

Oral Hygiene Knowledge and Practices of Orphans and Vulnerable Children in Benin City, Edo State.

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ABSTRACT

Background: Orphans and vulnerable children (OVCs) constitute a disadvantaged population with increased susceptibility to poor oral health outcomes due to limited access to oral health information, preventive services, and oral hygiene resources. Despite the high burden of oral diseases among OVCs, data on their oral hygiene knowledge and practices in Nigeria remain limited.

Objective: To assess the oral hygiene knowledge and practices of orphans and vulnerable children in Benin City, Edo State, Nigeria.

Methods: A descriptive cross-sectional study conducted among OVCs in selected orphanages in Benin City. Data were collected using a pretested interviewer-administered questionnaire adapted from the World Health Organization oral health questionnaire for children. Information on socio-demographic characteristics, oral hygiene knowledge, and oral hygiene practices was obtained. Oral hygiene knowledge was categorized as good or poor, while oral hygiene practice was graded as good, fair, or poor based on predetermined scoring criteria. Data were analyzed using IBM SPSS version 25, and statistical significance was set at $p \leq 0.05$.

Results: Overall, 137 (67.5%) participants demonstrated good oral hygiene knowledge. Most respondents recognized the importance of maintaining good oral hygiene (97.5%) and the role of regular dental visits in oral health maintenance (88.7%). Regarding oral hygiene practices, only 39.4% demonstrated good practice, while 52.2% and 10.3% had fair and poor practices, respectively. Although 91.1% used a toothbrush and toothpaste, 59.6% brushed only once daily, 89.2% were unaware of dental floss, and none reported routine dental check-ups.

Conclusion: While the majority of OVCs possessed good oral hygiene knowledge, oral hygiene practices were generally suboptimal. The observed knowledge–practice gap highlights the need for targeted oral health promotion programs and improved access to preventive oral healthcare services among OVCs in Nigeria.

Keywords: Oral hygiene knowledge, oral hygiene practice, orphans and vulnerable children.

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CLINICAL IMPLICATIONS

This study demonstrates that although most orphans and vulnerable children (OVCs) in Benin City possess good oral hygiene knowledge, this knowledge does not consistently translate into appropriate oral hygiene practices. The low prevalence of twice-daily tooth brushing, poor awareness of dental floss, and absence of routine dental visits underscore the need for interventions beyond health education alone. These findings highlight the importance of integrating preventive oral healthcare, caregiver training, regular dental screening, and provision of oral hygiene materials into orphanage and school health programmes to improve oral health outcomes and reduce oral health disparities among vulnerable children.

INTRODUCTION

Oral health is an integral component of general health and quality of life. It encompasses the ability to perform essential functions such as eating, speaking, and social interaction without pain, discomfort, or disease. Oral diseases, particularly dental caries and periodontal diseases, remain among the most prevalent chronic conditions worldwide and continue to pose significant public health challenges despite advances in preventive and therapeutic dentistry.^{1,2} The World Health Organization (WHO) has consistently emphasized that the burden of oral diseases disproportionately affects socially disadvantaged and vulnerable populations, thereby contributing to widening health inequities globally.²

Orphans and vulnerable children (OVCs) constitute one of the most disadvantaged population groups. The term OVC refers to children who are orphaned, abandoned, separated from their parents, or living in circumstances that compromise their physical, emotional, social, or developmental well-being.³⁻⁶ These children often experience poverty, inadequate healthcare access, poor nutrition, psychosocial stressors, and limited educational opportunities, all of which may adversely affect their oral health outcomes.^{5,6}

Globally, an estimated 153 million children have lost one or both parents, with approximately 17.7 million orphaned due to Acquired Immunodeficiency Syndrome (AIDS).⁴ Sub-Saharan Africa bears a disproportionate share of this burden, accounting for over 15 million AIDS-related orphans.^{7,8} Nigeria has one of the largest populations of OVCs worldwide,

with an estimated 17.5 million vulnerable children, including approximately 9.7 million orphans.^{9,10} Although Edo State has a lower prevalence than the national average, the number of affected children remains substantial and represents an important public health concern.^{9,10}

Evidence suggests that OVCs are particularly susceptible to poor oral health outcomes because of limited access to oral healthcare services, inadequate oral health education, insufficient caregiver support, and restricted availability of oral hygiene materials.^{11,12} Consequently, oral diseases that are largely preventable in the general population may become more prevalent and severe among institutionalized and vulnerable children. Studies conducted in India, Yemen, Ethiopia, Tanzania, and Nigeria have reported poor oral hygiene status, increased periodontal disease burden, oral mucosal lesions, and inadequate oral health practices among orphaned and institutionalized children.¹³⁻¹⁶

In Ethiopia, Burnett et al.¹⁵ reported deficient oral health knowledge and poor oral hygiene practices among marginalized children, while Onigbinde et al.¹⁶ documented a high prevalence of periodontal disease among children residing in orphanages in Lagos, Nigeria. Similarly, Ojahanon et al.⁷ found that although many institutionalized orphans in Benin City demonstrated fair oral hygiene status, significant gaps remained in oral health knowledge and preventive practices. These findings suggest that oral health disparities among OVCs are influenced not only by socioeconomic constraints but also by inadequate oral health literacy and limited exposure to preventive oral health programs.

while previous Nigerian studies have documented oral health challenges among orphaned children, few have comprehensively evaluated oral hygiene knowledge and practices within this vulnerable population. Understanding the existing level of oral health knowledge and behavioral practices among OVCs is essential for designing effective preventive programs and informing policy initiatives aimed at reducing oral health inequalities.

Therefore, this study aimed to assess oral hygiene knowledge and oral hygiene practices among orphans and vulnerable children residing in orphanages in Benin City, Edo State, Nigeria. The findings are expected to provide evidence for the development of targeted oral health promotion strategies and contribute to improving oral health outcomes among this underserved population.

MATERIALS AND METHODS

Study population

The study was carried out in Benin City, which is the capital of Edo state and the study population consisted of orphans and vulnerable children residing in orphanages within Benin City. Children lacking comprehension abilities, ability to communicate or suffering from acute or chronic systemic diseases, behavioral disorders and psychological problems were excluded from the study.

Study design

The study was a descriptive cross-sectional study utilizing questionnaires to obtain information on oral hygiene knowledge and practices from the participants. This study spanned a period of one month.

Sample size determination and Sampling Technique

A list of orphanage homes in Benin City was obtained from the Ministry of Social Development and Gender Issues (Orphan Division). A total of 23 orphanage homes was listed and the number of children in each home varied from 12 to 58 with an average of 35 children per home with a total number of about 400 OVCs in the homes.

Sample size was calculated using the Taro Yamane formulae used for calculating the sample size for a finite population. Convenience sampling was used to select the homes and the selection process continued until the desired sample size was attained. Children who met the inclusion criteria were included in the study.

Data collection and analysis.

Data was collected after informed consent was obtained with a written document from the legal guardians of the OVCs (Ministry of Women's Affairs and Gender Issues) and assent was obtained from participants. Data was collected using interviewer administered questionnaire which was developed from a modification of the WHO oral health questionnaire for children and from previously developed and tested questionnaires.^{17,18} This was pretested for standardization and assessed for face validity and acceptability by the study population. The questionnaire was administered in English language and Pidgin (the universally accepted local language in Benin City) by the researcher and two assistants, with help of their caregivers. The questionnaire consisted of 3 sections, A to C. Section A contained socio-demographic details, B and C

contained information on oral hygiene knowledge and oral hygiene practices respectively.

Data analysis was performed using IBM SPSS Statistics 25. Results were expressed in proportions, percentages and means with standard deviation. The results were further presented using tables and distribution assessed. Frequencies and percentages were used for qualitative data. The categorical variables were analyzed using Chi-square test.

For oral hygiene knowledge, a score of 1 was assigned to questions with correct response and a score of 0 was assigned to incorrect response. An individual with a score of 2 or greater of the 4 oral hygiene knowledge questions was considered to have good knowledge while participant with a score of less than 2 was considered of poor knowledge. Item or clustered percentage of above 50% for correct response was considered as having good knowledge, likewise item or clustered percentage below 50% for incorrect response was considered as having poor knowledge.

For oral hygiene practice, a score of 1 was assigned to questions with correct response and a score of 0 to incorrect response. A total of ten (10) questions were used to assess oral hygiene practice and was graded as Good if 7-10 questions were answered correctly, Fair if 4-6 questions were answered correctly and Poor if less than four (4) questions were answered correctly. A confidence interval of 95% was used and a p-value of 0.05 or less considered significant.

RESULTS

Socio-demographic characteristics of the study participants

A total of 203 OVCs were recruited for the study. Overall; there were more males [107;52.7%] than females [96;47.3%], as shown in Table 1. The majority of the participants were in the primary 1-3 educational class;

Response to oral hygiene knowledge questions.

As shown in Table 2, a total of 198(97.5%) OVCs answered positively that it is important to maintain good oral hygiene; while 119(58.6%) answered "Yes" to the question: Does brushing your teeth regularly prevent all tooth problems?

Oral hygiene knowledge scores

As shown in Figure 1, the majority (137; 67.5%), of the OVCs had good knowledge; while 66(32.5%) had poor knowledge.

Response to oral hygiene practice questions

As shown in Table 3, most of the study participants [185;91.1%] brushed their teeth with Toothbrush & Toothpaste. Fluoride toothpaste was the more common toothpaste type. Most of the participants brushed only once daily. Also, most of the participants only changed their toothbrush when it frayed.

Oral hygiene practice scores

A total of ten (10) questions were used to assess oral hygiene practice which was graded as Good if 7-10 questions were answered correctly, Fair if 4-6 questions were answered correctly and Poor if less than four (4) questions were answered correctly. The oral hygiene practice scores is as shown in Figure 2.

Table 1: Socio-demographic characteristics of the study participants

Variable	Frequency	Percentage (%)
Sex		
Male	107	52.7
Female	96	47.3
Total	203	100
*Age Category (years)		
< 10	68	33.5
10 – 12	54	26.6
13 – 15	81	39.9
Total	203	100
Mean age (years)	11.20 ± 2.88	
Pry 1 – 3	98	48.3
Pry 4 – 5	38	18.7
JSS 1 – 3	51	25.1
SSS 1 – 3	16	7.9
Total	203	100

*The age range was 7 – 15 years.

Table 2. Response to oral hygiene knowledge questions

Variable	Frequency	Percentage (%)
<i>Is it important to maintain good oral hygiene?</i>		
Yes	198	97.5
No	5	2.5
Total	203	100
<i>Does Brushing your teeth regularly prevent all tooth problems?</i>		
Yes	119	58.6
No	84	41.4
Total	203	100
<i>Does bleeding while brushing indicate presence of gum disease?</i>		
Yes	108	53.2
No	95	46.8
Total	203	100
<i>Does regular dental visit maintain oral hygiene?</i>		
Yes	180	88.7
No	23	11.3
Total	203	100

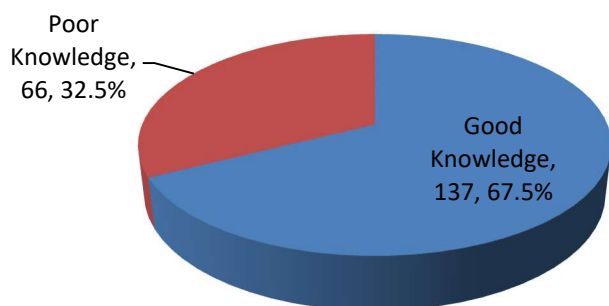


Figure 1: Oral Hygiene Knowledge scores of the OVCs

Table 3: Response to questions on oral hygiene practice

Variable	Frequency(N=203)	Percentage (%)
Q1. How do you brush your Teeth?		
Toothbrush & Toothpaste	185	91.1
Finger and Toothpaste	18	8.9
Q2. What type of Toothpaste do you use?		
Herbal	13	6.4
Fluoride	175	86.2
I don't Know	15	7.4
Q3. How often do you brush your teeth?		
Once daily	121	59.6
Twice daily	71	35
>Twice daily	11	5.4
Q4. How long do you brush your teeth?		
< 1 minute	73	36
2 minutes	118	58.1
5 minutes	12	5.9
Q5. How often do you change your toothbrush?		
Every 3 months	52	25.6
Every 6 months	28	13.8
When it frays	123	60.6
Q6. Do you use Dental Floss?		
Yes	4	2
No	18	8.9
I don't know what dental floss is	181	89.2
Q7. Do you clean your tongue?		
Yes	171	84.2
No	32	15.8
Q8. What do you use to clean your Tongue?		
Toothbrush	168	98.2
Toothbrush & Tongue scraper	3	1.8
Q9. Do you visit the dentist twice a year for dental checkup?		
Yes	0	0.0
No	203	100
Q10. Do you rinse your mouth with water after every meal?		
Yes	75	36.9
No	128	63.1

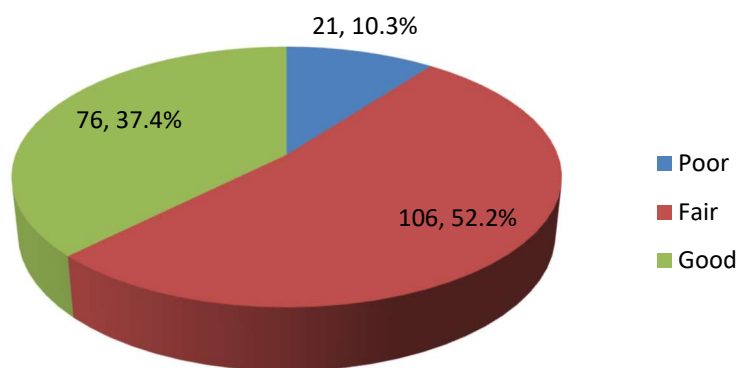


Figure 2: Oral hygiene practice scores among the OVCs

DISCUSSION

The study population consisted predominantly of males, who accounted for 52.7% of the participants. This finding is consistent with reports from India by Bhardwaj et al.,¹⁹ who similarly observed a slight male predominance among institutionalized children. However, it differs from the findings of Al Saffan et al.,²⁰ who reported a higher proportion of females in their study population. Such variations may reflect differences in admission patterns, cultural factors, and demographic characteristics of orphanage populations across different settings.

The mean age of participants was 11.2 ± 2.88 years, with most children aged between 13 and 15 years. This age distribution is comparable to that reported by D'Cruz and Aradhya,²¹ among school-aged children in India. The predominance of participants in the primary school category may be attributable to the age structure of institutionalized children in the selected orphanages and reflects the educational profile of many OVC populations in Nigeria.

The findings revealed generally good oral hygiene knowledge among the participants. Nearly all respondents (97.5%) recognized the importance of maintaining good oral hygiene, while 88.7% acknowledged the role of regular dental visits in maintaining oral health. Overall, 67.5% of the participants demonstrated good oral hygiene knowledge. These findings are consistent with studies conducted among institutionalized children in India, where relatively high levels of oral health awareness were reported.^{17,22}

The relatively good knowledge observed in this study may be attributed to the fact that all participants

were enrolled in formal education and may have received information on oral health through school-based health programs, caregivers, social media, or other mass communication channels. Nevertheless, some misconceptions remained evident. More than half of the participants believed that regular tooth brushing alone could prevent all dental problems, highlighting gaps in understanding regarding the multifactorial nature of oral diseases. This finding underscores the need for comprehensive oral health education programs that address not only tooth brushing but also dietary habits, fluoride use, professional dental care, and other preventive measures.

Despite the generally good level of oral hygiene knowledge, oral hygiene practices were suboptimal. Although 91.1% of participants reported using a toothbrush and toothpaste and 86.2% reported using fluoride-containing toothpaste, only 39.4% demonstrated good oral hygiene practice overall. Most participants brushed only once daily, and none reported attending routine dental check-ups. Similar findings have been reported among orphaned children in Saudi Arabia and Yemen, where adequate oral health knowledge did not necessarily translate into appropriate oral hygiene behaviors.^{14,23}

The widespread use of toothbrushes and fluoride toothpaste observed in this study is encouraging and compares favorably with reports from Tanzania and India, where more than 90% of children used toothbrushes and toothpaste for daily oral hygiene.^{22,24} However, the low prevalence of twice-daily tooth brushing remains a concern, as current evidence supports brushing twice daily with fluoride

toothpaste as a cornerstone of effective plaque control and caries prevention.²⁵

An important finding of this study was the limited awareness and utilization of adjunctive oral hygiene measures. Nearly nine out of ten participants did not know what dental floss was, and none reported regular preventive dental visits. Similar deficiencies have been reported among institutionalized children in other low- and middle-income countries.^{14,17,23} These observations may reflect limited access to oral health information, inadequate caregiver guidance, financial constraints, and restricted availability of preventive dental services.

The study also demonstrated a notable discrepancy between oral hygiene knowledge and oral hygiene practice. While approximately two-thirds of participants possessed good oral health knowledge, fewer than half translated this knowledge into appropriate oral hygiene behaviors. This knowledge-practice gap has been reported in several previous studies and suggests that awareness alone may be insufficient to produce sustained behavioral change.^{17,26} Behavioral practices are influenced by multiple factors, including accessibility of oral hygiene materials, caregiver supervision, institutional support, socioeconomic conditions, and access to oral healthcare services.

CONCLUSION

although most OVCs in Benin City demonstrated good oral hygiene knowledge, oral hygiene practices remained inadequate. The observed gap between knowledge and behavior highlights the need for targeted oral health promotion programs that extend beyond information dissemination and address structural barriers to adopting healthy oral hygiene practices. Strengthening preventive oral health interventions within orphanages may contribute significantly to reducing oral health disparities and improving the overall well-being of this vulnerable population.

LIMITATIONS

The present study has several strengths, including its focus on a vulnerable and under-researched population in Nigeria. However, the findings should be interpreted in light of certain limitations such as self-reported responses may be subject to recall and social desirability bias and only institutionalized OVCs were included, which may limit the generalizability of the findings to non-

institutionalized vulnerable children living in community settings.

RECOMMENDATIONS

Given the high burden of oral diseases among vulnerable populations and the largely preventable nature of many oral health conditions, integrating oral health promotion into orphanage care programs may contribute substantially to improving oral health outcomes. Provision of oral hygiene materials, regular professional dental screening, caregiver training, and school-based oral health education initiatives may help bridge the gap between knowledge and practice among OVCs

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