Original Article

Assessment Of Background Knowledge And Skills Of Integrated Management Of Childhood Illnesses Among Primary Health Care Workers In Oyo State, Nigeria

Running Title: Midwife-Led IMCI Training in Oyo State

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ABSTRACT

The Integrated Management of Childhood Illnesses (IMCI) strategy was developed to improve child survival through standardized guidelines for the assessment and management of common childhood illnesses. However, inadequate knowledge among primary health care (PHC) workers have limited effective implementation of IMCI in Nigeria, contributing to the persistent burden of morbidity and mortality among children under five years of age. This study examined the effect of midwife-led interventions on the knowledge and assessment skills of PHC workers on IMCI in selected primary health care centres in Oyo State, Nigeria. One-group pretest–posttest quasi-experimental design was adopted. Multi-stage sampling techniques was used with a total sample size of 132 participants. Data were collected using a structured questionnaire and an intervention checklist during the pre-intervention, intervention, and post-intervention phases. Descriptive and inferential statistics of sample t-test were used for data analysis, and hypotheses were tested at a 0.05 level of significance. The findings showed a significant improvement in IMCI knowledge among PHC workers following the intervention, with the mean knowledge score (0.59) pre-intervention to (0.87) post-intervention. IMCI assessment skills also improved from a mean score of 9.12 (SD = 7.27) to 18.08 (SD = 3.93) post-intervention ($t = -17.535$, $df = 131$, $p < 0.001$). The study concluded that midwife-led interventions significantly improve IMCI knowledge and skills among PHC workers, and scaling up such interventions may strengthen IMCI implementation and improve child health outcomes in Nigeria.

Keywords: Child Health Outcomes; Children under-five years of age; Integrated Management of Childhood Illnesses (IMCI); Knowledge and Skills; Midwife-led Intervention; Primary Health Care Workers.

INTRODUCTION

The continual increase in the prevalence of maternal and child mortality and morbidity, especially across developing countries such as Nigeria is calling to question, the efficacy of existing programs to alleviate the same, as well as the efficiency and quality of midwives in the country[1]. Recently, health workers across most developing and underdeveloped nations, such as Nigeria have been partly indicted in their role towards meeting the global maternal and child healthcare objectives, which centers on reducing child and maternal mortalities.

World health Organization[2] reported that, about 40 out of 1000 live birth children below five years old died, which amounted to 5.2 million deaths annually. Majority of these deaths occur across developing and underdeveloped countries, where Nigeria is found. Specifically reported that, almost half of the deaths occur in India, Ethiopia, Pakistan, the Democratic Republic of Congo and Nigeria. Recent evidence shows that Nigeria has under-5 death rate of 177 per 1000 live births[3]. Through these global trends, an estimated 48·1 million under-5 deaths is projected to occur between 2020 and 2030, of which almost 23% (11 million) can be prevented through appropriate delivery of essential primary health care as well as accurate clinical assessments[4].

In Nigeria, child health remains a critical concern, with a high burden of preventable childhood diseases. The National Demographic and Health Survey (NDHS) 2023 reported that neonatal and under-five mortality rates in Nigeria are among the highest globally[5]. Midwives, who are often the first point of contact for children in rural and

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underserved communities, face considerable challenges in applying IMCI protocols effectively. Studies also have shown that midwives in Nigeria often have limited knowledge and skills related to the integrated management of childhood illnesses, resulting in suboptimal care for children[1]. It is against this backdrop this study is set up to investigate the effect of midwife-led intervention on knowledge and assessment skills and practice of PHC workers on IMCI in selected primary health care centres in Oyo State.

This study, therefore, assesses the effectiveness of a midwife-led intervention on the knowledge and assessment skills of Primary Health Care Workers on Integrated Management of Childhood Illnesses within the selected local government areas of Oyo State, aiming to recommend strategies towards increasing the utilization of IMCI guidelines in improving child health care outcomes.

MATERIALS AND METHODS

Setting

The study was conducted in Iseke Primary Health Centre (PHC), Iyaji Primary Health Centre (PHC), Aafin Primary Health care Centre, Ode-Aremo PHC, Ibrahim Taiwo Primary Health Centre, Saja Primary Health Centre, Oke-Ola Primary Health Centre, Adebayo Alata PHC of Oyo state, located in Southwestern Nigeria. The primary health care centers are predominantly inhabited by Yoruba people with mixed religious affiliations and are nurses, midwives and Community Health Extension Workers (CHEWs).

Study Design

One group quasi-experimental pre-post research group design was used to assess the effectiveness of a midwife-led intervention on knowledge and skills of Primary Health Care Workers on Integrated Management of Childhood Illnesses within the selected local governments of Oyo State.

Population and Sampling

Population for this study included all Primary Health Care workers from eight primary health care centres. Four each from Oyo Central and Oyo North senatorial district. Inclusion required willingness to participate, those who were not physically, emotionally or mentally fit were excluded.

The sample size was calculated using Slovine formula:

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

Where: S = Sample size

N = population of study

e = error margin

Therefore, $S = 172/1+172\ (0.05)^2$

$S = 172/1+172x\ 0.0025$

$S = 172/\ 1+0.43$

$= 172/1.43$

$= 120.28$

$= 120$

So as to take care of attrition due to non-response 10% of the calculated population was added:

$10/100 \times 120 = 12$

Hence, $120+12 = 132$

The study adopted multi-stage sampling techniques. Since it is impossible to include all eligible primary health care workers in Oyo State, given the time available for this research study, a concise representation of two senatorial districts was selected using scientific based sampling procedure, the senatorial districts arrived at were Oyo Central and Oyo North senatorial district. The sampling procedure was as follows:

Stage 1: The three senatorial districts were: Oyo North, Oyo Central and Oyo South

Stage 2: The study selected two out of the three senatorial districts (Oyo Central Senatorial District and Oyo North Senatorial District) in Oyo State utilizing random sampling techniques.

Stage 3: The selected senatorial districts were randomly stratified: Oyo Central Senatorial District and Oyo North Senatorial District

Stage 4: Two Local Governments were further selected from each of the stratified senatorial districts using Simple Random sampling techniques and were: Oyo West, Atiba, Ogbomoso North and Ogbomoso South

Stage 5: Two PHCs were further selected from each of the Local Government using systematic sampling techniques, while proportionate sampling methods was used to justify sample size for each PHC. The study total sample size of one hundred and thirty-two which include: Primary Health care Centre Iseke (12), Iyaji Primary Health care centre (15), Aafin Primary Health care Centre (21), Ode-Aremo Primary Health care centre (18), Ibrahim Taiwo PHC (15), Saja PHC (15), Oke-ola PHC (15), Adebayo Alata PHC (18)

Stage 6: The selection of participants were based on systematic sampling techniques.

Data Collection Instrument

This study adapted items from existing questionnaires from WHO IMCI guidelines[2] used in previous related studies and intervention checklist comprising sections on demographics, knowledge (8 items) and skills (10 items).

Procedure for Data Collection

The procedure for data collection was divided into three phases: Pre-intervention phase, Intervention phase and Post Intervention phase.

Pre-Intervention Phase

Two research assistants were trained to assist in data collection process. With the approval to collect data, the researcher and assistants proceeded to selected PHCs. The gate keepers were Nurses across healthcare facilities, who helped in the process of data collection. Meetings were scheduled with the proposed participant through zoom, where the aim of this study was made explicit to them, followed by selection of required number of participants from each level, distribution and instant retrieval of questionnaire (pre-intervention assessment) was carried out. Furthermore, a date for the next meeting (intervention) was picked and phone numbers of individual participants were requested and noted for reminder. Four weeks were spent for this phase.

Intervention Phase

An evidence-based educational intervention was prepared

to educate the participants. It was further subjected to scrutiny before adopting it to educate the participants. Interventions were carried out in each of the selected PHCs. To avoid exhaustion, the intervention was scheduled for two PHCs per week. Therefore, four (4) weeks were used for the intervention phase.

Post Intervention Phase

Following the intervention phase, participants were allowed to reflect and put into practice what they had been taught for a period of Four (4) weeks. Then a post-interventional assessment was conducted using questionnaires. The participants were recalled and presented with a copy of questionnaire each. After completion, the questionnaire were retrieved immediately. Distribution of questionnaire lasted for four (4) weeks, while the whole data collection process lasted for a total of 12 weeks.

Ethical Considerations

Ethical approval with approval number NHREC/OYOSHRIEC/10/11/22 was obtained from the Oyo State Ministry of Health. Informed consent was obtained from all participants; confidentiality and anonymity were maintained throughout data handling and reporting. Beneficence and maleficence were ensured.

Data Analysis

Data were analyzed using SPSS version 28. The analysis was done using both descriptive statistics (frequency and percentage) and inferential statistics to summarize demographic and main outcome variables, and paired t-tests assessed intervention effects at a significance level of 0.05.

RESULTS

Table 1 depicting socio-demographic characteristics of the respondents revealed important factors relevant to the study. The age distribution showed the majority of the respondents were within the 36–50 years age group 62(47.0%), followed by 21–35 years 38(28.8%) and 51–65 years 32(24.2%), with a mean age of 42.32 ± 10.87 years.

Table 2 revealed the knowledge of Primary Health Care (PHC) workers on the Integrated Management of Childhood Illnesses (IMCI) pre and post intervention. The mean knowledge score pre-intervention was 0.59 and 0.87 post-intervention.

Table 3 revealed the assessment skills of Primary Health Care (PHC) workers on the Integrated Management of Childhood Illnesses (IMCI) pre and post intervention. Pre-intervention, the mean score was 1.89 and 2.81 post intervention.

Table 4 presents the independent sample T-Test that there is no significant difference in the pre and post intervention knowledge of PHC Workers on IMCI in Oyo State. The results from the SPSS output show a mean difference of -2.20 (Mean = -2.19697, SD = 2.23244). The t-value of -11.307 with 131 degrees of freedom. The associated p-value (Sig. 2-tailed) was .000, which is well below the conventional significance level of 0.05.

Table 5 presents the independent samples t-test comparing pre- and post-intervention skills of PHC workers on IMCI in Oyo State. The analysis revealed a mean difference of -8.96 (Mean = -8.96212, SD = 5.87192). The t-value of -17.535 with 131 degrees of freedom and a p-value of .000 ($p < 0.05$) indicates that there is a statistically significant difference between pre- and post-intervention assessment skills.

Table 1: Socio-demographic characteristics of the respondents (n=132)

Age	Frequency(n)	Percentage (%)
21 - 35		
36 – 50	38	28.8
51 – 65	62	47.0
	32	24.2
	42.32(±10.87)	
Gender		
Male	29	18.0
Female	103	82.0
Marital Status		
Married	98	74.2
Single	28	21.2
Separated	6	4.6
Religion		
Christian	58	43.9
Islam	68	51.5
Traditional Worshippers	6	4.6
Category		
Nurse	18	13.6
Midwives	26	19.7
Nurses/midwives	25	18.9
CHEW	63	47.8
Qualifications		
Diploma	108	81.8
B.Sc	20	15.2
M.Sc	4	3.0

Table 2a: Knowledge on integrated management of Childhood illnesses

Variable	Pre-Intervention		Post-Intervention	
	True	False	True	False
The IMCI process can be used by all doctors, nurses and other health professionals who see young infants and children less than five years old.	74 (43.9%)	58 (62.1%)	116 (87.9%)	16 (12.1%)
IMCI a case management process for a first-level facility, such as a clinic, health center or an outpatient department of a hospital	82 (37.9%)	50 (40.2%)	97 (73.5%)	35 (26.5%)
In IMCI healthcare worker will screen for multiple illnesses, such as malaria, that could be happening at the same time	53 (59.8%)	79 (68.9%)	128 (97.0%)	4 (3.0%)
IMCI guidelines provide algorithms for assessing and treating the diarrhea	91 (68.9%)	41 (31.1%)	110 (83.3%)	22 (16.7%)
The guidelines help determine when to transfer patient to advanced care	81 (61.4%)	51 (38.6%)	99 (75.0%)	33 (25.0%)
The assessment of a child includes checking the child for other health problems.	46 (34.9%)	86 (65.2%)	121 (91.7%)	11 (8.3%)
Assessment, classification, treatment, counselling and follow-up are the components included in Integrated management of childhood illnesses	98 (74.2%)	34 (25.8%)	128 (97.0%)	4 (3.0%)
Assessing childhood illnesses involves the use of IMCI guidelines	93 (70.5%)	39 (29.5%)	119 (90.2%)	13 (9.8%)
	Mean (x): 0.59		Mean (x): 0.87	

Table 2b: Pre and post Intervention knowledge of PHC workers on IMCI

Knowledge of IMCI	Pre-intervention		Post-intervention	
	Frequency	Percentage	Frequency	Percentage
Below Average	38	28.8%	6	4.5%
Average	56	42.4%	18	13.6%
Above average	38	28.8%	108	81.8%
Minimum	0.20		0.50	
Maximum	0.80		1.00	
Mean	0.59		0.87	

Mean Gain = 0.87 – 0.59 = (0.28)

Table 3: Integrated management of Childhood illnesses (IMCI) Assessment skill

Variable	Pre-Intervention			Post-Intervention		
	Certainly	Possibly Not	Not at all	Certainly	Possibly Not	Not at all
Do you give pre-referral treatment for sick children being referred?	52 (39.4%)	38 (28.8%)	42 (31.8%)	118 (89.4%)	12 (9.1%)	2 (1.5%)
Do you give the first dose of relevant drugs to the children who are in need of specific treatment?	68 (51.5%)	49 (37.1%)	15 (11.4%)	102 (77.3%)	8 (6.1%)	22 (16.7%)
Do you teach the mother how to give oral drugs at home?	41 (31.1%)	23 (17.4%)	68 (51.5%)	127 (96.2%)	4 (3.0%)	1 (0.8%)
Do you teach the mother how to feed and give fluids during illness at home?	56 (42.4%)	23 (17.4%)	53 (40.2%)	129 (97.7%)	3 (2.3%)	0 (0.0%)

Do you teach the mother how to treat local infections at home?	22 (16.7%)	54 (40.9%)	56 (42.4%)	121 (91.7%)	8 (6.1%)	3 (2.3%)
Do you provide advice on the home management of sick children at home?	15 (11.4%)	28 (21.2%)	89 (67.4%)	98 (74.2%)	30 (22.7%)	4 (3.0%)
Do you ask the mother or other caregiver to return with the child for follow-up on a specific date, if needed?	52 (39.4%)	48 (36.4%)	32 (24.2%)	101 (76.5%)	19 (14.4%)	12 (9.1%)
Do you teach the mother how to recognize signs indicating that the child should be brought back to the clinic immediately?	34 (25.8%)	51 (38.6%)	47 (35.6%)	96 (72.7%)	24 (18.2%)	12 (9.1%)
Do you counsel the mother about her own health?	25 (18.9%)	39 (29.5%)	68 (51.5%)	114 (86.4%)	13 (9.8%)	5 (3.8%)
Do you reassess the children for any new problem when they are brought back to the clinic?	29 (22.0%)	40 (30.3%)	63 (47.7%)	122 (92.4%)	10 (7.6%)	0 (0.0%)
	Mean (x) = 1.89			Mean (x) = 2.81		

Table 4: Paired sample T-test for pre and post intervention knowledge of PHC Workers on IMCI in Oyo State.

Paired Samples Statistics							
Knowledge in IMCI	Mean	N	Std. Deviation	Std. Error Mean	t-value	Df	Sig. (2-tailed)
Pre-intervention	4.6818	132	2.58982	.22541	-11.307	131	.000
Post-intervention	6.8788	132	1.51849	.13217			

[t(131)= –11.307, p<0.05)]

Table 5: Paired sample T-test for pre and post intervention assessment skills of PHC Workers on IMCI in Oyo State.

Paired Samples Statistics							
Assessment skills of IMCI	Mean	N	Std. Deviation	Std. Error Mean	t-value	Df	Sig. (2-tailed)
Pre-intervention	9.1212	132	7.27332	.63306	-17.535	131	.000
Post-intervention	18.0833	132	3.93466	34247			

[t (131)= -17.535, p<0.05)]

DISCUSSION

The socio-demographic profile of the respondents presents how Integrated Management of Childhood Illness (IMCI) knowledge and skills are shaped at the primary healthcare level. In this study, the age distribution, reflects a workforce of relatively mature health professionals, although, older age groups may exhibit resistance to new technologies or innovative strategies in some situation, which means that training must be carefully tailored to balance experience with evolving practice needs. This finding holds a huge significance with workers within this age bracket often bring extensive professional experience that could enhance their adaptability to IMCI retraining and updates. The findings thus corroborate the position of Ng *et al.,*[6] and Xie *et al.,*[7] who emphasized that mid-career health professionals tend to show resilience in adopting policy-driven interventions.

Also, the findings from the pre- and post-intervention knowledge on integrated management of Childhood illnesses assessment skill revealed a substantial improvement in the understanding of the Integrated Management of Childhood Illnesses (IMCI) among the participants. This supports the positive impact of midwife-led IMCI training in enhancing healthcare workers' knowledge and readiness to manage childhood illnesses at the primary healthcare level. This aligns with the study conducted by Oladokun *et al.,*[8] and Dada *et al*, (2022)[9] reporting that short, targeted training on IMCI leads to significant gains in healthcare worker competency and case management accuracy.

Furthermore, Findings from Integrated management of Childhood illnesses (IMCI) Assessment skill, results indicate a significant improvement in the skills of primary healthcare (PHC) workers in the management of childhood illnesses following the IMCI training, suggesting that the training intervention effectively strengthened the practical competencies of PHC workers in line with global child health standards This finding aligns with previous studies conducted by Wolde *et al.,*[10] in Ethiopia and Chen *et al.,*[11] in China, where structured IMCI training programs were found to significantly boost healthcare workers' diagnostic and clinical decision-making skills. Likewise, Okonkwo et al.,[12] reported that Nigerian healthcare workers demonstrated better compliance with IMCI protocols in case management following targeted training interventions.

The first null hypothesis, which stated that there is no significant difference in the pre- and post-intervention knowledge of PHC workers on IMCI in Oyo State, was rejected. The pre-test mean score was low compared to post- test means score. The mean difference indicates that post-intervention knowledge was significantly higher than pre-intervention levels. The results revealed that structured IMCI training contributes to measurable knowledge acquisition among primary health care workers. This finding provides strong evidence to reject the null hypothesis, confirming that the IMCI training had a significant positive effect on the knowledge of PHC workers. The improved post-test performance can be ascribed to the hands-on training method, job aids, and active participation encouraged during the intervention. As the Integrated Management of Childhood Illness relies heavily on proper recognition and classification of symptoms, enhancing healthcare workers' knowledge is a foundational step towards reducing under-five morbidity and mortality. These results reinforce the recommendations by the World Health Organization[3] that regular in-service training and refresher courses are important for sustaining knowledge retention and improving clinical outcomes among frontline health workers. Also, these findings are consistent with studies by Nguyen *et al.,* (2021)[13] in Vietnam and Adepoju *et al.*[14], in Nigeria, where post-training knowledge scores significantly improved after structured IMCI training programs were implemented. Similarly, Isagunla *et al.*[15], reported in Kenya that participants demonstrated better recall and application of IMCI principles after attending capacity-building workshops.

The second null hypothesis, which stated that there is no significant difference in the pre- and post-intervention IMCI assessment skills of PHC workers, was also rejected. The mean skill score prior to the intervention was reduced while the post-intervention mean increased significantly. These results allow for the rejection of the null hypothesis, confirming that the IMCI intervention significantly enhanced the practical skills of PHC workers in managing childhood illnesses. This uniformity is critical because it ensures standardized delivery of child health services, thereby reducing disparities in care quality. The significant reduction in standard deviation from the pre-test to the post-test also suggests that skill acquisition became more uniform among the PHC workers after the intervention,

indicating not just improvement, but consistency in skill mastery. Moreover, this result supports the WHO's emphasis on skill-based training and practical simulations in IMCI capacity building. As emphasized by WHO and UNICEF (2020)[2,16], the effectiveness of the IMCI strategy depends largely on the competency of frontline workers in assessing, classifying, and managing childhood illnesses, all of which require well-developed clinical skills.

CONCLUSION

The study concluded that knowledge and assessment skills of PHC workers on Integrated Management of Childhood Illnesses (IMCI) increases during post-intervention compared to pre-intervention phase. The reason to this is that, the educational intervention was effective enough to improve assessment skills of PHC workers which was evident in the result.

RECOMMENDATIONS

Nursing, midwifery, and community health training institutions should strengthen their curricula to place greater emphasis on practical IMCI competencies. In addition, since effective IMCI requires both accurate health worker assessment and caregiver adherence to advice, it is suggested that PHC facilities strengthen community education efforts. Midwives and other PHC workers should be supported to organize caregiver education sessions, emphasizing recognition of danger signs, adherence to treatment, and timely return for follow-up care. In addition, there should be provision of IMCI job-aids and essential commodities for proper implementation of IMCI guidelines.

LIMITATION

This study was conducted in just eight PHCs in Oyo State, therefore findings may not capture activities related to IMCI in all PHCs in the state or in the country. Thus, the findings cannot be generalized to capture the state or the country as a whole. Findings should however be accepted with this foreknowledge.

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Declaration

All authors declared no conflict of interest