

## Original Research

### Evaluation of serum zinc levels in oral leukoplakia patients

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#### ABSTRACT:

**Background:** Cancer and precancerous lesions of the oral cavity is the most common neoplasm in the developing countries. Hence; the present study was undertaken for assessing the serum zinc levels in oral leukoplakia patients. **Materials & Methods:** A total of 50 patients who reported with a white patch and were histopathological proven oral leukoplakia were enrolled in the present study. Also 50 healthy subjects with negative oral findings and negative tobacco history of any other deleterious habit history were also included in the present study. Complete demographic details of all the subjects were obtained. The patients with oral leukoplakia were categorized as Group A while the healthy subjects were categorized as Group B. Serum samples were obtained from all the patients in sterile tubes and were transported to laboratory under aseptic conditions. In the laboratory, an auto-analyzer was used for assessment of serum zinc levels. All the results thus obtained were subjected to statistical analyses and were evaluated by SPSS software. **Results:** Mean serum zinc levels among the patients of the Group A and group B was found to be 78.13 µg/dL and 110.38 µg/dL respectively. A significant reduction in the mean serum zinc levels among the patients of the oral leukoplakia group was observed in comparison to the healthy controls. **Conclusion:** Zinc has a definitive role in the transition from normal mucosal to premalignant state. However; further studies are recommended.

**Key words:** Oral leukoplakia, Zinc

Received: 29 July, 2019

Revised: 25 September, 2019

Accepted: 29 September, 2019

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**This article may be cited as:** Choudhary A, Sharma H, Choudhary H. Evaluation of serum zinc levels in oral leukoplakia patients. *Int J Res Health Allied Sci* 2019; 5(5):159-161.

#### Introduction:

Cancer of the oral cavity is the most common neoplasm in the developing countries. A very high incidence of oral cancer has been reported from Kerala, South India, compared to other parts of the world. Similarly, the incidence of precancerous lesions of the oral cavity such as oral leukoplakia and oral submucous fibrosis is also very high.<sup>1-3</sup>

Oral potentially malignant disorders (OPMDs) have the tendency to transform into malignancy if not diagnosed and interrupted at the right time. The common OPMDs such as oral leukoplakia, lichen planus, oral submucous fibrosis (OSMF), erythroplakia, and many others have high malignant transformation rate. Despite the increased accessibility to the oral cavity, these lesions

are not quite often diagnosed at the early stages and eventually they transform into debilitating stage of oral cancer.<sup>4</sup>

The etiology of this high incidence is not fully known. The high incidence was attributed to several factors such as chewing, smoking and viral infections. Whatever may be the causative factors, very little information is available on the biochemical and immunological derangements.<sup>5,6</sup>

Hence; the present study was undertaken for assessing the serum zinc levels in oral leukoplakia patients.

#### MATERIALS & METHODS

The present study was commenced with the aim of assessing the serum zinc levels in oral leukoplakia

patients. A total of 50 patients who reported with a white patch and were histopathological proven oral leukoplakia were enrolled in the present study. Also 50 healthy subjects with negative oral findings and negative tobacco history of any other deleterious habit history were also included in the present study. Complete demographic details of all the subjects were obtained. The patients with oral leukoplakia were categorized as Group A while the healthy subjects were categorized as Group B. Serum samples were obtained from all the patients in sterile tubes and were transported to laboratory under aseptic conditions. In the laboratory, an auto-analyzer was used for assessment of serum zinc levels. All the results thus obtained were subjected to statistical analyses and were evaluated by SPSS software. Mann-Whitney U and student t test were used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

**RESULTS**

In the present study, a total of 50 oral leukoplakia patients and 50 healthy controls were enrolled. Mean age of the patients of the Group A and Group was found to be 42.5 and 43.8 years respectively. 60 percent of the patients of Group A and 56 percent of the patients of Group B were males while the remaining were females. Mean BMI of the patients of the Group A and Group B was found to be 26.45 and 25.17 Kg/m<sup>2</sup> respectively. In the present study, mean serum zinc levels among the patients of the Group A and group B was found to be 78.13 µg/dL and 110.38 µg/dL respectively. A significant reduction in the mean serum zinc levels among the patients of the oral leukoplakia group was observed in comparison to the healthy controls.

**Table 1:** Demographic data

Parameter	Group A	Group B
Mean age (years)	42.5	43.8
Gender	Males	28
	Females	22
Mean BMI (Kg/m <sup>2</sup> )	26.45	25.17

**Table 2:** Comparison of serum zinc levels

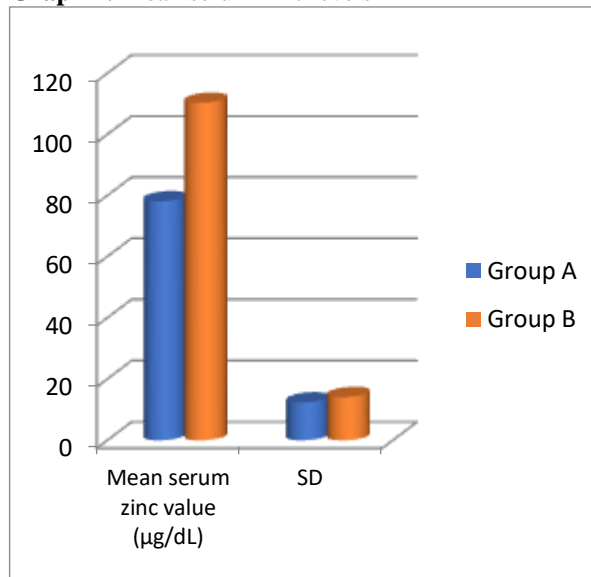
Group	Mean serum zinc value (µg/dL)	SD	U value	p-value
Group A	78.13	12.36	432.82	0.000
Group B	110.38	14.11		

**DISCUSSION**

Oral cancer is one of the 10 most common forms of cancer among men in developed countries and is ranked as the sixth most common cancer around the world. Oral cancer accounts for approximately 4% of all cancers and 2% of all cancer deaths worldwide. The World Health

Organization (WHO) reported oral squamous cell carcinoma (OSCC) as having one of the highest mortality ratios amongst all malignancies. In India OSCC accounts for 50-70% of all cancers.<sup>5-7</sup>

**Graph 1:** Mean serum zinc levels



The role of certain trace metals, especially zinc in the pathology of various diseases has been the subject of a number of comprehensive reviews. Zinc and copper have been the most extensively studied of the trace elements in patients with malignant disease and these elements in serum has been found to be reliable parameter as a diagnostic and prognostic index in case of craniofacial tumors. Recent technological advances have made saliva as a tool for the diagnosis of many things; among them are hormone imbalances, liver function, immunodeficiency and even cancer.<sup>8,9</sup>

In the present study, a total of 50 oral leukoplakia patients and 50 healthy controls were enrolled. Mean age of the patients of the Group A and Group was found to be 42.5 and 43.8 years respectively. 60 percent of the patients of Group A and 56 percent of the patients of Group B were males while the remaining were females. Mean BMI of the patients of the Group A and Group B was found to be 26.45 and 25.17 Kg/m<sup>2</sup> respectively. Jayadeep A et al estimated serum levels of copper, zinc, ceruloplasmin, total iron and total protein in 92 patients with oral leukoplakia and squamous cell carcinoma and 45 age and sex matched controls. Copper was significantly increased in oral leukoplakia and cancer in both sexes. The level of zinc decreased significantly only in male patients with leukoplakia and cancer. Copper zinc ratio was found significantly elevated in oral leukoplakia and cancer. A marked increase in serum ceruloplasmin was seen in oral leukoplakia and cancer in both sexes. A significant decrease of serum total iron

and proteins were observed only in carcinomas. These findings suggested that reduction in the serum total iron and total protein may be due to malnutrition caused, on its turn, by tumour burden. Serum ceruloplasmin level and copper-zinc ratio demonstrated significant differences in the patients of both sexes from those of controls, while, comparing leukoplakia with cancer, a significant difference is only observed in male patients. Thus, their study showed that these factors have diagnostic value only in differentiating malignancies from normal and a little value as biomarkers of disease progression.<sup>10</sup>

In the present study, mean serum zinc levels among the patients of the Group A and group B was found to be 78.13 µg/dL and 110.38 µg/dL respectively. A significant reduction in the mean serum zinc levels among the patients of the oral leukoplakia group was observed in comparison to the healthy controls. Garg R et al assessed the alterations in serum Cu and Zn levels in oral potentially malignant disorders (OPMDs) and to correlate the variations with the severity and progression of the OPMDs. 20 of each clinically diagnosed and histopathologically proven cases of leukoplakia (Group 1), oral lichen planus (Group 2), clinically diagnosed cases of oral submucous fibrosis (OSMF) and 20 healthy age and sex matched controls were taken based on the clinical staging. Clinical examination of the selected subjects was carried out and an informed consent was obtained, following which blood samples were collected from the participants. After serum separation, Cu and Zn levels were analyzed using the colorimetric method. Serum copper levels were increased and zinc levels were decreased in patients with OPMDs when compared to that in the control group. However, gradual increase in the levels of serum Cu was found with the advancing stages of OSMF. No statistical significant relation was observed in the levels of serum Zn with the disease progression in OSMF. Serum Cu and Zn levels can have diagnostic significance in early evaluation of OPMDs. Increased serum Cu levels can be used as a marker of disease progression and severity in OSMF.<sup>11</sup>

## CONCLUSION

From the above results, the authors concluded that zinc has a definitive role in the transition from normal mucosal to premalignant state. However; further studies are recommended.

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