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# A DEEP DIVE INTO IMCI INTEGRATION: ASSESSING PRIMARY HEALTHCARE CENTERS IN PORT HARCOURT

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**Abstract:** Childhood diseases are a major global health issue, causing millions of deaths each year in low and middle-income countries. To combat this, the World Health Organization introduced the Integrated Management of Childhood Illness (IMCI) strategy in 1992, designed as a standardized tool for nurses and midwives in primary healthcare settings. The IMCI guides healthcare providers through assessment, classification, treatment, counseling, and follow-up for childhood illnesses. This approach helps classify illnesses based on danger indicators and severity, enabling effective treatment. Nigeria adopted the IMCI strategy in 1996, yet consistent training programs have been lacking, resulting in limited improvements in child health. The under-5 mortality rate in Nigeria has risen from 128 to 132 deaths per 1,000 live births between 2013 and 2018.

**Keywords**: Childhood diseases, Integrated Management of Childhood Illness (IMCI), Primary healthcare, Under-5 mortality, Health indicators

## 1.0 Introduction

About ten million children under five years old die yearly in low and middle-income nations from malaria, pneumonia, diarrhea, measles, and malnutrition (Meno, Makhado & Matsipane, 2019). In a bid to reduce the global impact of childhood diseases, the World Health Organization developed and adopted the Integrated Management of Childhood Illness (IMCI) strategy in 1992 (UNICEF, 2016). The IMCI was developed to be a standardized tool for use by nurses and midwives in primary healthcare settings (Kalu, Lufesi, Havens & Mortimer, 2016). It is an algorithm or clinical protocol that guides the nurse-midwife through assessment, classification, identification of required treatment, treatment, counseling, and follow-up (Tshivhase, Madumo &

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Govender, 2020). The algorithm helps the care provider to classify childhood illness based on danger indicators and severity (Reñosa, Dalglish & Bärnighausen, 2020).

Nigeria adopted the IMCI strategy in 1996, and since then some training programs have been organized by the government for some providers in the primary health level of public service. However, these training programs have not been very consistent over the years and the benefits of IMCI intervention are yet to reflect on the nation's health indicators. The nation's under-5 mortality rate has risen from 128 to 132 deaths per 1,000 live births from the year 2013 to 2018 (National Population Commission and ICF, 2019).

The increasing national child mortality statistics warrant a review of the knowledge base of primary health care providers concerning the IMCI strategy. It is hence essential to gain insight into the association between inservice training on IMCI and the knowledge of IMCI among primary care providers.

Information from such insight could inform policy recommendations that could improve the effectiveness of the IMCI Program.

In Port Harcourt (southern Nigeria), the under-five mortality rate was documented in 2018 to be 79 deaths per 1,000 live births (National Population Commission and ICF, 2019). Although this statistic is lower than the national under-5 mortality rate of 132 deaths per 1,000 live births, it however falls short of the Sustainable Development Goals target of less than 12 under-5 mortality per 1000 live births. Previous studies such as Afolalu (2020) and Pandya, Slemming and Saloojee (2018) have blamed the lack of in-service training as one of the factors limiting the effectiveness of the IMCI in semi-rural parts of Nigeria and Africa respectively. Port Harcourt is an urban metropolis in southern Nigeria, and it has no recent study in the past ten years that examined the primary healthcare providers' IMCI-related knowledge. This study aimed to examine the knowledge concerning IMCI intervention strategy among trained and untrained providers in Port Harcourt primary healthcare centres. The specific objectives of this study were to (1) assess the knowledge of IMCI intervention strategy among the untrained, (2) assess the knowledge of IMCI intervention strategy among the trained, and (3) compare the knowledge of IMCI intervention strategy between the trained and untrained providers.

## 2.0 Materials and Methods

### 2.1 Study design, period, and setting

A cross-sectional design was employed among consenting respondents (nurses) in Port Harcourt primary healthcare centres between 10$^{th}$ January and 15$^{th}$ April 2020. This study was conducted in all the 12 Model Comprehensive Primary Healthcare Centres (MCPHCs) in Port Harcourt, Rivers State. They include the primary healthcare centres at Abuloma, Amadi-Ama, Azuabie, Bundu-Ama, Churchill, Elekahia, Mgbundukwu, Nkpolu, Okuru, Orogbum, Ozuboko, and Potts-Johnson in Port Harcourt metropolis. Port Harcourt is situated about 52 kilometers southeast of Ahoada and 40 kilometers northwest of Bori. It shares boundaries with Obio-Akpor on the north, Eleme on the east, Okirika on the south, and Degema on the west. It accommodates at least 650,000 persons within its 109 square kilometers area.

### 2.2 Population, sample size, and sampling procedure

All the nurses practicing in the 12 MCPHCs in Port Harcourt composed the population for this study which amounted to 63. The census sampling method was used to enroll all members of the population into the study, but only 52 nurses consented to participate in this study (82.5% of the population). It included 12 respondents who had attended at least one IMCI training in the past (trained), and 40 respondents who had not attended any IMCI training in the past (untrained).

### 2.3 Instrument, data collection, and data analysis

A novel structured 24-item questionnaire with test-retest reliability of 0.81 was used for data collection from consenting respondents. The questionnaire consisted of two sections (A and B), where section A elucidated the background characteristics of the respondents and section B assessed the IMCI-related knowledge. The data

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collection procedure began with giving the questionnaire to the respondents to fill anonymously after the aim of this study has been explained to them. Knowledge of IMCI was operationally graded as inadequate (correct responses in less than 17 out 24 questionnaire items, score < 70%) and adequate (correct responses in not less than 17 out 24 questionnaire items, score ≥ 70%). Frequency and percentage were employed as descriptive statistical techniques. Frequency and percentages were used to summarize the questionnaire items. To test the difference of IMCI-related knowledge between the trained and untrained providers, the Mann-Whitney U test was employed at a 5% significance level. The data were analyzed with the aid of Statistical Products and Service Solutions version 25 (IBM SPSS, Chicago, IL, USA).

**2.4 Ethical clearance**

This study followed the Helsinki Declaration guidelines for studies involving humans. It was given ethical approval by the Institutional Review Board of the University of Port Harcourt on January 10th, 2020 (ID: UPH/MM69/011). Participation in this study was voluntary and written informed consent was collected before data collection from each respondent.

**3.0 Results**

Table 1 summarized the background characteristics of the respondents and showed that the majority of the respondents were aged 30-39 (40.4%), with post-basic nursing diploma (53.8%), 1-10 years of work experience (63.5%), and IMCI untrained (76.9%).

**Table 1: Background characteristics of the respondents (n = 52)**

| Variables | n | % |
|---|---|---|
| **Age** | | |
| 20-29 | 12 | 23.1 |
| 30-39 | 21 | 40.4 |
| 40-49 | 11 | 21.2 |
| 50-59 | 8 | 15.4 |
| **Sex** | | |
| Female | 43 | 82.7 |
| Male | 9 | 17.3 |
| **Marital status** | | |
| Married | 43 | 82.7 |
| Single | 9 | 17.3 |
| **Educational qualification** | | |
| Basic nursing diploma (RN) | 12 | 23.1 |
| Post basic nursing diploma (RM/RPHN) | 28 | 53.8 |
| Bachelor's degree (BSc/BNSc) | 10 | 19.2 |
| Master's degree (MSc/MNSc) | 2 | 3.8 |
| **Years of professional nursing practice** | | |
| 1-10 | 33 | 63.5 |
| 11-20 | 19 | 36.5 |
| **Training program on IMCI** | | |
| Trained on IMCI | 12 | 23.1 |
| Not trained on IMCI | 40 | 76.9 |

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n = frequency, % = percentage

Table 2 summarized the knowledge of IMCI among respondents without IMCI training, and it revealed that the majority of the respondents gave correct responses in 11 out of 24 items (45.8%, inadequate IMCI knowledge).

**Table 2**: Knowledge of IMCI among respondents without IMCI training **n = 40**

| **Item** | **Correct response n** | **Incorrect response n** | **Score (Percent of correct responses)** |
|---|---|---|---|
| **IMCI Assessment strategy** | | | |
| Integrated in IMCI refers to holistic care of the child under five years | 27 | 13 | 67.5 |
| The rationale for the integrated approaches is that most children present with signs and symptoms related to more than one condition | 21 | 19 | 52.5 |
| Improving health workers' skills, the healthcare system, and family/community practices are components of IMCI | 17 | 23 | 42.5 |
| IMCI clinical management requires sick children to be classified into defined categories of severity, based on the presence of key signs and symptoms | 37 | 3 | 92.5 |
| The classification is not aimed at reaching a precise diagnosis, instead it is to enable the selection of a treatment/management plan | 31 | 9 | 77.5 |
| Checking every sick child for general danger signs is how to begin | 23 | 17 | 57.5 |
| All sick children with serious classification need prereferral treatment and urgent referral | 31 | 9 | 77.5 |
| **Danger signs of IMCI diseases** | | | |
| Child not able to drink or breastfeed | 19 | 21 | 47.5 |
| Child vomits everything | 13 | 27 | 32.5 |
| Child has had more than one convulsions or is convulsing | 24 | 16 | 60.0 |
| Child is lethargic or unconscious | 16 | 24 | 40.0 |
| **What to do when danger signs are present (Case management)** | | | |
| Complete assessment immediately | 19 | 21 | 47.5 |
| Provide urgent pre-referral treatment | 15 | 25 | 37.5 |
| Refer child to hospital | 14 | 26 | 35.0 |
| **Major symptoms to be assessed** | | | |
| Cough or difficulty in breathing | 16 | 24 | 40.0 |

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|---|---|---|---|
| Diarrhoea | 24 | 16 | 60.0 |
| Fever | 18 | 22 | 45.0 |
| Ear problems | 12 | 28 | 30.0 |
| Malnutrition and anaemia | 23 | 17 | 57.5 |
| Check for immunization status | 9 | 31 | 22.5 |
| Then the child's illnesses are classified using a colourcoded triage system | 37 | 3 | 92.5 |
| **IMCI colour-coded triage system** | | | |
| Green = mild sign of disease and needs simple home care | 25 | 15 | 62.5 |
| Yellow = moderate sign of disease and needs drug treatment and follow-up | 14 | 26 | 35.0 |
| Red = very severe sign of disease and needs urgent referral to hospital | 17 | 23 | 42.5 |

n = frequency

Table 3 summarized the knowledge of IMCI among respondents with IMCI training, and it revealed that the majority of the respondents gave correct responses in 12 out of 24 items (50%, inadequate IMCI knowledge).

**Table 3**: Knowledge of IMCI among respondents with IMCI training **n = 12**

| **Item** | **Correct response n** | **Incorrect response n** | **Score (Percent of correct responses)** |
|---|---|---|---|
| **IMCI Assessment strategy** | | | |
| Integrated in IMCI refers to holistic care of the child under five years | 3 | 9 | 25.0 |
| The rationale for the integrated approaches is that most children present with signs and symptoms related to more than one condition | 5 | 7 | 41.7 |
| Improving health workers' skills, the healthcare system, and family/community practices are components of IMCI | 8 | 4 | 66.7 |
| IMCI clinical management requires sick children to be classified into defined categories of severity, based on the presence of key signs and symptoms | 12 | 0 | 100.0 |
| The classification is not aimed at reaching a precise diagnosis, instead it is to enable the selection of a treatment/management plan | 11 | 1 | 91.7 |
| Checking every sick child for general danger signs is how to begin | 12 | 0 | 100.0 |
| All sick children with serious classification need prereferral treatment and urgent referral | 12 | 0 | 100.0 |

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| | | | |
|---|---|---|---|
| **Danger signs of IMCI diseases** | | | |
| Child not able to drink or breastfeed | 6 | 6 | 50.0 |
| Child vomits everything | 8 | 4 | 66.7 |
| Child has had more than one convulsions or is convulsing | 9 | 3 | 75.0 |
| Child is lethargic or unconscious | 6 | 6 | 50.0 |
| **What to do when danger signs are present (Case management)** | | | |
| Complete assessment immediately | 6 | 6 | 50.0 |
| Provide urgent pre-referral treatment | 5 | 7 | 41.7 |
| Refer child to hospital | 6 | 6 | 50.0 |
| **Major symptoms to be assessed** | | | |
| Cough or difficulty in breathing | 6 | 6 | 50.0 |
| Diarrhoea | 11 | 1 | 91.7 |
| Fever | 9 | 3 | 75.0 |
| Ear problems | 12 | 0 | 100 |
| Malnutrition and anaemia | 3 | 9 | 25.0 |
| Check for immunization status | 5 | 7 | 41.7 |
| Then the child's illnesses are classified using a colourcoded triage system | 12 | 0 | 100.0 |
| **IMCI colour-coded triage system** | | | |
| Green = mild sign of disease and needs simple home care | 3 | 9 | 25.0 |
| Yellow = moderate sign of disease and needs drug treatment and follow-up | 6 | 6 | 50.0 |
| Red = very severe sign of disease and needs urgent referral to hospital | 8 | 4 | 66.7 |

n = frequency

Table 4 compared the knowledge of IMCI between respondents with and without IMCI training (trained vs. untrained), and it showed no significant difference (p = >0.05).

**Table 4**: Knowledge of IMCI among respondents with and without IMCI training **N = 52**

| **Item** | **Score of respondents with IMCI training n = 12** | **Score of respondents without IMCI training n = 40** | **U** | **p value** |
|---|---|---|---|---|
| **IMCI Assessment strategy** | | | 19.00 | 0.522 |
| Integrated in IMCI refers to holistic care of the child under five years | 25.0 | 67.5 | | |

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| | | | | |
|---|---|---|---|---|
| The rationale for the integrated approaches is that most children present with signs and symptoms related to more than one condition | 41.7 | 52.5 | | |
| Improving health workers' skills, the healthcare system, and family/community practices are components of IMCI | 66.7 | 42.5 | | |
| IMCI clinical management requires sick children to be classified into defined categories of severity, based on the presence of key signs and symptoms | 100.0 | 92.5 | | |
| The classification is not aimed at reaching a precise diagnosis, instead it is to enable the selection of a treatment/management plan | 91.7 | 77.5 | | |
| Checking every sick child for general danger signs is how to begin | 100.0 | 57.5 | | |
| All sick children with serious classification need prereferral treatment and urgent referral | 100.0 | 77.5 | | |
| **Danger signs of IMCI diseases** | | | 6.50 | 0.250 |
| Child not able to drink or breastfeed | 50.0 | 47.5 | | |
| Child vomits everything | 66.7 | 32.5 | | |
| Child has had more than one convulsions or is convulsing | 75.0 | 60.0 | | |
| Child is lethargic or unconscious | 50.0 | 40.0 | | |
| **What to do when danger signs are present (Case management)** | | | 9.00 | 0.529 |
| Complete assessment immediately | 50.0 | 47.5 | | |
| Provide urgent pre-referral treatment | 41.7 | 37.5 | | |
| Refer child to hospital | 50.0 | 35.0 | | |
| **Major symptoms to be assessed** | | | 15.00 | 0.250 |
| Cough or difficulty in breathing | 50.0 | 40.0 | | |
| Diarrhoea | 91.7 | 60.0 | | |
| Fever | 75.0 | 45.0 | | |
| Ear problems | 100 | 30.0 | | |
| Malnutrition and anaemia | 25.0 | 57.5 | | |
| Check for immunization status | 41.7 | 22.5 | | |
| Then the child's illnesses are classified using a colourcoded triage system | 100.0 | 92.5 | | |

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| | | | | |
|---|---|---|---|---|
| **IMCI colour-coded triage system** | | | 12.00 | 1.000 |
| Green = mild sign of disease and needs simple home care | 25.0 | 62.5 | | |
| Yellow = moderate sign of disease and needs drug treatment and follow-up | 50.0 | 35.0 | | |
| Red = very severe sign of disease and needs urgent referral to hospital | 66.7 | 42.5 | | |

U = Mann-Whitney U test; n = frequency; p value < 0.05 = significant

**4.0 Discussion**

This study found that knowledge of IMCI among respondents without IMCI training was inadequate (11 out of 24 items; score 45.8%). This finding is perhaps because IMCI protocol is not routinely used in the teaching hospitals where professional education of healthcare providers occurs before their employment in the public healthcare system. This finding was in line with the results of a Malawian study conducted by Kilov et al. (2021) 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. Both studies utilized public primary health centres. This finding was higher than was found in an Iraqi study conducted by Hussein and Farhood (2019) that found inadequate IMCI knowledge among healthcare providers (7%).

The discrepancy in findings could be related to the background characteristics of the respondents. This study assessed only nurses in the primary healthcare centres, whereas the Iraqi study assessed physicians and nurses together.

This study found that the knowledge of IMCI among respondents with IMCI training was inadequate (12 out of 24 items, score 50.0%). This finding could be because the IMCI trained healthcare providers do not routinely adhere to the IMCI protocol in their clinical activities as documented by Khatun, Saha, Aktar and Hasin (2021) in a Bangladeshi study. This finding partly corroborates with an Indian study by Joshi, Koringa, Sochaliya and Kartha (2016) that found inadequate knowledge among IMCI trained healthcare providers (57.4%). The slight discrepancy in findings could be linked to the sample size utilized in the study. The Indian study examined 774 IMCI trained healthcare providers while this study assessed only 12 IMCI trained healthcare providers. This finding was consistent with another Iraqi study by Hussein and Aldeen (2020) that found inadequate knowledge among IMCI trained healthcare providers.

This study found no significant difference in IMCI-related knowledge between previously trained and untrained healthcare providers (p = > 0.05). This finding would imply an insignificant effect of IMCI training (organized by the government in the past) on the IMCI-related knowledge of healthcare workers. This finding perhaps points to a lack of mentorship and supervision regarding IMCI protocol. This finding contradicts the findings of Kilov et al. (2021) that noted an association between IMCI-related knowledge and previous IMCI training. The main strength of this study was applying the census sampling technique which tries to eliminate sampling bias. Moreover, the limitations of this study were the use of a novel non-standardized IMCI knowledge scale, and a cross-sectional design which made it difficult to establish a causal relationship.

**5.0 Conclusion and Recommendation**

In this study, IMCI-related knowledge was inadequate between IMCI-trained and untrained healthcare providers and there was no significant difference in knowledge between them. In addition to frequent re-fresher IMCI training for healthcare providers, mentorship and supervision should be explored.

## References

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.

Hussein, S., & Aldeen, L. (2020). Knowledge and use of growth chart among health-care providers in Baghdad. *Iraqi Journal of Community Medicine, 33*(1), 30-35.

Hussein, S., & Farhood, H. (2019). Assessment of knowledge and practical skills among Integrated Management of Neonatal and Childhood Illness Program healthcare personnel in primary healthcare centres. *Medical Journal of Babylon, 16*(1), 351-356.

Joshi, K., Koringa, H., Sochaliya, K., & Kartha, G. (2016). A study on knowledge regarding integrated management of neonatal and childhood illness among trained anganwadi workers of Surendranagar district, Gujarat, India. *International Journal of Community Medicine and Public Health, 3*(2), 581-585.

Kalu, N., Lufesi, N., Havens, D., & Mortimer, K. (2016). Implementation of World Health Organization Integrated Management of Childhood Illnesses (IMCI) Guidelines for the Assessment of Pneumonia in the Under 5s in Rural Malawi. *PLoS ONE, 11*(5), Article ID e0155830.

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.

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.

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.

National Population Commission and ICF. (2019). *Demographic and health survey 2018*. Abuja: NPC and ICF

Pandya, H., Slemming, W., & Saloojee, H. (2018). Health system factors affecting implementation of integrated management of childhood illness (IMCI): qualitative insights from a South African province. Health Policy and Planning, 33(2), 171-182.

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 1732669.

Tshivhase, L., Madumo, M., & Govender, I. (2020). Challenges facing professional nurses implementing the Integrated Management of Childhood Illness programme in rural primary health care clinics, Limpopo Province, South Africa. *South African Family Practice, 62*(1), Article ID a5060.

**Original Article**

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.