

A Mixed Methods Study of the Oral Health Knowledge and Practice of Community Health Practitioners

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ABSTRACT

Background: Community Health Practitioners' (CHPs) are first in line to render health services at the Primary Health Centres at rural communities. This study aimed to determine the oral health knowledge and explore the roles CHPs play in promoting oral health in underserved communities.

Methods: Fifty-six practitioners were purposefully selected from a roster of Community Health Practitioners (CHPs) assigned to Ife North local government area in Osun State, Nigeria. Oral health knowledge was assessed using a 15-item self-administered questionnaire both before and after training in oral health promotion. The Mann-Whitney U test was employed to analyze knowledge scores, with the level of significance set at $P < 0.05$. Three focus groups delved into the roles of CHPs in oral health promotion, and their responses were analyzed according to the operationalized topic guide.

Result: The baseline oral health knowledge was 10.0 (± 1.77), and post-test knowledge increased to 11.44 (± 1.41), indicating a statistically significant difference ($p < 0.001$). Despite differing initial knowledge levels, Community Health Practitioners (CHPs) conveyed a willingness to contribute to oral health promotion. This commitment included integrating oral health education into general health education, conducting community mobilization efforts, and providing support for urgent oral care. Identified barriers encompassed challenges such as insufficient funding, inadequate transportation, and logistical issues.

Conclusion: To enhance the oral health knowledge of Community Health Practitioners (CHPs), there is a need for additional training sessions. Despite facing inherent barriers, the CHPs demonstrated a willingness to engage in downstream oral health promotion activities.

Keywords: Community Health Practitioners, Oral Health Knowledge, Oral health Promotion.

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INTRODUCTION

Globally, nearly half of the world's population is impacted by oral diseases, according to the Global Burden of Diseases Study in 2016 and oral diseases ranked among the most prevalent non-communicable diseases (NCDs)¹. In Nigeria, the prevalence of oral diseases is notably high with evidence indicating that between 30% and 43% of different populations

in Nigeria are affected by dental caries. Similarly, between 15% and 58% of adults are affected by periodontitis^{2,3}. Contributing factors to this high prevalence include insufficient awareness, and limited access to oral health care services, particularly preventive oral health care.³ In many low- and middle-income countries, urgent unmet oral health care needs persist, exacerbating oral health inequalities between rural and urban areas. Persons living in rural

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communities face barriers such as limited access to health care, lower income to spend on oral care resulting in a higher prevalence of oral diseases⁴. The Primary Health Care (PHC) system, which is a community-based concept designed to bring healthcare close to the people, has been considered a viable option for oral health promotion due to its attention to prevention and early intervention^{3,5}. Public health strategies for preventing oral diseases prove effective when integrated into the overall management of NCDs and aligned with national health strategies⁶. This underscores the importance of directing more efforts towards workforce investment, especially at the Primary Health Centres⁵.

Community Health Practitioners (CHP) play essential roles in Primary Health Care⁷. In Nigeria, they are designated as Community Health Officers (CHO), Senior Community Health Extension Workers (CHEW) and Junior Community Health Extension Workers⁷. The latter two are predominantly stationed, with 50% and 80%, respectively, in underserved communities where their responsibilities include facilitating access to health care, stimulating demand for services and fostering community trust. With adequate training, these practitioners deliver a spectrum of health services that mid-level workers are meant to carry out^{7,8}. Their primary responsibility has been the implementation of immunization programmes in Nigeria contributing significantly to the control of preventable diseases in Nigeria⁷.

Traditionally, the responsibility of preventing oral diseases and promoting oral health falls on oral health workers. However, due to the uneven distribution of these professionals and the inadequacy of suitable facilities, oral health services are often inaccessible at the primary health care level⁹. Recognizing this challenge, there is a growing emphasis on incorporating community health practitioners into oral health promotion efforts. Community Health Practitioners are present in all the local government areas and well trained in preventive care, have been identified as key contributors¹⁰. Braimoh *et al.* reported that CHPs are well-suited to deliver oral health care at the Primary Health Care level facilitating the integration of oral health with existing PHC structures. The study specifically noted their potential to provide oral health education covering aspects such as oral hygiene, dietary habits, the importance of routine dental checkups, especially at nutrition and maternal and child health clinics. However, the study highlighted the necessity for additional training to effectively carry out these roles¹⁰.

There has been negligible research on oral health knowledge and the roles of CHPs in promoting oral health, despite their crucial role in delivering essential oral health care at the PHCs. A study in East Azerbaijan, Iran¹¹ revealed varying levels of oral health knowledge among CHPs, with higher knowledge associated with fewer years of practice and a decline with longer years of service. Another study conducted in Nigeria¹⁰, however, reported inadequate knowledge of oral diseases, but notably, the study population included other

cadres of Primary Health Care staff such as nurses and midwives. While their level of oral health knowledge may be in doubt, their roles in promoting oral health also remain undefined.

Therefore, the objective of this study is to determine the oral health knowledge of community health practitioners and explore their potential roles in oral health promotion in a low-middle-income country.

METHODOLOGY

Study Design

This study employed convergent mixed methods research determining the oral health knowledge and exploring the role of Community Health Practitioners in promoting oral health in Nigeria. Information was obtained using a self-administered questionnaire and through Focus Group Discussions in December 2021.

The study was conducted at Ipetumodu, the location of the Primary Oral Health Care Unit of the Obafemi Awolowo University Teaching Hospital. The CHPs who work within the Primary Health Centres and health posts at Ife North Local Government Area were invited to participate in the study. Community Health Officers, Senior Community Health Extension workers and Junior Community Health Extension workers- who gave their informed consent were included in the study. To be eligible, these CHPs possessed a minimum of three years of practical experience in the field and were registered with the Local Government.

The research team collected demographic data, including age, sex, highest educational level, length of time in practice, and exposure to formal dental training. The study utilized a comprehensive instrument to evaluate participant's knowledge of oral health aspects such as the prevention of oral diseases, oral health outcomes and the oral health system. Oral health knowledge was appraised through a set of fifteen questions administered as pre-and post-tests, occurring before and after a 3-day training on oral health promotion. The Likert scale, encompassing responses from strongly agree, to strongly disagree, was employed. Participants received scores based on correct or incorrect responses with strongly agree/agree and disagree/strongly disagree, responses earning or deducting points respectively. A "neutral" response was considered incorrect and each correctly answered question earned one point. Scores ranged from zero to 15, with participants unaware that the same set of questions would be used for the post-test. They were directed to indicate their number codes on the questionnaires for easy identification.

The qualitative exploration of CHPs' role in promoting oral health involved three focus group discussions comprising a minimum of 18 participants per group. These groups were homogenous, consisting of Community Health Officers, Junior Community Health Extension Workers, and Senior

Community Health Extension Workers. A neutral moderator facilitated the discussions using an interview guide that probed participants' opinions on promoting oral health and preventing oral diseases. Prior to the sessions, the interview guide underwent a thorough check for clarity and consistency, then necessary adjustments were made before its use. The research team, equipped with qualitative research training, was well-versed in the research objective, ensuring proper data collection. Each group discussion lasted approximately 45 to 60 minutes and was concluded upon reaching information saturation. Participants were remunerated with a token of approximately \$10.

The study received ethical clearance from the Research Ethics Committee of the Obafemi Awolowo University Teaching Hospitals Complex, and registration number **IRB/IEC/0004553** was assigned to the study.

Sample size

The sample size was calculated using the formula:

$$\frac{Z_{1-\alpha/2}^2 P(1-P)}{d^2}$$

where $Z_{1-\alpha/2}^2$ represents the standard normal variate which corresponds to a 95% confidence level, thus 1.96 was used in this formula

P= proportion of CHPs who expressed need for oral health promotion training from Braimoh et al¹⁰. study which was 80.2%

d= absolute error determined to be 0.1

$$\frac{1.96^2 \times 0.82 (1-0.82)}{0.1^2} = 55.3$$

Data Analysis

Quantitative data underwent collection, coding, and entry into the IBM SPSS version 26 software for analysis. Univariate analysis and bivariate analysis were performed, utilizing percentages, frequencies, tables, and graphs for categorical data summarization. Continuous data were presented with means and standard deviations. Man-Whitney U tests were utilized to compare the before and after test scores, with statistical significance set at $P < 0.05$. Transcribed notes were systematically organized into pre-determined themes and direct quotes from the focus group discussions were utilized. This approach allowed for a broader interpretation of the communication that emerged during the discussions, enhancing the depth of the qualitative insights.

RESULTS

Quantitative Data

A total of 56 CHPs were recruited based on eligibility, with 49 completing the pre-and post-tests on oral health knowledge.

Among them, Junior Community Health Extension Workers (CHEW-J) constituted 41%, Senior Community Health Extension Workers (CHEW-S) comprised 36% and Community Health Officers (CHO) represented 23%. The participants were predominantly females, accounting for 92.9%. The mean (\pm Standard deviation) oral health knowledge score for CHPs was 10.0 (\pm 1.77) as detailed in Table 1. Scores ranged from six to 14, and the 25th and 75th percentiles were 9, 10 and 11, respectively for the 56 participants at baseline. Notably, performance was generally higher in the test of knowledge on the prevention of oral diseases compared to questions relating to oral health status, common oral diseases, and the oral health system. Participants excelled in knowledge about preventing oral disease, especially knowledge on the importance of routine dental visits. Conversely, only 14.3% agreed that establishing a dental clinic at existing PHCs would enhance the integration of oral health care with PHC delivery.

Table 1: Mean Oral health knowledge scores of CHPs

Variables	Mean (SD)
Overall correct responses (15)	10.0 (\pm 1.77)
Domains of Oral health knowledge	
Oral disease prevention (6)	4.64 (\pm 1.13)
Oral health status (4)	2.12 (\pm 0.93)
Oral disease (3)	1.60 (\pm 0.80)
Oral Health System (2)	1.66 (\pm 0.54)

The average (\pm Standard deviation) year of practice as a CHP was 17.8 (\pm 5.52) years. There was a negative correlation between years of practice and overall oral health knowledge score (Spearman's correlation = -0.079, $p = 0.565$). Interestingly, 71.4% of the participants had a previous exposure to oral health education. The association between this exposure (oral health education) and the overall oral health knowledge score for participants with or without previous exposure was not statistically significant ($p > 0.05$). The Cohen's effect size was minimal (Hedges'g = 0.241). Refer to Table 2.

The mean pre-and post-test scores following oral health promotion training for the CHPs showed a statistically significant difference ($P < 0.001$). Table 3 illustrates the distribution of baseline scores and the correct responses to the set of 15 oral health knowledge questions. Additionally, the dumbbell plot in Figure 1 depicts the pattern of oral health knowledge scores before and on the third day after the oral health education/training. Notably, some participants showed neither improved nor decreased oral health knowledge scores. Figure 2 presents box plots highlighting the gender differences in the knowledge assessment.

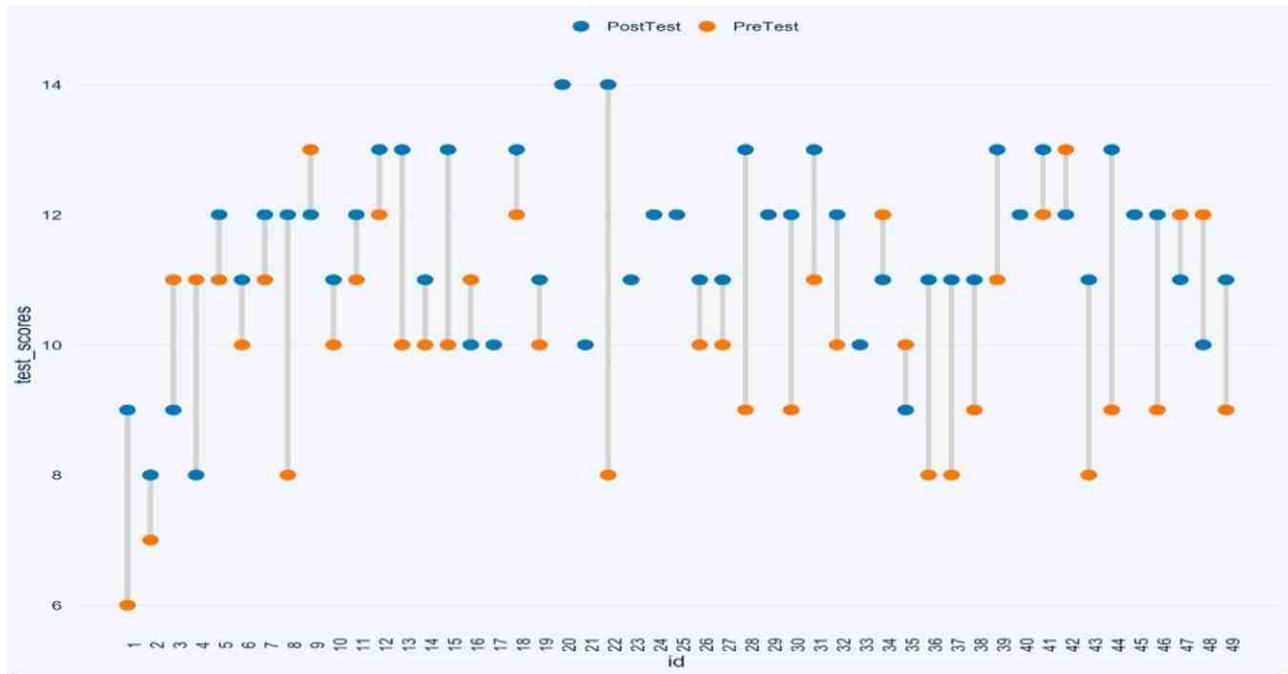


Figure 1. Dumbbell graph showing the pattern of the correct pre-and post-test scores of the 49 participants who completed the pre-and post-test. (Mean Pre-test: 10.0(±1.77) Mean Post-test: 11.44(±1.41) NB: 6 participants were excluded because they could not participate in either the pre-or post-test. And single dots, represent same pre- and post-test scores.

Table 2: Oral Health Knowledge and Previous exposure to oral health training		
Variables (N=56)	Mean (SD)	p-value
Overall Knowledge scores		
YES	9.88 (±1.81)	0.276
NO	10.31 (±1.70)	
Oral Health Knowledge Domains		
Oral disease Prevention		
YES	4.78 (±1.05)	0.221
NO	4.31 (±1.30)	
Oral health status		
YES	2.17 (±0.90)	0.371
NO	2.00 (±1.03)	
Oral health system		
YES	1.55 (±0.59)	0.014
NO	1.93 (±0.25)	
Common Oral diseases		
YES	1.42 (±0.78)	0.008
NO	2.06 (±0.68)	

Qualitative Data

Focus Group Discussions with Community Health Practitioners elicited their opinions and perspectives about oral health promotion and prevention of oral diseases in the community.

Importance of CHPs in Oral Health Promotion

The CHPs had a strong conviction about their importance in oral health promotion. They recognised their position in the health system and their peculiar closeness to the population.

“We are the group closest to the community; we are very important because whatever we tell them or instruct them to do is what they usually do. We are the first contact with the members of the community... we are their small god.” CHEW.

“We are at the grassroots, we are closer to the community than the professionals at the Tertiary Institution, and they usually come to us first.... People in the community have confidence in us as they see us often, and they know us well....If we give oral health education to them, there won't be oral diseases, and we will reduce the work of the dentists”. CHO.

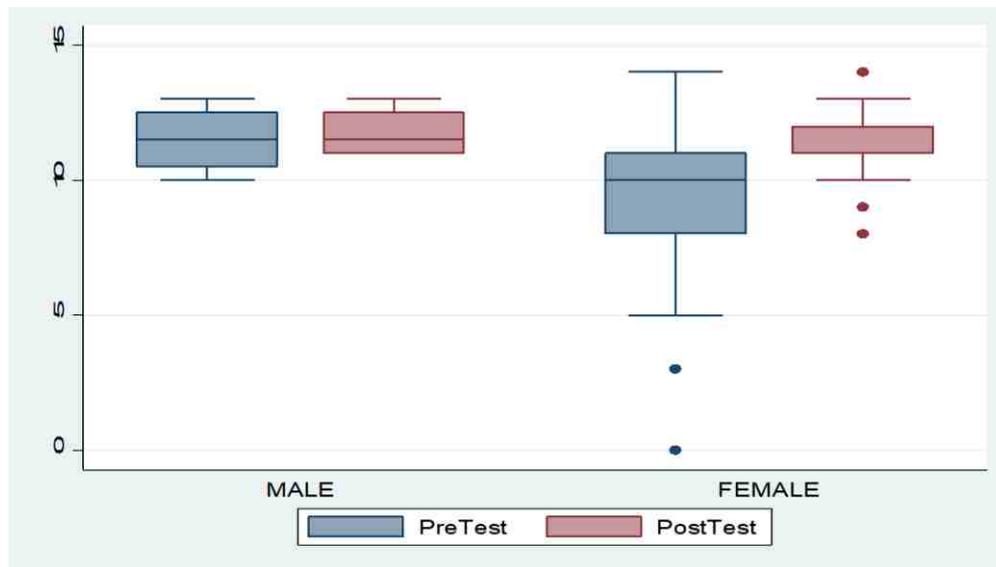


Figure 2: Gender comparisons in oral health knowledge pre- and post-test scores (p=0.084 and p=0.760 respectively)

Making a difference in the Community

The CHPs were clear about ways to impact the oral health of the community through avenues and platforms they routinely use to reach their communities. Their status in the community gives access to affect their communities. Notably, they recognised their limitations in oral health care for the members of the Community.

“We are close to them, we know them, and know their homes and can visit them for a follow-up to be sure they do all the health advice given to them.....We have access to pregnant women, especially during their ante-natal clinic. We will include oral examination as part of their general examination and talk to them about their oral health” CHEW

“Through Community mobilisation, we announce to the community and tell them about oral health. We can teach them about oral health. We raise awareness in the marketplace, mosques, churches and schools about oral health”. CHEW

“.... We can do settlement by settlement outreach until we cover all the wards” CHEW

“... if there is anybody with complaints about the mouth or teeth, we can do a minor treatment like prescribing warm saline mouth bath and do the proper referral. We cannot remove teeth, and we cannot do the cleaning of teeth”” We can also visit the patients at home for feedback....” CHO

Helping Members Perceive their need for Oral Health

The CHPs play important roles in stimulating the demand for oral health care by working with community representatives (Community Health Committees) and by raising awareness about oral health.

“We have community representatives that can always gather the people in the community; we go and educate them and tell them to inform the people to come to the clinic if they have dental diseases.” CHEW.

“We can give oral health talks along with general health talks” CHO.

“We could do more public awareness using the radio in the community and conduct free oral health screening” CHO.

Helping the members of the community to reach the dental centres

Reaching the dental centres for oral health care can be ensured by the CHPs. They will be familiar with the challenges in obtaining oral health care, such as stigmatization and lack of information about oral health care available to them.

“For example, people that have diseases like cleft lip, as we were taught during this training, can be associated with stigmatisation. Therefore, we will encourage them to talk to us by not stigmatising them... We can also refer them to the dental clinic and follow up on them to make sure they went to the appropriate channel for treatment.” CHEW

“We can make appropriate referrals from our places of work when they come to us, and we discover they need dental care. We can also make sure they go to the dental clinic.... We can also let them know that the dental professional will be available on particular days so that they can see them.” CHO.

Table 3: Distribution of responses of participants to the questions on oral health knowledge

Questions	Correct response	N=56	%
Prevention			
Brushing your teeth with toothpastes not containing fluoride is good for preventing tooth decay (hole)	Strongly disagree/Disagree	47	83.9
Frequent eating of sugary foods/drinks can lead to tooth decay (hole)	Strongly agree/Agree	51	91.1
Dry mouth can protect against tooth decay (hole)	Strongly disagree/Disagree	35	62.5
Regular brushing of teeth cannot protect one from gum bleeding, because it is normal	Strongly disagree/Disagree	36	64.3
Excessive intake of unripe fruits like lemon can lead to teeth sensitivity (shocking teeth)	Strongly agree/Agree	45	80.4
Members of the public should make sure they have a dental check-up two times every year	Strongly agree/Agree	54	96.4
Oral health Status			
The baby teeth in the mouth is not important to keep the space for the permanent to grow into	Strongly disagree/Disagree	28	50.0
Loss of teeth cannot interfere with speech	Strongly disagree/Disagree	32	57.1
Maintaining a good oral health will promote an overall good quality of life	Strongly agree/Agree	52	92.9
It is not likely we see type -2 diabetes in the mouth	Strongly disagree/Disagree	14	25.0
Common oral diseases			
Infants and children with mothers who have high caries rate are likely to have dental caries while growing up	Strongly agree/Agree	38	67.8
Chronic diseases like diabetes, respiratory diseases are risk factors for oral diseases	Strongly agree/Agree	40	71.5
Pregnant women are more likely to have healthy gingivae	Strongly disagree/Disagree	15	26.8
Oral Health System			
Establishing a dental clinic within a Primary Health Centre (PHC) will not promote the integration of oral health services with PHC services	Strongly disagree/Disagree	8	14.3
A Community Health Practitioner can help to improve the oral health knowledge in the community.	Strongly agree/Agree	53	94.6

The Need for Proper Engagement with the Community

The CHPs agreed that proper community engagement is necessary for oral health promotion. The need to dispel misconceptions about oral health can be addressed through effective community engagement and interactions.

“Community involvement is very important, and by our interactions with the community, we let them know that oral health is in their hands, and by keeping their mouth healthy, they help their general health. Because their oral health is a reflection of their general health..” CHEW

“...It is for their own advantage and ours. When they are healthy, we have a community free of diseases.” CHEW

“if we promote oral health in the community, it will lead to a healthy community” CHO.

“We also need to stop the misconceptions some people have about oral health, like a natal tooth which some people think is due to a curse. We inform them about the services we render and reassure them. We can also make them aware of the appropriate channels for treatment.” CHO.

Barriers to CHPs Promoting Oral Health

The participants were very specific about the barriers to promoting oral health in the community, with a unanimous

view about the lack of financial impetus on the demand and supply side of oral health care in the community.

“Finance... the cost of dental treatment should be reduced. We also lack transport fare for logistics. If the distance patients have to travel is too far, they will not come...” CHO

“No motivation, no equipment, lack of training” CHO.

DISCUSSION

The findings of this study highlight a deficiency in oral health knowledge among CHPs coupled with a keen interest in promoting oral health and preventing oral diseases. Employing a mixed-methods approach, we conducted a quantitative assessment of oral health knowledge and gathered information on the opinions and perceptions of CHPs regarding oral health promotion and disease prevention in Nigeria.

The oral health knowledge scores ranged from six to 14 and with approximately 37% of the participants scoring above the 75th percentile, indicating disparities within the group's knowledge levels. This aligns with varying reports in the literature on oral health knowledge among Community Health Practitioners, ranging from fair knowledge to overall proficiency with some deficiencies.^{3, 12,13,14,15} We attribute the difference in our findings to contextual factors such as the degree or extent of inter-professional collaborations and the occasions for repeated exposure to oral health education. One of the studies¹⁵, which reported good oral health knowledge, was among trainee CHPs in a Tertiary Hospital and expectedly would have been exposed to oral health education during their mandatory postings at the dental school.

While the overall oral health knowledge in this study was found to be insufficient, participants exhibited a comparatively better performance in the dimension of preventing oral diseases. Notably, CHPs undergo training in the basic principles of preventive care and are mandated to practice preventive activities at the Primary Health Centres. Consequently, they offer culturally acceptable health education and nutrition counsel to prevent non-communicable diseases and implement most national preventive programs such as childhood immunisation in the country⁷. Compared with other dimensions of oral health knowledge examined in this study, the higher scores in preventing oral diseases suggest that their involvement in stipulated public health programs may have positively influenced their affective and behavioural domains of learning about oral health.

This study observed that despite approximately 70% of the participants having prior exposure to oral health education, there was no statistically significant difference compared to participants without such exposure. The average years of practice, approximately 17 years in this study showed a negative correlation with knowledge but not statistically

significant. Notably, our study participants exhibited a wide variation in years of practice, as illustrated in Figure 1. We hypothesize that with increasing years of practice, without continuous education in oral health and only one exposure to oral health knowledge at diploma levels, CHPs may lack appreciable and contemporary oral health knowledge. While this study identified a statistically significant difference in pre- and post-test scores of oral health knowledge, the evaluation was conducted on a short-term basis, limiting insights into oral health knowledge retention. Past studies have indicated that oral health knowledge imparted through pieces of training may remain unchanged or diminish over time^{16,17}. Consequently, we advocate for more frequent training, re-training, the integration of oral health education into work routines and its inclusion in the academic curriculum. This advocacy is crucial, especially given evidence suggesting that lack of competency among Primary Health Care workers at the micro (clinical practice) level is a significant hindrance to the integrated delivery of oral health care at Primary Health Centers.¹⁸

Despite the documented level of oral health knowledge among Community Health Practitioners (CHPs) in this study, the qualitative analysis of participants' perceptions of oral health promotion revealed predominantly positive findings. Direct quotes from de-identified participants in the study have been presented and organized according to the topic guides. This approach facilitates a more comprehensive interpretation of the study's findings.

The study findings highlighted their perspectives about the significance of their role in oral health service delivery and their potential to instigate positive changes to the current state of oral health care delivery. Members of the community tend to trust health team members who are close and share similar socio-cultural characteristics that influence health. Moreover, the opportunity to deliver client-based services increases when patients can be visited at their homes, allowing for the reinforcement of oral health education messages. Crucial roles such as enhancing oral health awareness, promoting oral health behaviour and facilitating oral health care services for the community, as similarly reported in other studies¹⁹, can be strengthened through clear community engagement. Such community engagement aids the acceptance of oral health messages, improves their oral health literacy, and is more likely to result in healthier communities. Evidence from the literature suggests that recognising the role of Primary Health Care Workers and CHPs in the delivering of oral health care will support the practice of integrated oral health services at the Primary Health Centres. The involvement of this cadre of health workers will thus contribute to effective and efficient delivery of health services especially in low-and middle-income countries like Nigeria by integrating of oral health services with their routine practice^{18,20,21}.

The study faced limitations due to its sample size. While the sample size was determined mathematically in this study, a

larger size may have enhanced the accuracy of the quantitative assessment of the oral health knowledge. A probability sampling method was not employed; however, the utilization of a maximum variation sampling strategy aimed to capture a wide range of perspectives from the research participants on this topic. Additionally, including a qualitative approach provided more contextual richness to the research question, adding more depth to the study. To generate more robust evidence for policy guidance on this subject, future studies encompassing multi-Primary Health centers on a larger scale may be warranted.

CONCLUSION AND RECOMMENDATIONS

In the light of the overall insufficient level of oral health knowledge among the participants in this study, it is crucial for health stakeholders and policymakers to recognize the imperative for increased training and capacity development programs for CHPs. As primary health workers serving as the gateway into the health system, focusing on the capacity of CHPs to deliver basic oral health care is essential.

The willingness of CHPs to promote oral health particularly in underserved, rural, and remote communities should prompt corresponding actions from the stakeholders, including the state Ministry of Health, the Federal Ministry of Health, and other relevant government agencies involved in the delivery of health care. The relatively higher scores in the oral health knowledge dimension, particularly regarding prevention, attributable to the cross-cutting delivery of services at the PHC, further present a significant opportunity to bolster oral health promotion at the PHC. This positions CHPs as key members of the health team.

Given that oral diseases are the most prevalent NCDs, stakeholders must prioritize raising oral health awareness among community members in places where they live, work, and age. Oral health promotion is most effective when executed by health personnel familiar with these settings and context. Therefore, adopting a settings-based approach to promoting oral health is achievable through the instrumentality of the CHPs.

Authors' contributions: MIA, EOO and TOM conceived the study and contributed significantly to the entire manuscript write-up. TOA, IKA and FRA coordinated the focus-group discussions and data collection during the study. FJO was responsible for the data analysis and interpretation of data. All authors were involved in the manuscript write-up and gave approval of the final version. MIA, EOO and IKA are guarantors of the paper.

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