BRIEF COMMUNICATION

Predictors of oral health quality of life in HIV-1 infected patients attending routine care in Australia

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Keywords
human immunodeficiency virus; oral health quality of life; patient-based outcomes; measures; quality of life.

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Received: 1/20/2011; accepted: 3/11/2011.

doi: 10.1111/j.1752-7325.2011.00257.x

http://www.sesiahs.health.nsw.gov.au/Albionstcentre/

Abstract

Objective: To examine predictors of oral health quality of life (OHQoL) in a human immunodeficiency virus (HIV)-infected population undergoing routine HIV care in the era of antiretroviral therapy.
Method: The study was an anonymous self-administered survey of 273 patients. Subjects completed the Oral Health Impact Profile-14 and questionnaires on socio-demographics, HIV, and dental issues. Multiple logistic regression analysis was conducted to determine the predictors of OHQoL.
Results: The study found smoking [odds ratio (OR) = 2.44], time to last dental visit (OR = 2.63), denture use (OR = 2.83), and income level (OR = 0.27) were significantly associated with OHQoL. No HIV-related variables predicted OHQoL.
Conclusion: Smoking, not consulting a dentist in the last year, denture use, and low income were identified as significant predictors which could be targeted to improve quality of life among people living with HIV. Preventing dental diseases may also reduce the risk of activation of latent HIV by oral pathogens.

Introduction

The Oral Health Impact Profile (OHIP)-14 is a succinct, valid, and reliable measure to assess the perceived impact of oral health in individuals (1). Few studies have been reported using the OHIP-14 measuring oral health quality of life (OHQoL) in people living with human immunodeficiency virus (PLHIV). These studies were conducted very early in the era of antiretroviral therapy (ART) or limited to women and the African continent (2-4). HIV viral load (VL) and CD4 T-cell counts have been related to oral disease, and this information was lacking in some of the earlier studies. Advances in ART has not only resulted in decreased morbidity and mortality but has also diminished opportunistic infections including oral-related presentations (5). Hence, findings of the earlier OHQoL studies in PLHIV may have little relevance to current care. The aim of this study was to determine predictors of OHQoL in a HIV-1 infected population in Sydney attending for routine HIV care in the era of ART.

Methods

The study was approved by the South Eastern Sydney and Illawarra Area Health Research Ethics Committee. The study was conducted in a government-funded HIV ambulatory care centre in Sydney, Australia, which provides care for PLHIV representing a range of socioeconomic backgrounds. Inclusion criteria for participation were clients aged more than 18 with a known HIV infection attending for routine HIV care between December 2008 and February 2009. The study was limited to 3 months to avoid repeat responses as patients routinely seek HIV care at the Centre quarterly. Subjects were approached to complete anonymous self-administered questionnaires. Two hundred and seventy-three of the 648 patients (42 percent) who attended the Centre during the period of study completed the questionnaires.

Sociodemographics (age, gender, ethnicity, educational level, employment status, weekly income, smoking, and recreational drug use), HIV related [treatment status (on or off ART), HIV VL, CD4 T-cell counts], dental variables (denture use and time to last dental visit), and the OHIP-14 were completed.

The OHIP-14 was computed using the single count (OHIP-SC) method. Participants responded to each question on a 5-point Likert scale coded never = 0, hardly ever = 1, occasionally = 2, fairly often = 3, and very often = 4. Each question score was then dichotomized using the threshold of "fairly often" and "very often." The range of scores for each participant ranged from 0 to 14 with higher OHIP-SC scores indicating poorer OHQoL.

Statistical analysis was undertaken using SPSS (V10 SPSS Inc Chicago, IL). Mann–Whitney *U*-test was used to compare differences between groups. Continuous variables were assessed for association using Spearman's rank correlation (rho).

Multiple logistic regression (MLR) analysis was used to identify variables independently associated with OHIP-SC. The dependent variable was dichotomized comparing the proportion of subjects with OHIP-SC score of 0 and > 0 (score 1-14) using the median split. Independent variables entered were eight sociodemographic, three HIV related, and two dental variables. Cross-tabulation was used to check categorical variables for cell violations and adequacy in sampling. The binary logistic stepwise method was used for regression analysis. The probability for entry and removal of variables was set at 0.05 and 0.20. Hosmer–Lemeshow goodness-of-fit statistic was used to check the fit of the model. Two hundred and thirty-two patients with complete data were used for this analysis.

Results

A total of 273 subjects [264 (97 percent) men, 212 (78 percent) Caucasian] with a mean age of 45.3 [standard deviation (SD) = 9.7 years] participated in the study. Over two-thirds (68.5 percent) were employed full-time, part-time, or casual with 138 (50.5 percent) reporting weekly incomes in excess of AU$600.00. The majority (98 percent) had at least a secondary education with 111(40.7 percent) reporting a graduate or postgraduate degree.

The mean duration of HIV infection was 13.5 (SD = 7.3 years) with 243 (89 percent) on antiretroviral treatment and 235(86 percent) with undetectable VL. The mean CD4 count of the cohort was 582 cells/μL. Current smoking and recreational drug use was reported in 93 (34.0 percent) and 119 (43.6 percent) of respondents, respectively.

Denture use (both complete and partial) was reported in only 41 (15 percent). A majority [197 (72.1 percent)] reported having visited a dentist within the last year.

Of the 10 categorical variables tested comparing mean OHIP-SC scores, six (education level, employment status, income level, smoking, denture use, and time to last dental visit) were found to be significantly associated with the OHIP-SC score. No differences were found with gender, ethnicity, recreational drug use, and treatment status (Table 1). All three continuous variables (age, VL, and CD4 T-cell counts) had no correlation with the OHIP-SC.

The MLR analysis with OHIP-SC as the dependent variable with 13 independent variables entered found a significant model [stepwise: $\chi^2 = 45.76$, degrees of freedom (d.f.) = 4, $P = 0.000$]. Hosmer–Lemeshow goodness-of-fit statistic showed the model was good ($P > 0.05$). Smoking,

Table 1 Univariate Comparison of Mean Scores of OHIP-SC with Dependent Variables for HIV-Positive Clients in an HIV Clinic in Sydney

	*n**	OHIP-14 SC Mean (SD)	*P*-value†
Total	273	1.64 (2.95)	
Gender			
Male	264	1.54 (2.88)	
Female	9	1.50 (2.07)	0.604
Ethnicity			
Caucasian	212	1.62 (3.05)	
Non-Caucasian	61	1.24 (1.97)	0.571
Education level			
At least high school	86	2.30 (3.50)	
Tertiary (including technical)	186	1.20 (2.47)	0.009
Employment			
Employed (full or part-time)	187	1.04 (2.19)	
Unemployed	86	2.74 (3.79)	0.000
Weekly income			
<AU$350	81	3.17 (3.82)	
AU$ >350	188	1.02 (2.22)	0.000
Current smoker			
Yes	93	2.58 (3.68)	
No	180	1.04 (2.22)	0.000
Current recreational drug use			
Yes	119	1.50 (2.84)	
No	154	1.57 (2.88)	0.640
ART Status			
On ART	243	1.45 (2.73)	
Not on ART	29	2.29 (3.77)	0.556
Denture use			
Yes	41	3.26 (3.86)	
No	231	1.24 (2.54)	0.001
Time to last dental visit			
<12 months	197	1.18 (2.57)	
>12 months	76	2.47 (3.34)	0.003

* May not add to 273 because of missing values.

† All tests were Mann–Whitney *U*-test two-tailed, $\alpha = 0.05$.

OHIP-SC, Oral Health Impact Profile-14 single count; HIV, human immunodeficiency virus; SD, standard deviation; ART, antiretroviral therapy.

time to last dental visit, denture use, and income level were the only independent predictors of OHQoL, predicting accurately in 72.8 percent of cases. Smokers were 2.44 times more likely to report oral problems [OR = 2.44, 95% confidence interval (CI) = 1.31-4.56]. Participants who reported not being to a dentist in the last 12 months were 2.63 times more likely to have oral problems compared with those who have visited a dentist in the last year (OR = 2.63, 95% CI = 1.37-5.04). Respondents with a removable prosthesis were nearly three times more likely to report more impacts than those with natural dentition (OR = 2.83, 95% CI = 1.24-6.46). Income level indicated respondents with an income level less than AU$350 per week were 73 percent more likely to report oral problems compared with their counterparts with income in excess of AU$350 per week (OR = 0.27, 95% CI = 0.15-0.52).

Discussion

This study aimed to determine predictors of OHQoL in a HIV-1 infected population and found no HIV-specific factors related to OHQoL. However, other modifiable factors that were found to predict OHQoL have implications for HIV clinical care. Recent advances in HIV management, in antiretrovirals and their accessibility, and public awareness of the benefits of early diagnosis may have been contributory factors in these findings.

Smoking was found to have a negative effect on the OHQoL. Epidemiologic evidence exist which implicate tobacco use to oral cancer and precancer, caries, periodontal disease, and tooth loss (6). Smoking has also been associated with HIV-related oral lesions, to unfavorable lipid profile with increased risk of cardiovascular disease, and implicated in other comorbid medical conditions in HIV-infected patients (6,7). Furthermore, there is now compelling evidence to support significant benefits to tobacco use cessation with regards to various oral and general health outcomes, which warrants smoking cessation interventions as a component of HIV care (6).

This study also found that patients reporting not having had a dental visit for more than year had a poorer OHQoL. With the increased importance now focused on chronic oral inflammatory disorders, such as periodontitis and PLHIV having reportedly higher average levels of dental and gingival disease (8), daily oral hygiene practice, access to routine dental screening, prophylaxis, and treatment of oral diseases will significantly improve the oral health status and QoL of PLHIV and potentially reduce the risk of HIV activation by oral pathogens.

As reported elsewhere, denture use predicted poorer QoL in our study (9). Tooth loss and denture wearing are avoidable reinforcing the importance of routine dental prevention measures and early intervention. Income level was the only socioeconomic variable found to be a predictor of OHQoL in this study. Income gradients have been previously reported in self-reported oral health and scores on the oral health scale (9). More than a quarter of PLHIV in Australia live below the poverty line, thus this finding was not unexpected (10).

There are some limitations in this study. As participation was voluntary, those who completed the questionnaires may have been more concerned about their oral health and generally well educated. Due to the anonymous nature of the study, we were unable to collect any information on non-responders. However, the socioeconomic demographics of the participants were similar to a larger Australian national study, which is predominantly male (92.4 percent), median

age of 47 years, 90.9 percent with at least a secondary education, on ART with good viral suppression and similar mean CD4 counts (10), suggesting that the current findings may be applicable to the wider HIV population in Australia regardless of the participation rate. The study also did not exclude patients who may have psychological or other comorbid conditions that may have a confounding effect on the responses to the OHQoL measure used in the study. Another limitation is that objective measures of oral health were not assessed because of lack of resources. However, the OHIP-14 used in the study has been validated against such measures extensively and have been found to be reliable.

The study found no HIV specific factors predicted OHQoL in HIV-infected patients. However, modifiable factors similar to the general population such as smoking, income level, denture use, and time to last dental visit predicted OHQoL. Dental diseases are preventable and with routine care, early detection, and treatment will result in maintaining a healthy dentition and supporting tissues, avoidance of denture use, and possibly reducing the risk of activation of latent HIV by oral pathogens.

Conflicts of interest

None.

Source of funding

Internal.

Acknowledgments

The authors would like to thank the clients who contributed their valuable time in completing the questionnaires.

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