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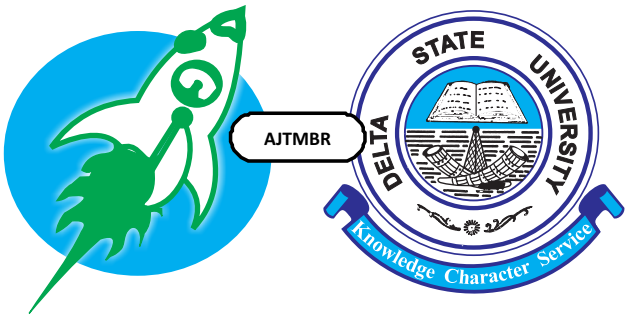

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Focus and Scope

The African Journal of Tropical Medicine and Biomedical Research is a multidisciplinary and international journal published by the College of Health Sciences, Delta State University of Abraka, Nigeria. It provides a forum for Authors working in Africa to share their research findings on all aspects of Tropical Medicine and Biomedical Sciences and to disseminate innovative, relevant and useful information on tropical medicine and biomedical sciences throughout the continent. The journal will publish original research articles, reviews, editorials, commentaries, short reports, case reports and letters to the editor. Articles are welcome in all branches of medicine and dentistry including basic sciences (Anatomy, Biochemistry, Physiology, Pharmacology, Psychology, Nursing etc) and clinical sciences (Internal Medicine, Surgery, Obstetrics and Gynaecology, Dental surgery, Child Health, Laboratory Sciences, Radiology, Community Medicine, etc). Articles are also welcome from social science researchers that document the intermediating and background social factors influencing health in countries of Africa. Priority will be given to publication of articles that describe the application of the principles of primary health care in the prevention and treatment of diseases.

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Acknowledgments should be included on a separate sheet of paper and should not exceed 100words. Funding sources should be noted here.

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Table of Contents

Management of Ear Infections by Primary Healthcare Workers

Babalola OE. [1], *Adeyemo AA.* [1,2]

Abstract

Introduction: Ear infections are prevalent in children, and inadequate management of these infections by Primary Health Care Workers (PHCWs) contributes significantly to the burden of hearing loss. This study assessed PHCWs' knowledge and management practices of Childhood Ear Infections (CEI).

Materials and Method: The cross-sectional study used a semi-structured, self-administered questionnaire to elicit responses on knowledge and practice of CEI from 120 PHCWs working in urban and peri-urban areas in southwest Nigeria. Data were analyzed using descriptive and inferential statistics.

Result: The mean knowledge and practice scores were 27.2±4.7 and 9.7±2.9 respectively. Good and poor knowledge scores were seen in 14% and 4% of respondents respectively while 55% of respondents had poor practice scores. Knowledge was significantly associated with job cadre and the level of education was associated with CEI management practice.

Conclusion: PHCWs lack adequate knowledge of CEI, highlighting the need for continuous in-service training and mentorship in CEI management for all PHCWs.

Keywords: Childhood, Ear infection, Hearing loss, Primary Health Care, Health Workers

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INTRODUCTION

Ear infections occur in all age groups however, it is more common in children than adults. [1] Childhood ear infection (CEI) is the most frequently diagnosed illness among children in the United States (accounting for as high as 90%) [2] and in Uganda.[3,4] Ear infections affect 75 – 95% of the pediatric population,[5] most episodes occur within the first three years of life. The frequency of ear infections tends to peak between 12 to 18 months. [5] About 62% of children will have their first episode of middle ear infection by their first birthday, about 80 percent by the third birthday, and nearly 100 percent will have at least one episode by age five.[6] The burden of ear illnesses is highly prevalent in low- and middle-income countries (LMIC), [7] contributing significantly to the existing burden of health care.

The Primary Health Care (PHC) center is the first point of contact for healthcare in many LMIC communities and its services are often the entry point to health services for those in distress. 3 Primary healthcare workers (PHCWs) as health providers, therefore, play a huge role in the provision of basic health services for children, adults, and families. PHCWs are trained to recognize the risk factors as well as signs and symptoms of CEI in children. [8] The Standing Orders by the Federal Ministry of Health, Nigeria through the National Primary Healthcare Development Agency are guidelines for PHCWs, narrating health symptoms and describing how to

care for patients with different health conditions.[9] These Standing Orders include care for patients with CEI. PHCWs are also expected to recognize when the risk of harm is high enough to warrant referral to a higher level of healthcare provider. Poorly managed CEI may lead to complications such as hearing loss [10] with subsequent delayed acquisition of language, and impairment of cognition and emotional competence.[11] Other squeal of pediatric hearing loss include adverse effects on communicative skills, academic progress, and social success, with subsequent limitation of vocation and choices. [11] The earlier pediatric hearing loss occurs, the more significant adverse effect it exerts on a child's development.[12]

Children are the most vulnerable and dependent members of society, and their health is considered to be an overall measure of the health of society.[13] Since PHCWs are often the first point of contact with the healthcare system in LMICs the type of care they provide may form the core context for a child's development and a reflection of the health of the society. Thus, there is a need to ascertain the level of knowledge and practice of PHCWs in the management of CEI. This study aimed to determine the knowledge and practices relating to the management of CEI among PHCWs. The outcome can inform appropriate modifications to existing educational programs on ear health for PHCWs and policies regarding ear health safety.

MATERIALS AND METHODS

Study design, sampling, and data collection

This was a descriptive cross-sectional survey conducted in two purposively selected Local Government Areas (LGAs); Egbeda and Ibadan North LGAs in Ibadan, a cosmopolitan city in Southwest Nigeria. A total sampling of all the PHCWs (Nurses, Community Health Officers, Senior Community Extension Workers, and Junior Community Extension Workers) in both LGAs was done.

Data were collected from participants using an interviewer-administered structured questionnaire. The questionnaire included sections on socioeconomic status, socio-demographic characteristics of participants, knowledge, and practices relating to CEI. It also had 47 knowledge questions and 20 practice questions. Knowledge was categorized into causes, risk factors, signs and symptoms of CEI, the appearance of eardrums when diseased, and the consequences of poor management of CEI. Each question was scored with a mark and summed up to give a composite knowledge score which was categorized into good, average, and poor. Scores ≥33 were graded as good knowledge, 17 – 33 were graded as average knowledge, and scores ≤16 were graded as poor knowledge scores. Practice questions drawn out of the Standing Orders for Community Health Officers and Community Health Extension Workers with the inclusion of externally structured questions were used to test the management skill of CEI. Practice questions were also scored on a 20–point scale, scores <10 and >10 were categorized as poor and good practices respectively. An observational checklist was also used to collect data on the presence or absence of relevant ear health equipment such as otoscopes, ear syringes, headlights and mirrors, kidney bowls, and syringes in managing CEI in all the PHC facilities in the selected LGAs.

The data were analyzed using descriptive and inferential statistical tools. A chi-square test was done to establish associations between the independent (socio-demographic characteristics of the PHCWs) and dependent variables (knowledge and practices relating to CEI). Cross-tabulation of the dependent and independent

variables was also done to establish associations between variables. All statistical tests were conducted at a 2-sided significance level of 0.05.

The research adhered to the latest version of the Declaration of Helsinki throughout its implementation. Ethical approval for the study was granted by the joint University of Ibadan and University College Hospital Institutional Review Committee in Ibadan, Oyo state, Nigeria with approval number UI/EC/13/0327. Written informed consent was obtained from the Primary Health Care Workers after providing comprehensive information about the study.

RESULTS

A total of 120 primary health care workers responded to the survey with 69 PHCWs from Egbeda and 51 PHCWs from Ibadan North LGAs. There were more females 88 (73.7%) than males, and the mean age of the respondents was 40.94±7.71 years. Almost all 114 (95%) of the PHCWs had tertiary education as their highest level of education, 50.8% (61) were senior community health extension workers while the other half belonged to other cadres. Table 1 shows the socio-demographic characteristics of the respondents.

The majority 98 (81.7%) of the respondents had an average knowledge score, 4.2% (5) of respondents had poor knowledge, while only 14.2% (17) of respondents had a good knowledge score (Table 2). Most of the respondents missed significant knowledge questions relating to CEI, for example, 60% of the respondents disagreed that overcrowding could predispose children to CEI and 67.5% and 87.5% did not agree that bottle-feeding and exposure to passive smoking respectively, are risk factors for CEI. However, most of the respondents (83.3%) correctly identified vaccination as an important way of preventing CEI (see Questionnaire in Appendix II).

Overall, (66) 55% of the respondents had poor practice scores while (54) 45% had good practice scores (Table 3). Nurses and senior CHEWs had better practice scores compared to the CHOs and junior CHEWs. Similar to what was seen in the knowledge scores, key practice questions were missed by the respondents, for example, 82.5% of the PHCWs chose the administration of Artemether-Lumefantrine to a child with ear pain and discharge (see Questionnaire in Appendix II). Though the PHCWs agreed that the Standing Orders were well-designed to guide in the management of illness in children, (79) 65.8% of them had not received any training relating to ear health within the 24 months preceding the study. Apart from kidney bowls and syringes, all PHCs in the study sites lacked adequate ear health instruments to manage CEI (Table 4). The provision of training and equipment was suggested by the respondents as an important requirement for better management of CEI. Chi-square analysis revealed a positive association between the job cadre of respondents and the level of knowledge about CEI (Table 5), thus showing that the job cadre influenced the knowledge of CEI. Positive associations were seen between the management practices of CEI and both the educational level and job cadres of PHCWs (Table 6), suggesting that the level of education and job cadres of PHCWs influenced their management of CEI.

Table 1 Distribution of the socio-demographic characteristics of PHCWs

Variable	Category	Frequency (%)
Gender	Male	32 (26.7)
	Female	88 (73.7)
Age	20-30yrs	15 (12.5)
	31-40yrs	36 (30.0)
	41-50yrs	57 (47.5)
	51-60yrs	12 (10.0)
PHC Location	Egbeda	69(57.5)
	Ibadan North	51(42.5)
Educational level	Tertiary education	114(95.0)
	Secondary education	6(5.0)
Job role	Nurse	15(12.5)
	Community Health Officer	22(18.3)
	Senior Community Health Extension worker	61(50.8)
	Junior Community Health Extension worker	22(18.3)

Table 2 PHCWs Knowledge of childhood ear infections

Grade	Score	Frequency	Percent
Poor	≤ 16	5	4.2
Average	>16-33	98	81.7
Good	>33	17	14.2

Table 3 Practices of PHCWs as it relates to the management of childhood ear infections

Grade	Frequency	Percent
Good	66	55.0
Poor	54	45.0

Table 4 Checklist of available equipment for managing CEI

Equipment	Egbeda LG	Ibadan North LG
Otoscope	Absent	Absent
Pneumatic otoscope	Absent	Absent
Cotton applicators 14cm serrated	Absent	Absent
Headlight (spear bulb)	Absent	Absent
Head mirror	Absent	Absent
Ear syringe	Absent	Absent
Kidney bowls	Present	Present
Otoscope (spear bulb)	Absent	Absent
Disposable specula	Absent	Absent
Syringes	Present	Present

Table 5 Association between PHCW's education/ Job cadre and knowledge of CEI

Variable	Knowledge grade			Chi-square
Education				0.195
Secondary education	1(0.8%)	5(4.2%)	0(0%)	
Tertiary education	4(3.3%)	93(77.5%)	17(14.2%)	
	5(4.2%)	**98(81.7%)**	**17(14.2%)**	
Job Cadre				**0.020***
Nurse	0(0%)	13(10.8%)	2(1.7%)	
CHO	0(0%)	17(14.7%)	5(4.2%)	
Senior CHEW	0(0%)	52(43.3%)	9(7.5%)	
Junior CHEW	5(4.2%)	16(13.3%)	1(0.8%)	
	5(4.2%)	**98(81.7%)**	**17(14.2%)**	

***** indicates a significant relationship at a 5% margin of error (Yates correction of 0.5).

Table 6 Association between PHCW's education/ Job cadre and practice of CEI

Variable	Practice grade		Chi-square
Education			0.005*
Secondary education	6(5.0%)	(0.5%)	
Tertiary education	48(40.0%)	66(55.0%)	
	54(45.0%)	66(55.0%)	
Job Cadre			0.001*
Nurse	(0.5%)	15(12.5%)	
CHO	12(10.0%)	10(8.3%)	
Senior CHEW	22(18.3%)	39(32.5%)	
Junior CHEW	20(16.7%)	2(1.7%)	
	(0.5%)	15(12.5%)	

***** indicates a significant relationship at a 5% margin of error (Yates correction of 0.5).

DISCUSSION

The female gender was dominant among PHCWs, a trend that is seen in many PHC facilities in Nigeria,[14-16] Kenya,[17] and Nepal[18]. The majority of the respondents in this study had formal education, and a large proportion of these respondents had tertiary education; however, studies from other locations showed that the majority of PHCWs completed only secondary education..[19] The difference may be related to the localities where the study was conducted, the locales for this study were situated close to a major cosmopolitan city in Nigeria. The mean age recorded in this study showed that most of the PHCWs were older workers this peculiarity was recorded in other studies, suggesting that PHCWs are not highly mobile.[18,20]

There is no prior study detailing the knowledge of PHCWs on CEI, however, studies among caregivers in India[21] and Nigeria[22] showed low overall knowledge of otitis media. Most of the PHCWs in this study could identify some risk factors and symptoms of CEI, the better knowledge of the PHCWs compared to those of caregivers showed the impact of the training received by PHCWs. Nonetheless, this training appears inadequate with respect to CEI as shown in the overall knowledge score. This is may be due to a lack of training in primary ear and hearing care training (PEHC) by many PHCWs in LMICs.[23] There is a need to improve knowledge about risk factors for CEI among PHCWs.[24] The responses and knowledge scores of the study participants suggests the need to prioritize provision of additional courses targeted at improving and refreshing the knowledge of PHCWs on CEI; the trained PHCWs can then pass this knowledge across to parents and caregivers.

The importance of standard operating procedures for all cadres of health workers was demonstrated in the knowledge of immunization practices. Several reports have shown that over 80% of health workers have poor knowledge of national policy on safe immunization practices,[20,25,26] but the majority of PHCWs in this study were knowledgeable on the importance of

immunization in the prevention of CEI. More than 80% of children under the age of three suffer from CEI, with an average treatment cost of $5 billion annually,[27,28] yet vaccination has been shown to benefit children who are prone to recurrent CEI.[29]

While the majority of the PHCWs had an average score on knowledge parameters, the majority also had poor practice scores relating to CEI. This poor practice may be related only to CEI as it has been shown that some PHCWs have good practices on drug provision for general childhood ailments.[30,31] The practices of junior PHCWs (community health officers, and junior community health extension workers) in the management of CEI were poor. There was also a difference in the level of practice between the various cadres of PHCWs. The lower cadre of PHCWs could not deliver better CEI management services like those of the higher cadres probably due to differences in the level of training and experience compared to the senior cadres. This hypothesis explaining the differences between job cadre and management capabilities is corroborated by other reports which showed that higher education produces better performance among health workers, and more educated community health workers deliver better services.[32] Higher education levels tend to boost general knowledge among PCHWs, which in turn improves their performance, whereas a lower education level is linked to poorer healthcare service delivery. [33] However, the education level of PHCWs did not impact their knowledge scores of CEI. A possible cause for this observation could be related to the age of the respondents. The majority of the PHCWs were in the older age category and thus had attained their highest educational level several years earlier. Insufficient training for PHCWs is a significant contributor to the knowledge and practice gap, and accounts for the average to poor grades obtained in the study. Lack of training or insufficient training is a proven problem in PHC practices[15] with healthcare workers reporting inadequate training.[34] Thus, despite the level of education of the respondents it is probable that the lack of regular on-the-job training contributed to the lack of correlation between the level of education and the knowledge scores. Unfortunately, this lack of training for PHCWs appears not to be an isolated incident.[34] PCHWs with additional or refresher training are more likely to achieve high-performance levels as continuous training helps PCHWs perform more effectively. [35] This has been demonstrated in several studies where on-the-job training improved PCHWs' skills and knowledge and enabled better job performance.[36-38] Thus, provision of periodic refresher courses for PHCWs is vital for enhanced service delivery in the management of CEI. Provision of financial motivation and incentives in addition to supplemental training and appropriate equipment provision will also encourage PHCWs to improve the delivery of primary Ear and Hearing Healthcare in LMICs.[15,34]

The poor practice scores of CEI observed among the PHCWs denote key deficiencies in the management of childhood illnesses. This is not an isolated trend as similar reports have been documented.[34] PHCWs were not familiar with the Standing Orders guiding their operations as revealed by the poor practice scores. These Standing Orders serve as a foundation for effective training, monitoring, and assessment of all primary healthcare services to improve healthcare delivery quality, [39] therefore, non-adherence to the standing orders poses health risks to the members of the society. The necessary equipment for the management of CEI in a primary health care center was inadequate and did not meet the recommendations specified by

the WHO Primary Ear and Hearing Care manual.[40] Lack of this equipment can adversely affect the services provided by PHCWs in managing CEI; it may also contribute to the poor management practices of CEI. A previous survey of health workers revealed complaints of lack of equipment, lack of motivation, and inadequate training and supervision in health facilities. [34] This suggests that periodic assessments and monitoring of PHCs are necessary to ensure the adequacy of necessary equipment for CEI management[15]

The study was limited by the relatively small sample size (though reflective of all PHCWs in the study sites), thus limiting the power for comparisons. The cross-sectional nature of the study also made it impossible to incorporate all personnel especially those on vacation at the time of the study.

CONCLUSION

The level of knowledge and management of CEI among PHCWs is less than optimal. There is a need for regular in-service training on the management of CEI for PHCWs, especially the lower cadre officers. Adequate resources should be deployed on health, education, and social services including provision of appropriate medical equipment for PHCWs, to facilitate better service delivery and sustainability.

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Declaration of Conflicting Interest

The Authors declare that there is no conflict of interest.

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