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Research Article

### THE USE OF MOUTHWASH WITH A HIGH ALCOHOL CONTENT (25% OR HIGHER) INCREASES THE RISK OF ORAL SQUAMOUS CELL CARCINOMA

<sup>1</sup>Dr Wajiha Abbas, <sup>2</sup>Dr Jahangir Hammad, <sup>3</sup>Dr Umer Hussain

<sup>1</sup>Post Graduate Resident, Oral and Maxillofacial Surgery Department, <sup>2</sup>Associate Professor, Oral and Maxillofacial Surgery Department, <sup>3</sup>Senior Registrar, Oral and Maxillofacial Surgery Department, <sup>1,2,3</sup>Sandeman Provincial Hospital / Bolan University of Medical and Health Sciences Quetta.

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**Abstract:**

**Background:** Recent studies have highlighted the role of alcohol as mouthwash antigens may lead to the higher oral cancer risk. Conclusively the reviews in literature are conflicting, especially the one showing enough evidences to accept the scheme that all mouthwash containing the alcohol contributed enough to elevate the oral cancer development. The current study aims to assess and associate the use of mouthwash with a high alcohol content in increasing the risk of oral squamous cell carcinoma.

**Methods:** An observational case control design was used for the present study. A total of 100 cases and equal numbers of healthy controls were participated in the study. Candidates of age  $\geq 18$  years of either genders were included and divided in two groups i.e. cases with carcinoma and controls without carcinoma. And use of mouthwash with high alcohol concentration were noted. Odds ratio were calculated.

**Results:** A total of 200 individuals participated in the current study. Out of the total participants 100 were case and 100 controls. In all individuals, cases are more likely to report the mouth wash use than the controls. 40% of the males and 60% of the females uses the mouthwash on regular basis. The crude odds ratio (OR) for using the mouthwash was 1.3 and 1.8 in males and females respectively.

**Conclusion:** The current study concludes that regular use of mouthwash containing a high alcohol concentration lead to an increased oral cancer risk especially in females.

**Keywords:** Mouthwash antigens, High alcoholic levels, Oral squamous cell carcinoma, Oral Cancer.

**Corresponding author:**

**Dr. Wajiha Abbas,**

Post Graduate Resident, Oral and Maxillofacial Surgery Department,  
Sandeman Provincial Hospital /

Bolan University of Medical and Health Sciences Quetta.

([wajiha\\_abbas@hotmail.com](mailto:wajiha_abbas@hotmail.com))

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**INTRODUCTION:**

In the local and international markets several mouthwashes having concentrations of ethanol, even fewer contain high alcoholic levels up to 26%. [1] Certain recent studies have highlighted the role of alcohol as mouthwash antigens may lead to the higher oral cancer risk. [2-3] Conclusively the reviews in literature are conflicting, especially the one showing enough evidences to accept the scheme that all mouthwash containing the alcohol contributed enough to elevate the oral cancer development. [2] While the other conditions that review of the published data had shown an association among the mouthwash use, and the alcohol containing mouthwash and the oral cancers, is not totally reinforced by the epidemiological evidence. [3-5] The aforesaid reviews published in 2008 and 2009 and explicitly highlighted the evidences in order to upkeep their conclusions. The current study aims to assess and associate the use of mouthwash with a high alcohol content in increasing the risk of oral squamous cell carcinoma.

**MATERIAL AND METHODS:**

An observational case control design was used for the present study. The sample size for current study was calculated through the formula derived by T.A Yamne. [6] A total of 100 cases and equal numbers of healthy controls were participated in the study. Individuals of age  $\geq 18$  years of both gender having oral squamous cell carcinoma (cases) or without carcinoma (controls) were included in this study. The exclusion criteria for cases include all the children and adolescents below than 18 years of age and were unwilling to participate also the patients with renal or cardiac disorders. The duration of study was eight months starting from Nov 2017. The demographic, diagnostic and the clinical information and findings

were collected. Highly trained interviewers administer the interviews with cases and controls through a pre tested well-structured questionnaire. The questions are related to tobacco use, diet, occupation, oral health status and other characteristics and findings. The oral health measured or indicated with the use of denatures, number of teeth and dental x-ray, duration and reason for use of mouthwash etc. All the tests and procedures were opted by practicing the standard operating procedures (SOPs). The ethical approval was taken from the ethical Committee and additionally an informed consent was also taken from all the study participants or their parents.

**Statistical analysis:**

The entire collected information was stored electronically in MS Excel (a computer software).<sup>17</sup> Later this data was entered in SPSS and analyzed by using version 20.0. Mean and standard deviation was calculated for descriptive. Frequency distribution and percentages were generated for all qualitative variables. The P values less than equal to 0.05 was considered statistically significant in all inferential statistics.

**RESULTS:**

A total of 200 individuals participated in the current study. Out of the total participants 100 were case and 100 controls. The mean age of the participants was  $43.2 \pm 10.14$  years. Out of the total participants, 68% were female and 32% were male. Almost 43% males and 61% females used the mouthwash (at least once a month). The percentage of mouthwash use increased with the increase in age, though there is slight difference of mouthwash use in both genders. More on the detailed summary is given in table 1.

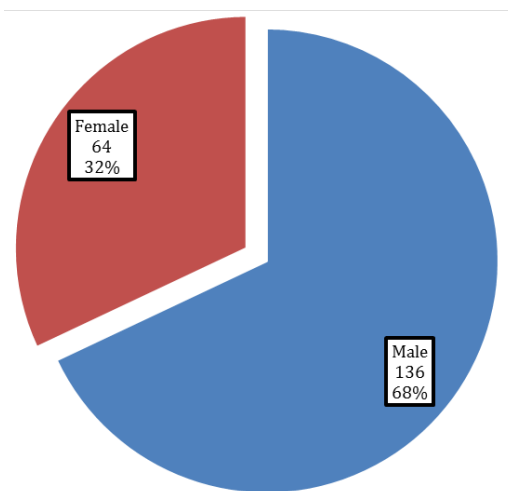


Fig 1: Distribution of gender of patients

**Table 1: Mouth wash user gender wise characteristics among cases and controls**

Ever used mouthwash regularly (%)				
	Cases		Control	
	Male	Females	Male	Females
<b>Age (in years)</b>				
Below 40	40%	50%	30%	43%
41-50	54%	46%	45%	54%
Above 50	55%	70%	60%	65%
<b>Tobacco use</b>				
Non Smoker	37%	91%	41%	93%
Smoker	63%	9%	59%	7%
<b>Education</b>				
Illiterate	15%	20%	25%	18%
Up to primary	40%	45%	30%	35%
Above primary	50%	60%	47%	50%

In all individuals, cases are more likely to report the mouth wash use than the controls. 40% of the males and 60% of the females uses the mouthwash on regular basis. The crude odds ratio (OR) for using the

mouthwash was 1.3 and 1.8 in males and females respectively. After the adjustment of the factors like education and age, the sex specific ORs were 1.3 and 1.8. More on the adjusted OR's were given in table 2.

**Table 2: Adjusted ORs for oral cancer associated to mouthwash use.**

Mouthwash use indicator	Male	Female
	OR	OR
<b>Age started</b>		
Below 20	1.6	2.3
21-40	1.3	1.4
41-50	1.6	1.2
Above 50	0.8	1.7
<b>Duration (in years)</b>		
Below 5	1.0	1.0
5 to 10	1.0	1.5
Above 10	1.5	2.0
<b>Number of times per month (frequency)</b>		
Zero	1.0	1.0
1 to 5	1.1	1.3
Above 5	2.0	1.7
<b>Alcohol content</b>		
None	1.0	1.0
Lo2	0.6	0.9
Medium	1.5	1.8
High	1.7	2.0

**DISCUSSION:**

The study was conducted to assess and associate the use of mouthwash with a high alcohol content in increasing the risk of oral squamous cell carcinoma. We not only identified the association but also calculated the risk. In literature very, few studies had described and assess the increased risk of oral cancer with the use of mouthwash. They had opted the similar study design as of this study. [7,8] In these studies, the risk was reported high among those who do not smoke. In another hospital-based study administered by the American Health Foundation (AHF), they reported a higher risk of 2.4 folds in women who used the mouthwash daily with increasing risk among non-smokers. [7]

The present study was reported with the elevated risk of cancer among women than the men. This finding is incorporated with other studies findings. Another study investigation reported the increased cancer risk among women and especially in those desisting from tobacco. [8-9] The current study has shown that risk of cancer increases or varies with the dose proportions, duration and the frequency of mouthwash use and importantly the content of alcohol in the mouthwash. Therefore, this study findings affirms the regular use of mouthwash elevate the oral cancer risk with strong linkage to the women. Other associated factors to increasing oral cancer is still not clear and a debatable point. We cannot completely rule out the confounding factors but only by providing the adjusted odds ratios. Another, infrequent factor is the smokeless tobacco, but it did not affect the observation through the mouthwash use. The mouthwash user sometime underreported the use of tobacco or alcoholic beverages, but the misclassification would have to be substantially greater for cases to account for the seen excess risks. Certain wrong information provides by the individuals either forgetting or reporting falsely the use of mouthwash at least one time in the previous six months. A fundamental clarification seems biologically reasonable as many mouthwashes (marketed commercially) containing oral carcinogen and alcohol is said to be a well-recognized cause of oral cancer. [10,11]

The principle interpretation was unswerving with the number and frequency of mouthwash along with the duration and the dose response. Many mouthwashes use different contingents including the color, taste and fragrance but the high alcohol observed to be associated with the elevated oral cancer risk. But the role or mechanism of alcohol in oral cancer is still not well known. [10]

The oral swishing through the mouthwash having 25% ethanol may give a local mucosal tissue. The oral swishing with a mouthwash containing 25% ethanol might provide an exposure of the local mucosal tissue is very much alike of drinking a 100-proof alcoholic beverage mitigated with water almost same quantity or any other mixers, though the quantitative caparisons are not available. It is unlikely to perceive an effect of alcohol ingestion because fewer of people swallowed the mouthwash. [11-13] There may be more studies required with larger sample size in the regions to highlight the factor of high alcohol contents in mouthwash and their outcomes role in oral cancer.

**CONCLUSION:**

It is concluded from the current study that regular use of mouthwash containing a high alcohol concentration lead to an increased oral cancer risk especially in females.

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