

Oral Health-related Quality of Life in HIV: A Systematic Review

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ABSTRACT

Aim: To systematically evaluate the literature evidence related to oral health and quality of life (QoL) among HIV-positive adults.

Background: The oral health-related quality of life (OHRQoL) is an essential entity to be measured for understanding the domains affected due to oral health problems. HIV comes with an array of complexities in the oral cavity and is also reflection of the systemic illness of the oral cavity. Hence, it is essential to know the area affected and also the lesions that contribute the most to decrease the QoL in this aspect. A systematic review was carried out in relation to studies across PubMed and Google Scholar regarding HIV and OHRQoL from January 1970 to May 2019. Of the 1,374 articles screened, 11 studies were filtered for the final review.

Review results: The physical domain followed by the psychological domain is the most affected in the HIV-positive patients. The maximum effect is due to dental caries and periodontitis. No studies report about oral substance abuse and its effect.

Conclusion: Studies are further needed on a larger sample size and on similar scales and parameters to ensure greater evidence for intervention related to areas that should be focused upon for improving the QoL of HIV-positive patients.

Clinical significance: There is a greater need to include quality-based assessment while treating HIV-positive people. Also not just physical indicators like pain or dental caries, even social indicators like mental and social dimensions of a patient's life should be included while deciding the treatment approach.

Keywords: HIV, Oral health, Quality of life.

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INTRODUCTION

HIV as an infection affects both the physical and the mental well-being of an individual. It compromises the quality of life (QoL) of a person with respect to physical, mental, as well as social dimensions. It is difficult to pinpoint at any one area that remains unaltered due to HIV infection in an individual's life. Numerous research works have focused on the development of conceptualizing as well as measuring the impact and correlation of different domains on the overall life of an individual^{1,2} and HIV is a major challenge in this regard. Garratt et al.³ and Bowling⁴ state, "It is multidimensional and theoretically incorporates all aspects of an individual's life ... there is a general interest in how to achieve the 'goodness' of life, sometimes called life satisfaction or quality of life." Paisley and associates state that health care intervention has moved beyond mere clinical signs and symptoms. The World Health Organization (WHO) definition of QoL encompasses all governing principles of a human life for terming it as a good and satisfactory living; as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment,"⁵ which very much holds true for a seropositive individual. Devins et al. claim that chronic disease disrupts an individual's life and that this disruption may be interpreted in terms of its impact on well-being, or QoL.⁶ Chronic diseases progress slowly, have a prolonged duration requiring intensive medical intervention, and could limit the well-being of the individual by worsening the overall health,⁷ which is very relevant to HIV-positive patients. Symptom statuses are

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invariably influenced directly by psychological parameters, which in turn affect functional health that has an overall impact on the

QoL.⁸ Individuals who are infected but asymptomatic reportedly enjoy the same physical QoL as compared to the noninfected individuals. According to the UNAIDS report, apart from the immunocompromised condition, social stigma and discrimination, poverty, unemployment, relationship problems, and surrounding circumstances reduce the QoL in HIV-positive people.^{9,10} Assessing QoL is essential since it is a good method of documentation of the patient's disease burden, improving or depleting health changes over a period of time and also to quantify the return on healthcare investment.¹¹ Clinically, lower viral load, higher CD4 count, fewer opportunistic infections and higher hemoglobin levels, lower number of pills, and better adherence to the ART regime is associated with better QoL.¹²⁻²⁰ Risk factors for oral diseases, like unhealthy diet, tobacco use, alcohol abuse, and poor oral hygiene, and other correlate to sociocultural determinants like poor living conditions, low education level, and lack of traditions, beliefs, and culture affect oral health among HIV patients.²¹⁻²⁸ Oral lesions strongly associated with HIV infection include pseudomembranous oral candidiasis, oral hairy leukoplakia, HIV gingivitis and periodontitis, Kaposi's sarcoma, and non-Hodgkin's lymphoma.^{29,30} The decreased salivary flow rate may not only increase the risk of dental caries but may also have a further negative impact on QoL, because of difficulty in chewing, swallowing, and tasting food.³¹ Research has shown that oral lesions may not only be associated with a depleting CD4 count, it may also indicate the underlying spread and serve as a hallmark of opportunistic infections.^{32,33} According to Duggal et al., the symptoms of oral diseases that are indirectly related with HIV infection like pain and discomfort adversely affect food selection, leading to inadequate dietary intake and concomitantly poor nutrition, which weakens the already compromised immune status.³⁴ Oral problems may lead to discomfort, dysfunction, or disability, which has been shown to affect the overall QOL of HIV-positive individuals.^{34,35} For a long time, clinical indices like the decayed-missing-filled (DMF) index have been used to measure oral health. However, these indices fail to take into account multidimensional measures of diseases that consider the patient's perspective and the impact of oral problems on day-to-day life.^{36,37} The need to evaluate the QOL in the field of dentistry has led to the development of different oral health-related quality of life (OHRQoL) instruments, including the oral health impact profile (OHIP).³⁸ Three studies have revealed that factors like gender, race, living situation, dental caries, periodontal disease, smoking status, cocaine consumption, denture use, and not consulting a dentist in the previous year were associated with psychosocial and functional impact of oral disorders.³⁹⁻⁴² With individual research works reported, no higher level of evidence is available to compare and collectively combine the results of the literature reports with regards to the impact of oral health among HIV-positive patients and its QoL. The rationale behind this systematic review was to systematically review the literature related to oral health and QoL among the HIV population.

MATERIALS AND METHODS

The study was conducted at Pune, India. This systematic review followed the PRISMA guidelines.

Inclusion and Exclusion Criteria

All articles in English language only were included. The following exclusion criteria were applied: articles not using OHQoL instruments, articles that did not evaluate OHRQoL among HIV

AIDS-positive people, case reports, cross-sectional studies, review articles, book chapters, theses and guidelines, unpublished data, data from nonscientific sources, and from conference proceedings or plain reviews.

Search Strategy

Search for all articles published in English from January 1970 to May 2019 was made. The databases used were PubMed and Google Scholar. The search strategy for PubMed-involved terms is mentioned in Table 1.

The search strategy revealed 1,373 articles through database searching (PubMed) and one from other additional sources. So in all 1,374 articles were accessed in total. After the initial screening of title and abstract, 14 articles were selected. No risk of bias assessment was done for the selection. Three articles were not found to be satisfying the study objectives and hence were excluded from the review. Overall, 11 articles were found to be relevant for further analysis (refer Flowchart 1). The studies were selected based on the following criteria:

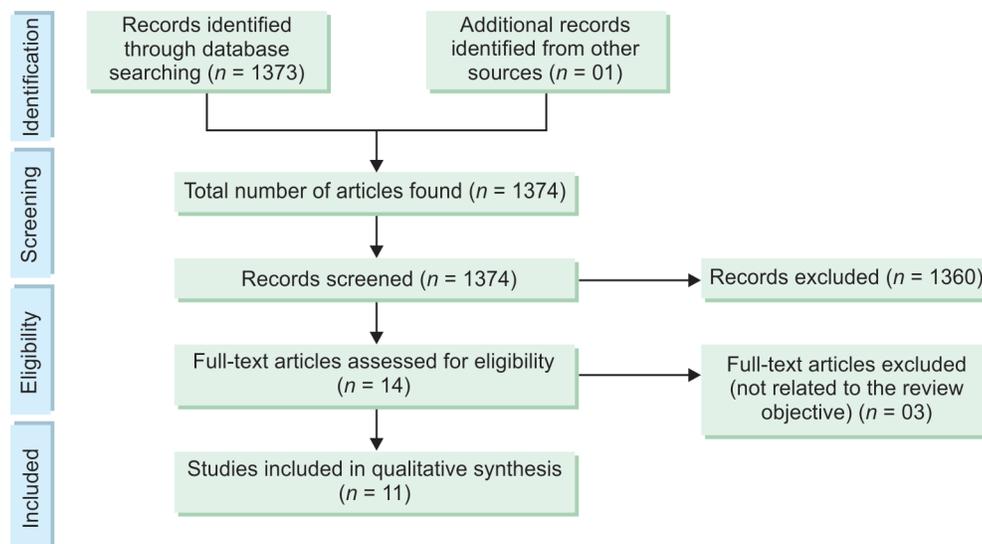
- Mentioned the population and place where the study was carried out
- Focused on the OHRQoL measurement among the HIV population
- Used a standard scale that was easily accessible and acceptable
- Correlated the QoL with oral health problems

RESULTS

The literature search based on the predecided criteria fetched 11 articles in all. Of the total 11, 7 studies used the OHIP-14 impact profile (Mulligan et al.,³⁹ Jeganathan et al.,⁴¹ Mohamed et al.,⁴³ de Quadros Coelho et al.,⁴⁴ Busato et al.,⁴⁶ Liberali et al.,⁴⁷ Santo et al.⁴⁹). Three of the studies used the OHIP- 49 questionnaire (Sánchez et al.,⁴⁸ Tomar et al.,⁴⁰ and Coates et al.³⁷). Soares et al.⁴⁵ used the HAT-QoL questionnaire, which is not very specific to

Table 1: Search strategy for articles in PubMed

PubMed	# 1 ("Health Status Indicators"[MeSH] OR "Oral Hygiene practices" OR "Activities of Daily Living"[MeSH] OR "Quality of Life"[MeSH] OR "quality of life" OR "Oral health-related quality of life" OR "OHQoL" OR "OHIP" OR "activities of daily living" OR "health status standards" OR "Social Stigma"[MeSH] OR "stigma" OR "psychological impact" OR "physical impact" OR "disability" OR "Social Discrimination"[MeSH] OR "discrimination" OR "social impact" OR "Substance Abuse, Oral"[MeSH] OR "addiction" OR "Anxiety"[MeSH] OR "anxiety" OR "Depression"[MeSH] OR "depression")
	#2 ("dental caries" [MeSH] OR "caries" OR "gingivitis" [MeSH] OR "gingivitis" OR "periodontitis" [MeSH] OR "periodontitis" OR "malocclusion" [MeSH] OR "malocclusion" OR "toothache" [MeSH] OR "toothache" OR "tooth loss" [MeSH] OR "tooth" OR "dental" OR "anodontia" OR "jaw" OR "mouth" [MeSH] OR "Mouth" OR "oral" OR "AIDS-Related Opportunistic Infections" [MeSH] OR "AIDS-related opportunistic infections" OR " AIDS Related opportunistic infections")
	#3 ("hiv" [MeSH] OR "HIV" OR "HIV-AIDS" OR "HIV/AIDS")
	#1 AND #2 AND #3

Flowchart 1: Flow chart for selection of articles for systematic review (as per PRISMA guidelines)

the oral health profile of the subject participants. All the studies had both male and female participants, except for the study by Mulligan,³⁹ which was carried out on 689 women participants only. The most severely affected domain from these studies based on the OHIP-49 and 14 was that of physical pain (questions: Have you had painful aching in your mouth and have you found it uncomfortable to eat any foods because of problems with your teeth, mouth, or dentures?). Social disability and handicap (questions: Have you been a bit irritable with other people because of problems with disability of your teeth, mouth, or dentures? Have you had difficulty doing your usual jobs because of problems with your teeth, mouth, or dentures? Have you felt that life in general was less satisfying because of problems with your teeth, mouth, or dentures? Have you been totally unable to function because of problems with your teeth, mouth, or dentures?) seemed to be the least affected (Table 2). Only two studies reported of comparison with the general HRQoL (Mohamed et al.⁴³ and de Quadros Coelho et al.⁴⁴). Consistency of the questionnaire was also not tested in most of the studies (Coates et al.,³⁷ Tomar et al.,⁴⁰ Jeganathan et al.,⁴¹ Mohamed et al.,⁴³ Busato et al.,⁴⁶ and Santo et al.⁴⁹) (Table 3). The studies overall mentioned oral lesions like dental caries, periodontitis, tooth loss, plaque, ulcers, and xerostomia. The highest reported lesions were dental caries and periodontitis (63.6%) while the least focused and reported problem was halitosis (9.1%) (Fig. 1). A total of six studies specified to dental caries (using the DMFT index or DSTN or the CDCI), three studies each were related to periodontal pathology and ulcers related to oral mucosa, two studies each reported on xerostomia and tooth loss, while one study considered oral substance abuse and halitosis (bad breath) as a part of their study parameters. All domains, physical, mental, social, functional, and psychological, were studied by the authors. The highest domain reported was of physical domain getting affected by five studies.^{37,45,46,48,49} The least affected domain was of social disability.^{43,46,48,49} Three studies reported that psychological discomfort was the major issue faced by the patients.^{41,43,44} Mulligan³⁹ and Tomar⁴⁰ did not specify which domain was the most or the least reported. Three studies showed that there was no handicap or inability to carry out normal activity among the participants.^{37,41,44} None of the studies exclusively can be generalized due to their limitations (Table 4).

DISCUSSION

The reports available in the literature overall prove that the QoL is definitely affected by HIV in one or the other way. Out of all the studies in the analysis, two studies did not report the highest affected domain specifically.^{39,40} Two studies observed all the hard and the soft tissues with the OHQoL.^{39,49} Five of the studies showed the correlation between dental caries with the different dimensions of OHRQoL.^{37,39,43,48,49} Six of the studies reported the effect based on periodontal tissue pathology.^{37,39,43,46,48,49} Jeganathan⁴¹ and Busato⁴⁶ reported of a physical disability and psychological discomfort, respectively, as the most affected domain due to xerostomia. It is an established fact that medications have an adverse effect on the oral cavity prominently on the salivary function, leading to increased dental caries, halitosis, candidiasis, and gingivitis. Hence, xerostomia along with other factors studied together is essential. The only study to follow the WHO pattern for epidemiological studies was that of Santo et al.,⁴⁹ Tomar et al.⁴⁰ and de Quadros Coelho⁴⁴ did not report which oral tissue and lesion was the most affected. Even though habits were mentioned, a detailed history and its correlation to reasons and continuation of the abuse, the effect on the oral cavity, and the awareness related to its ill effects were not considered in any of the studies. Two studies (Mulligan et al.³⁹ and Tomar et al.⁴⁰) though report a strong association of substance abuse with a depleting QoL, it does not provide any impetus for any community intervention further. Unfortunately, we cannot conclude from the literature regarding the best tool to record the QoL. It also fails to provide us discrete information on the isolated effect of common dental issues like caries, pain, and tooth loss in HIV patients. Not all the studies had carried out a comparison with non-HIV patients, hence it is difficult to infer if the alterations in QoL are due to the lesions or the additional burden of HIV also. Surprisingly, no article was available that compared a pre- and postintervention among the HIV-positive patients and evaluate which domain and by how much is the change occurring if appropriate treatment is provided. Hence, there is still a lot of scope for research in this field since only epidemiological cross-sectional data cannot encompass ever-changing dimensions of health scenario. The analysis we conducted has certain limitations. We included only the freely available full

Table 2: Articles assessed for systematic review

S.no	Author	Year	Place of study	Sample size	Scale used	Observation		Conclusion
						Total impact prevalence	Mean OHIP	
1	Mohamed et al. ⁴³	April–May 2013	Malaysia	121	OHIP-14	33.90%	8.8 ± 7.92	Psychological discomfort (2.1 ± 1.95) Impact of oral disease is higher in PLWHA than the general population
2	de Quadros Coelho et al. ⁴⁴	May 2011–June 2012	Brazil	422	OHIP-14	33.90%	12.29 ± 13.94	Psychological discomfort Oral health needs to be considered as a part of the general health quality of life
3	Soares et al. ⁴⁵	2012	Brazil	177	HAT-QoL	61.8% (health concern)	–	Dental caries affected the domain of health concern and dentures affected the domain of sexual activity Impact of oral disease is higher in PLWHA than the general population
4	Busato et al. ⁴⁶	March–October 2008	Brazil	195	OHIP-14	6.30%	–	Social impact Xerostomia significantly lowered the quality of life of PLWHA
5	Liberati et al. ⁴⁷	2009–2010 (secondary data)	Australia	60	OHIP-14	33.90%	0.9	Psychological PLWHA twice more likely to have oral problems. Their QoL is affected 1.5 times more than the healthy counterparts
6	Jeganathan et al. ⁴¹	2012	Australia	100	OHIP-14	–	18.6	Psychological PLWHA with xerostomia have two times poorer QoL compared to PLWHA who have no xerostomia
7	Sanchez et al. ⁴⁸	March 2007–November 2010	Argentina	200	OHIP-49	43%	–	Social impact Unmet oral health care needs impairs the QoL of PLWHA
8	Tomar et al. ⁴⁰	April 2005–December 2007	South Florida (USA)	594	OHIP-49	62.60%	5.8 ± 8.8	Minimum six impacts affected per person Oral health impacts higher than the general population. Strong association of smoking with OHRQoL
9	Santo et al. ⁴⁹	2010	Portugal (Cascias county)	101	OHIP-14	–	5.83 ± 7.79	Physical disability Oral problems have a mild impact on QoL
10	Mulligan et al. ³⁹	From 2001—followed up to 5.5 years	United States of America	689 women	OHIP-14	–	5.9	– HIV infected women have consistently poor oral health quality of life. It is 10% higher than their healthier counterparts. It depletes with HAART and lower CD4 counts
11	Coates et al. ³⁷	October 1992–July 1993	South Australia	54	OHIP-49	47.9	–	Psychological impact Painful aching and embarrassment of appearance due to dental problems was two times higher than the general population

Table 3: Qualitative analysis of the selected articles

S.no	Author	Time spent on the questionnaire	Scale used	Exclusion criteria mentioned		Cost effectiveness	Patient acceptance	Internal consistency	Validity	Any comparison with other scales	Comparison with the general health scale	Culturally appropriate
				Inclusion criteria	mentioned							
1	Mohammed et al. ⁴³	No	OHIP-14	Yes	No	No	No	No	No	No	Yes	Yes
2	de Quadros Coelho et al. ⁴⁴	No	OHIP-14	Yes	Yes	No	No	Mentioned (done in a previous study)	Yes	No	Yes	Yes
3	Soares et al. ⁴⁵	No	HAT-QoL	Yes	Yes	No	No	Yes (Pilot tested)	Yes (Pilot tested)	No	No	Yes
4	Busato et al. ⁴⁶	No	OHIP-14	Yes	No	No	No	No	No	No	No	Yes
5	Liberali et al. ⁴⁷	No	OHIP-14	No	No	No	No	Yes (by previous studies)	Yes (by previous studies)	No	No	Yes
6	Jeganathan et al. ⁴¹	No	OHIP-14	No	No	No	No	No	No	No	No	Yes
7	Sánchez et al. ⁴⁸	No	OHIP-49	Yes	No	No	Yes	Yes	Yes	No	No	Yes
8	Tomar et al. ⁴⁰	No	OHIP-49	Yes	No	No	No	No	No	No	No	Yes
9	Santo et al. ⁴⁹	No	OHIP-14	No	No	No	No	No	No	No	No	Yes
10	Mulligan et al. ³⁹	No	OHIP-14	No	No	No	Yes (by previous studies)	Yes (by previous studies)	Yes (by previous studies)	No	No	Yes
11	Coates et al. ³⁷	No	OHIP-49	No	No	No	No	No	No	No	No	Yes

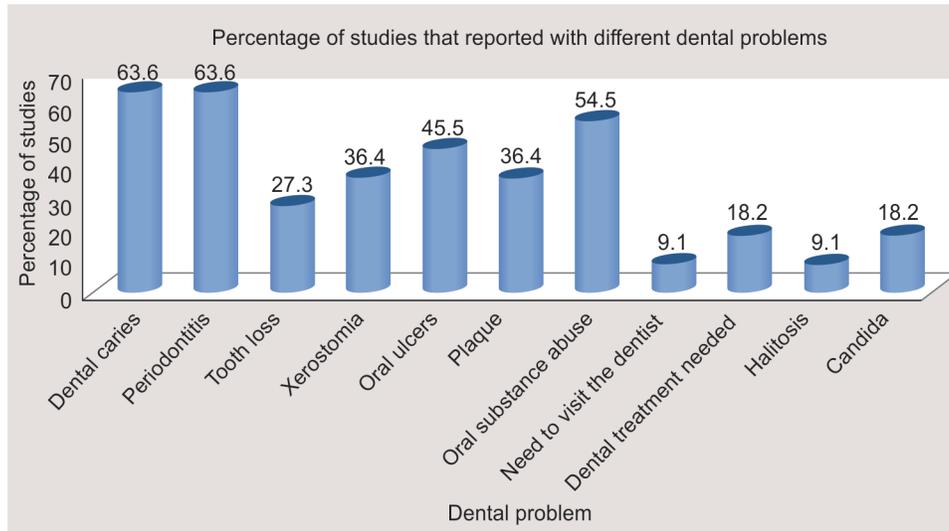


Fig. 1: Percentage of different dental problems reported across the 11 different studies

Table 4: Study characteristics of the reported literature

Author/study	Place of study (developed or developing nation)	Sampling frame	Pilot tested	Tool translated in local language	Approach (camp/ NGO/public program)	Interview or self-administered questionnaire	Literate/ illiterate population	Generalizability
Mohamed et al. ⁴³	Developing	Specified	Yes	Yes	Public program	Self-administered	Literate	No
de Quadros Coelho et al. ⁴⁴	Developed	Specified	Yes	Yes	Referral centers	Interviews	Literate	No
Soares et al. ⁴⁵	Developed	Specified	Yes	Yes	Referral centers	Not specified	Both (literate and illiterate)	No
Busato et al. ⁴⁶	Developed	Specified	No	Yes	Referral centers	Interview	Literate	No
Liberali et al. ⁴⁷	Developed	Specified	No	Not applicable	Referral centers	Interview	Literate	No
Jeganathan et al. ⁴¹	Developed	Not specified	No	Not applicable	Referral centers	Self-administered	Literate	No
Sánchez et al. ⁴⁸	Developed	Not specified	No	Yes	Private institute	Self-administered	Literate	No
Tomar et al. ⁴⁰	Developed	Not specified	No	Yes	Public program	Not specified	Literate	No
Santo et al. ⁴⁹	Developed	Not specified	Yes	Yes	Institution based	Self-administered	Literate	No
Mulligan et al. ³⁹	Developed	Specified	No	Not applicable	Public program	Interviews	Literate	No
Coates et al. ³⁷	Developed	Specified	No	Not applicable	Public program	Interviews	Literate	No

All were clinic-based studies and no community or field survey was carried out

texts. Other unpublished data were not considered. There is a possibility of evidences not reported but collected for conference proceedings or for paper presentations. We did not limit the reports from only one region, hence sociocultural aspects that affect the approach of the patients to seek treatment and also those aspects may affect their QoL.

CONCLUSION

From the review, we can conclude that there is a strong evidence of dental caries and periodontitis affecting the OHRQoL among

patients. Comparing with general QoL is essential to see if there are any confounding effects. Physical domain remains to be the most affected followed by psychological domain in the OHRQoL scale. Studies are further needed on a larger sample size and on similar scales and parameters to ensure greater evidence.

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