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IMPLEMENTING AND EVALUATING A PAEDIATRIC EMERGENCY MANAGEMENT TRAINING PROGRAM FOR PRIMARY HEALTHCARE WORKERS IN ZARIA

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Abstract

Nigeria continues to grapple with alarmingly high under-five mortality rates, with approximately 2,300 children dying daily due to preventable and treatable diseases such as pneumonia, malaria, and diarrheal illnesses. This crisis is particularly pronounced in rural areas, where childhood mortality rates are significantly higher than in urban centres. For many rural communities, primary healthcare (PHC) centres serve as the sole access point to medical services, making these centres critical to addressing this public health challenge. Despite their importance, PHC centres often face significant challenges, including inadequate infrastructure, limited access to essential medications, and a shortage of adequately trained health personnel.

This study aimed to implement and evaluate a Paediatric Emergency Management Training Program for healthcare workers at PHC centres in Zaria, Kaduna State. The primary objective was to assess the effectiveness of the training in improving the competency of health workers in managing common paediatric emergencies, thereby enhancing the overall quality of care provided at these centres.

A cross-sectional descriptive study was conducted involving 139 healthcare workers from selected PHC centres in Sabon Gari and Zaria Local Government Areas, utilizing a multi-stage random sampling technique. Data collection was performed using a pre-tested, semi-structured, self-administered questionnaire designed to evaluate the participants' baseline knowledge, followed by an assessment after the training intervention. The data were analysed using SPSS version 21, with chi-square tests employed to examine the associations between variables. Results were presented using tables and charts for clarity.

The findings revealed a generally low baseline competency in managing common paediatric emergencies among the healthcare workers. Specifically, 66 (48.5%) of the respondents demonstrated very poor knowledge regarding the causes of common paediatric emergencies, 32 (23.5%) had poor knowledge, 34 (25.0%) had good knowledge, and only 4 (2.9%) of the respondents exhibited excellent knowledge. Similarly, knowledge regarding the treatment of these emergencies was also lacking, with 46.7% of respondents showing very poor understanding, 34.1% having poor knowledge, 16.3% demonstrating good knowledge, and only 3.0% showing excellent knowledge. A statistically significant relationship was observed between academic qualifications and knowledge levels in both causes ($p = 0.004$) and treatment ($p = 0.000$) of paediatric emergencies.

The low baseline knowledge underscores the critical need for targeted training interventions. The study highlights the importance of establishing a sustained partnership between the Department of Paediatrics at Ahmadu Bello University Teaching Hospital and the Departments of Primary Health Care in Zaria and Sabon Gari Local Governments. Regular training workshops, held quarterly, are recommended to continuously equip PHC workers with the necessary skills to effectively manage paediatric emergencies, ultimately contributing to a reduction in childhood mortality rates in the region.

Keywords Paediatric emergencies, Nigeria, Primary healthcare, Healthcare workers, Emergency management skills, Child mortality.

INTRODUCTION

A medical emergency is an acute health condition that poses an immediate risk to a person's life or long-term health if not treated promptly. In paediatric patients, these emergencies are particularly concerning due to their rapid progression and the unique physiological responses of children compared to adults. Paediatric emergencies are classified as those affecting individuals under 18 years of age and represent a significant burden on healthcare systems globally (Barbiellini et al., 2021; Jordan et al., 2022; Newgard et al., 2023). They remain a

leading cause of morbidity and mortality, especially among children under five years of age, who are particularly vulnerable due to their developing immune systems and dependency on caregivers for timely medical intervention. The World Health Organization (WHO) emphasizes that paediatric emergencies require urgent medical attention to prevent death or severe long-term health consequences (WHO, 2016; Elhassan et al., 2021).

The incidence and pattern of paediatric emergencies tend to be consistent across regions with similar socio-demographic characteristics, reflecting common public health challenges and resource limitations. For example, a study conducted in Khartoum, Sudan, reported that respiratory tract infections accounted for 33% of paediatric emergencies, followed by diarrheal disorders (29.9%), infectious diseases (8.3%), severe malaria (5.5%), and severe acute malnutrition (3.5%) (Elhassan et al., 2021). These findings align with those from other regions in Sub-Saharan Africa, where similar patterns have been observed. In a five-year review of paediatric admissions at the Children's Emergency Room of the University of Nigeria Teaching Hospital (UNTH) in Enugu, the most frequent emergencies included febrile convulsions (21.5%), severe malaria with anaemic heart failure (18.4%), acute pneumonia (16.1%), diarrheal diseases (12.3%), sickle cell anaemia crises (7.6%), acute neurological conditions (7.6%), and acute severe asthma (5.2%) (Fagbamigbe et al., 2017; Oguonu et al., 2018). These studies underscore the critical need for effective training programs tailored to the specific emergency care needs in paediatric populations, particularly in regions where these conditions are prevalent.

The high burden of paediatric emergencies, particularly in low-resource settings, underscores the critical need for effective emergency management protocols at the primary healthcare (PHC) level. In many developing countries, including Nigeria, PHC centres are the first point of contact for most patients, especially in rural areas. However, these centres are often under-resourced and inadequately staffed, leading to suboptimal care during emergencies (Oleribe et al., 2016; Agodirin et al., 2019).

Training healthcare workers in the management of paediatric emergencies is essential to improving outcomes in these critical situations. Studies have shown that targeted training programs can significantly enhance the preparedness of healthcare workers, thereby reducing morbidity and mortality rates in paediatric emergencies (Auerbach et al., 2018; Topjian et al., 2020). However, despite the recognized importance of training, there remains a paucity of studies evaluating the effectiveness of such programs in Nigeria's PHC settings, particularly in northern regions like Zaria, Kaduna State.

The Alma-Ata Declaration of 1978 emphasized the importance of primary health care as a key strategy for achieving "Health for All" by the year 2000, highlighting the need for accessible, equitable, and affordable health care services. In Nigeria, PHC is the cornerstone of the health policy and represents the first level of contact between individuals and the health care system (WHO, 2008). However, the effectiveness of PHC in Nigeria is often compromised by inadequate infrastructure, limited access to essential drugs, and a shortage of trained personnel (Oleribe et al., 2016; Suberu, Obohwemu & Soyobi, 2024; Suberu et al., 2024a). The situation is exacerbated in rural areas, where the burden of disease is higher and the availability of trained healthcare workers is lower (Fagbamigbe et al., 2017; Suberu et al., 2024b).

The need for a comprehensive Paediatric

Emergency Management Training Program for PHC workers in Zaria is underscored by the region's high under-five mortality rates, which are among the highest in Nigeria (NDHS, 2013). The lack of trained personnel in these settings often leads to delays in the recognition and management of paediatric emergencies, contributing to preventable deaths. Training programs that focus on equipping healthcare workers with the necessary skills to manage common paediatric emergencies could play a pivotal role in reducing child mortality rates in these settings.

This study aims to implement and evaluate a Paediatric Emergency Management Training Program specifically designed for PHC workers in Zaria. By focusing on the training needs of these workers, the study seeks to improve the quality of care provided during paediatric emergencies, ultimately reducing the high rates of morbidity and mortality among children in the region. The program will be tailored to address the specific challenges faced by PHC workers in Zaria, including the management of common paediatric emergencies such as severe malaria, respiratory infections, and diarrheal diseases.

METHODOLOGY

Study Setting

This study was conducted in Zaria, a prominent city in Kaduna State, Nigeria. Zaria has a population of approximately 698,348 people, served by 55 primary healthcare centres (PHCs). These centres are the main access point for healthcare services in the region, catering to a diverse population that includes both urban and rural residents. The study setting reflects the broader healthcare landscape of northern Nigeria, where PHCs play a crucial role in delivering essential health services, particularly in underserved areas (National Population Commission & ICF International, 2014; WHO, 2014).

Study Design

A cross-sectional descriptive study was employed to evaluate the paediatric emergency management skills of healthcare workers in the selected PHCs of Zaria. This design was chosen for its effectiveness in capturing a detailed snapshot of the skills present at the time of the study, allowing for the identification of strengths and gaps within the healthcare workforce (Abodunrin et al., 2018; Chinawa et al., 2020).

Study Participants

The participants included healthcare workers actively engaged in patient care at the selected PHCs. These workers included pharmacy technicians, junior and senior community health extension workers (J-CHEWs and S-CHEWs), nurses, midwives, community health officers (CHOs), and medical officers (doctors). To ensure the participants had adequate experience in handling paediatric emergencies, only those with a minimum of six months of experience were included in the study. This approach is consistent with previous studies that focus on evaluating practical skills among healthcare providers (Akinyemi et al., 2017).

Exclusion Criteria

Healthcare workers who were on leave during the data collection period or those not directly involved in patient care were excluded. This exclusion was necessary to focus the study on individuals with active roles in managing paediatric emergencies, thereby ensuring that the findings were relevant to frontline healthcare delivery (Okoli & Oli, 2015).

Sample Size

The sample size was calculated to ensure representativeness and statistical validity. Using a 95% confidence level and a 5% margin of error,

with an additional 10% allowance for attrition, the final sample size was determined to be 146 healthcare workers. This sample size was sufficient to detect significant differences in skill levels among the participants, providing robust data for analysis (Fagbamigbe et al., 2020; WHO, 2014).

Sampling

A multi-stage sampling technique was employed to select participants. First, 15 wards were randomly chosen from Zaria and Sabon Gari Local Government Areas to ensure a representative sample. Next, one PHC was randomly selected from each ward. Finally, healthcare workers were selected from each PHC based on their proportion within the centre, using simple random sampling. This approach minimized selection bias and ensured that the sample accurately reflected the healthcare workforce in the region (Uzochukwu & Onwujekwe, 2004).

Data Collection Instrument

A structured questionnaire, developed and pretested for reliability and validity, was used to collect data. The questionnaire included sections on demographics, work experience, and specific questions assessing skills related to paediatric emergency management. The instrument focused on evaluating practical skills rather than theoretical knowledge, ensuring that the study directly addressed the competencies required in real-world emergency scenarios (Abodunrin et al., 2018; Chinawa et al., 2020).

Data Collection

Data collection occurred over a three-month period, with researchers visiting the selected PHCs to distribute and collect questionnaires. Participants completed the questionnaires in a private setting to ensure confidentiality. Researchers were available to clarify any questions, which helped improve the accuracy and completeness of the responses (Akinyemi et al., 2017).

Data Management and Analysis

After data collection, the questionnaires were reviewed, coded, and entered into SPSS version 21 for analysis. Descriptive statistics were used to summarize the demographic and skill data, while chi-square tests were employed to examine associations between categorical variables, such as skill levels and educational background. A p-value of less than 0.05 was considered statistically significant, indicating strong associations between variables (Okoli & Oli, 2015).

Scoring

The study utilized a scoring system to categorize the skill levels of healthcare workers in paediatric emergency management. Responses were classified into four categories: very poor, poor, good, and excellent. This system was based on predefined criteria from the pilot study, which helped to objectively measure and compare the skill levels of the participants (Abodunrin et al., 2018).

Ethical Considerations

Ethical approval was obtained from the Department of Community Medicine at Ahmadu Bello University, Zaria. In addition, permissions were secured from the Directors of Primary Health Care in Sabon Gari and Zaria Local Government Areas, as well as from the heads of the participating PHCs. All participants provided informed written consent, ensuring they were aware of the study's purpose, procedures, and their rights, including the option to withdraw at any time. Confidentiality was maintained throughout the study by anonymizing responses and securely storing data (Federal Ministry of Health, 2010; National Population Commission & ICF International,

2014).

Study Limitations

The cross-sectional design of this study captures the skill levels of healthcare workers as of December 2016. However, it does not account for changes in skills or healthcare practices that may have occurred since then due to policy changes, training programs, or resource updates. Additionally, the reliance on self-reported data introduces the potential for bias, as participants may either overestimate their skills or underreport deficiencies. To mitigate this, the study included practical scenario-based questions to complement the self-assessment and provide a more accurate picture of the participants' skills (World Health Organization, 2014).

RESULTS

A total of 146 questionnaires were administered, resulting in a response rate of 95% with 139 completed questionnaires returned. The collected data were analysed using SPSS version 21 and presented in tables and charts to address the study objectives. The high response rate of 95% indicates the cooperation and engagement of the healthcare workers involved in the study, enhancing the representativeness of the findings.

As seen in Table 1, most (35.3%) of the respondents were within the age group 26-35 years with a mean age of 30.9±8.8 standard deviation. Majority (83.5%) of them were females, 69.1% of them were married, 83.5% of were Hausa, majority (85.6%) of them were Muslims, most of them (87.8%) have had tertiary education, and 29.5% of them were nurses/midwives.

Table 1: Socio-demographic characteristics of respondents

Variable	Frequency (n=139)	Percent (%)
Age (years)		
<26	46	33.1
26-35	49	35.3
36-45	35	25.2
>45	9	6.5
Sex		
Male	23	16.5
Female	116	83.5
Marital status		
Married	96	69.1
Single	41	29.5
Divorced	1	0.7
Widowed	1	0.7
Tribe		
Hausa	116	83.5
Yoruba	5	3.6
Igbo	4	2.9
Others	14	10.1

Religion		
Christianity	18	12.9
Islam	119	85.6
Others	2	1.4
Education status	2	
Primary	15	1.4
Secondary	122	10.8
Tertiary		87.8
Qualification	41	
Nurse/midwife	10	29.5
CHO	25	7.2
SCHEW	20	18.0
JCHEW	15	14.4
EHO	11	10.8
Medical Lab Technician	17	7.9
Others		12.2

Fifty-five (39.6%) of the respondents had a health care working experience of less than 3 years, 31 (22.3%) had experience of between 3-5 years while 53 (38.1%) of respondents have been health workers for more than 5 years.

Table 2: Work experience of respondents

Variable	Frequency (n=139)	Percent
Below 3 years	55	39.6
3-5 years	31	22.3
Greater than 5 years	53	38.1

Majority (65.5%) of the respondents have had some form of medical training within the last two years preceding this study.

Table 3: PHC workers who have had some form of medical training in the last two years of practice

Medical training	Frequency (n=139)	Percent (%)
Had	91	65.5
Not had	48	34.5

Majority (65.5%) of the respondents would like to attend a training to improve their knowledge of the management of common paediatric emergencies.

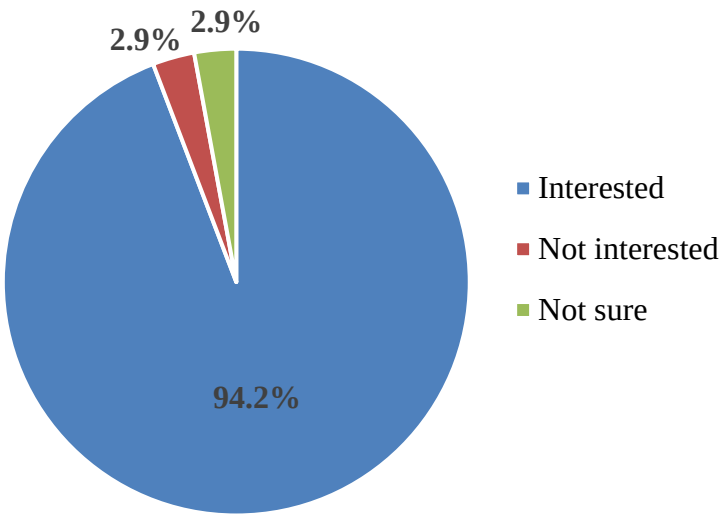

Figure 1: PHC workers who would like to attend a training to improve their knowledge of the management of common paediatric emergencies

DISCUSSION

The implementation of a Paediatric Emergency Management Training Program for primary healthcare (PHC) workers in Zaria is crucial for enhancing the emergency care capabilities at the grassroots level. This study, aimed at evaluating the impact of such a program, revealed several critical insights into the preparedness and training needs of healthcare workers in this region.

The study highlighted a significant gap in the formal training of PHC workers, particularly in the management of paediatric emergencies. Despite the relatively high interest in further training (94.2% of respondents), the actual knowledge and skill levels in critical areas such as severe malaria management, dehydration treatment, and emergency response protocols were found to be inadequate. For instance, only 30.4% of healthcare workers correctly identified IV artesunate as the first-line treatment for severe malaria, reflecting a broader trend of insufficient familiarity with up-to-date treatment guidelines (Akinyemi et al., 2017; Chinawa et al., 2020)

This lack of preparedness underscores the urgent need for targeted training interventions. The disparities in knowledge and skills among healthcare workers, particularly when compared to studies in more resource-rich settings, highlight the consequences of insufficient training. In high-income countries, standardized training programs such as Paediatric Advanced Life Support (PALS) have been shown to dramatically improve the readiness of healthcare providers, with over 93.5% of participants achieving high scores on competency assessments (Topjian et al., 2020). In contrast, the lower performance observed in Zaria can be attributed to the absence of similar, rigorous training frameworks in the Nigerian PHC system.

Moreover, the study revealed that most healthcare workers did not possess adequate skills in

emergency response, with only 23.6% demonstrating good diagnostic skills for paediatric emergencies. This is particularly concerning given the high incidence of paediatric emergencies such as severe dehydration, which requires prompt and accurate intervention (World Health Organization, 2014; Okoli & Oli, 2015). The study's findings are consistent with previous research in similar settings, where healthcare workers often struggle with the practical application of theoretical knowledge in emergency situations (Abodunrin et al., 2018).

The successful implementation of a Paediatric Emergency Management Training Program in Zaria would likely address these deficiencies by providing comprehensive, hands-on training tailored to the specific challenges faced by healthcare workers in this region. Such a program should include modules on the management of common paediatric emergencies, the use of emergency equipment, and adherence to standardized treatment protocols. The training should also incorporate simulation-based learning, which has been shown to significantly improve clinical skills and decision-making in emergency scenarios (Auerbach et al., 2018).

Furthermore, the study highlights the importance of continuous professional development. Given the rapidly evolving nature of medical guidelines and the introduction of new treatment modalities, it is imperative that healthcare workers in PHCs receive ongoing training to keep their skills and knowledge up to date (Fagbamigbe et al., 2020). This could be facilitated through periodic refresher courses, workshops, and access to updated clinical guidelines.

The findings of this study clearly demonstrate the need for a structured and ongoing Paediatric Emergency Management Training Program in Zaria. Such a program would not only enhance the knowledge and skills of PHC workers but also improve the overall quality of care provided to children in emergency situations. Implementing this training program would be a critical step towards achieving better health outcomes for children in Zaria and similar settings across Nigeria.

CONCLUSION

The statistically significant relationship between academic qualifications and knowledge levels in both the causes and treatment of paediatric emergencies suggests that improving educational standards and providing regular, structured training can significantly enhance the competency of healthcare workers. Establishing a sustained partnership between the Department of Paediatrics at Ahmadu Bello University Teaching Hospital and the Departments of Primary Health Care in Zaria and Sabon Gari Local Governments is crucial. Regular training workshops, held quarterly, are recommended to ensure that PHC workers are consistently equipped with the necessary skills to manage paediatric emergencies effectively.

By addressing the gaps in knowledge and skills through ongoing training and support, it is possible to improve the quality of care provided at PHC centres. This, in turn, can lead to a significant reduction in childhood mortality rates in the region, ultimately contributing to better health outcomes for children in Nigeria. The study’s findings advocate for a proactive approach to healthcare worker training, emphasizing the importance of continuous professional development in the fight against preventable childhood diseases.

Availability of Data and Materials

The authors declare consent for all available data present in this study.

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Authors' Contributions

The entire study procedure was conducted with the involvement of all writers.

Competing Interests

The authors declare no conflicts of interest.

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