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EVALUATION THE CHANGES IN SALIVARY ELEMENTS (ZN, CU, NI, MG, MN AND TOTAL ANTIOXIDANT LEVEL) AND SOME HEMATOLOGICAL PARAMETER IN RHEUMATOID ARTHRITIS DISEASE

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ABSTRACT

Rheumatoid arthritis (RA) is a comparatively common, disabling, autoimmune disease that is recognized by progressive joint disorder, functional disability and significant pain. Its prevalence is estimated at 0.5 - 1.0% of adults worldwide. The patients enrolled in this study was rheumatoid arthritis, they diagnosed clinically by rheumatologist. The whole study samples consist of 60 persons, 30 female patients with rheumatoid arthritis with 30 healthy female controls. From both group (patients and control) saliva and serum samples was taken to computation Zn, Cu, Ni, Mg, Mn and Total antioxidant level in saliva and red blood cell count, packed cell volume and hemoglobin concentration in serum. The results of this study reported that there is no significant difference in component of saliva including (Zn, Cu, Ni, Mg, and Mn) between rheumatoid arthritis patient and healthy control. In addition to that the level of hematological parameter includes (RBC count, PCV and Hb) between two groups are no remarkable difference. But the level of antioxidant in saliva of rheumatoid arthritis patients varies from healthy control. Patients with rheumatoid arthritis their components in saliva and serum are slightly differ but not marked only salivary antioxidant are change clearly.

INTRODUCTION

Rheumatoid arthritis is a chronic inflammatory, systemic disease that product most prominent manifestations in the diarthrodial (Michael *et al*., 2010). Rheumatoid arthritis (RA) as well as a chronic subversive inflammatory disease recognized by the persistence and accumulation of an inflammatory infiltrate in the synovial membrane that leads to synovitis and the demolition of the joint architecture producing in impaired action. Rheumatoid arthritis, a chronic multisystem disease, is also related with bone destruction and joint connective tissue (Weyand, 2009). Trace elements indicate to "elements that occurs in natural and perturbed environments in small quantity and that, when present in sufficient bioavailable condensation are toxic to living organism (Wada, 2004). Copper is an environmental bioelement which plays an essential role in the cell's physiology, as a component or cofactor of the enzymes, take part in anti-oxidative operations, or in detoxification of oxygen free radicals. Zinc is a part of every cell in the body and forms a part of over 300 enzymes that possess functions ranging from proper working of the body hormones to cell growth. Zinc deficiency can reason in growth retardation (Florianczyk, 2008). Cu is also accountable for appropriate cartilage mineralization, configuration of collagen structure and elastin (Tapiero *et al*., 2003). Nickel is an essential part of all organs of vertebrates. Its absorption can be controlled. Low nickel offers decreased growth (Anke *et al*., 1984). Nickel aids in iron absorption, as well as glucose

metabolism and lipid, hormones, adrenaline, and cell membrane make better bone strength and may also play a function in production of red blood cells (Wilfred, 2012). Magnesium (Mg) is one of the most plentiful cations present in living cells. It is a crucial mineral that is needed for a broad variety of physiological functions. Imbalances in magnesium metabolism are prevalent and associated with different pathological conditions (Touyz, 2004). Manganese performance as an activator of enzyme and as a component of metalloenzymes. They own a role to play in oxidative phosphorylation, fatty acids and mucopolysaccharide metabolism, urea cycle and cholesterol metabolism. (Rehnberg *et al*., 1982). Total Antioxidants are the body's defense system that neutralizes the destructive effects of ROS and depress damage to cells. As the first defensive line, saliva has a defensive antioxidant system that fights against oxidant-induced damage (Khan *et al*., 2003). Recently saliva is a favorable option for diagnosis of many systemic diseases through the estimation of certain substances for each type of disease (Van Bruggen *et al*., 2011). This study aimed to demonstration if there are any changes in salivary elements concentration, salivary total antioxidant and hematological parameters with rheumatoid arthritis disease.

MATERIALS & METHODS

Patients

The study group consists from 30 patients with rheumatoid arthritis and 30 control person with the range of age about

(30-65) years. The two groups (patients and control) were female only. Rheumatoid arthritis patients were detected clinically, by rheumatology specialists as rheumatoid arthritis depending on the seven criteria of the American Rheumatism Association with assessment of disease action depending on Disease Activity Score 28 (DAS 28).

Saliva collection
Un-stimulated (resting) saliva was collected after the patients rinsed out his mouth with water. The first mouthful of saliva is collected into small plastic polyethylene tube. The collection period was 20 minutes and the sampling time was always between 9-11 A.M. The collected saliva was centrifuged at 4000 rpm for 10 minutes. The centrifuged supernatants were stored frozen at (20ºC) until time of analysis.

Serum collection
Three milliliters of venous blood sample were collected from each one (patients and control) of the two study groups who were Chosen. The serum was gained by putting each blood sample in a clean dry plain tube and allowed to clot at 37 ^{o} C for 20 – 30 minutes, centrifuged at 3500 rpm for 15 minutes to estimate the three hematological parameters.

Biochemical analysis
Saliva levels of Zn, Cu, Ni, Mg and Mn were measured and determined by Flame Atomic Absorption Spectrophotometer using standardized procedure by air–acetylene. The concentration level of each component was expressed as (ppm) unit. Total antioxidant level assay. The assay procedure included: 1- Adding 100 µl Cu_2+working solution to all standard and sample wells. 2- Covering the plate and incubating at room temperature for 1.5 hours. 3- Reading the absorbance at 570 nm using the plate reader (Miller *et al.*, 1993). Hematological parameters were measured by ordinary labs procedure to estimate (RBC $\times 10^6$, PCV% and Hb mg/ml)

Statistical analysis was performed using statistical package for social science SPSS version (14). Data analysis and processing were carried by non-parametric tests with a significant *P*-value of less than 0.05 taken as significant.

RESULTS

TABLE 1: P-value with Significant level for the tested salivary elements in Rheumatoid arthritis patients and control person.

Salivary elements	Control Mean ± SD	Rheumatoid arthritis Mean ± SD	P-value	Sig.
Zn	0.20 ± 0.01	0.39 ± 0.02	> 0.05	NS
Cu	0.14 ± 0.02	0.17 ± 0.01	> 0.05	NS
Ni	0.18 ± 0.01	0.19 ± 0.01	> 0.05	NS
Mg	3.9 ± 0.12	4.03 ± 0.21	> 0.05	NS
Mn	0.07 ± 0.001	0.08 ± 0.001	> 0.05	NS
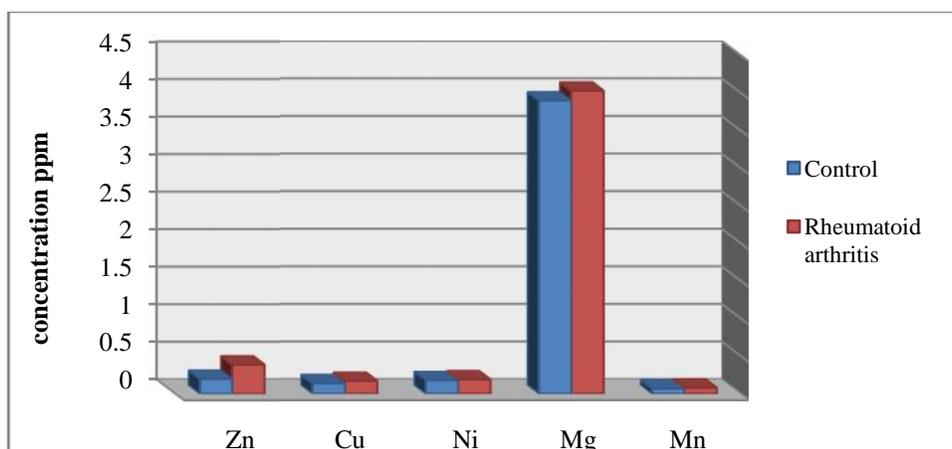
FIGURE 1: Concentration in ppm of salivary elements in Rheumatoid arthritis patients and control person

TABLE 2: P-value with significant level for the hematological parameters in Rheumatoid arthritis patients and control person

Hematological parameters	Control Mean± SD	Rheumatoid arthritis Mean± SD	P-value	Sig.
RBC $\times 10^6$	4.62 ± 0.42	4.92 ± 0.36	> 0.05	NS
PCV%	44.74 ± 4.62	36.31 ± 2.78	> 0.05	NS
Hb mg/ml	13.11 ± 1.4	11.09 ± 1.8	> 0.05	NS
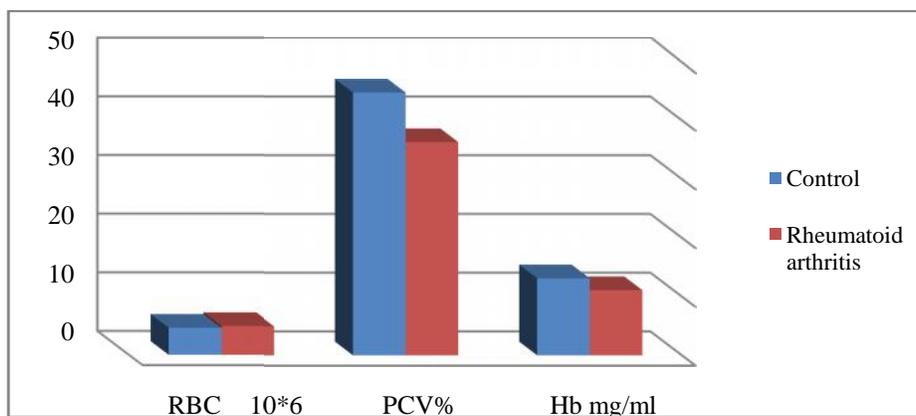
FIGURE 2: Difference between Rheumatoid arthritis patients and control person in Hematological parameters

TABLE 3: Total anti-oxidant level significant level of Total anti-oxidant level for Rheumatoid arthritis patients and control person

	Control Mean± SD	Rheumatoid arthritis Mean± SD	P-value	Sig.
Total anti-oxidant level	8.92 ± 1.73	3.61 ± 1.26	< 0.05	S
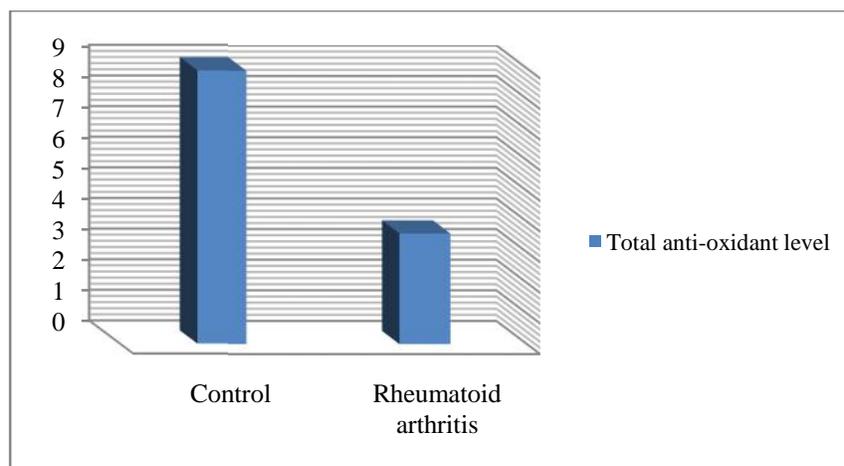
FIGURE 3: Difference between Rheumatoid arthritis patients and control person in Total anti-oxidant level

DISCUSSION

The results of this study that associated to salivary elements (Zn, Cu, Ni, Mg and Mn) revealed non-significant difference between healthy control person and rheumatoid arthritis patients as shown in table 1. In disparity to the results of the study of (Huda and Mohammed in 2012) in which there is significant difference between healthy control person and rheumatoid arthritis patients. The description for this difference may be due the sample which was used in this study was saliva while the sample in study of (Huda and Mohammed in 2012) was serum. However, many studies indicated that there was a correlation between trace elements levels and rheumatoid arthritis diseases. The non- significant rise in all these salivary elements reflects the state of inflammation. The role of Zinc and Copper in chronic inflammatory disease is interest because they are co-factor of important enzymes associated with collagen and bone metabolism. The references about this subject are very few that lead to produce uncompleted comparison with other results.

CONCLUSION

The composition of saliva and serum between patients with rheumatoid arthritis and healthy control are slightly change but not clear, only the level of antioxidant are differ clearly.

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