

**Research Article**

**Assessment of Epidemiology of oral health issues and important biomarkers for the analysis of oral cancer**

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**ABSTRACT**

**Introduction:** Cancers of the oral cavity and pharynx account for 3% of all cancers in the United States. Oral cancer usually includes cancer of the lip, tongue, salivary glands, and other sites in the mouth; while pharyngeal cancer includes cancers of the nasopharynx, oropharynx, and hypopharynx.

**Objectives of the study:** The main objective of the study is to find the important biomarkers which are used for the identification of oral cancer in humans.

**Methodology of the study:** 5.0 ml blood sample was taken from vein. Blood was further processed for the estimation of serum biomarkers i.e glutathione and MDA. Commercially available enzymatic kits of Randox were used.

**Results:** According to our data GSH and MDA shows the maximum decrease in case of tongue cancer patients. There is a maximum change observed in case of tongue cancer patient after radiotherapy. **Conclusion:** It is concluded that oral health cancer is one of the most leading cause of death in Pakistan and there are number of factors which are associated with this. But GSH and MDA are the two most important bio markers for the identification of oral cancer before and after treatment of radiotherapy in patients.

**Keywords:** Oral, Health, Biomarkers

**INTRODUCTION**

Cancers of the oral cavity and pharynx account for 3% of all cancers in the United States. Oral cancer usually includes cancer of the lip, tongue, salivary glands, and other sites in the mouth; while pharyngeal cancer includes cancers of the nasopharynx, oropharynx, and hypopharynx<sup>1</sup>. More than 90% of oral or pharyngeal cancers are squamous cell in origin. Cancer is a leading cause of mortality and morbidity worldwide, counting for 7 million deaths per year. It is the second most common cause of death in developing countries. Cancer is the second leading cause of death worldwide, surpassed only by cardiovascular disease. Therefore, fighting cancer is measured to be one of the most significant areas of research in medicine and which possibly contributes to

increased interest in chemoprevention as an alternative approach to the control of cancer. Natural or dietary factors have attracted a great deal of interest because of their safe efficacy and perceived ability to act as highly effective chemo preventive agents<sup>2-3</sup>.

Cancer is due to failure of the mechanisms that usually control the growth and proliferation of the cell. Normally, in an adult tissue many cells do not proliferate except during healing process. Cancer occurs when normal mechanism of cell is disturbed and cells produced or divide excessively<sup>4</sup>. The loss of normal mechanism of cell is may be genetics or may be due to the influence of tumor-promoting chemicals, hormones and sometime viruses. There are two

major lines of investigations in cancer biochemistry; the metabolism of cancer cell and the effect of cancer on the host metabolism. The cancer cell presents at least three abnormal behavior patterns, involving proliferation, differentiation and its social relationship with neighboring cells<sup>5</sup>.

Mouth cancer (143–145 ICD-9) is a major health problem in many parts of the world. While its incidence is relatively low in most western countries there are some important exceptions to this trend: on the Indian subcontinent and in other parts of Asia it remains one of the most common forms of cancer<sup>6</sup>. A great deal of research is being done to learn what DNA changes are responsible for causing cells of the oral cavity and oropharynx to become cancerous. One of the changes often found in DNA of oral cancer cells is a mutation of the p53 gene<sup>7</sup>. The protein produced by this gene normally works to prevent cells from growing too much and helps to destroy cells with DNA damage too extensive for the cells to repair. Damage to p53 DNA can lead to increased growth of abnormal cells and formation of cancers. Recent studies suggest that tests to detect these p53 gene alterations may allow very early detection of oral and oropharyngeal tumors<sup>8</sup>.

## RESULTS

According to our data GSH shows the maximum decrease in case of tongue cancer patients. There is a maximum change observed in case of tongue cancer patient after radiotherapy. The levels of GSH become decreases from 4.39±0.95 to 1.31±0.23. So, they neutralize the maximum free radicals in case of tongue cancer.

**Table 01:** Levels of GSH in oral cancer patients

TONGUE	CONTROL	GSH (µg/dl)			
		MALES (n=04)		FEMALES (n=00)	
		BEFORE	AFTER	BEFORE	AFTER
	8.26				
R1	0.00	4.26±0.00	1.25±0.00	0.00±0.00	0.00±0.00
R2	0.00	4.43±1.7	1.33±0.28	0.00±0.00	0.00±0.00
R1+C	0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00
R2+C	0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00
C	0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00
Total	8.26	4.39±0.95	1.31±0.23	0.00±0.00	0.00±0.00

Tongue cancer involves many factors like smoking, drinking e.t.c. According to our data MDA levels become increases in case of tongue cancer patients. The patients who received radiotherapy one time or two times shows the increase in MDA levels. MDA is considered as a important biomarker in case of tongue cancer.

## OBJECTIVES OF THE STUDY

The main objective of the study is to find the important biomarkers which are used for the identification of oral cancer in humans.

## METHODOLOGY OF THE STUDY

5.0 ml blood sample was taken from vein. Blood was further processed for the estimation of serum biomarkers i.e glutathione and MDA. Commercially available enzymatic kits of Randox were used. Blood was centrifuged at 4000 rpm for 10 minutes and serum was separated. Blood samples will be collected into EDTA tubes from fasting proteins. The blood will be centrifuged and indomethacin and butylated hydroxytoluene will be added into the plasma samples before they will be stored at -80°C until analysis.

## STATISTICAL ANALYSIS

Student's t-test was performed to evaluate the differences in roughness between group P and S. Two-way ANOVA was performed to study the contributions. A chi-square test was used to examine the difference in the distribution of the fracture modes (SPSS 19.0 for Windows, SPSS Inc., USA).

**Table 02:** Levels of MDA in oral cancer patients

TONGUE	CONTROL	MDA(moles/ml)			
		MALES (n=04)		FEMALES (n=00)	
	2.35moles/ml	BEFORE	AFTER	BEFORE	AFTER
R1	0.00	4.26±0.00	5.46±0.00	0.00±0.00	0.00±0.00
R2	0.00	3.69±0.75	4.93±1.21	0.00±0.00	0.00±0.00
R1+C	0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00
R2+C	0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00
C	0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00
Total	2.35	3.83±0.67	5.06±1.02	0.00±0.00	0.00±0.00

**DISCUSSION**

Oral cancer affects around 14.1 million people, making it one of the most prevalent cancers in the world. Developing countries, especially those from the South Asian region, have a higher burden of oral cancer compared to developed countries<sup>9</sup>. With an estimated increase of 13,000 new cases each year, oral cancer is the most common cancer among men and second only to breast cancer among women in Pakistan. It also has the second highest cancer related mortality rates in the country. Oral cancer thus warrants immediate public health attention and evidence based concerted efforts for its control and prevention in Pakistan<sup>10</sup>.

At first glance, oral cancer research output in Pakistan appears to have grown exponentially over time. This growth is however relative rather than absolute, since publication numbers were very small at the beginning<sup>11</sup>. The growth trend in oral cancer research is in contrast to the field of clinical radiology in Pakistan, the only medical field in which research output analysis has been carried out. No differences in clinical radiology research output were seen before or after the year 2000. The general pattern of oral cancer literature growth in Pakistan however is comparable to the Indian cancer research output, where oral cancer is one of the most researched cancers due to its huge burden of disease. Oral cancer research output in both countries has seen a rapid growth post year 2000<sup>12-14</sup>.

Historically, in Pakistan, Government policies including those in the field of health, have neither emphasized on, nor clearly defined its research priorities, thus underscoring the importance of

research. This, among many factors, has contributed to a lack of research culture in the country, evidenced by Pakistan's poor performance in the field of research, where it has contributed less than 0.1% of the world's research output, including health research<sup>13</sup>.

The aetiology of squamous cell carcinoma of the oral cavity is generally accepted to be multifactorial. Tobacco and alcohol are established as important cofactors in malignant development in the oral cavity, but in addition microorganisms. Such as human papillomavirus (HPV), have gained much interest over the past decade. A high prevalence of HCV infection in oral cancer patients is also seen in Karachi one would assume with some degree of certainty that the high incidence of oral cancer would be a result of tobacco chewing, betel quid chewing, cigarette smoking and synergism between these factors<sup>15</sup>.

The data of the Karachi Cancer Registry showed carcinoma of the oral cavity as the second most common malignancy in the city. A multi centric study conducted by the Pakistan Medical and Research Centre in 1982 reported oral cancer as the second most common malignancy in Pakistan. A frequency study from Karachi published in 1983 put oral cancer as the third most common malignancy for the males and the second most common malignancy for the females. A frequency study of patients attending the Institute of Radiotherapy and Nuclear Medicine (IRNUM), Peshawar, during 1990- 1994 showed that the third most common male tumor was oral cancer<sup>1</sup>.

**CONCLUSION:** It is concluded that oral health cancer is one of the most leading cause of death in

Pakistan and there are number of factors which are associated with this. But GSH and MDA are the two most important bio markers for the identification of oral cancer before and after treatment of radiotherapy in patients.

#### CONFLICT OF INTEREST

There is no conflict of interest.

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