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Quality of life associated with oral health in smokers and non-smokers

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Original Article

Abstract

BACKGROUND AND AIM: Smoking can affect the quality of daily life, like distributing sense of smell and taste and decreasing the level of energy for exercise. In addition, smoking can affect the health of oral cavity. The aim of this study was to evaluate the quality of life (QOL) associated with oral health in smokers and non-smokers.

METHODS: The population under study included 300 patients who referred to dental school, offices, and clinics in Kerman, Iran. After obtaining consent, the questionnaire included demographic information and questions about smoking and its impact on people. During a dental visit, patients were asked to answer the questions of two questionnaires: EuroQol five-dimensional (EQ-5D) questionnaire and the Oral Health Impact Profile-14 (OHIP-14). Wilcoxon-Mann-Whitney test, t-test, chi-square test, and analysis of variance (ANOVA) were used and statistical analyses were performed by SPPS software. $P < 0.05$ was significant.

RESULTS: In this study, 300 people were studied (134 men and 166 women). The mean age was estimated to be 35.20 ± 8.68 years (range from 20 to 78 years). 85 people (29%) were smokers. Among smokers, only 10 (11.4%) were women. The study found that people who had smoked in the past had higher EQ-5D questionnaire score than those who had not smoked so far. QOL related to oral health was lower in smokers than in non-smokers, and there was a significant relationship in this area.

CONCLUSION: There was a significant relationship between age, sex, and EQ-5D scores in smokers. Moreover, oral health-related QOL (OHRQOL) in smokers was lower than non-smokers and there was a significant relationship.

KEYWORDS: Quality of Life; Oral Health; Smokers

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Smoking can cause disastrous effects on human health, but still many people smoke. Based on the recent studies, cigarette smoke contains more than 4000 chemicals which at least, 50 of them are carcinogenic such as arsenic, tar, and carbon monoxide (CO). In addition, cigarette has nicotine which causes addiction. Smoking is a main reason of death in world and causes 13000 deaths per year.[1-3]

Risk of death between smokers in range of 33 to 70 years old is three times more than non-smokers. Besides, study results show that half of smokers will die within twenty years due to smoking-related diseases.[1-3]

Smoking often causes heart, liver, and lung diseases. Smoking is the main risk factor for diseases such as heart failure, stroke, chronic obstructive pulmonary disease (COPD), and cancers specially lung cancer, throat cancer,

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and pancreatic cancer. Starting smoking at early age and smoking cigarette with high tar content increase the risks of these diseases.

World Health Organization (WHO) estimated that smoking led to death of 4.5 million in 2004 and 100 million in 20thcentury; this quantity is much more than the number of death due to human immunodeficiency virus (HIV), tuberculosis (TB), car accident, and suicide.[3]

Smoking also can affect the quality of daily life, like distributing sense of smell and taste and decreasing the level of energy for exercise, raising anxious and depression risks, and affecting the individual communication with family, friends, and colleagues. In addition, smoking can affect the health of oral cavity and tongue.[4]

Cancer of the oral cavity is the 6th most common cancer in both genders, although it is the 3rd common cancer for men in some countries. Tobacco consumption is the main risk factor for oral cancer and precancerous lesions. Smoking causes some oral lesions like smoker's melanosis, keratotic patches, oral mucositis, leukoplakia, and hairy tongue. Smoking often is aligned with mucosal color change and tooth decay.[5]

Caries and calculus increase gingival diseases such as gingivitis and periodontitis and decrease the ability of gingiva to repair itself that causes necrosis. In addition, smoking reduces density and bulk of alveolar bone around teeth and increases the gingival packet and risk of implant rejection.[5]

Important aspect of smoking is its relation with health-related quality of life (HRQOL). Smoking not only affects the person who uses it, but also affects the quality of life (QOL) of other people.[6]

It is estimated that smoking is a main reason of 19% of mortality in 2002 (27% in men and 11% in women) and 12% of disabilities in world.[7] The purpose of this study was to evaluate the QOL associated with oral health in smokers and non-smokers.

Methods

This study was a descriptive-analytic study. The population under study included 300 patients who referred to dental school, offices, and clinics in Kerman, Iran. There were 15 clinics and offices and they were selected based on their list and lottery. After obtaining consent, the questionnaire included demographic information and questions about smoking and its impact on people. People who smoked more than five cigarettes a day were considered smokers. During a dental visit, patients were asked to answer the questions of two validated questionnaires: the EuroQol five-dimensional (EQ-5D) questionnaire, which examines the QOL, and the other one, the Oral Health Impact Profile-14 (OHIP-14), including 14 questions that in all of these questions, the individuals were asked to answer the questions about their teeth, mouth, or prosthesis problems based on their experience in the past twelve months.[8]

Responses were recorded on the basis of the Likert criterion, so that if the problem was almost always experienced, it would be coded as 4, "often": code 3, "occasionally": code 2, "rarely": code 1, and the zero code was assigned to "never". Therefore, the total score of individuals was in the range of 0-56, and the higher total score indicated that the QOL associated with the health of the individual's mouth was weakening.

The "EQ-5D" questionnaire is a common tool for assessing QOL, which is comprehensive, and also. The EQ-5D questionnaire takes between 1-5 minutes depending on the status of the individual.[9,10]

This tool has been translated into sixty languages and has been used in various patients and its validity and reliability have been verified.[5,11,12]

The questionnaire contains six questions that cover five areas of mobility, self-care, routine activities, pain or discomfort, anxiety or depression, as well as a health status grading chart. Each of the questions has three scales and has a score of 20 to 100, respectively (a lower score indicating a better quality in that area). In addition, the health

grading chart is graded from 0 to 100 that the person determines his/her health status on it. Validity and reliability of this questionnaire have been reported in previous studies for various components from 0.77 to 0.88.[13-15] Besides, Cohen's Kappa coefficient in re-evaluation of this questionnaire for various components was between 0.61 and 1.

Independent samples t-test was used to compare the mean score of the EQ-5D and OHIP-14 questionnaires between the two groups of smokers and non-smokers. Chi-square test was used to evaluate the relationship between nominal variables relative to each other and statistical analyses were performed by SPPS software (version 21, IBM Corporation, Armonk, NY, USA).

Results

In this study, 300 people were studied (134 men and 166 women). The mean age was estimated to be 35.20 ± 8.68 years (ranging from 20 to 78 years). 87 people (29.0%) were smokers. Among smokers, only 10 (11.4%) were women. There was a significant relationship between sex and smoking (P = 0.001).

Of smokers, 34 people used cigarettes on a daily basis, and 53 occasionally smoked. The average smoking rate was 5.64 cigarettes per day. The duration of smoking varied from 1 year to 23 years, and the average consumption duration was reported to be 8.76 years.

The demographic characteristics of smokers and non-smokers are shown in table 1. The study showed that the largest groups of smokers were 20-30 years old and 40-50 years old (Table 2).

Table 2. Relative and absolute frequency of smokers and non-smokers based on age

Age group (year)	Smoker	Non-smoker	Total
20-30	25 (35.7)	45 (64.3)	70 (23.3)
30-40	13 (17.3)	62 (82.7)	75 (25.0)
40-50	32 (31.6)	69 (68.4)	101 (33.7)
50-60	12 (32.4)	25 (67.6)	37 (12.3)
> 60	6 (29.4)	12 (70.6)	17 (5.7)
Total	87 (29.0)	213 (71.0)	300 (100)

Data are presented as number and percentage

The mean score of the EQ-5D questionnaire was 51.50 ± 12.55 and some people reported some of the problems in EQ-5D: mobility (20.1%), self-care (14.4%), normal activities (23.2%), pain and discomfort (41.5%), and anxiety and depression (35.3%). Table 3 shows the mean EQ-5D and its areas in smokers and non-smokers.

The study found that people who had smoked in the past had higher EQ-5D questionnaire score than those who had not smoked so far; in fact, they were affected by possible reported health problems, but their impact was not statistically significant (P = 0.120). Moreover, there was a significant relationship between smokers and non-smokers in the areas of mobility and anxiety and depression (P = 0.001) (smokers more than non-smokers).

Table 1. Demographic characteristics of the participants in the study

Variable		Non-smoker	Smoker
Age	Age (year)	26.3 ± 2.5	44.1 ± 10.7
	Age range	20-45	19-78
Sex	Men	57 (42.5)	77 (57.5)
	Women	156 (94.0)	10 (6.0)
Level of education	Diploma and under diploma	51 (69.8)	22 (30.2)
	Higher than diploma	162 (71.3)	65 (28.6)
Marital status	Married	121 (72.8)	45 (27.2)
	Single	92 (68.6)	42 (31.4)
Job	Employed	188 (71.5)	75 (28.5)
	Unemployed	25 (67.5)	12 (32.5)
Number of visits to the dentist	Less than twice	194 (71.0)	79 (29.0)
	Twice or more	19 (70.4)	8 (29.6)

Data are presented as mean ± standard deviation (SD) or number and percentage

Table 3. Mean and standard deviation (SD) of EuroQol five-dimensional (EQ-5D) and its domains in smokers and non-smokers

	EQ-5D	Domains of EQ-5D				
		Mobility	Self-care	Normal activities	Pain and discomfort	Anxiety and depression
Never smoker	26.2 ± 1.2	21.2 ± 1.2	31.2 ± 0.2	26.2 ± 1.5	22.5 ± 2.2	25.1 ± 0.7
Smoking once or twice	32.5 ± 2.3	35.2 ± 1.1	30.2 ± 1.6	34.2 ± 1.9	40.2 ± 3.2	25.2 ± 3.9
Smoking before but not smoking now	41.5 ± 3.5	45.1 ± 1.7	45.1 ± 5.2	49.9 ± 4.2	35.2 ± 4.5	35.2 ± 1.9
Smoking less than 10 cigarettes/day	55.6 ± 6.3	53.2 ± 2.2	62.1 ± 5.1	56.7 ± 3.2	49.2 ± 1.2	58.2 ± 1.5
Smoking 10-19 cigarettes/day	66.2 ± 8.5	66.2 ± 5.1	59.1 ± 9.1	61.8 ± 12.2	62.2 ± 8.2	63.2 ± 9.1
Smoking 20 or more cigarettes/day	83.2 ± 7.3	91.2 ± 8.2	85.2 ± 6.1	80.1 ± 9.1	75.5 ± 7.2	85.2 ± 7.5

Data are presented as mean ± standard deviation (SD)
EQ-5D: EuroQol five-dimensional

Table 4. Mean and standard deviation (SD) of Oral Health Impact Profile-14 (OHIP-14) questionnaire in smokers and non-smokers

Group	Mean ± SD	Min	Max
Never smoker	22.2 ± 2.4	15	30
Smoking once or twice	28.1 ± 4.1	17	37
Smoking before but not smoking now	21.2 ± 1.4	15	30
Smoking less than 10 cigarettes/day	35.5 ± 5.2	22	51
Smoking 10-19 cigarettes/day	28.1 ± 4.5	17	37

SD: Standard deviation

This study showed that the average score of the EQ-5D questionnaire was 54.50 ± 8.12 in smokers and 26.20 ± 1.20 in non-smokers. There was a significant relationship between age, sex, and EQ-5D scores in smokers (P = 0.001, P = 0.020, respectively in smokers). In other words, people with higher age and men had higher scores.

In our results, the difference between smokers and non-smokers was more marked for those who smoked between 15 and 24 cigarettes a day. As a result, QOL was lower. QOL related to oral health was lower in smokers than in non-smokers, and there was a significant relationship in this area (Table 4).

Discussion

This study investigates the EQ-5D questionnaire and QOL related to oral health in smokers and non-smokers. In this study, 300 persons were surveyed (134 men and 166 women). 87 persons (29%) were smokers. Among them, only 10 persons (11.4%) were women. There was a significant relationship between sex and smoking. The study shows that those who were smokers in the past had a higher EQ-5D questionnaire score than those who were not smokers, and in other words, they were affected by possible reported health problems, but the effect was not statistically significant, which is similar to the study of Vogl et al.[16]

In the study of Schmitz et al., smokers had a better general health than non-smokers.[17] This can have different reasons. For example, people who responded negatively to smoking may have smoked in the past, or may live with a smoker. This study showed that the average score of the EQ-5D questionnaire was 54.80 ± 9.12 in smokers and 26.20 ± 1.20 in non-smokers. There was a significant relationship between age, sex, and EQ-5D scores in smokers; in other words, people with higher age and men had higher scores.

A study by Guiterrez-Bedmar et al. found that smokers generally had a lower overall health status than non-smokers. Among the smoker groups, the average public health scores were reversely related to the amount of tobacco smoke. These differences were clinically and statistically significant.[18] Lyons et al. also assessed the QOL of smokers with "always" and "never" options. Their findings showed the main differences in three dimensions of physical activity (performance, pain, and general health of the body) and the results showed lower general health in the smoker group.[19]

The study by Vogl et al. showed that smoking was significantly associated with

general health in the British population.[16] This research is consistent with high-income industrial countries, such as Spain, Denmark, Finland, the United States (US), Australia, the Netherlands, as well as past British studies.[18,20,21] Findings show that smoking rates, particularly more than 20 cigarettes per day, affect all areas of health which is consistent with previous expectations.

A study by Lyons et al. in a sample population of over 14 years old in the Valladolid health district (Spain), does not report the differences between smokers and non-smokers for physical or mental dimensions.[18] In our results, the difference between smokers and non-smokers was marked by the higher consumption of cigarettes per day, which is consistent with Guiterrez-Bedmar et al.[18] In fact, Wilson et al. have encouraged heavy smokers to smoke less than 15 cigarettes per day to improve their QOL.[20] This may be the first hard step to complete quitting.

The results of this study showed that there was a significant relationship between smokers and non-smokers in the range of mobility and anxiety and depression, which is consistent with the researches by Guiterrez-Bedmar et al.[18] and Vogl et al.[16]

The strong link between smoking and depression is proven. This is partly due to common factors and is likely to be bilaterally coupled with a stronger effect, such as depression at the onset of smoking, getting smoke every day and continuing.

Laaksonen et al. have shown that middle-aged people who smoke in the city of Helsinki, Finland, have a relatively lower mental health than non-smokers.[21] Another study also found that smokers in two general Brazilian universities never had a better average score in physical activity, general health, and mental dimensions than others.[19]

Training messages are usually more relevant to information about the dangers of smoking and the benefits of quitting it. In fact, these messages show widespread issues related to the incidence of illness, death, and physical disability for smokers in all age groups. Our findings suggest that smoking cessation may also have a positive impact on general health and this information can be useful in encouraging smokers to quit. These positive effects may even have a direct impact on several aspects of the daily lives of smokers.

In the study by Guiterrez-Bedmar et al., smokers had a higher mean score compared to non-smokers, and these differences were significant in physical and mental pain.[18] Wilson et al. achieved lower physical-health scores for smokers compared to non-smokers.[20] Mulder et al.[22] showed that non-smokers only had a lower score for joint pain in comparison with those who used to be smoker in the past. In other studies, there were no significant differences between non-smokers and those who were formerly smokers.[16,18-21]

Guiterrez-Bedmar et al. conducted a similar study on disabled adults. They showed that the average scores of those who quitted smoking were significantly better than the average scores of smokers in all dimensions, except for body performance.[18] Wilson et al. showed that there were no significant differences between smokers and non-smokers when physical and mental disorders were controlled as potential effective factors.[20] However, the psychological aspect of general health of nicotine-dependent smokers is more likely to be harmed in comparison to non-smokers and non-nicotine-dependent smokers. Previous researches have shown that some of the chronic physical and psychological disorders are more common in smokers.[22-24] People with physical or psychological disorders may have a lower QOL. This lower QOL is due to their underlying illness, not their smoking status. This is an ambiguity in the relationship between smoking and QOL.[10,25,26] Lyons et al.[19] and Vogl et al.[16] have reported that even without chronic diseases, smokers may have a worse general health than non-smokers.

Our findings are consistent with Lyons et al.[19] and Bronnum-Hansen et al.,[25] who

found that a greater dependence on nicotine was associated with lower QOL and also with Schmitz et al.[17] data that showed that nicotine addicts had a lower QOL than non-smokers and nicotine-free smokers. People who have stress and low self-confidence and those who are prone to poor lifestyle may be more likely to be addicted to nicotine, which is also associated with weak public health. On the other hand, nicotine dependence also creates a defective cycle, and inability to quit can be stressful, which increases emotional anxiety.

A study by Vogl et al. found that a heavy smoker might report 86% of some severe problems, such as anxiety and depression and 42% of problems in common activities.[16] By encouraging heavy smokers to quit through various supportive mechanisms, 70% of moderate to severe problems, such as anxiety/depression can be reduced.

Conclusion

The oral HRQOL (OHRQOL) in smokers was lower than non-smokers and there was a significant relationship. Moreover, there was a significant relationship between age, sex, and EQ-5D scores in smokers. In other words, people with higher age and men had higher scores.

Conflict of Interests

Authors have no conflict of interest.

Acknowledgments

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