INTERNATIONAL JOURNAL OF MEDICAL SCIENCE AND PUBLIC HEALTH RESEARCH (ISSN – 2767-3774)
VOLUME 05 ISSUE 11 Pages: 23-40
OCLC –1242424495

International Journal of Medical Science and Public Health Research

Journal Website: https://ijmsphr.com/index.php/ijmsphr

Research Article

THE IMPACT OF PAEDIATRIC EMERGENCY MANAGEMENT SKILLS ON PATIENT OUTCOMES IN ZARIA

Submission Date: October 25, 2024, Accepted Date: October 30, 2024,
Published Date: November 07, 2024
Crossref Doi: https://doi.org/10.37547/ijmsphr/Volume05Issue11-04

Suberu Omeiza Peter
MPH, Cardiorespiratory Unit, Leeds Teaching Hospitals NHS Trust, Leeds, United Kingdom

Obohwemu Oberhiri Kennedy
PhD, Department of Health, Wellbeing & Social Care, Global Banking School/Oxford Brookes University, Birmingham, United Kingdom;
PENKUP Research Institute, Birmingham, United Kingdom

Soyobi Yewande Victoria
MBBS, Oni Memorial Children Hospital, Ibadan, Nigeria;
Riverside Nursing Home, Aberdeen, United Kingdom

Abdelkader Nourhan
MSC, Department of Health, Wellbeing & Social Care, Global Banking School/Oxford Brookes University, Birmingham, United Kingdom

Adesida-Ehebha Tolulope
MSPH, Sunderland Royal Hospital, South Tyneside and Sunderland NHS Foundation Trust, Sunderland, United Kingdom

Corresponding Author: Obohwemu Kennedy Oberhiri, PhD

ABSTRACT

Paediatric emergencies represent a critical challenge in Nigeria, where approximately 2,300 children under the age of five die daily, predominantly from preventable and treatable conditions such as pneumonia, malaria, and diarrheal diseases. Mortality rates are disproportionately higher in rural areas, where primary health care (PHC) centers often serve as the only point of access to medical services. The effectiveness of these centers is largely dependent on the emergency management skills of their healthcare workers. Despite their importance, there has been limited research on how the skills of PHC workers in managing paediatric emergencies impact patient outcomes.

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This study aimed to assess the proficiency of healthcare workers in primary healthcare centers in Zaria in managing common paediatric emergencies. A cross-sectional descriptive study was conducted among 139 health workers selected through a multi-stage sampling technique in Sabon Gari and Zaria Local Government Areas. Data collection was carried out using a pre-tested semi-structured self-administered questionnaire. The data were analyzed using SPSS version 21, and associations were tested using the chi-square test, with results presented in tables and charts.

The findings revealed a significant deficiency in the emergency management skills of healthcare workers. A majority of respondents demonstrated inadequate skills in handling paediatric emergencies, with 66 (48.5%) exhibiting very poor competency in the management of common paediatric emergencies, and 32 (23.5%) displaying poor competency. Only a small fraction, 4 (2.9%) of respondents, demonstrated excellent skills in emergency management. Similarly, 46.7% of the respondents had very poor skills in the treatment of common paediatric emergencies, while only 3.0% exhibited excellent treatment skills. A statistically significant relationship was observed between the level of academic qualification and emergency management skills ($p < 0.05$).

The results underscore the critical need to enhance the skill levels of healthcare workers in PHCs through continuous professional development. This could be achieved through collaborative efforts between the Department of Paediatrics at Ahmadu Bello University Teaching Hospital and the Primary Health Care Departments of Zaria and Sabon Gari local governments, focusing on regular training and workshops. Improving the skills of healthcare workers in managing paediatric emergencies is essential for reducing child mortality and improving health outcomes in the region.

KEYWORDS

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

INTRODUCTION

Paediatric emergencies, defined as acute medical conditions occurring in individuals under the age of 18, pose significant risks to life and long-term health if not promptly and adequately managed (Agbesanwa et al., 2023). These emergencies are a major cause of morbidity and mortality among children, particularly those under the age of five, especially in low- and middle-income countries (LMICs) such as Nigeria (Eze et al., 2023). In these settings, the burden of paediatric emergencies is exacerbated by factors such as poverty, malnutrition, and the inadequacy of healthcare infrastructure (Akodu et al., 2024).

The pattern of paediatric emergencies tends to be consistent across regions with similar socio-demographic characteristics. Studies from different parts of Africa have highlighted the prevalence of respiratory tract infections, diarrheal diseases, malaria, and severe acute malnutrition as the leading causes of paediatric emergencies. For instance, in Khartoum, Sudan, respiratory tract infections accounted for 33% of paediatric emergencies, while in Enugu, Nigeria, febrile convulsions, severe malaria, and acute pneumonia were the most common emergencies recorded in the Children's Emergency Room at the

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University of Nigeria Teaching Hospital (Abdelrahman et al., 2014; Okoli et al., 2015).

Globally, malnutrition is a significant underlying factor contributing to paediatric emergencies, with more than 50% of childhood deaths attributed to undernutrition. This relationship is particularly pronounced in cases involving diarrheal diseases, pneumonia, measles, and malaria, where undernutrition substantially increases the risk of mortality (UNICEF, 2016).

Despite global efforts to reduce child mortality, such as the Millennium Development Goal (MDG) 4, which aimed to reduce the under-five mortality rate by two-thirds between 1990 and 2015, progress has been uneven. While significant reductions in child mortality have been achieved, particularly in developing regions, the rate of decline has not been sufficient to meet the MDG targets, and challenges remain in many low-resource settings. In 2013, an estimated 6.3 million children under five died worldwide, with the majority of these deaths occurring in sub-Saharan Africa and South Asia (UNICEF, 2016).

Nigeria, with one of the highest under-five mortality rates in the world, continues to grapple with this public health challenge. As of 2013, the under-five mortality rate in Nigeria was 128 deaths per 1,000 live births, a figure that underscores the severity of the problem (NDHS, 2013). The primary contributors to child mortality in Nigeria include pneumonia, diarrhea, malaria, and neonatal conditions, all of which are exacerbated by the inadequacies of the primary health care (PHC) system, particularly in rural areas where access to healthcare services is limited (Iuliano et al., 2020; Okoroiwu, Uchendu and Essien, 2020; Odejimi et al., 2022).

The structure of healthcare delivery in Nigeria is tiered, with PHC being the most accessible level of care for the majority of the population, particularly in rural areas (Abati, 2020; Abubakar, 2021; Irabor, Ebirim and Aloba, 2022). PHCs are intended to provide essential healthcare services, including the management of common paediatric emergencies. However, these centers are often plagued by a lack of skilled manpower, inadequate facilities, and insufficient resources. These deficiencies severely limit the ability of PHC centers to effectively manage paediatric emergencies, thereby contributing to the high rates of child mortality in the country.

A study conducted in Lagos State revealed significant deficiencies in the infrastructure and human resources available at PHC facilities. For instance, many facilities lacked basic amenities such as water, power, and adequate sanitation, and were poorly equipped to handle emergencies. Moreover, the healthcare workers in these facilities often lacked the necessary knowledge and skills to manage paediatric emergencies effectively, with no opportunities for in-service training or professional development (Akinyemi et al., 2017; Suberu, Obohwemu & Soyobi, 2024; Suberu et al., 2024).

Given the critical role of PHC centers in the healthcare system and their responsibility for managing the bulk of paediatric emergencies in rural Nigeria, it is imperative to assess and enhance the emergency management skills of healthcare workers in these facilities. This study aims to evaluate the competence of healthcare workers in PHC centers in Zaria in managing common paediatric emergencies, with the goal of identifying gaps and proposing interventions to improve patient outcomes.

METHODS

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Study Setting

Zaria, a prominent city in Kaduna State, Nigeria, is characterized by its diverse population and significant urban-rural divide. The city encompasses 55 primary healthcare centers (PHCs) that collectively serve a population of approximately 698,348 individuals (National Population Commission [NPC] & ICF International, 2014). These PHCs are strategically distributed across various wards to ensure accessibility to essential health services for residents, particularly in underserved rural areas. The selected PHCs for this study are representative of the broader healthcare infrastructure in Zaria, encompassing both urban and rural settings to provide a comprehensive assessment of paediatric emergency management skills among healthcare workers.

Study Design

A cross-sectional descriptive study design was employed to evaluate the paediatric emergency management skills of healthcare workers in Zaria's PHCs. This design was chosen for its effectiveness in providing a snapshot of the current skill levels at a specific point in time, facilitating the identification of prevalent competencies and gaps (Abodunrin et al., 2018). Cross-sectional studies are particularly useful in public health research for informing policy and intervention strategies due to their ability to assess multiple variables simultaneously (Chinawa et al., 2020).

Study Participants

The study targeted healthcare workers actively involved in patient care within the selected PHCs. Participants included pharmacy technicians, junior community health extension workers (J-CHEWs), senior community health extension workers (S-CHEWs), nurses, midwives, community health officers (CHOs), and medical officers (doctors). To ensure that participants had sufficient exposure to paediatric emergencies, inclusion criteria required a minimum of six months of experience in their current role (Akinyemi et al., 2017). This criterion aligns with standard practices in similar studies to ensure that respondents possess adequate familiarity with emergency scenarios (Okoli & Oli, 2015).

Exclusion Criteria

Healthcare workers who were on leave, either temporarily or permanently, during the data collection period were excluded from the study. Additionally, those not directly involved in patient care, such as administrative staff and non-clinical support personnel, were also excluded. This exclusion criterion was implemented to focus the study on individuals actively engaged in managing paediatric emergencies, thereby enhancing the relevance and accuracy of the findings (Okoli & Oli, 2015).

Sample Size

The sample size was calculated using the formula for estimating proportions in cross-sectional studies, ensuring a 95% confidence level and a 5% margin of error. An initial sample size of 132 was determined based on the population of 55 PHCs, assuming a proportion of 50% for maximum variability (Fagbamigbe et al., 2020). To account for an anticipated 10% non-response rate and potential attrition, the sample size was increased to 146 healthcare workers. This adjustment ensures sufficient power to detect significant differences and associations within the data, enhancing the study's reliability (World Bank, 2010).

Sampling

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A multi-stage sampling method was employed to select study participants, ensuring a representative sample from both Sabon Gari and Zaria Local Government Areas. In the first stage, 15 wards were randomly selected from the two areas to ensure proportional representation. In the second stage, one PHC was randomly chosen from each selected ward, resulting in 15 PHCs being included in the study. Finally, within each selected PHC, healthcare workers were selected proportionately based on their numbers, utilizing simple random sampling to minimize selection bias (Uzochukwu & Onwujekwe, 2004). This method enhances the generalizability of the study findings across different PHCs in Zaria.

Data Collection Instrument

Data were collected using a structured, pre-tested, semi-structured self-administered questionnaire. The questionnaire comprised sections on demographic information (age, gender, education level, years of experience), work experience, and specific skills related to paediatric emergency management. The skills assessment included practical scenarios and self-rated competence levels, focusing exclusively on skills rather than knowledge or training (Abodunrin et al., 2018). The questionnaire was developed based on validated instruments from previous studies to ensure reliability and validity (Chinawa et al., 2020). It was pilot-tested on a small sample of healthcare workers not included in the final study to refine questions and improve clarity.

Data Collection

Data collection took place over a period of three months, during which researchers visited the selected PHCs to administer the questionnaires. Healthcare workers were approached individually to complete the self-administered questionnaires in a private setting, ensuring confidentiality and reducing potential response bias. Researchers were available on-site to provide clarifications and assist with any difficulties in understanding the questionnaire, thereby enhancing the completeness and accuracy of the data collected (Akinyemi et al., 2017). Participation was voluntary, and respondents were assured that their responses would be used solely for research purposes.

Data Management and Analysis

Upon collection, the questionnaires were reviewed for completeness and consistency. Data were then coded and entered into SPSS version 21 for analysis. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize the demographic characteristics and skill levels of the participants. Inferential statistics, specifically the chi-square test, were employed to assess associations between categorical variables such as academic qualification and skill levels in paediatric emergency management. A p-value of less than 0.05 was considered statistically significant, allowing for the identification of factors significantly associated with varying skill levels (Okoli & Oli, 2015).

Scoring

A scoring system was implemented to evaluate the skills of healthcare workers in managing paediatric emergencies. Responses were categorized into four levels: very poor, poor, good, and excellent. This categorization was based on predefined criteria, with cut-off points determined from the distribution of scores in the pilot study. Twenty-one questions were used to assess the health workers' skill in diagnosing and treating common paediatric emergencies. Thirteen of these questions were single response questions while 8 were multiple response questions. Each correct response was scored 2 points and each

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incorrect response was scored 0. The overall maximum obtainable score for skill in diagnosing and treating common paediatric emergencies was 96 and the minimum was 0.

Table 1: Grading of knowledge and skill scores

Knowledge/Skill level	Range of scores (%)
Very poor	0-29.9
Poor	30-49.9
Good	50-74.9
Excellent	>75

The scoring system allowed for an objective assessment of skill levels, facilitating the identification of areas requiring improvement and informing targeted interventions (Abodunrin et al., 2018).

Ethical Considerations

Ethical clearance for the study was obtained from the Department of Community Medicine at Ahmadu Bello University, Zaria. Additionally, permissions were secured from the Directors of Primary Health Care in both Sabon Gari and Zaria Local Government Areas, as well as from the heads of all participating PHCs. Informed written consent was obtained from all participants, ensuring that they were fully aware of the study's purpose, procedures, and their rights, including the right to withdraw at any time without repercussions (National Population Commission & ICF International, 2014). Confidentiality was maintained by anonymizing responses and securely storing data, in accordance with ethical research standards (Federal Ministry of Health, 2010).

Study Limitations

This study's cross-sectional design provides a snapshot of the skills of healthcare workers in December 2016. Consequently, the findings may not reflect subsequent changes due to healthcare policy shifts, training programs, or resource availability. Furthermore, the reliance on self-reported data for skill assessment may introduce response bias, as healthcare workers might overestimate their skills or underreport limitations. To mitigate this, the study incorporated practical scenario-based questions to complement self-assessments, enhancing the reliability of the skill evaluation (World Health Organization, 2014). Future studies could employ longitudinal designs and objective skill assessments to provide a more comprehensive understanding of skill development over time.

RESULTS

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A total of 146 questionnaires were administered, 139 questionnairres were filled and returned giving a response rate of 95%. The results were analysed and presented in tables and charts, according to the study objectives.

Table 2: 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

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Medical Lab Technician	17	7.9
Others		12.2

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 3: 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

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 4: Skills in diagnosing common paediatric emergencies

Skill	Frequency (n=110)	Percent (%)
Very poor skills	41	37.3
Poor skills	39	35.5
Good skills	26	23.6
Excellent skills	4	3.6

The table shows the aggregated skill scores of the respondents in diagnosing common paediatric emergencies. Forty-one (37.3%) of the respondents had very poor skills in the diagnosis of common paediatric emergencies; 39 (35.5%) had poor skills; 26 (23.6%) had good skills, and only 4 (3.6%) of the respondents had excellent skills.

Table 5: Skills in diagnosing severe dehydration

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Diagnosis	Frequency (n=139)	Percent (%)
Acute diarrheal disease with mild dehydration	18	12.9
Acute diarrheal disease with moderate dehydration	8	5.8
Acute diarrheal disease with severe dehydration	95	68.3
I don't know	18	12.9

The table shows the diagnosis made by the health workers when given the case scenario of a 1-year-old girl who presented with a history of several bouts of diarrhoea and vomiting with the following features of severe dehydration: cold clammy extremities, lethargy, inability to suck, sunken eyes and anterior fontanelle, barely palpable pulse, and loss of skin turgor. Majority (68.3%) of the respondents made an accurate diagnosis of acute diarrhoeal disease with severe dehydration; 18 (12.9%) of the respondents wrongly chose acute diarrhoeal disease with mild dehydration; 8 (5.8%) of the respondents wrongly chose acute diarrhoeal disease with moderate dehydration; while 18 (12.9%) of the respondents admitted that they are unable to make a diagnosis.

Table 6: Skills in diagnosing severe protein energy malnutrition 1

	Response	Frequency (n=138)	Percent (%)
Kwashiorkor is diagnosed if the child has oedema, and his/her weight is between 60-80% of expected for his age	Yes	53	38.4
	No	85	61.6
Marasmus is diagnosed if patient's weight is <60% of expected for his age and he/she has no pedal oedema	Yes	39	28.3
	No	99	71.7

This table shows the response given by the health workers when asked whether the above statements were correct. Majority of the respondents did not know the correct definition of kwashiorkor (61.6%) and marasmus (71.7%).

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Table 7: Skills in diagnosing severe protein energy malnutrition 2

	Response	Frequency (n=138)	Percent (%)
Which of the following formulae will you use to calculate the expected weight (in kg) for a 16-month-old child?	weight = $\frac{n+9}{2}$	37	26.8
	weight = 2n + 8	26	18.8
	I don't know	75	54.3

This table shows the response of the health workers when asked which of the given formulae they will use to calculated expected weight (in kg) for a 16-months-old child. Only 26 (18.8%) of the respondents know the correct formulae for calculating the expected weight for a 16-month-old child, 101 (73.2%) did not know out of which 75 (54.3%) admitted this ignorance.

Table 8: Skills in diagnosing congestive heart failure in children

Skill	Frequency (n=138)	Percent (%)
Swollen liver, fast breathing, and fast heartbeat	41	29.7
Difficulty in breathing, cough and body weakness	63	45.7
Fast breathing, headache and fever	6	4.3
I don't know	28	20.3

The table above shows the response of the health workers when asked about the cardinal signs of heart failure in children. Only 41 (29.7%) of the respondents knew the cardinal signs of heart failure in children. Sixty-three (45.7%) wrongly chose a triad of difficulty in breathing, cough and body weakness; 6 (4.3%) wrongly chose a triad of Fast breathing, headache and fever; while 28 (20.3%) of the respondents admitted ignorance of the cardinal signs of heart failure in children.

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Table 9: Skills in diagnosing acute bacterial meningitis 1

Response	Frequency (n=139)	Percent (%)
Complicated measles	37	26.6
Meningococcemia	26	18.7
Chicken pox	16	11.5
Scabies	10	7.2
I don't know	50	36.0

When given the case scenario of a girl presenting acutely with fever, headache, convulsions, loss of consciousness, body rashes and severe hypotension but no diarrhoea, only 26 respondents (18.7%) made an accurate diagnosis of meningococcaemia, while a large group of the respondents (36.0%) admitted ignorance of the right diagnosis.

Table 10: Skills in diagnosing acute bacterial meningitis 2

Investigations	Response	Frequency (n=139)	Percent (%)
CSF MCS	Yes	25	18.8
	No	114	82.0
CSF analysis	Yes	37	26.6
	No	102	73.4

When given the same case scenario as in Table 4.13 above, most of the respondents did not know that CSF MCS (82.0%) and CSF analysis (73.4%) have important roles in the diagnosis of acute bacterial meningitis.

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Table 11: Skills in treating common paediatric emergencies

Skill	Frequency (n=137)	Percent (%)
Very poor skills	34	24.8
Poor skills	58	42.3
Good skills	45	32.8
Excellent skills	0	0.0

The table shows the aggregated skill scores of the respondents in treating common paediatric emergencies. A large group (24.8%) of the respondents had very poor skills in the treatment of common paediatric emergencies; 58 (42.3%) had poor skills, while 45 (32.8%) of the respondents had good skills. None of the respondents have excellent skills in the management of common paediatric emergencies.

Table 12: Skills in preparing salt sugar solution (SSS)

Skill	Frequency (n=139)	Percent (%)
Dissolve 1 level teaspoon of salt and 10 level teaspoons of sugar (or 5 cubes of sugar) in 2 full soft drink bottles of water	89	64.0
Dissolve 1 level teaspoon of salt and 10 level teaspoons of sugar (or 5 cubes of sugar) in 1 full soft drink bottle of water	27	19.4
Dissolve ½ level teaspoon of salt and 8 level teaspoons of sugar in 2 full soft drink bottles of water	7	5.0

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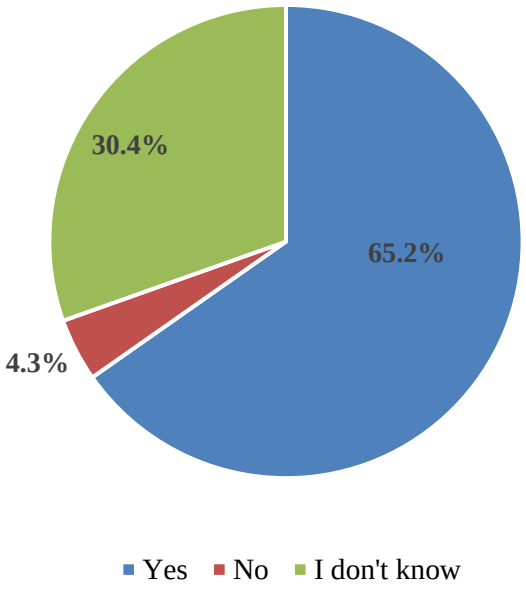
I don't know	16	11.5

When asked how they will advise mothers to prepare salt sugar solution at home, only 7 (5.0%) of the respondents knew the new method of constituting SSS.



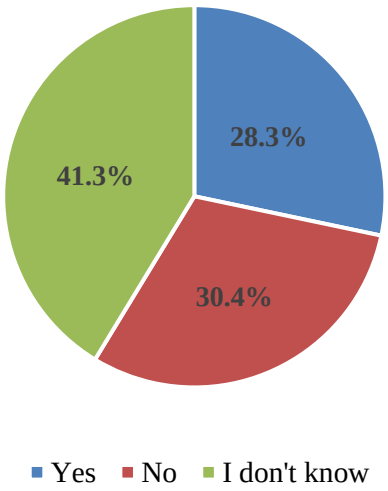


Figure 1: Skills in the treatment of congestive heart failure

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When asked whether they will administer digoxin to a child with anaemic heart failure, 39 respondents (28.3%) incorrectly said "Yes", 42 of them (30.4%) correctly responded "No", while 57 of them (41.3%) admitted ignorance of the right response. Note that digoxin is contra-indicated in treating congestive heart failure from severe anaemia.

Table 13: Skills in treating acute bacterial meningitis

Response	Frequency (n=139)	Percent (%)
Give antibiotics	65	46.8
Give antiviral drugs	10	7.2
Give IV fluid therapy	34	24.5
I don't know	30	21.5

The table shows the responses of the health workers when given the same case scenario as in Table 4.13 above and asked what treatment they will initiate first. Only 34 (24.5%) respondents recognized the importance of giving IV fluid therapy first in a girl with severe hypotension. Sixty-five (46.8%) of the respondents chose to antibiotics, 10 (7.2%) chose to give antiviral drugs while 30 (21.5%) admitted ignorance of what to do.

DISCUSSION

Several factors may influence the ability of primary healthcare workers to effectively manage paediatric emergencies. These determinants include healthcare system factors, organizational factors, individual factors, and intersectional factors. By addressing these factors, policymakers and healthcare providers can create a more supportive and enabling environment for primary healthcare workers, ultimately improving the quality of care provided to children in need.

Healthcare System Factors

i. Resource Availability: Access to essential equipment, medications, and diagnostic tools is crucial for effective paediatric emergency management. Inadequate resource availability can hinder the ability of healthcare workers to provide appropriate care (Akinyemi et al., 2017). For instance, the lack of oxygen concentrators, defibrillators, or basic laboratory facilities can significantly impair the management of conditions like pneumonia, cardiac arrest, or infections.

ii. Infrastructure: The physical infrastructure of PHCs, including the availability of adequate space, electricity, and water supply, can impact the efficiency of healthcare delivery and the ability of healthcare workers to provide timely care (Okoli et al., 2015). Poor infrastructure can create challenges in maintaining a clean and hygienic environment, storing essential supplies, and operating medical equipment.

iii. Workload and Staffing: Heavy workloads and insufficient staffing can lead to burnout, stress, and decreased job satisfaction among healthcare workers,

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which can negatively impact their performance (World Health Organization, 2020). When healthcare workers are overwhelmed with a high number of patients or lack adequate support staff, it can be difficult to provide timely and quality care, especially for emergencies.

Organizational Factors

i. Leadership and Supervision: Effective leadership and supervision can play a crucial role in creating a supportive and conducive work environment for healthcare workers. Strong leadership can foster a culture of continuous learning and improvement, provide guidance and mentorship, and ensure that healthcare workers have the resources and support they need to perform their jobs effectively (Abdelrahman et al., 2014).

ii. Training and Continuing Medical Education (CME): Regular training and CME programs can help healthcare workers stay updated on the latest guidelines and best practices in paediatric emergency management. Access to these opportunities can significantly enhance their skills and knowledge (Onah et al., 2016). Well-designed training programs can address specific knowledge gaps, improve clinical skills, and boost confidence among healthcare workers.

iii. Clinical Guidelines and Protocols: The availability of clear and evidence-based clinical guidelines and protocols can provide healthcare workers with standardized guidance on the diagnosis and management of paediatric emergencies. These guidelines can help to ensure consistency of care, reduce errors, and improve patient outcomes (World Health Organization, 2019a).

Individual Factors

i. Motivation and Commitment: Healthcare workers who are motivated and committed to providing high-quality care are more likely to develop the necessary skills and knowledge. Factors such as job satisfaction, career development opportunities, and recognition can influence motivation and commitment (World Health Organization, 2019b).

ii. Personal Characteristics: Individual characteristics, such as problem-solving skills, decision-making abilities, communication skills, and cultural sensitivity, can also impact a healthcare worker's performance in managing paediatric emergencies. These personal attributes can help healthcare workers to effectively assess patients, make appropriate diagnoses, and communicate effectively with patients and their families.

CONCLUSION/RECOMMENDATIONS

This study underscores the multifaceted nature of factors influencing the skill level of primary healthcare workers in managing paediatric emergencies. Addressing these factors requires a comprehensive and multidisciplinary approach. By investing in healthcare infrastructure, improving staffing levels, providing targeted training and continuing medical education, developing and disseminating clinical guidelines, fostering effective leadership and supervision, addressing socioeconomic disparities, promoting cultural sensitivity, and investing in research, policymakers and healthcare providers can significantly enhance the skills of healthcare workers and improve the quality of care provided to children in need.

Availability of Data and Materials

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

FUNDING

This research did not receive any grant from funding agencies in the public, commercial, or not-for-profit sectors.

Authors' Contributions

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

Competing Interests

The authors declare no conflicts of interest.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the management and technical staff of PENKUP Research Institute, Birmingham, United Kingdom for their excellent assistance and for providing medical writing/editorial support in accordance with Good Publication Practice (GPP3) guidelines.

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INTERNATIONAL JOURNAL OF MEDICAL SCIENCE AND PUBLIC HEALTH RESEARCH (ISSN – 2767-3774)
VOLUME 05 ISSUE 11 Pages: 23-40
OCLC –1242424495

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