ORIGINAL ARTICLE

Impact of oral lesions among South African adults with HIV/AIDS on oral health-related quality of life

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Abstract *Background/purpose:* This study examined the association between oral conditions in human immunodeficiency virus (HIV)/acquired immune-deficiency syndrome (AIDS) patients and the oral health-related quality of life (OHRQoL) among South African adults.
Materials and methods: Participants consisted of 175 HIV-positive adults who visited Johannesburg Hospital's outpatient HIV clinic. A systematic oral examination recorded the presence or absence of HIV-related lesions. A structured self-administered questionnaire was used to determine participants' sociodemographic characteristics and access to dental care. It included items adapted from the Oral Health Impact Profile (OHIP), which measures the OHRQoL. Participants' OHIP scores were not normally distributed, thus were dichotomized as either less than or equal to the median score or greater than the median score: participants with above-median scores had a poorer OHRQoL. The data analysis included a multivariable-adjusted logistic regression analysis.
Results: In total, 109 (62.3%) subjects had multiple oral lesions. Those with more than two lesions were significantly more likely to report a poorer OHRQoL. Presenting with pseudomembranous candidiasis or erythematous candidal lesions, being female, and having visited a dentist in the last year were significantly associated with a poorer OHRQoL.

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Conclusion: Oral candidal lesions were the most strongly associated with a poorer OHRQoL among the studied adult South African population living with HIV/AIDS.

Introduction

Oral lesions are important markers in the clinical spectrum of human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS) markers. The presence of such lesions are indicative of possible acute seroconversion illness, suggest an HIV infection in an undiagnosed person, and indicate clinical disease progression and/or marked immune suppression in HIV-infected individuals.[1] More than 50% of people infected with HIV experience oral lesions at least once at some time during the course of the disease.[2,3]

Oral lesions cause severe discomfort and may therefore have a serious impact on a person's quality of life (QoL).[3] However, only limited information is available on the influence of oral lesions on the oral health-related QoL (OHRQoL) in resource-poor countries,[4] despite the fact that most of the over 36 million people currently living with HIV/AIDS worldwide live in resource-poor countries,[5] and are therefore likely to suffer from oral lesions at some point. In South Africa, 5.7 million people (17.5% of the total population) are estimated to be infected with HIV.[5] Most of these people live in resource-poor informal settlements (slums) in urban areas,[6] where regular access to oral-health services may be limited. The presentation of oral lesions may be influenced by social conditions such as unemployment and a person's level of access to oral care.[4]

Numerous studies, both in South Africa and elsewhere, have documented specific oral manifestations of HIV infection, such as necrotizing gingivitis (NG), necrotizing periodontitis (NP), Kaposi's sarcoma, oral candidiasis, and other fungal and opportunistic infections.[2,7] However, there is little information on the extent to which these various oral conditions are associated with discomfort, dysfunction, or disability, in other words, the QoL.

Coates et al[7] are among the few researchers who have looked at social impacts of oral conditions among dental patients living with HIV by means of the Oral Health Impact Profile (OHIP) scale. Those authors demonstrated that HIV-positive patients experience greater social impacts from oral disease than did a comparable sample of the general population. In addition to the influence of social class, the perception of the influence of oral health on the QoL was also shown to be influenced by age and sex.[8,9] In particular, studies suggested that older adults and women perceived oral health as having a greater impact on their QoL than younger adults and men, respectively,[9] and poor oral health has a greater impact on the overall well-being of people who are financially disadvantaged.[10,11]

At the time when this report was compiled, there was only one published study on the influence of oral manifestations on the QoL of HIV-positive patients in South Africa, measured using the OHIP scale.[3] That study demonstrated the validity of the OHIP scale among HIV patients and clearly showed that oral conditions had a significantly greater impact on the QoL of HIV-positive patients presenting with oral lesions than on those without oral lesions. However, the study did not report on the specific contributions of various types of oral lesions to OHRQoL, nor did it control for recent or past access to oral-health services.

The purpose of the current study was therefore to explore impacts of various types of HIV-associated oral lesions on the QoL of a sample of patients visiting an HIV/AIDS outpatient clinic at Johannesburg Hospital, South Africa while controlling for any contact with dental services in the past year.

Materials and methods

Study design and study population

This cross-sectional descriptive study included 175 consenting patients who were diagnosed as being HIV-positive and who visited the HIV clinic at Johannesburg Hospital as outpatients between October 2003 and January 2004. Participants were patients aged 15–55 years who came to the clinic for follow-up treatment or were returning for treatment after child birth following a diagnosis of HIV infection during pregnancy. All participants had already undergone counseling prior to testing for HIV infection and were aware of their HIV status.

Approval to undertake this study was granted by the Committee for Research on Human Subjects at the University of the Witwatersrand, Johannesburg, South Africa. Data were recorded anonymously, and strict confidentiality was ensured at all stages of the research.

Data collection procedure and measures

Data were collected by means of a structured, self-administered questionnaire, followed by a systematic oral examination. The self-administered questionnaire was divided into three parts. The first part was designed to obtain information pertaining to the personal, social, and demographic details of the respondents. A detailed medical and dental history of all patients was obtained, as well as the length of time that had passed since their initial HIV/AIDS diagnosis. The second part obtained data regarding the participants' use of oral-health services in the 12 months preceding the survey, and their knowledge of oral-health and oral-hygiene practices. The third part of the questionnaire addressed oral symptoms experienced by the participants in the 2 weeks prior to their participation and how these symptoms had affected them in terms of various oral activities, such as eating, talking, and swallowing, and psychological functioning. In the third part, a modified

OHIP questionnaire, a scaled index of the social impacts of oral disorders that draws on the theoretical hierarchy of oral-health outcomes across seven domains, was used to test the impacts of oral lesions on the QoL.[12] A shorter time frame for symptom reporting was used than in the original OHIP design in order to limit recall bias and reduce discrepancies between symptoms experienced in the past and the clinical condition observed at the time of the survey.

Participants were asked to respond to the questions using a five-point Likert-type scale with the following response options: 4 meaning "very often", 3 "fairly often", 2 "sometimes", 1 "hardly ever", and 0 "never/don't know". The seven domains of the scale were functional limitations, physical pain, psychological discomfort, physical disabilities, psychological disabilities, social disabilities, and handicaps.[12] Statements obtained from the patient group were weighted using Thurstone's method of paired comparisons to reflect the relative importance of each statement.[12] This step was necessary to account for variations in the impacts of different events; for example, severe toothaches were given more weight than sensitivity when coming into contact with hot and cold foods. Health personnel resident at Johannesburg Hospital were used to interpret (translate) the questionnaire for participants who could not understand or speak English proficiently.

A clinical orofacial examination was performed using mouth mirrors and a portable light source, in a private consulting room, with the patient sitting on a chair with his or her head slightly tilted back. An oral examination was carried out on every respondent by a single trained examiner. The first author (ASB), the only examiner, was blinded to the completed questionnaire in order to remove any potential examiner bias based on prior knowledge of the participants' responses to the OHIP scale. The examiner's assessment was calibrated by a specialist in oral medicine, using colored clinical photo slides; and a diagnosis of oral conditions associated with HIV was based on presumptive criteria, as described in the WHO classification of oral lesions associated with HIV.[13] The caries status was recorded based on a WHO method.[14]

After the examination, patients who had oral lesions were referred to the dental clinic of the hospital for standard treatment. The patients examined already knew their HIV status and had been counseled before being tested for HIV infection. During the examination, 10% of participants were recalled at random to check for intra-examiner reproducibility (and the Kappa coefficient was 0.92).

Data analysis

All data were captured using Epi Info 2002 (Center for Disease Control and Prevention, Atlanta, GA, USA) for analysis. The code for each question in the seven domains was multiplied by the relevant weight and summed up within each conceptual domain. The factor structure of the OHIP scale was examined using a principal component analysis (PCA). Descriptive analyses included the age, sex, and population group distribution of the study sample and various oral lesions observed during the oral examinations. Given the significant skewness of the distribution of OHIP scores, for further analysis, the participants' OHIP scores

were dichotomized as less than or equal to the median value or greater than the median value for the studied population, with greater than median OHIP scores representing a poorer OHRQoL. An alternative strategy of log-transforming the OHIP scores was not pursued because the authors were of the opinion that this would provide less clinical meaning as far as its interpretation.

Group differences in proportion were tested using the Chi-square test. All differences were taken as significant at a level of $P < 0.05$. Variables that were significantly associated with the OHRQoL in a bivariate analysis at the $P < 0.25$ level were entered into a multivariable adjusted model. A stepwise binary logistic regression model was constructed to determine factors that were significantly independently associated with a poor OHRQoL.

Results

In total, 175 HIV-positive or AIDS patients were included in the study. The average age (±standard deviation; SD) of participants was 36.2 ± 9.17 years. The majority of the study participants were single (68%) and female (77.7%) (Table 1). Of the participants, 59.4% ($n = 104$) were unemployed, and only 28% ($n = 49$) had visited dental services in the past year. Of those who had visited a clinic, 24.5% ($n = 12$) had gone for a checkup. The most common service received was tooth extraction (53%; $n = 26$). None of the participants were on antiretroviral treatment.

The most common lesion found was pseudomembranous candidiasis (57.1%). More than 50% of the participants presented with angular cheilitis, and more than 30% had some form of gingivitis or periodontitis (Table 2). Of the participants examined, 17.1% had oral ulcers. Only one case of Kaposi's sarcoma was recorded. More than 50% of participants had two or more lesions; 13.7% (24) had one

Table 1 Sociodemographic characteristics of the study population.

Characteristic		Percent (n)
Age group (y)	15–24	3.4 (6)
	25–34	47.5 (83)
	35–44	32.0 (56)
	45–54	12.0 (21)
	≥55	5.1 (9)
Sex	Male	22.3 (39)
	Female	77.7 (136)
Marital status	Married	23.4 (41)
	Single	68.0 (119)
	Divorced/widowed	8.6 (15)
Population group	Black	94.3 (165)
	Others	5.7 (10)
Employment status	Employed	40.2 (70)
	Unemployed	59.8 (104)
Educational level	No formal education	2.3 (4)
	Grades 1–4	8.0 (14)
	Grades 5–8	29.7 (52)
	Grades 9–12	50.3 (88)
	Higher education (tertiary)	9.7 (17)

Table 2 Prevalences of human immunodeficiency virus (HIV)-associated oral lesions ($n = 175$).

Type of lesion	Number of patients	Percent (%)[a]
Candidiasis pseudomembranous	100	57.1
Erythematous	35	20
Hyperplastic	6	3.4
Atrophic	5	2.9
Angular cheilitis	88	50.3
Oral hairy leukoplakia	3	1.7
Periodontal diseases	54	30.9
Linear gingival erythema	14	8.0
Necrotic ulcerative gingivitis	20	11.4
Necrotic ulcerative periodontitis	20	11.4
Herpes	20	11.4
Oral warts	5	2.9
Oral ulcer	30	17.1
Kaposi's sarcoma	1	0.6
Swelling of the parotid gland	2	1.1

[a] The total percentage of lesions was >100% because some subjects presented with more than one type of lesion at the time of the examination.

Table 3 Distribution of participants with above median Oral Health Impact Profile (OHIP) scores by sociodemographic characteristics.

Characteristics	Percent > median OHIP score	P
Sex		
Male	39.5% (15)	0.15
Female	52.6% (71)	
Marital status		
Married	34.1% (14)	0.02
Not married	54.9% (73)	
Population group		
Black	50.3% (83)	0.73
Others	44.4% (4)	
Employment status		
Employed	37.5% (24)	0.01
Not employed	56.5% (62)	
Educational level		
Beyond primary school	51.4% (36)	0.76
Primary school or less	49.0% (51)	
Use of dental services		
No	45.2% (57)	0.04
Yes	62.5% (30)	
Age group (y)		
>35	55.7% (44)	0.17
<35	45.3% (43)	

lesion, and only 24% (42) did not have any oral lesions at the time of their examination.

The PCA confirmed the seven-domain structure of the OHIP scale, with Cronbach's alpha standardized coefficient of 0.92 for the OHIP scale. The mean ($\pm$SD) and median (range) OHIP scores were 30.1 ± 33.2 and 15.5 (0–157), respectively. Those who were not married, were unemployed, and had visited a dentist in the 12 months preceding the day of the survey had significantly poorer OHRQoL scores (Table 3).

Presenting with a single lesion was not significantly associated with a poorer OHRQoL. However, those who had multiple lesions, in particular those who had more than two lesions, were significantly more likely to report a poorer OHRQoL (Table 4).

In the bivariate analysis, presenting with a diagnosis of pseudomembranous candidiasis, erythematous candidiasis, and linear gingival erythema was significantly associated with a poorer QoL. Those who presented with necrotic ulcerative gingivitis (NUG), compared to those who did not, tended to have a poorer OHRQoL than those who reported an above-median OHIP score (70% vs. 47.4%; P = 0.06).

In the multivariable-adjusted logistic regression model, factors that remained independently associated with an increased likelihood of reporting a poorer OHRQoL after controlling for potential confounders were being female and presenting with pseudomembranous or erythematous candida lesions (Table 5). Those who had visited a dentist within the last 12 months prior to the survey were significantly more likely to have reported a poorer OHRQoL.

Discussion

This study demonstrated variations in contributions of various HIV-associated oral lesions to a poor OHRQoL. Unlike the impact of candidal lesions, the impact of NUG and linear gingival erythema on a poorer OHRQoL that was observed in the bivariate analysis appeared to have been completely attenuated by access to oral-health services because these effects were no longer significant in the final regression model.

Consistent with previous findings on the very good reliability of the OHIP measurement instrument,[3] our study demonstrated that the OHIP was a reliable measure of the OHRQoL among HIV-positive patients in South Africa considering that we also obtained excellent internal consistency for the OHIP scale ($\alpha = 0.92$). However, in contrast to the findings in a previous study from South Africa,[3] our results did not show a significant association between merely presenting with an oral lesion and reporting a poorer OHRQoL. These differences may be related to the dissimilar analytical approach employed in the two studies. A very large proportion of those grouped as presenting with oral lesions in the previous study[3] presented with multiple lesions. Our study actually demonstrated in the bivariate analysis that presenting with more than two oral lesions, as opposed to fewer lesions, was significantly associated with a poorer OHRQoL. However, in our study, having multiple lesions was not significantly associated with a poorer OHRQoL after controlling for potential confounders, including specific lesion types and access to dental services. Therefore, differences between the findings of this study and that reported from a similar study in Cape Town, South Africa,[3] may also be partly explained by differences in access to care and proportions of specific lesions in the two study samples.

The presence of two specific types of lesion, namely, pseudomembranous and erythematous candidal lesions, were independently associated with a poorer OHRQoL in

Table 4 Association between oral lesions and a poor oral-health-related quality of life (>median Oral Health Impact Profile (OHIP) score).

Type of oral lesion	Percent > median OHIP	P
Caries		
Absent	48.2% (54)	0.53
Present	53.2% (33)	
Pseudomembranous candidiasis		
Absent	40.5% (30)	0.03
Present	57.0% (57)	
Erythematous candidiasis		
Absent	46.7 (70)	0.03
Present	70.8 (17)	
Angular cheilitis		
Absent	53.5% (46)	0.36
Present	46.6% (41)	
Hairy leukoplakia		
Absent	49.1% (84)	0.25
Present	100.0% (3)	
Linear gingival erythema		
Absent	47.5% (76)	0.03
Present	78.6% (11)	
Necrotic ulcerative periodontitis		
Absent	48.4% (75)	0.22
Present	63.2% (12)	
Necrotic ulcerative gingivitis		
Absent	47.4% (73)	0.06
Present	70.0% (14)	
Oral ulcer		
Absent	47.2% (68)	0.11
Present	63.3% (19)	
Any lesion		
Absent	40.5% (17)	0.16
Present	53.0% (70)	
>One lesion		
Absent	45.5% (30)	0.35
Present	52.8% (57)	
>Two lesions		
Absent	41.7% (48)	0.02
Present	66.1% (39)	

Table 5 Multiple logistic regression model of factors associated with a poorer oral health-related quality of life (QoL).

Characteristic	Odds ratio (95% confidence interval)	P
Sex		
Male	1 (referent)	0.02
Female	2.65 (1.16—6.04)	
Use of dental services within past year		
No	1	0.02
Yes	2.34 (1.13—4.84)	
Pseudomembranous candidiasis		
Absent	1	0.01
Present	2.51 (1.29—4.88)	
Erythematous candidiasis		
Absent	1	0.01
Present	4.26 (1.56—11.69)	

Model fit; Hosmer and Lemeshow test P = 0.82.

our final model and were present in different proportions in our study and that previously published from South Africa.[3] Only 27% of our sample presented with erythematous candidiasis, compared to 66% found in a similar study from South Africa.[3] Our study showed that erythematous candida lesions contributed most to reporting a poorer OHRQoL. This is not surprising, given the significant psychological discomfort that can be associated with this type of lesion that is not commonly found in the general population. The relationship between these oral candida lesions and the OHRQoL remained even after controlling for access to oral-health services, suggesting that the treatment of oral lesions might not have been adequately addressed by oral-health professionals compared to those related to periodontal conditions.

Although gingival lesions such as linear gingival erythema and necrotizing gingivitis were associated with reporting a significantly poorer OHRQoL, these associations did not remain after controlling for dental visits within the previous year. It is indeed expected that patients who had access to dental services would have received appropriate treatment for an acute condition such as necrotizing gingivitis that would have alleviated the impact of this lesion prior to being examined in this study. It was noteworthy that the presence or absence of a carious lesion or severe periodontal lesion also did not significantly distinguish those who reported a poorer OHRQoL within the previous 2 weeks from those who did not. This observation may also be related to the fact that few people with severely compromised periodontal tissues or very painful carious lesions would keep their teeth for as long as 2 weeks. Indeed, the most common service provided in this study setting is tooth extraction. It is quite possible that at the time of the oral examination for the purposes of the survey, some patients without carious lesions or severely compromised periodontal lesions (in other words, patients who might already have had affected teeth either filled or extracted) might also have reported having experienced symptoms related to a poorer OHRQoL within the 2 weeks prior to the survey. The implication is that one would then not detect a significant difference as a result of the absence or presence of these particularly painful lesions using a cross-sectional approach as employed in the current study, which relies on information on the experience of symptoms within the 2 weeks prior to the date of the oral examination. It may also well be that the carious lesions were such that they were not severe or deep enough to become symptomatic. Nevertheless, there is a need for a better-controlled study to further elucidate the impacts of particular types of oral lesions on the OHRQoL.

Consistent with the literature,[8] this study identified sex as a significant predictor of the OHRQoL. The significantly higher proportion of females with a poorer OHRQoL could be related to previous findings that women generally perceive oral health as having a greater impact on their QoL than do men.[9] In particular, compared to men, women more frequently perceive oral health as enhancing their QoL, moods, appearance, and general well-being.[9] Thus, our study findings corroborate findings from other studies

that demonstrated that compared to men, women more frequently report that their poor oral health causes them pain, embarrassment, and financial hardship.[9] Considering that most people living with HIV in South Africa are women,[6] an implication of the finding of a poorer OHRQoL among women is that management of HIV-associated oral lesions should be an important part of larger strategies directed at addressing sex inequity in health and QoL in South Africa.

The final model derived in this study showed that differences in age did not significantly explain differences in the reported OHRQoL. This finding may be related to the fact that there was limited variation in ages of the studied population given that about 80% of the studied subjects were middle-aged (25–44 years). Furthermore, in contrast to previous findings that those with lower incomes reported a poorer OHRQoL,[10] the unemployment status was not significantly associated with the OHRQoL, when potential confounders were controlled for. Considering that those unemployed were more likely to report a poorer OHRQoL in the bivariate analysis, the lack of significance in the final model may have been related to the fact that women in South Africa are also the group likely to be unemployed, and thus sex could have been a significant confounder of the association between unemployment and a poorer OHRQoL in this predominantly female study population.

The cross-sectional design employed in this study limited our ability to draw causal inferences because the temporal order of events was unknown. Although trained healthcare workers were available to assist with interpreting (translating) the English questionnaire when participants requested an interpreter, the use of a questionnaire compiled in English may nevertheless have compromised the responses of some patients, who were only literate in languages other than English. However, we do not think this would have significantly changed the results obtained because there were very few attendees of this city capital hospital that were considered insufficiently proficient in English to complete the English questionnaire on their own.

Furthermore, results obtained in this study should not be extrapolated to the broader South African population, because the study participants were predominantly black Africans attending one of the largest state hospitals in the country's largest city. Nevertheless, despite these limitations, the current study provides useful information and a baseline that can be used as a framework for further studies on the potential role of access to care in improving the QoL among people living with HIV. In particular, this study also quantified the burden of illness in patients who have multiple oral lesions associated with HIV infection.

In conclusion, oral candidal lesions made the greatest contribution to reporting a poorer OHRQoL in the studied population. Access to dental care appears to have influenced the impacts of HIV-related periodontal lesions on the OHRQoL. Nevertheless, in order to further improve the OHRQoL among HIV-positive people, this study identified a need to prioritize the management of common candidal lesions within dental settings.

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