

# Determine Relationship Between Xerostomia and Quality of Life of HIV Person's Living in Prison

Helwiah Umniyati<sup>1</sup>, Rizki Putri Noviani<sup>1</sup>, Masriadi<sup>2</sup>

<sup>1</sup>Department of Dental Public Health, YARSI University, Jakarta,

<sup>2</sup>Department of Epidemiology, Faculty of Public Health, Universitas Muslim Indonesia, Makassar, Indonesia

Received : 07-08-21

Revised : 28-09-21

Accepted : 18-05-22

Published : 29-06-22

**ABSTRACT** **Aims:** The objective of this study was to determine relationship between xerostomia and quality of life of HIV person's living in prison. **Materials and Methods:** an observational study using cross sectional design was done among 68 HIV AIDS person in prison in Jakarta, but only 54 could be analyzed because of incomplete data. We used the xerostomia inventory questionnaire to assess xerostomia, and for salivary flow rate was measured by the spitting method without stimulation. Quality of life was assessed using questionnaire of the Oral Health Impact Profile (OHIP-14). **Results:** Quality of life of HIV AIDS patient, only 55.6% was good. There was a significant relationship between xerostomia and quality of life with Prevalence Ratio 3.16. From 11 questions regarding xerostomia there were 4 questions that were significantly related to quality of life ( $P < 0.05$ ), namely dry mouth when eating, need water when swallowing food, dry eyes, dry nose. In conclusion many HIV AIDS patient experienced xerostomia which affects their quality of life. **Conclusion:** Xerostomia was a risk factor of having low quality of life, it showed on Prevalence ratio in most of items of OHIP.

**KEYWORDS:** HIV AIDS, quality of life, saliva flow rate, xerostomia

## INTRODUCTION

HIV and AIDS (acquired immune deficiency syndrome) is a global health problem and one of the biggest causes of death in the world. Based on UNAIDS data, at the end of 2018, as many as 37.9 million people in the world were living with HIV and 770,000 people had died from AIDS<sup>3</sup>. It has been shown that global HIV-AIDS deaths fell sharply after the use of antiretroviral therapy (ART) from 1.5 million in 2010 to 1.1 million in 2015. Rates of HIV infection in prisoners are much higher than in the general population in most countries of the European Region. Prisons are very high-risk places for HIV transmission, because of their very high population density, poor nutrition, very limited access to health care, the large number of drug users in prison, unsafe injecting practices, unprotected sex and tattoos.<sup>[1-3]</sup>

In patients with HIV AIDS there are objective and subjective changes associated with salivary flow

(hyposalivation and xerostomia). Hyposalivation is a condition where there is a decrease in the salivary flow rate which can be measured by collecting saliva for a certain period of time. Xerostomia or dry mouth is a symptom and not a disease that may or may not be accompanied by hyposalivation. Changed in salivary composition may stimulate xerostomia rather than the in quantity of salivary.<sup>[4]</sup>

Xerostomia is one of the oral manifestations of people living with HIV AIDS (PLWHA) and the prevalence of xerostomia varies from 1.2% to 63%, depending on the characteristics of the population studied and geographic location. In HIV patients. Hyposalivation has been reported as a significant risk factors and predictors of oral lesions in HIV-infected patients. These include mucosal dryness, difficulty in swallowing and speech,

**Address for correspondence:** Masriadi,

Jl. Abd. Dg. Sirua No. 155B/C Makassar, Indonesia.

E-mail: arimasriadi@gmail.com

### Access this article online

#### Quick Response Code:



**Website:** www.jispcd.org

**DOI:** 10.4103/jispcd.JISPCD\_229\_21

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

**How to cite this article:** Umniyati H, Noviani RP, Masriadi. Determine relationship between xerostomia and quality of life of HIV person's living in prison. J Int Soc Prevent Communit Dent 2022;12:360-4.

high susceptibility to oral infections (mainly candidiasis and dental caries), gingivitis, and mucositis.<sup>[5-12]</sup>

It is common, patients with xerostomia may complain of some symptoms such as burning sensation, abnormal taste, dysphagia, halitosis, lack of denture retention and etc. Oral examination may show dry mouth, thickened saliva, angular cheilitis or erythematous candidiasis, fissure of the tongue, cervical caries, and halitosis. The sensation of dry mouth has many effects on oral health, can negatively impact quality of life. Recently, many studies has been conducted to explore the relationship between quality of life and xerostomia. This study aims to examine the relationship between quality of life and xerostomia in HIV patients. We explored also the different levels of salivary flow, xerostomia, in HIV patients associated with quality of life using the OHIP questionnaire.<sup>[13]</sup>

## MATERIALS AND METHODS

A study using cross sectional design was done among 68 HIV AIDS person in prison in Jakarta, aged  $\geq 18$  years, consecutively recruited at Prison in Jakarta from September to December 2017. We used the xerostomia inventory questionnaire to assess xerostomia. This questionnaire consist of 11 questions. It was expressed with frequency of complaint with rating scale never = 1, very rarely = 2, sometimes = 3, often = 4, very often = 5. For analysis purposes, only 3 of the 5 answer options were used, namely never (score 1), occasionally (score 2) and ever (score 3). This modified version is called the Xerostomia Inventory-Dutch version. This version shows the severity of xerostomia between a score of 11 and 33. The salivary flow rate was measured using the saliva method without stimulation. Samples were instructed to refrain from eating, smoking and drinking coffee and tea for 1.5 hours prior to salivation. When taking saliva, samples are asked to sit up straight and refrain from speaking and swallowing. The normal rate of salivary

secretion without stimulation (USFR/unstimulated salivary flow rate) is 0.3–0.4 mL/min. Salivary flow rate is a parameter that describes high, normal, low or very low salivary flow expressed in units of ml / minute.<sup>[14,15]</sup>

Impact of xerostomia on quality of life was carried out using the Oral Health Impact Profile-14 (OHIP-14) questionnaire. OHIP-14 has five points Likert scales which are: never 0, hardly ever 1, occasionally 2, fairly often 3, and very often 4. The total OHIP-14 score was obtained by adding up the answers of 14 questions with a value between 0 and 56. The higher the score, the more negative the impact of xerostomia on quality of life was. The prevalence of a negative impact is determined by dividing the score into 2 which are: “fairly often” and “very often” as having a negative impact; and “never,” “hardly ever,” and “occasionally” as having no impact on a regular basis. Information about demographic, socioeconomic status, and other comorbidities were asked. Statistical analysis was conducted with SPSS version 23. Chi square test was used to verify the relationship between OHIP items and xerostomia with a significance test of 0.05.<sup>[5,16]</sup>

## RESULTS

Table 1 presents the item scores of xerostomia Inventory-Dutch version. Mean score of xerostomia Inventory-Dutch version was 16.76 (SD = 3.9) with the minimum score was 11 and the maximum score was 27. Most of the samples got up at night to drink and their lips felt dry. Some of them had difficulty in eating dry food and also felt dry on their skin face. Xerostomia was divided into two groups using median as cut off point and we got 55.67% of the samples were xerostomia.

This study involved 54 HIV patients. According to sociodemographic data, the mean age of the patients was  $30.89 \pm 4.76$  (range: 22–45 years). More than half of the patients reported their marital status as single (53.7%). There was 24.1% of patients had opportunistic

**Table 1: Items of the xerostomia inventory—Dutch version**

No.	Proposition	Never n (%)	Sometimes n (%)	Often n (%)
1	I sip liquids to aid in swallowing food	37 (68.5)	8 (14.8)	9 (16.7)
2	My mouth feels dry when eating a meal	39 (72.2)	7 (13.0)	8 (14.8)
3	I get up at night to drink	4 (7.4)	33 (61.1)	17 (31.5)
4	My mouth feels dry	28 (51.8)	25 (46.3)	1 (1.9)
5	I have difficulty in eating dry foods	41 (75.9)	6 (11.1)	7 (13.0)
6	I suck sweets or cough lollies to relieve dry mouth	41 (75.9)	11 (20.4)	2 (3.7)
7	I have difficulties swallowing certain foods	45 (85.2)	6 (11.1)	2 (3.7)
8	The skin of my face feels dry	26 (48.1)	21 (38.9)	7 (13.0)
9	My eyes feel dry	35 (64.8)	18 (33.3)	1 (1.9)
10	My lips feel dry	14 (25.9)	31 (57.4)	9 (16.7)
11	The inside of my nose feels dry	38 (70.4)	13 (24.1)	3 (5.6)

**Table 2: Comparison of demographic and other variables for the study groups with and without xerostomia**

Variables	Xerostomia n = 30 (55.6%)	No Xerostomia n = 24 (44.4%)	P Value	PR
Age				
>30 years	20 (76.9)	6 (23.1)	.006	2.2
≤30 years	10 (35.7)	18 (64.3)		
Mean age	32.1 ± 3.2	29.3 ± 5.9	.044	-
Smoking status				
Yes	26 (57.8)	19 (42.2)	.462	1.3
No	4 (44.4)	5 (55.6)		
Salivary flow				
Very low hyposalivation	4 (100.0)	0 (0.0)	.128	
Low hyposalivation	18 (56.3)	14 (43.8)		
Normal	8 (44.4)	10 (55.6)		
Oral lesion				
Yes	16 (61.5)	10 (38.5)	.563	1.23
No	14 (50.0)	14 (50.0)		
HIV-related factors				
ARV therapy				
No	8 (66.7)	4 (33.3)	.583	1.27
Yes	22 (52.4)	20 (47.6)		
Duration of ART therapy				
≥ 1 year	16 (59.3)	11(40.7)	.382	1.48
< 1 year	6 (40.0)	9 (60.0)		
Opportunistic infection				
Yes	11 (84.6)	2 (15.4)	.036	1.83
No	19 (46.3)	22 (53.7)		
Duration of infection				
≥ 1 year	24 (64.9)	13 (35.1)	.083	1.84
< 1 year	6 (35.3)	11 (64.7)		
Risk factor				
NAPZA	18 (66.7)	9 (33.3)	.171	1.50
Others	12 (44.4)	15 (55.6)		
Mean OHIP	17.5 ± 11.5	13.0 ± 7.8	.225	

infection such as anemia, hepatitis, cardiovascular, gastritis, and TBC. The most frequent diseases were hepatitis and TBC. Half of the respondent was drug users. The average volume of salivary flow rate without stimulation for 1 minute was  $0.28 \pm 0.18$  (range 0.06 - 0.8). There was about 66.7% of respondents had hyposalivation (7.4% very low hyposalivation and 59.3% low hyposalivation) and it was about 48.1 percent of respondents had oral lesion.

Statistically significant differences were found between groups with xerostomia and no symptoms of xerostomia by age ( $P = .006$ ) with PR=2.2 and opportunistic infections ( $P = .036$ ) with PR=1.83. Other variables such as marital status, smoking, salivary flow, oral lesions, ARV therapy, duration of infection and risk factors were not statistically significant.

Quality of life (OHIP-14 score) was better in the group without Xerostomia than the group with Xerostomia although it was not statistically significant [Table 2]. The mean OHIP-14 score in the group with Xe was 17.5 and

in the group without Xe was 13.04. The mean OHIP score in the Xerostomia group was 17.5 (SD = 11.5), whereas in the non-xerostomia group the mean OHIP was 11.0 (SD = 7.8) without a significant relationship.

Table 3 shows a comparison of the negative impact of the prevalence of individuals using OHIP-14 (responses “very often” and “quite often”) between the xerostomia and non-xerostomia groups. The prevalence ratio shows that HIV patients with xerostomia are more at risk.

## DISCUSSION

The prevalence of xerostomia in our study was higher than found by Busato *et al.* The (53.7% vs. 40.0%). Navazesh *et al.* study found HIV-positive women are at a significantly higher risk for xerostomia and salivary gland hypofunction than HIV-negative women. In Gileva *et al.* study, All AIDS-patients had severe xerostomia and 14.4% of HIV patients. It is rather difficult to know whether xerostomia is part of the HIV disease or is a side effect of ARV drugs. Although reduced salivary flow is

**Table 3: Comparison of impact of OHIP-14 individual items (“very often” or “fairly often”) by xerostomia status**

Item (and dimension in italics)	Xe n = 30 (%)	No Xe n = 24 (%)	P Value	PR
Functional limitation				
Had trouble pronouncing any words	2 (6.7)	0 (0.0)	.197	2.6
Felt sense of taste has worsened	4 (13.8)	0 (0.0)	.054	4.4
Physical pain				
Had painful aching in your mouth	4 (13.3)	0 (0.0)	.063	4.4
Found uncomfortable to eat any foods	6 (20.0)	1 (4.2)	.085	4.8
Psychological discomfort				
Had been self-conscious	9 (30.0)	2 (8.3)	.036	3.6
Felt tense	6 (20.0)	2 (8.3)	.230	2.4
Physical disability				
Diet had been unsatisfactory	5 (17.2)	0 (0.0)	.036	5.2
Had to interrupt meals	2 (6.9)	0 (0.0)	.197	2.6
Psychological disability				
Found difficulty to relax	1 (3.3)	1 (4.2)	.872	.8
Had been a bit embarrassed	5 (16.7)	2 (8.3)	.365	2.0
Social disability				
Had been a bit irritable with other people	7 (23.3)	1 (4.2)	.049	5.6
Had difficulty doing your usual jobs	1 (3.3)	0 (0.0)	.367	1.7
Handicap				
Felt life in general was less satisfying	3 (10.0)	1 (4.2)	.416	2.4
Had been unable to function	2 (6.7)	1 (4.2)	.643	1.6

a major cause of xerostomia, complaints of xerostomia are also found in the absence of a deficiency in salivary flow. Several theories suggest that in HIV conditions it is possible that xerostomia is affected by lymph nodes which can lead to significant hyperplasia of the parotid gland, which eventually manifests as salivary gland hypofunction or enlargement of the parotid area.<sup>[5]</sup> On the contrary, ART has been reported to increase salivary gland disease in people with HIV.<sup>[16,17]</sup>

HIV infected subjects without HAART showed greater risks of having orofacial pain, oral dryness, oral lesions, than those with use of HAART. A study by Navazesh *et al.* also reported that HIV infected women are at a significantly higher risk of xerostomia and salivary gland hypofunction than are non-infected women. Navazesh *et al.*'s study in 2009 found that HAART was a significant risk factor for developing decreased salivary flow rate and also played a role in enlargement of the salivary glands in HIV-positive patients. The mechanism for this ART to decrease salivary flow is unclear. There are also findings that increased viral load can negatively impact salivary flow and xerostomia. Although in this research we did not have enough information. Our suggestion a cohort study is needed in which the various factors that can influence salivary flow and xerostomia are controlled. As mention before, xerostomia has a significant negative impact on oral health-related quality of life (OHQoL) not only in HIV infected person but also in the general population.<sup>[5,18]</sup>

Decreased salivary flow rate will increase the risk of dental caries and further has negative impacts on quality of life, such as difficulty in chewing, swallowing, and tasting food 3.7%. Our study showed that HIV patient with xerostomia were more risk of having low quality of life compared to non-xerostomia. It has been reported that xerostomia caused psychosocial aspects ranging from a mild effect on self-reported oral health to frustration, embarrassment, unhappiness, or substantial disruptions in daily living.<sup>[19,20]</sup>

Saliva plays a significant role in oral and systemic health and its absence affects the quality of life. Individuals who suffer from salivary gland dysfunction are at risk for development of dental caries, periodontal diseases, and fungal infection. Xerostomia and salivary gland hypofunction have been shown to be associated with HIV infection. Salivary flow rates of both unstimulated and stimulated saliva were found to be significantly decreased in HIV-infected subjects compared with non-HIV controls. This may imply that salivary gland function can be compromised by HIV infection. This finding is consistent with that of our previous study, in which salivary flow rate of HIV-infected subjects in Thailand was found to be affected by HIV infection and was significantly decreased with advanced stage of the disease.<sup>[21]</sup>

With respect to the feeling of oral dryness (xerostomia), HIV-infected subjects without HAART showed a greater risk of feeling dry in the mouth than those with short-term HAART. A previous study by Silverberg *et al.* reported that prevalence of xerostomia was increased in patients who

had discontinued HAART and those who had switched HAART regimens. Those patients with stable HAART showed the lowest prevalence of xerostomia. Similar findings were observed in a study by Navazesh *et al.* where continued HAART usage for at least 6 months decreased the risk for developing a complaint of too little saliva.<sup>[22]</sup>

## CONCLUSION

Xerostomia was a risk factor of having low quality of life, it showed on Prevalence ratio in most of items of OHIP.

## ACKNOWLEDGEMENT

The authors would like to thank all respondents, respondent's family members, and staff at the Parison office who participated in this study.

## FINANCIAL SUPPORT AND SPONSORSHIP

Nil.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

## AUTHORS' CONTRIBUTIONS

Helwiah Umniyati was involved in idea conception, study design, acquisition, interpretation, as well as article writing and editing. Rizki Putri Noviani was involved in assisting in collecting research data and administering research permits. Masriadi was involved in the analysis, as well as the writing and editing of articles.

## ETHICAL POLICY AND INSTITUTIONAL REVIEW BOARD STATEMENT

All procedures were performed according to the Oral Health Impact Profile-14 (OHIP-14) questionnaire. Ethical clearance from the Institutional Committee (No. 1847/H.20/KEPK-YARSI/IX/2017) was obtained prior to the commencement of.

## PATIENT DECLARATION OF CONSENT

Informed consent (written and oral) was obtained from all the parents and participants.

## DATA AVAILABILITY STATEMENT

Not available.

## REFERENCES

- Liping M, Peng X, Haijiang L, Lahong J, Fan L. Quality of life of people living with HIV/AIDS: A cross-sectional study in Zhejiang province, China. *PLoS One* 2015;10:e0135705.
- UNAIDS. Global AIDS Update 2016. Geneva: UNAIDS; 2016. Available from: [https://www.unaids.org/sites/default/files/media\\_asset/global-AIDS-update-2016\\_en.pdf](https://www.unaids.org/sites/default/files/media_asset/global-AIDS-update-2016_en.pdf). [Last accessed on 2020 Nov 7].
- Menuju Indonesia Bebas AIDS 2030 diaks. Available from: <https://www.kemerkopmk.go.id/menuju-indonesia-bebas-aids-2030-pada>. [Last accessed on 10 December 2020].
- López-Verdín S, Andrade-Villanueva J, Zamora-Perez AL, Bologna-Molina R, Cervantes-Cabrera JJ, Molina-Frechero N. Differences in salivary flow level, xerostomia, and flavor alteration in Mexican HIV patients who did or did not receive antiretroviral therapy. *AIDS Res Treat* 2013;2013:613278.
- Hopcraft MS, Tan C. Xerostomia: An update for clinicians. *Aust Dent J* 2010;55:238-44; quiz 353.
- Jeganathan S, Carey H, Purnomo J. Impact of xerostomia on oral health and quality of life among adults infected with HIV-1. *Spec Care Dentist* 2012;32:130-5.
- Orellana MF, Lagravère MO, Boychuk DG, Major PW, Flores-Mir C. Prevalence of xerostomia in population-based samples: A systematic review. *J Public Health Dent* 2006;66:152-8.
- Busato IM, Thomaz M, Toda AI, Alanis DG, França BH, de Lima AA, *et al.* Prevalence and impact of xerostomia on the quality of life of people living with HIV/AIDS from Brazil. *Spec Care Dentist* 2013;33:128-32.
- Gerdin EW, Einarson S, Jonsson M, Aronsson K, Johansson I. Impact of dry mouth conditions on oral health-related quality of life in older people. *Gerodontology* 2005;22:219-26.
- Thomson WM, van der Putten GJ, de Baat C, Ikebe K, Matsuda K, Enoki K, *et al.* Shortening the xerostomia inventory. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2011;112:322-7.
- Satyakiran GV, Bavle RM, Alexander G, Rao S, Venugopal R, Hosthor SS. A relationship between CD4 count and oral manifestations of human immunodeficiency virus-infected patients on highly active antiretroviral therapy in urban population. *J Oral Maxillofac Pathol* 2016;20:419-26.
- Locker D. Measuring oral health: A conceptual framework. *Community Dent Health* 1988;5:3-18.
- Oliveira BH, Nadanovsky P. Psychometric properties of the Brazilian version of the oral health impact profile-short form. *Community Dent Oral Epidemiol* 2005;33:307-14.
- Mandel L, Surattanont F. Regression of HIV parotid swellings after antiviral therapy: Case reports with computed tomographic scan evidence. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2002;94:454-9.
- Patton LL, Phelan JA, Ramos-Gomez FJ, Nittayananta W, Shiboski CH, Mbuguye TL. Prevalence and classification of HIV-associated oral lesions. *Oral Dis* 2002;8:98-109.
- Navazesh M, Mulligan R, Karim R, Mack WJ, Ram S, Seirawan H, *et al.*; Oral Substudy of the Women's Interagency HIV Study Collaborative Study Group\*. Effect of HAART on salivary gland function in the women's interagency HIV study (WIHS). *Oral Dis* 2009;15:52-60.
- Reichert PA. US1 HIV- changing patterns in HAART era, patients' quality of life and occupational risks. *Oral Dis* 2006;12:3.
- Petersen PE. Policy for prevention of oral manifestations in HIV/AIDS: The approach of the WHO global oral health program. *Adv Dent Res* 2006;19:17-20.
- Jones JA, Kressin NR, Spiro A 3<sup>rd</sup>, Randall CW, Miller DR, Hayes C, *et al.* Self-reported and clinical oral health in users of VA health care. *J Gerontol A Biol Sci Med Sci* 2001;56:M55-62.
- Turner M, Jahangiri L, Ship JA. Hyposalivation, xerostomia and the complete denture: A systematic review. *J Am Dent Assoc* 2008;139:146-50.
- Nittayananta W, Talungchit S, Jaruratanasirikul S, Silpapojakul K, Chayakul P, Nilmanat A, *et al.* Effects of long-term use of HAART on oral health status of HIV-infected subjects. *J Oral Pathol Med* 2010;39:397-406.
- Ramírez-Amador V, Patton LL, Naglik JR. Wipawee Nittayananta. Innovations for prevention and care of oral candidiasis in HIV-infected individuals: Are they available?-A workshop report. *Oral Dis* 2020;1:91-102.