

A STUDY ON ORAL MANIFESTATIONS AND ORAL CANDIDAL CARRIAGE IN FEMALE SEX WORKERS - A CROSS SECTIONAL STUDY**Dr. Taranpreet Kaur*, Dr. Mubeen Khan and Dr. Kondajji Ramchandra Vijayalakshmi**

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Article Received on 01/09/2017

Article Revised on 22/09/2017

Article Accepted on 13/10/2017

ABSTRACT

Background & Objectives: Female sex workers (FSWs) represent a marginalized population that is frequently involved in activities like unprotected sex and sharing of needles which makes them vulnerable to STDs, especially HIV. These STDs may lead to immunosuppression which further promotes growth of opportunistic organisms (*Candida albicans*) in the oral cavity. **Aims & Objectives:** The aims and objectives of this study are to study the prevalence of oral lesions among FSWs and to assess the oral Candidal carriage in this group of population. **Materials and methods:** This study will comprise of 30 FSWs attached to a recognized NGO as study group and 30 outpatient healthy females as control group. A detailed oral examination will be carried out and findings will be recorded on a specially prepared proforma. The samples will be collected using oral rinse technique and inoculated on Sabouraud's dextrose agar medium for isolation of candida. Candidal colony count/ml will be determined and data will be statistically analyzed. **Results:** An increase in mean DMFT index was found in study group as compared to controls. Majority of FSWs had habit of alcohol abuse followed by combined habit of smoking and tobacco and the difference in distribution was found to be statistically significant. A statistically significant increase in CFU / ml of saliva of *Candida albicans* was found in study group as compared to controls. **Conclusion:** The significant oral candidal count in female sex workers without active oral manifestations alerts the oral physician for occurrence of other opportunistic infections and their management in dental settings.

KEYWORDS: *Candida albicans*; Oral Health; Sex Workers.**INTRODUCTION**

Female sex workers represent a marginalized population that faces a number of occupational hazards.^[1] A wide variety of factors, such as, money, debt, violence, addiction, homelessness, mental illness, stigmatization and poverty, drive people into this work. Female sex workers are sexually promiscuous, are more likely to have multiple sex partners and inconsistent condom use.^[2] Frequent involvement in activities like sharing of needles and syringes with other intravenous drug users and unprotected sex with their drug using partners makes them vulnerable to sexually transmitted diseases, especially Human immunodeficiency virus (HIV).^[3] Also, sexually transmitted infections lower the immunity which in turn allows the oral flora (*Candida albicans*) to increase and cause oral candidiasis.^[4]

Because the early signs and symptoms of any systemic disease are reflected in the mucous membrane of oral cavity, hence, careful examination of oral cavity and assessment of oral symptoms can help a physician in early diagnosis of the infectious and sexually transmitted diseases.^[5] A limited number of studies have been conducted on female sex workers and their oral health

status but no Indian study has been reported so far. Hence, a sincere attempt has been made to conduct a study which will serve as an early warning for the potential for spread of infections in female sex workers and will aid in planning appropriate interventions to provide information regarding oral health care.^[6]

AIMS AND OBJECTIVES

- 1) To study the oral health status among female sex workers.
- 2) To assess the oral candidal carriage in this group of population.
- 3) To correlate the oral health status with oral candidal count in female sex workers.

Materials and methods**i) Source of data**

This study was conducted in the Department of Oral Medicine & Radiology, Government Dental College and Research Institute, Bangalore, in association with Department of Psychiatry, BMCRI, Bangalore and Department of Neuromicrobiology, NIMHANS, Bangalore during the period from September 2016 to November 2016. The study comprised of 60 patients who

were selected on the basis of set inclusion and exclusion criteria. The study was conducted in full accordance with ethical principles and was reviewed and approved by an ethical board of the institution.

ii) Method of collection of data

The present study comprised of 60 patients who were divided into two groups.

- **Group I (Study group)** – 30 female sex workers attached to a registered NGO.
- **Group II (Control group)** – 30 age and sex matched controls.

iii) Inclusion criteria

- i) Females above 18 years of age.
- ii) Ability and willingness of subject to understand study requirements and give written informed consent.

iv) Exclusion criteria

- i) Pregnant women and lactating mothers.
- ii) Patients who were not willing for participation.
- iii) Patients on antiretroviral drugs.

v) Materials

- Dental chair with adequate artificial illumination facility.
- A pair of disposable gloves
- Disposable mouth mask.
- Sterilized stainless steel Kidney tray
- Sterilized cotton holder
- Plane mouth mirrors
- Straight probes
- Tweezers
- 10 ml of 0.9% normal saline
- Sterilized containers for collection of oral rinse
- Sabouraud's Dextrose Agar (SDA) plates
- Standard calibrated loop with an internal diameter of 4 mm
- Incubator

The patients who satisfied the above inclusion and exclusion criteria and were willing to participate were selected for the study. All the patients were informed about the details of the study and a written informed consent was obtained in their local language. A detailed case history was recorded on a specially prepared case history proforma and thorough intraoral examination was carried out. Questionnaire data, collected through in – person interviews, was used to assess history of substance abuse, medical and dental history, and demographic characteristics. Under a well illuminated light source, a thorough intraoral examination was carried out. The findings were recorded and oral health status assessment was done using DMFT index by Klein and Palmer and Russel's Periodontal index. Following this, the subjects were subjected to sample collection to assess the oral microflora with special reference to *Candida*. Subjects were asked to gargle 0.9% normal

saline for 1 min and then the contents were collected in a sterile container and transported to the lab within 30 min. The washings were inoculated on Sabouraud's dextrose agar medium for isolation of *Candida* using standard calibrated loop with an internal diameter of 4 mm. The inoculated plates were incubated for 24–48 h at 37°C. Colony forming units / ml were determined and the obtained data was statistically analyzed.

Statistical methods

Proportions were compared using Chi square test and Student 't' test was used to determine the statistically significant difference between the groups. Pearson correlation coefficients were calculated to determine the correlation between oral health status and oral candidal carriage. ANOVA was used to test the difference between groups. A statistically significant difference was considered to be present when 'p' values were < 0.05.

RESULTS

In the present study, the mean age in study group was 42.53 ± 7.47 years whereas it was 37.73 ± 7.87 years in control group and the difference was found to be statistically insignificant. All FSWs included in the study were married whereas 30% of women in control group were single. Most of the FSWs (90%) had primary education or less and only 10% had secondary education and above whereas 50% of females in control group had secondary education and above. 10% of FSWs were found to be seropositive for HIV.(Table 1)

The mean DMFT index in study group was 8.03 ± 6.08 whereas it was 7.20 ± 4.38 in control group and the difference was found to be statistically insignificant with a p value of 0.545. However, a statistically significant increase in mean Russel's Periodontal index was found in study group (2.41 ± 1.28) as compared to controls (1.37 ± 1.22) with a p value of 0.002. (Graph 1) About 36% of FSWs had been engaged in profession for more than 5 years and 80% above 20 years of age at the commencement of profession.(Table 2)

Majority of FSWs had habit of alcohol abuse (46.7%) followed by combined habit of smoking and tobacco (23.3%). Whereas 86.7% females in control group had no habit and 13.3% had habit of smokeless tobacco abuse. The difference in distribution of habit among study group and control group was found to be statistically significant with a p value of 0.000. (Graph 2) About 20% of FSWs currently consumed smokeless tobacco and the frequency of use was 1 – 5 times / day in 66% females. Majority of FSWs i.e. 77.8% initiated the habit of smokeless tobacco after 18 years of age. The difference in smokeless tobacco use among study group and control group was found to be statistically significant with p value of 0.004.

Majority of FSWs were current alcohol users (63.3%) and the number of units consumed per week ranged from 1 – 50 standard alcohol units in 36.8% FSWs. Almost

73% FSWs started drinking after 18 years of age. About 23.3 % FSWs were current smokers and majority of them consumed 1 – 4 cigarettes per day (42.9%). Majority of them (80%) initiated the habit after the age of 18 years.

On comparison of Candidal count in study group and control group, a statistically significant increase in CFU / ml of saliva was found in study group as compared to

controls with a p value of 0.000. Majority of FSWs (43.3%) had candidal count in range of 11 – 49 CFU / ml of saliva whereas candidal colonies were absent in maximum number of subjects in control group (43.3%). (Graph 3) On correlation of DMFT index and Russel Periodontal index with Candidal count, no correlation was found with Pearson coefficient value of -.090 and -.068 respectively.(Table 3)

Table 1: Showing demographic characteristics among study and control group.

Parameters		Study group	Control group	p value
Mean age (in years)		42.53 ± 7.47	37.73 ± 7.87	0.312
Marital status	Married	100%	70%	0.001*
	Unmarried	0%	30%	
Educational status	No formal education	30%	10%	0.002*
	Primary education	60%	40%	
	Secondary education and above	10%	50%	
Seropositive status	Positive	10%	0%	0.076
	Negative	27%	30%	

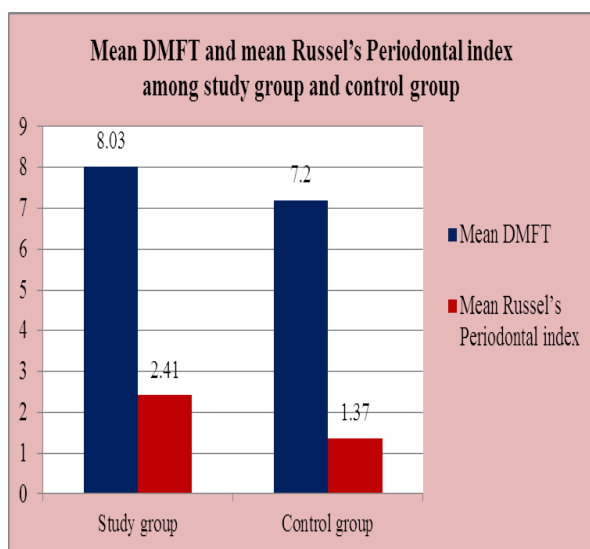
*significant 'p' value

Table 2: Showing duration and age at starting profession in female sex workers.

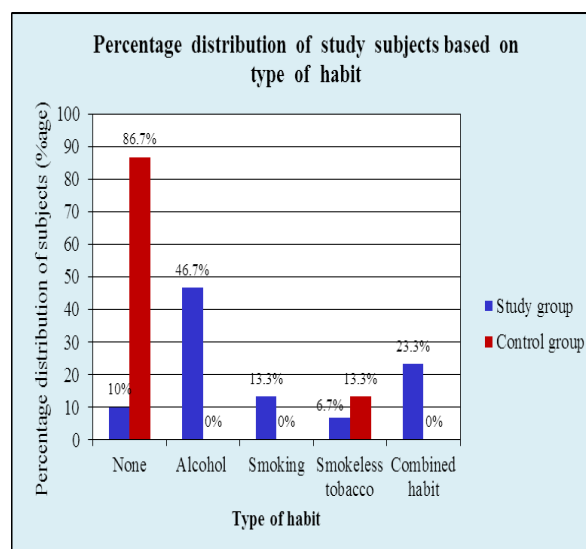
Parameters		Study group
Duration of profession	< 5 years	63.3%
	> 5 years	36.7%
Age at starting profession	< 20 years	20%
	>20 years	80%

Table 3: Showing correlation of oral health status with Candidal count (CFU / ml of saliva).

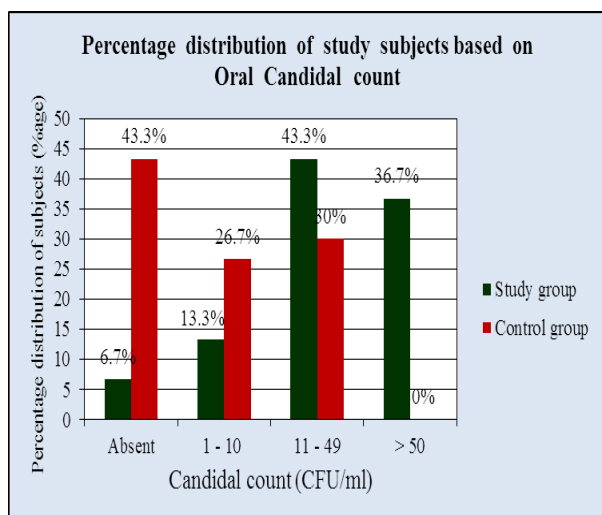
Oral health status		Candidal count (CFU / ml of saliva)
DMFT index	Correlation (r)	-.090
	'p' value	.635
Russel's periodontal index	Correlation (r)	-.068
	'p' value	.720



Graph 1: Showing mean DMFT and mean Russel's Periodontal index among study group and control group.



Graph 2: Showing percentage distribution of study subjects based on type of habit.



Graph 3: Showing percentage distribution of study subjects based on Oral Candidal count.

DISCUSSION

Oral diseases affect the majority of adult populations worldwide but are particularly high and burdensome in socially marginalized populations. They present as morphological or functional abnormalities of teeth and supporting structures. FSWs constitute a high-risk population for oral diseases many of which being preventable, treatable or curable.^[7]

In the present study, most of the FSWs (60%) had primary education and only 10% had secondary education and above. Similar findings were reported in the studies conducted by **Odukoya OO et al., 2013** who reported that 60.7% FSWs had primary education and 31.6% had secondary education and above.^[8] The literature suggests that poor education, as well as a lack of training and qualifications, impacts on vulnerability; driving entrance into sex work and reducing the chances of finding alternative forms of employment.^[9]

In the present study, 10% of FSWs were found to be seropositive for HIV. These findings were not in accordance with the study conducted by **Nouaman et al., 2015** who reported the estimated prevalence of HIV infection to be 33.7%.^[7]

The mean DMFT index in study group was 8.03 ± 6.08 whereas it was 7.20 ± 4.38 in control group and the difference was found to be statistically insignificant with a p value of 0.545. The DMFT index reported in our study was higher than the DFMT index reported (3.5) in the study conducted in 2015 by **Nouaman et al.** However, a statistically significant increase in mean Russel's Periodontal index was found in study group (2.41 ± 1.28) as compared to controls (1.37 ± 1.22) with a p value of 0.002. This may be due to limited access of this socially marginalized population to oral health services, prevention and care.^[7]

Majority of FSWs had habit of alcohol abuse (46.7%) followed by combined habit of smoking and tobacco (23.3%). Whereas 86.7% females in control group had no habit and 13.3% had habit of smokeless tobacco abuse. The difference in distribution of habit among study and control group was found to be statistically significant with a p value of 0.000. These findings can be explained based on the fact that FSW who live and work in brothels may be at increased risk of exposure to these substances.^[8] Also use of these substances acts as a means to cope with the stressors of sex work.

Majority of FSWs were current alcohol users (63.3%) and the number of units consumed per week ranged from 1 – 50 standard alcohol units in 36.8% FSWs. Almost 73% FSWs started drinking after 18 years of age. Similar findings were reported in the study conducted by **Odukoya OO et al., 2013** who reported 67.8% FSWs to be current alcohol users with 40.2% consuming alcohol in the range of 1 – 50 standard alcohol units and 77.4% started drinking after the age of 18 years.^[8] These findings are explained based on the assumption that drinking among FSWs may serve as self-medication or maladaptive coping to deal with economic disadvantage, an impoverished life style, stressful work, as a disinhibitor or an 'excuse' for sex work and it's use by male clients to enhance sexual performance.^[10]

About 23.3% FSWs were current smokers and majority of them consumed 1 – 4 cigarettes per day (42.9%). Majority of them (80%) initiated the habit after the age of 18 years. These findings resonate with those from studies conducted by **Odukoya OO et al., 2013** who reported 20.8% FSWs to be current smokers; 37.3% consumed 1 – 4 cigarettes / day and 82.4% initiated the habit after the age of 18 years.^[8]

In the present study, the habit of smokeless tobacco use was found in 20% of FSWs and the difference in smokeless tobacco use among study and control group was found to be statistically significant with p value of 0.004.

On comparison of oral Candidal count among study and control group, a statistically significant increase in CFU / ml of saliva was found in study group as compared to controls with a p value of 0.000. Majority of FSWs (43.3%) had oral Candidal count in range of 11 – 49 CFU / ml of saliva whereas Candidal colonies were absent in maximum number of subjects in control group (43.3%). This may be due to exposure of FSWs to risk factors like oral sex which causes a sharp increase in prevalence of oral candidiasis and other opportunistic infections.^[4]

On correlation of DMFT index and Russel Periodontal index with Candidal count, no correlation was found with Pearson coefficient value of -0.090 and -0.068 respectively. This may be due to small sample size in our study.

CONCLUSION

The significant oral candidal count in female sex workers without active oral manifestations alerts the oral physician for occurrence of other opportunistic infections and their management in dental settings. There is a need to deliver prevention and care services for oral diseases in these vulnerable population groups. Based on the results of this study, it is necessary to shed more light on the risk factors of oral diseases like oral candidiasis as they may have a negative impact on the quality of life.

REFERENCES

1. Sagtani RA, Bhattarai S, Adhikari BR, et al. Violence, HIV risk behavior and depression among female sex workers of eastern Nepal. *BMJ Open*, 2013; 3: 002763.
2. Barua P, Mahanta J, Medhi GK, Dale J, Paranjape RS, Gay Thongamba G. Sexual activity as risk factor for hepatitis C virus (HCV) transmission among the female sex workers in Nagaland. *Indian J Med Res*, 2012; 136(Supplement): 30-35.
3. Tran TN, Detels R, Hien NT, Long HT, Nga PT. Drug use, sexual behaviours and practices among male drug users in Hanoi, Vietnam—a qualitative study. *International Journal of Drug Policy*, 2004; 15: 182–188.
4. Quadri J.A, Ojure M.A, Mosobalaje F.K. Assessment of the Risk Factors of Oral Candidiasis among Commercial Sex Workers in Ijebu – Ode Local Government Area of Ogun State, Nigeria. *J. Chem. Bio. Phy. Sci. Sec. B*, 2013; 3(4): 2766-2771.
5. Wadhawan R, Solanki G, Sabir S, Palekar S, Pareekh A. Oral manifestations of systemic diseases: a review. *Journal of Science*, 2014; 4(4): 233-241.
6. Ghys PD, Jenkins C, Pisani E. HIV surveillance among female sex workers. *AIDS*, 2001; 15(3): S33-S40.
7. Nouaman et al. Oral health and HIV infection among female sex workers in Abidjan, Côte d'Ivoire. *BMC Oral Health*, 2015; 15: 154.
8. Odukoya OO, Sekoni AO, Onajole AT, Upadhyay RP. Alcohol consumption and cigarette smoking pattern among brothel-based female sex workers in two local government areas in Lagos state, Nigeria. *African Health Sciences*, 2013; 13(2): 490–497.
9. Balfour R, Allen J. A Review of the Literature on Sex Workers and Social Exclusion. By the UCL Institute of Health Equity for Inclusion Health, Department of Health, April 2014.
10. Li Q, Li X, Stanton B. Alcohol Use Among Female Sex Workers and Male Clients: An Integrative Review of Global Literature. *Alcohol & Alcoholism*, 2010; 45(2): 188–199.