INTERNATIONAL JOURNAL OF MEDICAL SCIENCE AND DENTAL HEALTH
(ISSN: 2454-4191)
www.ijmsdh.org (2026)

Received: 08 January 2026
Revised: 19 February 2026
Accepted: 21 March 2026
Published: 06 April 2026

Page No - 11-16
DOI - 10.55640/ijmsdh-12-04-03

Article Citation: Okereke, P. U., Ozioma, C. F. ., Okereke, O. W. ., Elebesunu, E. ., Bale, B. I. ., Offurum, C. ., Azubuike, I. ., Okoli, O. G. ., Ikegwuonu, O. ., Okeke, A. C. ., Obidike , E. C., F. Umeh, M. ., Umeh, C. V. ., & C. Obodo, P. . (2026). Towards Strengthening HIV Case Detection and Management: A Review of The Role of Oral Healthcare and Enhanced Laboratory Diagnostics. International Journal of Medical Science and Dental Health, 12(04), 11-16. https://doi.org/10.55640/ijmsdh-12-04-03

Towards Strengthening HIV Case Detection and Management: A Review of The Role of Oral Healthcare and Enhanced Laboratory Diagnostics

Promise Udohchukwu Okereke (BDS)

Faculty of Dentistry, College of Medicine, University of Nigeria
YOHAN Research Institute
Alliance for Oral Health Across Borders (AOHAB), New York, USA

Chukwuemeka Victor Umeh

Sheffield Teaching Hospitals NHS Foundation Trust, UK

Obumneme Wisdom Okereke (BDS)

Faculty of Dentistry, College of Medicine, University of Nigeria
Alliance for Oral Health Across Borders (AOHAB), New York, USA

Emmanuel Elebesunu (BMLS)

Department of Medical Laboratory Sciences, Faculty of Health Sciences and Technology, University of Nigeria, Enugu Campus, Enugu, Nigeria.

Babatunde Ismail Bale (DOpt)

Department of Optometry, Faculty of Life Sciences, University of Benin, Benin City, Edo, Nigeria

Chimeremeze Offurum (BDS)

Faculty of Dentistry, College of Medicine, University of Nigeria

Immanuel Azubuike (BMLS)

Department of Medical Laboratory Science, Faculty of Health Science and Technology, University of Nigeria, Enugu Campus, Enugu, Nigeria.

Ogechi Grace Okoli (MBBS)

University of Jos, Plateau, Nigeria
Pan OJ Clinic, Bonny Island, Rivers State, Nigeria

Obinna Ikegwuonu

Surgery Interest Group of Africa

INTERNATIONAL JOURNAL OF MEDICAL SCIENCE AND DENTAL HEALTH
(ISSN: 2454-4191)
www.ijmsdh.org (2026)

Anthony Chukwuebuka Okeke (MBBS)

Nnamdi Azikiwe University Teaching Hospital Nnewi

Ezije C. Obidike (BDS)

Faculty of Dentistry, College of Medicine, University of Nigeria, Enugu, Nigeria
University of Nigeria Teaching Hospital, Enugu, Nigeria
Zoom36 Dental Clinic Port Harcourt, Rivers, Nigeria

Mmesoma F. Umeh (B.Pharm)

Faculty of Pharmaceutical Sciences, University of Nigeria, Nsukka, Enugu, Nigeria

Chukwuma Franklin Ozioma

Faculty of Clinical Sciences, College of Medicine, University of Nigeria, Enugu Nigeria

Perfectus C. Obodo (BDS)

Faculty of Dentistry, College of Medicine, University of Nigeria
Ideal Dental Services Limited

Authors Contribution

PUO and EE contributed to the conception and design of the study. All authors wrote the first and final drafts of the manuscript. All authors reviewed the final manuscript and approved of its publication.

Corresponding author:

Promise Udohchukwu Okereke

Faculty of Dentistry, College of Medicine, University of Nigeria

Abstract

An estimated 84.2 million people have suffered the disease since its discovery. Although the number of new cases decreased by 32% since 2010, it is most prevalent in Africa 68% [25.7 million], resulting in approximately 470,000 AIDS-related deaths with Nigeria having the highest number of people living with HIV/AIDS (PLWHA) in the region and the second highest globally. Rapid diagnostic tests (RDTs) have emerged as indispensable tools for point-of-care testing, providing quick results with minimal infrastructure requirements.

Dentists play a critical role in the early detection of HIV, as they are in a unique position to identify oral manifestations associated with the infection. The oral cavity is frequently the first site where symptoms of HIV appear, often even before individuals are aware of their serostatus. Dentists have a responsibility to be aware of the oral manifestations of HIV and to consider HIV infection in the differential diagnosis of these conditions. Additionally, dentists can play a proactive role in HIV screening by offering rapid HIV testing services in their dental.

With recent findings demonstrating the high transmissibility of HIV early in infection, and the potential benefit of early initiation of treatment, it is essential to identify as many infected individuals as possible. HIV testing is the key part of diagnosis and prevention efforts hence the need for synergy between oral health practitioners and laboratory diagnostic experts in bridging the gap of diagnosis and prevention among healthcare professionals.

Keywords: Dentist; Detection; Diagnostics; Eradication; HIV; Laboratory.

Introduction

Since its identification, the Human Immunodeficiency Virus (HIV) has remained a major global public health challenge. The virus primarily targets CD4+ T lymphocytes, leading to a gradual decline in immune function and increased susceptibility to opportunistic infections and certain cancers [1]. Globally, approximately 84.2 million people have been infected since the epidemic began [2].

Although there has been a 32% decline in new HIV cases since 2010, the disease burden remains disproportionately high in sub-Saharan Africa. The region accounts for 68% of global HIV cases (approximately 25.7 million individuals) and about 470,000 AIDS-related deaths annually [1]. Nigeria, notably, holds the highest HIV burden in West and Central Africa and ranks second globally in the number of people living with HIV/AIDS (PLWHA) [3].

Over the past few decades, there have been significant advancements in the management of HIV, including improvements in medical care, the introduction of combination antiretroviral therapy (cART), and expansion of community support services [4]. Nevertheless, access to oral healthcare and advanced diagnostic services remains limited in many regions of Nigeria [5].

While cART has reduced the prevalence of several HIV-associated oral conditions, emerging trends show a shift in the types of manifestations observed. For instance, the incidence of oral candidiasis and Kaposi's sarcoma has declined, while

conditions such as HIV-associated salivary gland disease and xerostomia have become more frequent [6,7]. This paper discusses the role of enhanced oral healthcare and advanced laboratory diagnostics in improving HIV case detection and management, particularly within the Nigerian healthcare context.

HIV BURDEN AND DETECTION IN NIGERIA

Between 2003 and 2021, Nigeria saw a significant decline in HIV prevalence among adults aged 15 to 49 years—from 4.4% to 1.3%. This figure has stabilized over the last four years [8,9]. Despite various national and international efforts aimed at curbing the epidemic, Nigeria remains among the top five countries globally in terms of the total number of HIV cases [10].

Currently, an estimated 1.9 million Nigerians are living with HIV, with women aged 15 and older constituting more than 63% of the infected population [11]. Vulnerable groups continue to bear a disproportionate burden of the epidemic: men who have sex with men have an estimated prevalence of 25%, sex workers 16.7%, and people who inject drugs (PWID) 10.9% [11]. HIV-related mortality remains a concern, with approximately 51,000 deaths recorded annually in Nigeria [11].

To meet the UNAIDS target of ending the HIV epidemic by 2030, Nigeria must scale up interventions that improve testing, treatment initiation, and viral load suppression. Data from the Nigeria AIDS Indicator and Impact Survey (NAIIS) revealed progress toward the UNAIDS 90-90-90 target at 47% for diagnosis, 96% for treatment, and 81% for viral suppression. Notably, states such as Rivers, Benue, and Akwa Ibom account for over 50% of the national burden [12,13].

An 18-month Antiretroviral Therapy (ART) surge programme initiated in 2020 by the Nigerian government, in collaboration with PEPFAR and the Global Fund, markedly improved HIV case detection. A key success factor was the integration of community-based rapid diagnostic testing alongside facility-based services [14].

Rapid diagnostic tests (RDTs), which employ lateral flow immunoassay techniques, provide a low-cost and efficient method for HIV screening, especially in resource-limited settings like Nigeria's. Platforms such as Uni-Gold, Determine, and Stat-Pak have been validated for use by WHO and the Nigerian Ministry of Health [15,16]. These tests have demonstrated comparable sensitivity and specificity to ELISA and Western Blot assays [17,18]. Nonetheless, limitations exist, particularly in detecting infections during the early seroconversion window, leading to potential false negatives [19,20].

ROLE OF ORAL HEALTHCARE IN HIV CASE DETECTION

Dentists are often the first healthcare providers to detect signs of HIV due to the prevalence of oral manifestations in early stages of infection. These manifestations may appear before individuals become aware of their serostatus, making the dental setting a valuable point for early diagnosis. Therefore, dentists must remain vigilant in assessing such signs and include HIV in their differential diagnoses when appropriate. Furthermore, dental professionals can provide rapid HIV testing or referrals, particularly for patients with indicative lesions [21–23].

Rapid HIV testing in dental clinics enhances early diagnosis by providing immediate results, thereby enabling prompt linkage to care. Studies show that incorporating HIV screening into dental practices increases the identification of undiagnosed cases, especially in populations less likely to access traditional healthcare services.

ORAL MANIFESTATIONS OF HIV

HIV infection is associated with a wide range of oral pathologies. Common manifestations include oral candidiasis, characterized by creamy white lesions on the tongue or inner cheeks; oral hairy leukoplakia, a white corrugated lesion typically found on the sides of the tongue; and Kaposi's sarcoma, a vascular tumor affecting the oral mucosa. Additional findings include recurrent aphthous ulcers, persistent herpes simplex virus infections, gingival hyperplasia, xerostomia, non-Hodgkin lymphoma, salivary gland disease with reduced salivary flow, and advanced periodontal disease presenting with halitosis and oral pain [21,24–26].

Recognizing these signs provides an opportunity for dentists to engage in proactive HIV detection, education, and referral, especially as the healthcare model shifts toward integrated, multidisciplinary approaches [27].

BARRIERS TO HIV SCREENING IN DENTAL SETTINGS

Despite the strategic role of dental clinics in HIV screening, several barriers hinder their involvement. Time and staffing constraints often limit the capacity to conduct additional testing during routine visits. A lack of specialized training in HIV testing protocols and counseling further impedes dentist participation. Moreover, concerns persist about patient acceptance of HIV testing in a dental setting [28,29].

Overcoming these barriers requires targeted education and training initiatives, supported by policy changes that normalize

HIV screening in all healthcare settings, including dentistry [27–29].

ENHANCED LABORATORY DIAGNOSTICS IN HIV CASE DETECTION

Laboratory diagnostics have evolved significantly, transitioning from first-generation antibody assays to highly sensitive and specific fourth-generation antigen/antibody combination tests. Earlier methods, such as Western Blot and IFA, often failed to detect acute infections due to their reliance on IgG antibody responses [30,31]. The 2014 adoption of fourth-generation assays revolutionized HIV screening by enabling detection of both p24 antigen and HIV-1/2 antibodies, reducing the diagnostic window and enabling earlier intervention [32–35].

Oral fluid-based RDTs such as OraQuick Advance and Chembio DPP have improved accessibility, though concerns remain regarding their ability to detect early infection stages [36–38]. The Alere Determine HIV–1/2 Combo and Bio-Rad Geenius serve as more sensitive confirmatory tools in this regard [39–41].

Molecular diagnostics represent a paradigm shift in HIV detection. The Aptima HIV-1 RNA NAAT, the first FDA-approved RNA test, can identify infections during the acute phase, even before seroconversion [42]. This test targets the HIV-1 5'-LTR and pol genes to ensure broad strain coverage [43]. Additionally, HIV DNA assays provide critical information for identifying viral reservoirs or diagnosing infants. Viral load testing, commonly performed using RT-PCR platforms such as the COBAS TaqMan and Abbott RealTime systems, remains the gold standard for monitoring treatment efficacy [44–46].

RECOMMENDATIONS

To significantly improve HIV detection and management in Nigeria, a multi-stakeholder strategy is essential. The following refined recommendations are directed toward the government, healthcare facilities, and diagnostic laboratories.

Government-Level Recommendations

The Nigerian government should establish and periodically update a national HIV diagnostic algorithm, ensuring it incorporates global best practices and emerging technologies. This may be accomplished through consultative stakeholder meetings involving clinicians, laboratory experts, policymakers, and civil society. Alternatively, Nigeria may adopt and adapt WHO's existing diagnostic algorithm, which promotes a two-step approach involving a screening test followed by confirmatory testing using antibody differentiation or molecular assays [47,49].

Additionally, a robust national quality assurance (QA) program must be enforced across all levels of testing. This should encompass comprehensive training, development of standard operating procedures, equipment calibration, biohazard safety, and regular performance monitoring via external QA schemes [50].

The establishment of Communicable Disease Surveillance Centres (CDSCs) across all geopolitical zones is also recommended. These centers would aggregate data from local testing facilities to track regional trends and guide resource allocation, public education, and policy interventions [51].

Hospital and Dental Clinic Recommendations

Healthcare workers, including dentists and general practitioners, should be systematically trained to recognize and manage HIV-related oral lesions, such as oral candidiasis and leukoplakia. These clinical signs are often early indicators of immunosuppression and warrant immediate follow-up testing [52].

Routine HIV screening should be incorporated into clinical care using an opt-out approach, whereby patients are informed that testing is standard unless they specifically decline. This strategy has proven effective in increasing testing uptake, particularly in high-prevalence regions [48].

Laboratory and Diagnostic Centre Recommendations

A **tiered laboratory network** should be implemented to streamline referrals and ensure that patients or specimens requiring advanced testing (e.g., viral load, CD4 count, infant diagnosis) are efficiently directed to higher-tier laboratories. National and regional reference labs should offer periodic training to lower-tier facilities, particularly on point-of-care tools and new diagnostic technologies [50].

Laboratories must adhere to stringent internal and external quality assurance protocols, aligning with national regulations. Participation in regular QA schemes and implementation of standard algorithms are essential for maintaining diagnostic accuracy and public trust [51].

Conclusion

Nigeria's progress in combating HIV requires a coordinated, integrated approach that bridges oral healthcare, community testing, and advanced laboratory diagnostics. Dentists play a critical role in early case detection through the recognition of oral manifestations and provision of rapid testing.

Meanwhile, innovations in diagnostic technologies, including fourth-generation assays and molecular testing, enhance early detection and treatment monitoring.

To achieve epidemic control, Nigeria must adopt inclusive policies that expand diagnostic access, strengthen quality assurance systems, and support routine screening across all healthcare settings. Training, surveillance, and tiered lab networks are essential to closing existing gaps.

Ultimately, by aligning clinical, community, and policy efforts, Nigeria can accelerate progress toward the UNAIDS 95–95–95 targets and bring the country closer to ending the HIV epidemic by 2030.

References

1. World Health Organization. WHO Africa Health Topics - HIV/AIDS. 2018 [cited 2023 Mar 6]. Available from: https://www.afro.who.int/health-topics/hivaids
2. UNAIDS. AIDSInfo: Number of people living with HIV. 2018 [cited 2023 Mar 6]. Available from: https://aidsinfo.unaids.org/
3. National Agency for the Control of AIDS (NACA). Revised National HIV and AIDS Strategic Framework 2019–2021: Future directions for the HIV/AIDS response in Nigeria. 2018 [cited 2023 Mar 6]. Available from: https://naca.gov.ng/wp-content/uploads/2019/03/NATIONAL-HIV-AND-AIDS-STRATEGIC-FRAMEWORK
4. Broder S. The development of antiretroviral therapy and its impact on the HIV-1/AIDS pandemic. Antiviral Res. 2010 Jan;85(1):1–18.
5. Tobias C. Oral health care: the forgotten need for HIV-positive populations in the continuum of care. Presented at: American Public Health Association Annual Meeting; 2007 Nov 7; Washington, DC.
6. McCarthy GM. Host factors associated with HIV-related oral candidiasis: a review. Oral Surg Oral Med Oral Pathol. 1992 Feb;73(2):181–6.
7. Patton LL, McKaig R, Strauss R, Rogers D, Eron JJ Jr. Changing prevalence of oral manifestations of HIV in the era of protease inhibitor therapy. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2000 Mar;89(3):299–304.
8. Awofala AA, Ogundele OE. HIV epidemiology in Nigeria. Saudi J Biol Sci. 2018;25(4):697–703.
9. O'Brien-Carelli C, Steuben K, Stafford KA, Aliogo R, Alagi M, Johanns CK. Mapping HIV prevalence in Nigeria using small area estimates to develop a targeted HIV intervention strategy. PLoS One. 2022 Jun 8;17(6):e0268892.
10. World Population Review. HIV Rates by Country 2023 [Internet]. [cited 2023 Mar 6]. Available from: https://worldpopulationreview.com/country-rankings/hiv-rates-by-country
11. HIV Country Profiles [Internet]. [cited 2023 Mar 6]. Available from: https://cfs.hivci.org/index.html
12. Jahun I, Dirlikov E, Odafe S, Yakubu A, Boyd AT, Bachanas P, et al. Ensuring optimal community HIV testing services in Nigeria using an Enhanced Community Case-Finding Package (ECCP), Oct 2019–Mar 2020: Acceleration to HIV epidemic control. HIV AIDS Res Palliat Care. 2021;13:839–50.
13. Strengthening Integrated Delivery of HIV/AIDS Services, FHI 360. Implementing the surge HIV response in Akwa Ibom: an accelerated HIV epidemic control drive (technical brief).
14. Jwanle P, Ibiloye O, Obaje M, Ngwoke K, Usha T, Amoo O, et al. Accelerating HIV epidemic control in Benue State, Nigeria, 2019–2021: the APIN program experience. Ther Adv Infect Dis. 2023 Feb;10:20499361231153549.
15. Motayo BO, Usen U, Folarin BO, Okerentugba PO, Innocent-Adiele HC, Okonko IO. Detection and seroprevalence of HIV-1 & 2 antibodies in Abeokuta, Southwest Nigeria. Int J Virol Mol Biol. 2012;1(2):18–22.
16. Franco-Paredes C, Tellez I, del Rio C. Rapid HIV testing: a review of the literature and implications for the clinician. Curr HIV/AIDS Rep. 2006 Dec;3(4):169–75.
17. Saba AM, Abdullahi M, John B, Angulu S, Dogari J. Evaluation of the sensitivity and specificity of three rapid test kits used in the detection of HIV in public hospitals, Niger State, Nigeria. J Sci Res Med Biol Sci. 2022 Mar 12;3(1):1–6.
18. Cappello JM, Gunasekera A, Gunasekera D, Esfandiari J, Ippolito T. A multicentre performance evaluation of the DPP® HIV-1/2 assay. J Clin Virol. 2013 Dec;58:e59–64.
19. Odaibo GN, Donbraye E, Adewumi MO, Bakaery AS, Ibeh MA, Olaleye DO. Reliability of testing and potential impact on HIV prevention in Nigeria.
20. Olusola BA, Olaleye DO, Odaibo GN. Detection of early HIV-1 infection among febrile persons and blood donors in Oyo State, Nigeria. medRxiv. 2020 Apr 14.
21. National Institute of Dental and Craniofacial Research (NIDCR). Oral manifestations of HIV/AIDS [Internet]. 2023 [cited 2023 Dec 2]. Available from: https://www.nidcr.nih.gov/health-info/hiv-aids

22. Centers for Disease Control and Prevention (CDC). HIV/AIDS [Internet]. 2023 [cited 2023 Dec 2]. Available from: https://www.cdc.gov/hiv/default.html
23. World Health Organization. HIV/AIDS [Internet]. 2023 [cited 2023 Dec 2]. Available from: https://www.who.int/news-room/fact-sheets/detail/hiv-aids
24. Reznik DA. Oral manifestations of HIV disease. Top HIV Med. 2005;13(5):143–8.
25. Bajpai S, Pazare AR. Oral manifestations of HIV. Contemp Clin Dent. 2010;1(1):1–5.
26. Weinert M, Grimes RM, Lynch DP. Oral manifestations of HIV infection. Ann Intern Med. 1996 Sep 15;125(6):485–96.
27. Santella AJ, Schlub TE, Schifter M, Tolani M, Hillman RJ. Australian dentists' perspectives on rapid HIV testing. Aust Dent J. 2016 Sep;61(3):270–6.
28. Parish CL, Siegel K, Liguori T, Abel SN, Pollack HA, Pereyra MR, et al. HIV testing in the dental setting: perspectives and practices of experienced dental professionals. AIDS Care. 2018;30(3):347–52.
29. Reznik DA. Screening for infectious diseases in the dental setting. Dent Clin North Am. 2012 Oct;56(4):809–18.
30. Centers for Disease Control and Prevention (CDC). Laboratory testing for the diagnosis of HIV infection: updated recommendations. CDC Stacks. 2014.
31. Yuksel P, Saribas S, Kuskucu M, et al. Problems encountered in conventional HIV 1/2 algorithms. Afr Health Sci. 2018;18(2):407–16.
32. Kania D, Truong TN, Montoya A, et al. Performance of fourth-generation HIV assays on filter paper. J Clin Virol. 2015;62:92–7.
33. Welles HC, King HAD, Nettey L, et al. Broad coverage of neutralization-resistant SIV strains by second-generation antibodies. PLoS Pathog. 2022;18(6):e1010574.
34. Din M, Waris A, Khan M, et al. The contemporary immunoassays for HIV diagnosis: a concise overview. Asian Biomed. 2023;17(1):3–12.
35. Vallefuoco L, Mazzarella C, Portella G. Fourth generation assays for HIV testing. Expert Rev Mol Diagn. 2016;16(7):723–32.
36. Rapid detection by the OraQuick ADVANCE® Rapid HIV 1/2 Antibody Test. PeerJ. 2018;6:e4430.
37. Kalou MB, Castro A, Watson A, et al. Evaluation of Chembio Dual Path Platform HIV-Syphilis Assay. Afr J Lab Med. 2016;5(1):433.
38. Figueroa C, Johnson C, Ford N, et al. Reliability of HIV RDTs for self-testing: systematic review and meta-analysis. Lancet HIV. 2018;5(6):e277–90.
39. Sirivichayakul S, Pankam T, Pattanachaiwit S, et al. Ability of Alere HIV Combo to diagnose acute HIV infection. Asian Pac J Allergy Immunol. 2021. doi:10.12932/AP-290521-1144
40. Pandori MW, Westheimer E, Gay C, et al. Multispot rapid HIV-1/HIV-2 differentiation assay: comparison with Western blot. J Clin Virol. 2013;58 Suppl 1:e92–6.
41. Shigemi U, Yamamura Y, Matsuda M, et al. Evaluation of Geenius HIV 1/2 confirmatory assay. J Clin Virol. 2022;152:105189.
42. Manak MM, Eller LA, Malia J, et al. Identification of acute HIV-1 infection by Aptima HIV-1 RNA qualitative assay. J Clin Microbiol. 2017;55(7):2064–73.
43. Nair SV, Kim HC, Fortunko J, et al. Aptima HIV-1 Quant Dx—automated diagnosis and quantification of HIV-1. J Clin Virol. 2016;77:46–54.
44. Racca S, Paolucci S, Lai A, et al. External quality assessment of HIV-1 DNA quantification assays. Sci Rep. 2022;12(1):3291.
45. Hardie D, Korsman S, Ameer S, et al. Reliability of plasma HIV viral load testing beyond 24 hours. PLoS One. 2019;14(7):e0219381.
46. Etienne L, Eymard-Duvernay S, Aghokeng A, et al. Real-time RT-PCR assay for genetically diverse HIV/SIV strains. J Clin Microbiol. 2013;51(3):787–98.
47. Tüzüner U, Gülcen BS, Özdemir M. Laboratory algorithm in HIV infection diagnosis. J HIV Clin Sci Res. 2016;3(1):007–10.
48. Wilson E, Tanzosh T, Maldarelli F. HIV diagnosis and testing: what healthcare professionals can do. Oral Dis. 2013;19(5):431–9.
49. Cornett JK, Kirn TJ. Laboratory diagnosis of HIV in adults: a review of current methods. Clin Infect Dis. 2013;57(5):712–8.
50. Alemnji G, Nkengasong JN, Parekh BS. HIV testing in developing countries: requirements. Indian J Med Res. 2011;134(6):779–86.
51. Parry JV, Mortimer PP, Perry KR, et al. Towards error-free HIV diagnosis: guidelines on lab practice. Commun Dis Public Health. 2003;6(4):334–50.
52. Koyio LN, Sanden WJMvd, Dimba E, et al. Oral health training increases HIV patient identification. PLoS One. 2014;9(3):e90927.