%)	148 (38.5%)	60 (15.6%)	44 (11.5%)	2.96	Moderate
3	The operating hours for IMCI services are convenient.	118 (30.7%)	162 (42.2%)	64 (16.7%)	40 (10.4%)	2.94	Moderate
4	Waiting time before receiving IMCI services is reasonable.	86 (22.4%)	128 (33.3%)	96 (25.0%)	74 (19.3%)	2.59	Moderate
5	The cost of IMCI services is affordable.	140 (36.5%)	156 (40.6%)	52 (13.5%)	36 (9.4%)	3.04	High
6	IMCI services are accessible to elderly and physically challenged persons.	92 (24.0%)	134 (34.9%)	92 (24.0%)	66 (17.2%)	2.66	Moderate
	Cluster Mean	119 (31.0%)	147 (38.3%)	69 (18.0%)	49 (12.7%)	**2.88**	**Moderate**

Source: Field Survey, 2025.

Cut-off Mean Decision Rule: 2.5

Table 4 presents respondents' perceptions regarding the accessibility of PHC services. On average, 31.0% of respondents strongly agreed and 38.3% agreed with the accessibility statements, while 18.0% disagreed and 12.7% strongly disagreed. The cluster mean score of 2.88 indicates a moderate level of accessibility of PHC services in in Benin City.

SECTION E: Utilization of IMCI Protocols

Table 5: Utilization of IMCI Protocols

S/N	Statement	SA	A	D	SD	Mean	Remark
1	I consistently apply IMCI protocols when managing eligible childhood illnesses.	122 (31.8%)	148 (38.5%)	70 (18.2%)	44 (11.5%)	2.90	Moderate
2	I use IMCI guidelines during childhood immunization and preventive services where applicable.	134 (34.9%)	156 (40.6%)	56 (14.6%)	38 (9.9%)	3.00	High
3	I use IMCI protocols during outpatient consultations for children under five years.	118 (30.7%)	150 (39.1%)	72 (18.8%)	44 (11.5%)	2.89	Moderate
4	I apply IMCI protocols during maternal and child health services.	126 (32.8%)	158 (41.1%)	58 (15.1%)	42 (10.9%)	2.96	Moderate
5	I prefer using IMCI protocols over routine clinical judgment alone.	94 (24.5%)	128 (33.3%)	96 (25.0%)	66 (17.2%)	2.65	Moderate
6	My experience encourages continued use of IMCI protocols.	112 (29.2%)	146 (38.0%)	78 (20.3%)	48 (12.5%)	2.84	Moderate
7	I encourage my colleagues to utilize IMCI protocols.	120 (31.3%)	152 (39.6%)	68 (17.7%)	44 (11.5%)	2.91	Moderate
	Cluster Mean	118 (30.7%)	148 (38.5%)	71 (18.5%)	47 (12.3%)	**2.88**	**Moderate**

Source: Field Survey, 2025.

Cut-off Mean Decision Rule: 2.5

Table 5 presents respondents' perceptions regarding the utilization of PHC services. On average, 30.7% of respondents strongly agreed and 38.5% agreed with the utilization statements, while 18.5% disagreed and 12.3% strongly disagreed. The cluster mean score of 2.88 indicates a moderate level of utilization of PHC services in in Benin City.

Test of Hypotheses

To determine whether selected Integrated Management of Childhood Illness (IMCI) service factors significantly predict the utilization of IMCI protocols among health workers in selected Primary Health Care centres in Benin City, a multiple linear regression analysis was conducted. The independent variables entered into the regression model were availability of IMCI provisions, accessibility of IMCI services, and awareness of IMCI services, while the dependent variable was utilization of IMCI protocols.

The hypothesis was tested at a 5% level of significance ($\alpha = 0.05$).

The decision rule was:

- Reject the null hypothesis (H_0) if the probability value (p-value) is less than 0.05.
- Fail to reject the null hypothesis (H_0) if the probability value (p-value) is equal to or greater than 0.05.

Hypothesis

- **H_0:** Availability of IMCI provisions, accessibility of IMCI services, and awareness of IMCI services do not significantly predict the utilization of IMCI protocols among health workers in selected Primary Health Care centres within in Benin City.

Table 6: Multiple Linear Regression Analysis of IMCI Service Factors as Predictors of Utilization of IMCI Protocols among Health Workers

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.621a	.386	.382	.412

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	92.345	4	23.086	135.42	.000b
Residual	147.435	379	0.389		
Total	239.780	383			

Regression Coefficients

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.
(Constant)	0.412	0.098		4.204	.000
Availability (AV)	0.274	0.034	0.326	8.059	.000
Accessibility (AC)	0.211	0.029	0.278	7.276	.000
Awareness (AW)	0.162	0.025	0.214	6.480	.000

Researcher's Computation, 2025

Model Summary Interpretation

Table 6 reveals that the multiple correlation coefficient (R = 0.621) demonstrates a moderate positive relationship between the combined IMCI service factors and the utilization of IMCI protocols among health workers. The coefficient of determination ($R^2 = 0.386$) indicates that approximately 38.6% of the variation in the utilization of IMCI protocols is jointly explained by the availability of IMCI provisions, accessibility of IMCI services, and awareness of IMCI services. The adjusted R^2 value of 0.382 suggests that the model provides a good estimate of the relationship after adjusting for the number of predictor variables included in the model. Furthermore, the standard error of the estimate (0.412) indicates that the model predicts utilization with a reasonable degree of accuracy.

ANOVA Interpretation

The ANOVA results show that the overall regression model is statistically significant ($F = 135.420$, $p < 0.001$). This indicates that the combined effect of the predictor variables such as availability of IMCI provisions, accessibility of IMCI services, and awareness of IMCI services significantly predicts the utilization of IMCI protocols among health workers. Therefore, the regression model is appropriate for explaining variations in IMCI utilization.

Regression Coefficients Interpretation

The regression coefficients reveal that all four predictor variables made statistically significant positive contributions to the utilization of IMCI protocols. Availability of IMCI provisions recorded the strongest influence on utilization ($\beta = 0.326$, $t = 8.059$, $p < 0.001$), indicating that increased availability of essential IMCI resources is associated with increased utilization of IMCI protocols by health workers.

Accessibility of IMCI services also significantly predicted utilization ($\beta = 0.278$, $t = 7.276$, $p < 0.001$), suggesting that easier access to IMCI services promotes greater adherence to IMCI protocols. Finally, awareness of IMCI services significantly predicted utilization ($\beta = 0.214$, t

= 6.480, $p < 0.001$), implying that increased awareness contributes positively to the utilization of IMCI protocols.

Decision

Since the overall regression model was statistically significant ($F = 135.420$, $p < 0.05$), the null hypothesis is rejected.

Conclusion

The study concludes that availability of IMCI provisions, accessibility of IMCI services, and awareness of IMCI services jointly and significantly predict the utilization of IMCI protocols among health workers in selected Primary Health Care Centre within in Benin City. The findings further indicate that availability of IMCI provisions was the strongest predictor of utilization, followed by accessibility, and awareness.

DISCUSSION

Awareness of IMCI Services

The present study demonstrated a moderate level of awareness of Integrated Management of Childhood Illness (IMCI) services among respondents, with a cluster mean of 2.92, although awareness of the existence of IMCI services was relatively high (mean = 3.08). This finding indicates that while respondents were generally aware of IMCI services, important knowledge gaps remained regarding service schedules, available interventions, and access procedures. Moderate awareness may limit timely utilization of IMCI services, particularly among caregivers who rely on adequate information to recognize childhood illnesses and seek appropriate care. The findings are consistent with evidence from Ethiopia, where [12] reported that caregivers with good knowledge of childhood illnesses were 2.18 times more likely to seek timely healthcare than those with poor knowledge (AOR = 2.18; 95% CI: 1.61–2.95) which demonstrates that awareness significantly influences health-seeking behavior. Similarly, an analysis of the Nigeria Demographic and Health Survey by [13] found that only 64.3% of caregivers sought appropriate healthcare for common childhood illnesses, with caregiver education and awareness identified as important determinants of care utilization. Furthermore, the study by [14] in Indian found out that where primary care nurses initially demonstrated a deficit-to-moderate pre-test mean score of 0.38±0.093, which massively improved to a post-test mean score of 0.71±0.087 following targeted instructional lectures. At the global level, Furthermore, the [15] reported that approximately 5 million children under the age of five died globally in 2021, with most deaths resulting from preventable conditions such as pneumonia, diarrhoea, malaria, neonatal infections, and malnutrition the very illnesses targeted by IMCI. The report further emphasized that strengthening caregiver education and community engagement remains one of the three core components of the IMCI strategy for reducing under-five mortality. Collectively, these findings suggest that although awareness in the present study was satisfactory, intensified community sensitization and routine health education are required to improve knowledge and optimize IMCI utilization.

Availability of IMCI Provisions

The present study found a moderate level of availability of IMCI provisions within Primary Health Care (PHC) facilities, with an overall cluster mean of 2.72, which indicates that although some essential IMCI commodities were available, important deficiencies remained in clinical guidelines, equipment, and logistics required for effective service delivery. This finding is consistent with evidence from Malawi reported by [16], who identified substantial resource gaps despite widespread IMCI implementation. Their assessment of 47 health facilities which involved 531 healthcare workers found that only 17% of facilities had functional respiratory rate timers, 30% had pulse oximeters, and 32% had micro-nebulisers. Conversely, essential medicines such as artemether–lumefantrine (98%) and cotrimoxazole

(96%) were widely available. Healthcare workers also achieved a relatively low mean IMCI knowledge score of 3.96/10, while refresher training significantly improved knowledge (β = 0.42; 95% CI: 0.01–0.82), which highlights the combined importance of adequate resources and continuous professional development for effective IMCI implementation. Comparable findings have been reported in Nigeria. [17] assessed 177 primary healthcare facilities in Ekiti State using the WHO Service Availability and Readiness Assessment (SARA) tool and reported an overall maternal and child health service readiness score of 0.47 ± 0.18 (47%) which indicates suboptimal facility preparedness. Only 52% of facilities met the minimum equipment readiness requirements, while urban facilities demonstrated significantly better readiness for medicines and commodities than rural facilities (0.51 ± 0.16 vs. 0.45 ± 0.17; $p < 0.05$). In addition, Ekiti North I Senatorial District recorded the highest readiness score (0.63 ± 0.19; $p < 0.001$) which demonstrates geographical disparities in service readiness. These findings are further supported by the WHO Service Availability and Readiness Assessment (SARA) framework, which identifies four essential domains of facility readiness: trained staff and clinical guidelines, basic equipment, diagnostic capacity, and essential medicines. The SARA framework has consistently shown that deficiencies in these domains reduce the capacity of health facilities to provide quality maternal and child health services and weaken the implementation of evidence-based interventions such as IMCI. Collectively, these findings support the present study by demonstrating that strengthening supply chain systems, ensuring uninterrupted availability of IMCI commodities, updating clinical guidelines, and investing in continuous health worker training are fundamental to improving IMCI implementation and child health outcomes.

Accessibility of IMCI Services

The present study revealed a moderate level of accessibility to Integrated Management of Childhood Illness (IMCI) services among respondents, suggesting that although IMCI services were generally accessible, barriers related to distance, waiting time, transportation, and service organization may still limit optimal utilization. This finding indicates that improving physical and organizational access remains essential for maximizing the effectiveness of IMCI interventions. The present findings are supported by the systematic review and meta-analysis conducted by [18], which synthesized evidence from 10 primary studies in Ethiopia. The authors reported an overall integrated community case management (iCCM) utilization rate of 42.73% (95% CI: 27.65%–57.80%). Caregivers living within 30 minutes of a health post were almost four times more likely to utilize child health services (OR = 3.93; 95% CI: 2.30–6.74), while awareness of iCCM services significantly increased utilization (OR = 3.64; 95% CI: 2.16–6.14). Likewise, caregivers who were knowledgeable about childhood illnesses were significantly more likely to access services (OR = 2.77; 95% CI: 2.06–3.74), emphasizing that accessibility extends beyond physical proximity to include awareness and health literacy. Comparable evidence was reported by [19] in Southwest Ethiopia during an assessment of Integrated Management of Newborn and Childhood Illness (IMNCI) services. Although the study primarily evaluated service quality, caregivers reported relatively high scores for provider empathy (mean = 4.04 ± 0.81), tangibility of services (mean = 3.88 ± 0.66), and assurance (mean = 3.78 ± 0.70), with an overall caretaker satisfaction level equivalent to 63.4% of the maximum obtainable score. These findings suggest that provider responsiveness, communication, and the organization of services substantially influence clients' perceived accessibility to child health services. Similarly, [20] assessed the quality of IMCI case management in Afghanistan through 3,072 observed sick-child consultations and reported a mean assessment index score of 4.81 ± 2.41. Children presenting with IMCI-targeted illnesses achieved assessment scores that were 1.02 points higher than other children (95% CI: 0.52–1.53; $p < 0.001$) which indicates that adherence to IMCI protocols improved access to comprehensive clinical assessment once children reached health facilities. Together, these

findings reinforce the present study by demonstrating that accessibility depends not only on geographical proximity but also on caregiver awareness, provider competence, and the quality-of-service delivery. Consequently, strengthening community awareness, reducing geographical and organizational barriers, and improving provider responsiveness are essential strategies for enhancing equitable access to IMCI services.

Utilization of IMCI Services

The present study demonstrated a moderate level of utilization of Integrated Management of Childhood Illness (IMCI) services among Primary Health Care users, with an overall cluster mean of 2.88, indicating that although respondents utilized IMCI services to some extent, utilization remained below the optimal level required for effective childhood illness management. This finding suggests that barriers related to awareness, accessibility, availability of resources, and service quality may have limited the full utilization of IMCI services within the study area. The findings are comparable to those of [18] who conducted a systematic review and meta-analysis involving 10 primary studies and 8,004 caregivers in Ethiopia. The authors reported an overall integrated community case management (iCCM) utilization rate of 42.73% (95% CI: 27.65%–57.80%). Caregivers residing within 30 minutes of a health post were almost four times more likely to utilize child health services (AOR = 3.93; 95% CI: 2.30–6.74), while awareness of iCCM services (AOR = 3.64; 95% CI: 2.16–6.14) and adequate knowledge of childhood illnesses (AOR = 2.77; 95% CI: 2.06–3.74) were significant predictors of service utilization. These findings demonstrate that both physical access and caregiver awareness substantially influence the uptake of IMCI-related services. Similarly, [21] found that only 46.5% of caregivers utilized integrated community case management services. Caregivers with good knowledge of childhood illnesses were almost three times more likely to utilize services (AOR = 2.95; 95% CI: 1.78–4.89), whereas those living within 5 km of a health facility were over three times more likely to access services (AOR = 3.11; 95% CI: 1.82–5.30). These findings collectively suggest that caregiver education, geographical accessibility, and proximity to health facilities remain important determinants of IMCI utilization. The present findings are further supported by the [22], which estimated that approximately 4.9 million children under five years of age died globally in 2022, with the majority of these deaths resulting from preventable conditions such as pneumonia, diarrhea, malaria, neonatal infections, and malnutrition, which are the principal conditions targeted by IMCI. Consequently, improving awareness, strengthening health facility readiness, reducing geographical barriers, and promoting caregiver education are critical strategies for increasing IMCI utilization and accelerating progress towards reducing preventable under-five mortality.

Conclusion

This study found that awareness, availability, accessibility, and utilization of Integrated Management of Childhood Illness (IMCI) services among Primary Health Care users in Oredo Local Government Area were generally moderate. Furthermore, awareness, availability, accessibility, and were significant positive predictors of IMCI service utilization. These findings underscore the need for targeted interventions to strengthen IMCI implementation and improve child health service uptake at the primary healthcare level.

Recommendations

1. Primary healthcare authorities should strengthen community-based health education and awareness campaigns to improve caregivers' knowledge of IMCI services.
2. Government and health facility managers should ensure the continuous availability of IMCI guidelines, essential medicines, equipment, and logistics through strengthened supply chain systems.
3. Health authorities should improve accessibility by the reduction of waiting times, expanding outreach services, and addressing geographical and financial barriers to care.

4. Regular capacity-building programs, supportive supervision, and quality assurance mechanisms should be implemented to improve healthcare providers' adherence to IMCI guidelines and enhance service quality.
5. Future studies should employ longitudinal or mixed-methods designs across multiple settings to provide broader evidence on factors influencing IMCI service utilization and implementation.

Strengths of the Study

1. The use of a cross-sectional study design enabled the researchers to assess the availability, accessibility, awareness, and utilization of Primary Health Care services within the study setting at a defined period.
2. The study included both Primary Health Care users and Primary Health Care workers which provided perspectives from service users as well as healthcare providers.
3. The combination of a structured questionnaire and an observation checklist allowed information reported by respondents to be complemented by direct assessment of the physical and operational conditions of the selected Primary Health Care facilities.
4. The application of appropriate statistical methods such as descriptive statistics and inferential analysis provided a systematic approach for summarizing the data and examining relationships between the study variables.

Limitations of the Study

1. Because the study employed a cross-sectional design, data were collected at a single point in time. Therefore, causal relationships between the assessed factors and utilization of Primary Health Care services cannot be established.
2. Information obtained through questionnaires, particularly regarding awareness, and utilization of services, may have been influenced by respondents' recall, personal experiences, or desire to provide socially acceptable responses.
3. Although an observation checklist was used to assess facility conditions, some observations may have been influenced by the presence of the researchers or by subjective interpretation of certain checklist items.
4. The availability of financial, logistical, and time resources may have limited the number of facilities and respondents that could be included in the study.

Suggestions for Further Studies

Future research should employ longitudinal or prospective study designs to establish temporal relationships between the availability, accessibility, awareness, and utilization of Primary Health Care services. Studies involving multiple Local Government Areas, states, or regions of Nigeria are recommended to improve the generalizability of findings. Further investigations should also examine the influence of socioeconomic status, cost of healthcare services, availability of essential medicines and equipment, staffing levels, waiting time, transportation barriers, and community perceptions on Primary Health Care utilization. In addition, intervention studies evaluating the effectiveness of health education, improved facility infrastructure, enhanced staffing, and other health-system strengthening strategies in improving access to and utilization of Primary Health Care services are warranted.

DECLARATIONS

Ethical Declaration

Ethical approval was obtained from the Edo State Primary Healthcare Centres Research Ethics Committee under the Edo State Ministry of Health, with approval protocol number HA/787/25/D/05120841, before commencement of the study. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

Consent for publication

Not Applicable.

Availability of data and materials

The datasets generated and/or analysed during the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Clinical trial number

Not applicable.

Human Ethics and Consent to Participate

Written informed consent was obtained from all participants aged 17 years and above before data collection. No participant younger than 16 years was enrolled in the study; therefore, parental or legal guardian consent was not applicable. Confidentiality, anonymity, and voluntary participation were ensured throughout the study.

Authors' Contributions

Clinton Oghosasere Egharevba (C.O.E) conceived and designed the study; conducted the literature review; performed data analysis and interpretation; coordinated manuscript revisions and journal correspondence. **Abieyuwa Emeshili (A.E)** developed the study methodology and research instrument; conducted literature searches and synthesis; participated in instrument development and validation. **Eguakun Charity (E.C)** drafted the initial manuscript; participated in research instrument development; conducted field data collection and data verification. **Ngozi Rosemary Osunde (N.R.O)** directed methodological review of the study; reviewed the analysis and interpretation of findings; and reviewed the manuscript for academic and scientific quality. **Patricia Atube (P.A)** led the clinical and Primary Health Care perspective in the interpretation of findings and reviewed the study methodology and research instrument. All authors approved the final version of the manuscript and accepted responsibility for the accuracy and integrity of the work.

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Supplementary Files

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- SupplementaryFile1UtilizationOfIntegratedManagementOfChildhoodIllnessIMCI.docx