

5. Discussion, conclusion and recommendations

5.1 Discussion:

This study had been conducted on 60 smokers as a test group and 40 healthy nonsmokers as control group. Both age and gender of the test group have been matched with control group.

This study have indicated that smokers have significantly higher serum Copper concentrations in tested smokers group as compared to nonsmokers; this result is equivalent to that of Benes *et al.* 2005 and Kocugit *et al.* 2001.

This study showed that serum magnesium levels were significantly increased in smokers when compared to nonsmokers this result is in agreement with previous studies of El – Zayadi *et al.* 2006 and Peacock *et al.* 2010.

In this current study, the lower serum zinc concentrations in the smokers are consistent with the results of Al-Azzawy *et al.* and Al-Qaicy *et al.* 2011 and Uz *et al.* 2003, who found significant decreases in serum zinc levels of smokers compared with non-smokers and attributed the lower serum levels of zinc in smokers to deficient absorption of zinc caused by a tobacco chelation effect.

The current study has revealed that there is no significant association between the number of tobacco cigarette smoking and serumcopper status in healthy adults; as have been concluded in Fischer *et al.* 1990, and Salonen *et al.* 1991.

It has also revealed that there is no significant association between the number duration of tobacco cigarette smoking during years and serum copper status in healthy adults; as have been concluded in Fischer *et al.* 1990, and Salonen *et al.* 1991.

This study has found that there is no significant correlation between the number of cigarettes that are smoked during the day and the levels of serum magnesium, and there is no significant adverse association between periods of smoking through years and serum levels of magnesium; despite what stated from studies as in Nechifor *et al.*, 2012.

On the other hand; the study has shown that there is a weak significant negative correlation between the number of cigarettes taken by Sudanese smokers and the level of serum zinc which agrees with Al-timimi et al., 2010. But it also has showed that there is no association between the serum levels of zinc and the duration of smoking which does not agree with any other study due to conducting on one branch of gender only; the reason is that the cultural context of the community makes the emulsification of samples more difficult and hence makes the study less definitive.

Absence of association between the serum zinc and the duration of the smoking during years as well has also been found in this this study and it is as same as what had been revealed in Fischer *et al.* 1990, and Salonen *et al.* 1991.

5.2 Conclusion:

From the results of this study; it is concluded that:

Smoking tobacco cigarettes among healthy males decreases serum levels of copper.

Smoking tobacco cigarettes among healthy males increases serum levels of magnesium.

Smoking tobacco cigarettes among healthy males decreases serum levels of zinc.

There is positive insignificant correlation between levels of serum copper and number of cigarettes per day.

There is negative insignificant correlation between levels of serum copper and duration of smoking per year.

There is positive insignificant correlation between levels of serum magnesium and number of cigarettes per day.

There is negative insignificant correlation between levels of serum magnesium and duration of smoking per year.

There is a negative weak significant correlation between levels of serum zinc and number of cigarettes per day.

There is positive insignificant correlation between levels of serum zinc and duration of smoking per year.

5.3 Recommendations:

From the results of this study, it is highly recommended that:

Alterations on the levels of those trace elements (Copper magnesium and zinc) due to smoke. So, smoking should be considered as more avoidable risk factor for many diseases as mentioned in the literature review.

Strong efforts should be done to stop smoking and minimizing the harmful effect of passive smoking.

Enhanced effort should be accomplished to compensate the difference in the levels of those trace elements.

The serum levels of copper concentration may not reflect actual copper status accurately. Copper status can be determined in several ways: serum or plasma copper, ceruloplasmin, erythrocyte superoxide dismutase, hair copper, and tissue or organ copper. Superoxide dismutase may provide a better measure of longer term copper status.

The best method of accurately determining zinc status is through measuring white blood cell levels. Since this test is not readily available and may be more expensive, serum zinc is routinely used.

More facilitated accurate studies should be conducted as this study was conducted with insufficient financial resources.