

Oral Health Status and its Determinants among a Group of Iranian Employees

Hadi Ghasemi^a, Noushin Sohrabi^b, Nasibeh Al-Eshaghi^b, Abbas Hajabedini^b, Mohammad- Hossein Khoshnevisan^{a, c}

^aAssociate Professor, Dept. of Community Oral Health, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran

^bThe Center for Industrial Hygiene and Employees' Health, Telecommunication Infrastructure Company, Tehran, Iran

^cAssociate Professor, Dept. of Community Oral Health, Research Institute for Dental Sciences, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Correspondence to Mohammad-Hossein Khoshnevisan (email: khoshmh@gmail.com).

(Submitted: 6 May 2020 – Revised version received: 13 July 2020 – Accepted: 14 July 2020 – Published online: Summer 2020)

Objectives This study aimed to assess the oral health status of a group of Telecommunication Company (TCC) employees in Tehran, Iran.

Methods This cross-sectional study included a convenience sample of 426 employees using the WHO suggested protocol for oral health survey. Data regarding employees' oral health knowledge, behaviors, and status were collected by oral examination and using a self-administered questionnaire. Statistical analysis included the Chi-square test, t-test, and ANOVA.

Results The participants' mean age was 45.89±8.17 years, and 63% were males. The majority of the respondents were aware of the effectiveness of tooth brushing and dental flossing for prevention of oral diseases, and the relationship between oral health and general health. Twice a day tooth-brushing was reported by 28% and daily dental flossing by 48%. Also, 93% of the employees were non-smokers. Their mean DMFT was 12.88±5.56 with the following components: D: 1.40±1.80, M: 2.71±3.57, and F: 8.78±4.77). Filled teeth were more prevalent among women, subjects with higher educational degrees, and the office staff than the technicians.

Conclusion The TCC employees seem to enjoy a good level of access and utilization of dental care services considering their high share of filled teeth in their DMFT index. Better maintenance and further improvement of their oral health require comprehensive and continuous oral health promotion programs.

Keywords Occupational Health; Oral Hygiene; Dental Health Surveys; DMF Index

Introduction

Healthy staff in a health promoting work environment would contribute to the overall economic productivity of any country. A healthy workplace can immensely impact on the employees' quality of life both during the working and non-working periods, which in turn determines the general level of health of the communities and populations.¹ Promoting health in the workplace, will benefit the company, employees, and the insurance systems. It has been claimed that every unit of money spent on workplace health promotion will reduce absenteeism costs, which ultimately helps to retain investment. Positive effects of healthy workplace on the employees include fewer health problems, more pleasant working environment, and more enthusiasm for work. Moreover, reduction in work-related diseases due to healthy workplace will help the insurance systems to save more.^{1,2}

Oral health, as an important part of general health, affects the overall wellbeing of individuals and consequently impacts on their productivity. In an effort to document the economic burden of oral diseases in 2010, it was estimated that the global productivity would lose about 144 billion US Dollars per year in terms of indirect costs due to untreated dental caries, severe periodontitis, and severe tooth loss.³ Employees' lost work hours because of oral diseases have

also been documented in several studies.⁴⁻⁶ It has been estimated that dental diseases on average cause 1.56 lost hours/worker in the Australian population⁶ and 3.5 lost hours/person in the Canadian population.⁵

Provision of any cost-effective dental care requires proper planning, which in the first step needs comprehensive oral health need assessment. A good understanding of the employees' oral health status and related behaviors will ensure the implementation of a more effective oral health promotion program for them. Evaluation of workers' oral health and related behaviors has been the subject of several studies. For example, in a study on a group of healthcare workers in Saudi Arabia, 32% reported tooth-brushing with a frequency of twice a day and 49% reported not smoking.⁷ In another study, 24% of bank employees in Bangalore, India, reported twice a day tooth-brushing and 76% reported not smoking.⁸ In Tokyo, Japan, 79% of a group of employees reported twice a day tooth-brushing and 60% reported not smoking.⁹ In Iran with more than 16 million workers and employees, information regarding the oral health of this important segment of the population is limited. The objective of the present study was to assess the oral health status and its determinants in a group of Telecommunication Company (TCC) employees in Tehran, Iran.

Materials and Methods

The present cross-sectional study was carried out on a convenience sample of 426 employees of TCC in Tehran, Iran. From April to July 2019, the participants underwent oral examination and completed a self-administered questionnaire regarding oral health. The Ethic Committee of Shahid Beheshti School of Dentistry approved this study (IR.SBMU.DRC.REC.1397.072).

A group of eight calibrated dental personnel including seven dental hygienists together with one general dental practitioner comprised the examination team and performed oral examinations in the participants' workplace. The WHO suggested protocol for oral health survey¹⁰ was employed for the examination. The calibration process included a four-hour demonstration of the WHO oral health examination form and questionnaire by one of the authors (HG) and conducting an oral examination on 10 volunteer dental patients. In this practice, the calibrator (HG) and all eight examiners performed oral examinations and filled out the form for each dental patient. The inter-examiner reproducibility was calculated using the Kappa coefficient. The coefficient for consistency of examination between each examiner and the calibrator ranged from 0.79-1.00 and the coefficient for consistency of examination among the eight examiners was 0.69. The examination conducted under the light of a dental unit using standard dental mirrors and community periodontal index (CPI) probes. Data on decayed, missed, and filled teeth (DMFT), CPI, level of attachment loss, dental fluorosis, erosion, trauma, and oral mucosal status were recorded.

A self-administered questionnaire was used to collect the employees' demographic information, oral health-related knowledge, and behaviors. The questionnaire included questions on year of birth, gender, level of education (later

categorized as <Bachelor's degree, Bachelor's degree, and >Bachelor's degree) and income, and job type (two categories of office staff and technician).

The employees' knowledge on oral health was inquired by means of eight statements related to different aspects of oral disease prevention (Figure 1). These statements were based on a published article,¹¹ The reliability coefficient (Cronbach's alpha) for the correlation between the statements was 0.68. The participants were requested to rate their agreement with each of the statements on a 5-point Likert scale with options from fully disagree to fully agree, and I do not know.

Another set of eight questions inquired the employees' oral health behaviors including the frequency of tooth brushing, dental flossing, eating sugary snacks between the main meals, cigarette smoking, pipe or hookah consumption, frequency of dental visits in the past year, and the reason for their last dental visit.

Statistical analysis included the Chi-square test for differences in frequencies and percentages. To evaluate the differences in the mean DMFT and its components based on the participants' demographic information, t-test and ANOVA were employed. Statistical significance was set at $P < 0.05$.

Results

The mean age of participants was 45.89 ± 8.17 years, and 63% were males. Table 1 presents the participants' demographics. Totally, 60% were younger than 50 years old. Women were generally younger than men, and the frequency of female office staff was higher than male office staff. More than half of the participants reported that they had a university degree.

Table 1- Demographic information of employees (n=426) separately for males(n=267) and females(n=159)

		Total (%)	Females (%)	Males (%)	p-value ¹
Age (years)	≤37	101 (24)	44 (28)	57 (22)	<0.001
	38-50	154 (36)	73 (46)	81 (30)	
	≥51	171 (40)	42 (26)	129 (48)	
Level of education	<Bachelor's degree	40 (9)	12 (8)	28 (10)	0.001
	Bachelor's degree	221 (52)	67 (42)	154 (58)	
	≥Master's degree	165 (39)	80 (50)	85 (32)	
Income level (Million Tomans/month)	≤3	96 (23)	37 (23)	59 (22)	0.43
	>3	330 (77)	122 (77)	208 (78)	
Job type	Technician	200 (47)	41 (26)	159 (59)	<0.001
	Office staff	226 (53)	118 (74)	108 (41)	

¹ Statistical analysis of differences by gender: Chi-square test

The participants' level of agreement with eight statements on oral disease prevention is shown in Figure 1. The majority of respondents agreed with the effectiveness of tooth brushing and dental flossing for prevention of dental caries and gingival disease. Similarly, they correctly specified the relationship between oral health and general health. Less than half of the respondents agreed that minimal rinsing after tooth brushing would increase the caries prevention effect of fluoride in the toothpaste. Almost one-third of the respondents agreed with the role of fissure sealant therapy in prevention of dental caries.

Figure 2 presents the participants' reported oral health behaviors. The majority of the participants (91%) reported brushing their teeth at least once a day. This value dropped to 28% when the criteria were set to twice per day tooth brushing. Almost half of the respondents reported using dental floss at least once a day and 93% reported being non-smokers. The latter three behaviors were found to be more prevalent among women than men ($p < 0.02$). More than two-thirds of the respondents reported to have visited a dentist over the past year and about one-third of the respondents stated that the dental visit was just for a routine

dental check-up. About 80% of the respondents reported eating sugar-containing snacks or drinks more than once a

day.

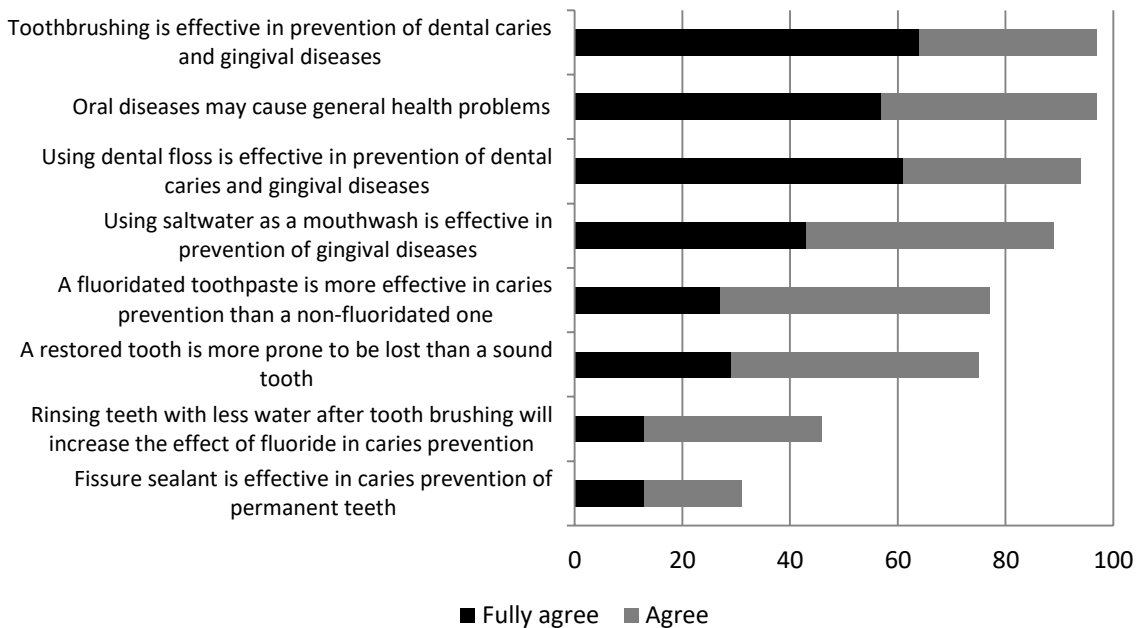


Figure 1- Percentages of employees (n=426) who fully agreed or agreed with the statements on oral disease prevention

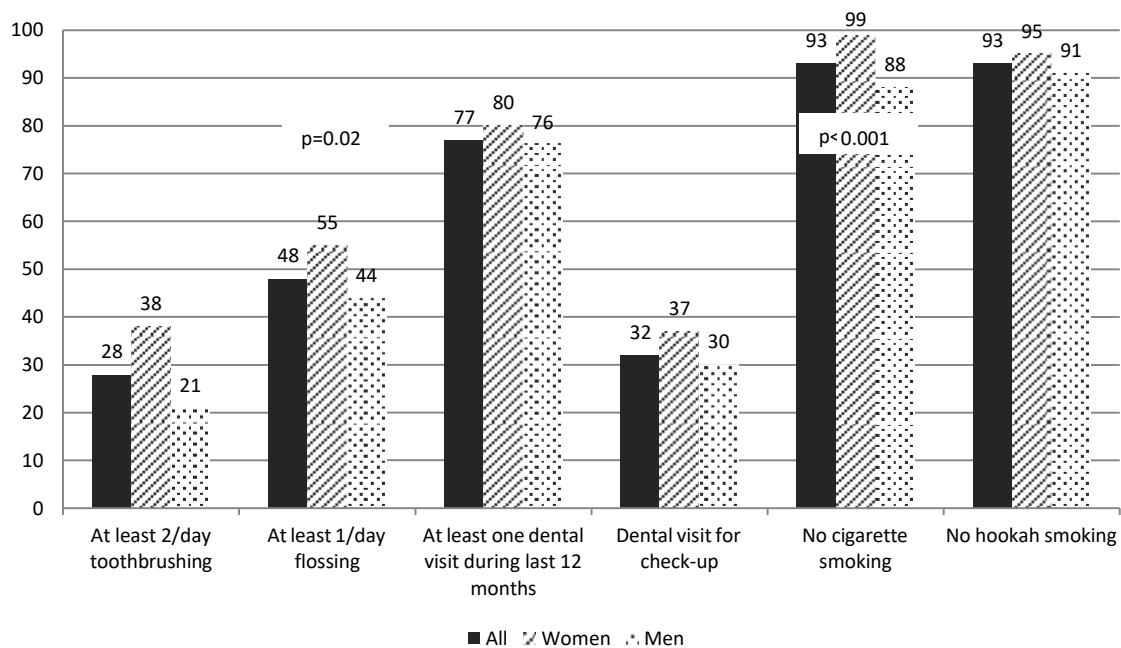


Figure 2- Percentages of the employees (n=426) who reported to follow different oral health behaviors separately for males and females (p-value indicates statistical gender difference by the Chi-square test).

The DMFT index of the participants and its components are presented in Figure 3. The mean DMFT was 12.88 ± 5.56 for all subjects, consisting of the following components: D: 1.40 ± 1.80 , M: 2.71 ± 3.57 , and F: 8.78 ± 4.77). The F component accounted for almost 70% of the DMFT index. The M component accounted for almost 20%, and the D component accounted for about 10%.

Women had higher number of filled teeth and fewer number

of decayed and missed teeth than men ($p < 0.03$). Subjects with educational level higher than the Bachelor's degree had higher number of filled and fewer number of missed teeth than those with educational level lower than the Bachelor's degree ($p < 0.03$). Participants over 38 year of age had higher number of missed teeth and a higher DMFT than younger individuals ($p < 0.04$). Technicians had a higher number of missed and a lower number of filled teeth than

the office staff ($p < 0.001$).

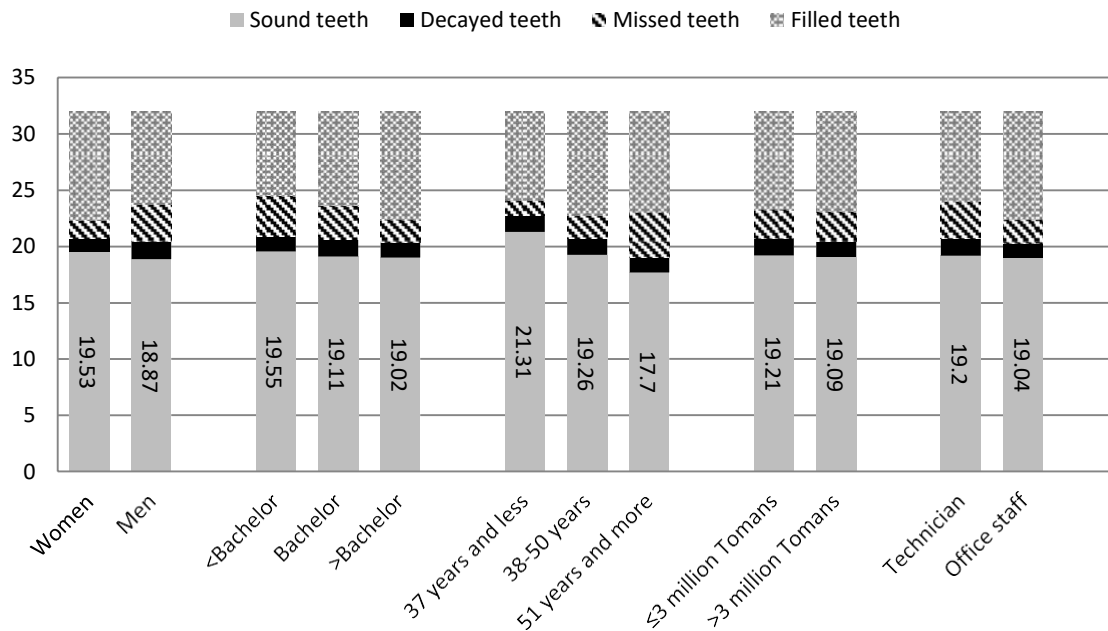


Figure 3- Mean of DMFT index and its components in the employees (n=426), based on their demographics [Sound teeth=32-(D+M+F)]

Around 26% of the participants had bleeding on probing and 14% were diagnosed with periodontal pocket (probing depth > 4 mm). The frequency of other conditions among the participants was as follows: Less than 6% showed at least one site of attachment loss in the indexed teeth. Trauma, fluorosis and oral mucosal disorders were recorded in < 4%, and signs of dental erosion (mostly limited to the enamel) were noted in 21% of the examined subjects.

Discussion

Based on the findings of the present study, on average, dental caries affected 13 teeth in each employee. Periodontal disease seemed to be rare since bleeding on probing was found in one out of four, and periodontal pocket was noted in 14% of the employees only. The majority of the employees demonstrated good level of awareness about different aspects of oral disease prevention. Regarding oral health behaviors, most participants were non-smoker and had a dental visit during the past year. However, they were mostly below the optimal level of tooth brushing, eating sugary snacks between meals, using dental floss, and regular dental check-up. Health knowledge is a prerequisite for healthy behaviors. The high percentage of awareness about most aspects of oral disease prevention among the employees may be considered as a reason for improved oral health behaviors both for themselves and their families. Yazdani et al. found that higher level of oral health literacy among parents was related to better dental health status and oral health

behaviors of themselves and their children.¹² However, having desirable level of knowledge is not sufficient alone for sustainable healthy behaviors, since behavior change is a complex process mediated by various individual, social, and environmental factors.¹³

It has been found that rinsing the mouth after tooth brushing will reduce the effect of toothpaste fluoride on caries prevention.¹³ Low percentage of agreement with the abovementioned recommendation among the participants of the present study calls for updating their knowledge with the most recent evidence.

Oral health status is highly influenced by the lifestyle and level of adherence to healthy behaviors at the individual and public levels. High prevalence of non-smokers among the study participants (93%) which is higher than what has been reported for Indian (76%)⁸, and Japanese employees (60%)⁹ and even the whole population of Iran (75%)¹⁴, highlights their concerns about their overall health.

Favorable level of oral health is found to be correlated with regular dental visits.¹⁵ The percentage of the participants who reported a dental visit in the past year in this study (77%) was higher than the findings of a population-based survey in Tehran (63%).¹⁶ This indicates a good level of access to oral health services among the employees in this study since TCC personnel in Iran benefit from subsidized dental services.

In relation to dental visits, some people visit a dentist for regular check-ups, irrespective of their dental needs (regular dental attenders) but others may see a dentist when they mostly experience dental pain (non-regular dental at non-

attenders).¹⁷ It has been shown that, regular dental attenders experience better oral health outcomes in terms of retaining their natural dentition. Such cases usually benefit from early detection of oral diseases and dentist's advice on proper oral disease prevention that helps limiting the harmful effects of oral diseases rather in initial stages.¹⁸ Most participants of this study seemed to undervalue the benefits of regular dental check-ups, since only one out of three employees reported to be a regular dental attender. Although this value (32%) is higher than findings of a study reported on the adult population of Isfahan Province (Iran) in which only 15% reported visiting a dentist for check-up¹⁹ but it is much lower than what has been reported in the UK (68%).²⁰

Tooth brushing at least twice a day has been widely recommended as a basic self-care behavior for preserving a favorable level of oral health.^{21, 22} Data from the western countries present a positive trend for adoption of this favorable habit. For example, some 50-70% of 11-15-year-old schoolchildren in 20 different countries reported to brush their teeth at least two times per day.²³ This behavior in the present study was reported by as low as 28% of the study participants. This figure is, however, comparable to the findings of some other local population studies; for example, 22% in a group of employees from Birjand University of Medical Sciences, South Khorasan Province²⁴, 19% in a group of 13 to 15-year-old students in Isfahan²⁵, and 26% of 15-year-old students in Tehran.²⁶ All these figures from a wide range of age groups in the country indicate that some 70-80% of Iranians underestimate the value of twice per day brushing as a recommended criterion for favorable level of oral health and calls for more emphasis in this regard by the public health promoting programs.

Caries experience in terms of the mean DMFT index in the subjects of this study (12.88) was close to the findings in a similar age group (35-44 years) of the latest National Oral Health Survey (13.20).²⁷ The share of each component of DMFT index in these two studies tells, however, different

stories. The DMFT index in the present study was mostly consisted of filled teeth (68%) but the F component in the national survey accounts for 25.5% of the index. The D component comprises about 33% of the index in the age group of 35-44 year Iranians, while for the subjects of the present study, about 11% of the total DMFT was made of decayed teeth. The share of M component from the total DMFT in the present study was also about half of the index in the national survey (21% vs. 40%). All these figures are indicative of a promising level of access to and utilization of dental services especially in terms of restorative dental care among the employees in the present study.

Conclusion

The overall picture of oral health among the employees in this study seems encouraging: good level of knowledge regarding the most aspects of oral disease prevention, high share of filled teeth in the DMFT index showing promising level of access and utilization of dental care services, and high prevalence of dental visits and not smoking. Flaws in some aspects of oral health knowledge and behaviors are, however, evident among these employees which require comprehensive and continuous oral health promotion program for more improvement of their oral health.

Acknowledgments

This ongoing project is the result of cooperation between the Research Institute for Dental Sciences of Shahid Beheshti University of Medical Sciences and The Center for Industrial Hygiene and Employees' Health, Telecommunication Infrastructure Company, Tehran, Iran. We wish to thank the TCC employees for their participation and cooperation.

Conflict of Interest

None Declared ■

References

- Burton J. WHO Healthy workplace framework and model: Background and supporting literature and practices. World Health Organization 2010. Chap: 9;P: 82-98.
- Sochert R, Siebeneich A, De Broeck V. European Network for Workplace Health Promotion. publicació en línia. Leuven (Bèlgica). 2013. Availibel at: <https://sund-by-net.dk/wp-content/uploads/images/ENWHP%20Image%20Brochure.pdf> (Accessed at: 05.01.2020)
- Listl S, Galloway J, Mossey P, Marcenes W. Global economic impact of dental diseases. *J Dent Res*. 2015 Oct;94(10):1355-61.
- Kelekar U, Naavaal S. Peer Reviewed: Hours Lost to Planned and Unplanned Dental Visits Among US Adults. *Prev Chronic Dis*. 2018 Jan;15:170225.
- Hayes A, Azarpazhooh A, Dempster L, Ravaghi V, Quiñonez C. Time loss due to dental problems and treatment in the Canadian population: analysis of a nationwide cross-sectional survey. *BMC Oral Health*. 2013 Apr;13:17.
- Australian Research Centre for Population Oral Health. Productivity losses from dental problems. *Aust Dent J*. 2012 Sep;57(3):393-7.
- Almoteb MM, Alalyani SS, Gowdar IM, Penumatsa NV, Siddiqui MA, Sharanesha RB. Oral hygiene status and practices among health-care workers: A cross-sectional study. *J Int Oral Health* 2019;11:268-73.
- Chandra MK, Jayakumar H, Vanishree N. Oral health status and treatment needs among Bank employees in Bangalore city, India. An Epidemiological study. *J Indian Assoc Public Health Dent*. 2009;7:169-75.
- Ichihashi T, Nishinoue N, Takada K, Muto T. Association between periodontal pockets and health-related behaviors of workers. *Sangyo Eiseigaku Zasshi*. 2015;57(1):1-8.

10. World Health Organization. Oral health surveys: basic methods. 5th Edition, 2013, World Health Organization.2013;Chap:1-5;P:35-62.
11. Ghasemi H, Murtomaa H, Torabzadeh H, Vehkalahti MM. Knowledge of and attitudes towards preventive dental care among Iranian dentists. *Eur J Dent.* 2007 Oct;1(4):222-9.
12. Yazdani R, Esfahani EN, Kharazifard MJ. Relationship of Oral Health Literacy with Dental Caries and Oral Health Behavior of Children and Their Parents. *J Dent (Tehran).* 2018 Sep;15(5):275-82.
13. Chestnutt IG. Dental Public Health at a Glance. John Wiley & Sons Ltd. 2016;chaps 20, 22;p 46-52.
14. Meysamie A, Ghaletaki R, Haghazali M, Asgari F, Rashidi A, Khalilzadeh O, et al. Pattern of tobacco use among the Iranian adult population: results of the national Survey of Risk Factors of Non-Communicable Diseases (SuRFNCD-2007). *Tob Control.* 2010 Apr;19(2):125-8.
15. Gill T. Association between dental attendance patterns and oral health in a national sample of British adults. Doctoral Dissertation. UCL (University College London), 2016.
16. Sistani MMN, Virtanen J, Yazdani R, Murtomaa H. Association of oral health behavior and the use of dental services with oral health literacy among adults in Tehran, Iran. *Eur J Dent.* 2017Apr-Jun;11(2):162-7.
17. Gilbert GH, Stoller EP, Duncan RP, Earls JL, Campbell AM. Dental self-care among dentate adults: contrasting problem-oriented dental attenders and regular dental attenders. *Spec Care Dent.* 2000Jul-Aug;20(4):155-63.
18. Talakey AA, Bernabé E. Long- term regular dental attendance and tooth retention among British adults: A cross- sectional analysis of national survey data. *Int J Dent Hyg.* 2019 Feb;17(1):64-70.
19. Eslamipour F, Tahani B, Heydari K, Salehi H. Dental care satisfaction among adult population in Isfahan, Iran and its influencing factors. *J Oral Health Oral Epidemiol* 2017 Mar; 6(4):218-25.
20. Vernekar N, Batchelor P, Heilmann A. Adult self-reported attendance for dental check-ups over a 16-year period in the UK. *Br Dent* 2019 Jun; 226 (2019):883-8.
21. Benzian H, Williams D. The challenge of oral disease: a call for global action. The oral health atlas. 2nd ed. Geneva: FDI World Dental Federation 2015. [https:// www.fdiworlddental.org/sites/default/files/media/documents/complete_oh_atlas.pdf](https://www.fdiworlddental.org/sites/default/files/media/documents/complete_oh_atlas.pdf)
22. Davies RM, Davies GM, Ellwood RP, Kay EJ. Prevention. Part 4: Toothbrushing: What advice should be given to patients? *Br Dent J* 2003Aug; 195:135-41.
23. Honkala S, Vereecken C, Niclasen B, Honkala E. Trends in toothbrushing in 20 countries/regions from 1994 to 2010. *Eur J Public Health.* 2015 Apr;25Suppl 2:20-3.
24. Akbari N, Rangin E, Sharifzadeh G. Oral health Surveys in staff and Educational hospitals of Birjand University of Medical Sciences in 2016. *J Birjand Univ Med Sci.* 2018Apr, 25(1): 62-71.
25. Asgari I, Amiri A. Relationship between self-reported oral hygiene and clinical plaque index among adolescents in Isfahan. *Caspian J Dent Res.* 2019 Sep; 8(2): 56-62.
26. Yazdani R, Vehkalahti MM, Nouri M, Murtomaa H. Smoking, tooth brushing and oral cleanliness among 15-year-olds in Tehran, Iran. *Oral Health Prev Dent.* 2008;6(1):45-51.
27. Khoshnevisan M, Ghasemianpour M, Samadzadeh H, Baez R. Oral health status and healthcare system in IR Iran. *J Contemp Med Sci* 2018Summer;4(3);107-18.

How to cite:

Hadi Ghasemi, Noushin Sohrabi, Nasibeh Al-Eshaghi, Abbas Hajabedini, Mohammad Hossein Khoshnevisan. Oral Health Status and its Determinants among a Group of Iranian Employees. *J Dent Sch* 2019;37(3):77-82.