The relation between household exposure to passive smoking and serum concentration of micronutrient

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الخلاصـه: اشـتركت فـي هـذا البحـث عشـرين أمـراه لا تـدخن ولكـن يتعرضـن للتـدخين بشـكل مسـتمر وعشـرين أمـراه أخـرى لا يـدخنن ولا يتعرضـن للتـدخين. كـان الهـدف مـن الدراسـة معرفـة مـدى تـأثير التعـرض للتـدخين علـى مسـتويات مضـادات التأكسـد وخصوصـا فيتـامين (A) ولقـد دلـت الدراسـة علـى انخفـاض فـي مسـتويات هـذه المركبات في النساء المتعرضات للتدخين وبدلاله أحصائيه معنوية(0.05)

Abstract: -

Twenty female their husband are heavy smokers were involved in this study in addition to another twenty women have no household exposure to cigarette smoking. All women have no serious health problem and they never smoke.

The object of our study was to assess the presence of any relation between household exposure to passive smoking and serum concentration of retinol, tocopherols and carotenoids.

Persons who smoke cigarettes are known to differ from persons who never smoked with respect to several life style behaviors, including eating less healthful diet and drinking more alcohol. The same could be true, to a lesser degree for comparison of non-smokers exposed to passive smoking with non-smoker who is not exposed to passive smoking.

Serum samples were taken from the two groups and analyzed to reveal the concentration of retinol, tocopherols and carotenoids. Comparison between the two groups shows that those non-smokers who were exposed to passive smoking at home had serum concentration of carotenoids lower than in females not exposed to passive smoking at home ($P<0.05$). For serum retinol concentration.
it was significantly higher in female with no household exposure than in female with household exposure ($P<0.05$), the same for serum tocopherols concentration. The results suggest that passive smoke exposure lowered circulating micronutrient concentration by directly depleting antioxidant micronutrient.

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Introduction: -

Studies of health effects of passive smoking often compared dieseses risk among non-smokers who lived with smokers with the risk of non-smokers who did not live with any smokers (1).

All of the group of fat-soluble vitamins that consist of tocopherols are essential for normal reproductions, muscle development, résistance of erythrocytes to hemolysis and various other biochemical function(5).It is an intracellular antioxidant and act in maintaining the stability of polyunsaturated fatty acids and other fat like substance including vitamin-A(6).

An adequate intake of nutrient is essential for the maintenance of health. Vitamin-A is a fat soluble, solid terpene alcohol essential for skeletal growth, maintenance of normal mucosal epithelium and visual acuity(2).It is present in the diet and can also be synthesized from dietary carotenes, it can be measured in plasma in which its transported bound to pre albumin and a specific retinol binding globulin (5). Carotenoids deficiency is common in women of reproductive age and young children in developing countries and is an important determinant of morbidity and mortality (1, 2).

The Carotenoids are the main dietary sources of vitamins A. It is found in green vegetables and yellow orange fruit (3). Foods rich in preformed vitamin A are rarely affordable in developing countries (4).

There is a theory that base on the grounds that household in which smoking takes place may differ from households with no smokers with respect to several life style behaviors (5, 6).

In the most extreme case, this set of circumstances could lead to the appearance of passive smoking being with adverse health outcome, when infact the association was due to dietary difference rather than to passive smoking (7, 8).

Materials and methods: -

1-Patient: -

Forty non-smokers females their age range between 35-40 years old attend a private clinic for different causes were involved in this study. Participation included donating a sample of blood and filling out a brief questionnaire. Twenty female gave the history of frequent exposure to smoking for more than ten years, their husbands are heavy smokers (more than 25 cigarettes/day), and while the other twenty have no history of exposure.

2- Laboratory assays: -

Serum micronutrient assay were conducted in two different laboratories. After centrifuge of blood sample the serum were stored at– 20ºc until assayed for micronutrient concentration. Samples were analyzed by fully automated HPLC (high performance liquid chromatography) for retinol, α-tocopherole, γ-tocopherol, total carotene, α -carotene and β -carotene.

The chromatography system consisted of refrigerated (4ºc) auto sampler (model 9300;Varian, Palo Alto, CA) a pump(model 9012;Varian), a column oven(29ºc; Croco-Cil, Riemerling, Germany), a guard column (model 69080; Varian), a 250×4.6 mm octadecylsilane(C_{98}) analytic column packed with 5-µm particles (Varian Res Elut, 90ºA), and an ultraviolet visual light detector(model 9050; Varian). The mobile phase was actonitrile (product number C 2502; Lab-scan sciences): ethanol (65:35, by volume) added to 0.05% triethylamine (product number 23,962-3; Aldrich chemical Co, Mil Waukee); the flow rate was 1.5ml/min [16].

Statistical analysis: -

The mean concentrations of serum micronutrient were estimated by mean ± SD.A Comparisons between the two groups were made by using (t-test).

RESULTS: -

The mean concentration of serum retinol was significantly higher ($P<0.05$) in non exposed female than exposed as shown in the table and fig(1). The mean concentration of α-tocopherol and γ-tocopherol were found also to be significantly higher in the serum of non-exposed group than exposed ($P<0.05$) as shown in the table and fig (2).

The measuring of the mean concentration of serum total carotenoids, α-carotene and β-carotene reveal a significantly higher concentration in

non-exposed group than exposed (P<0.05) as shown in the table and fig (3).

Discussion: -

With respect to the association between exposure to passive smoking and serum micronutrient, the primary finding of this study was that, in persons who lived with smokers tended to have lower serum total carotenoids, α-carotene and β-carotene concentration than did those who lived in households with no smokers these carotenoids measures are the same ones that were observed in previous researches (9,10,11).

An initial characterization of the associations between active smoking and micronutrients showed that, for men and women, serum concentration of total Carotenoids, α-carotene and β-carotene; were significantly lower in smokers than in non smokers (9).

Households with a smokers present may have poorer diets than do households with no smokers, resulting in less consumption of fruit and vegetables and hence lowered circulating micronutrient concentrations(7).

However, the results of previous studies provide some support for this line of reasoning. In one study, wives smoking habits were significantly associated with their husbands β-carotene consumption(10).In another study it was observed that, in non smoking men those whose partner smoked had in take of fruit, boiled vegetables, raw vegetables and juice that were 9%, 4%, 11% and 17% lower, respectively, than the intakes of those whose partner was not smokers(11).

Non smokers who were exposed to passive smoking at home had serum concentration of these carotenoids that were almost uniformly lower than in persons not exposed to passive smoking at home (12,13),but these difference were significant for only about one half of the comparison made.

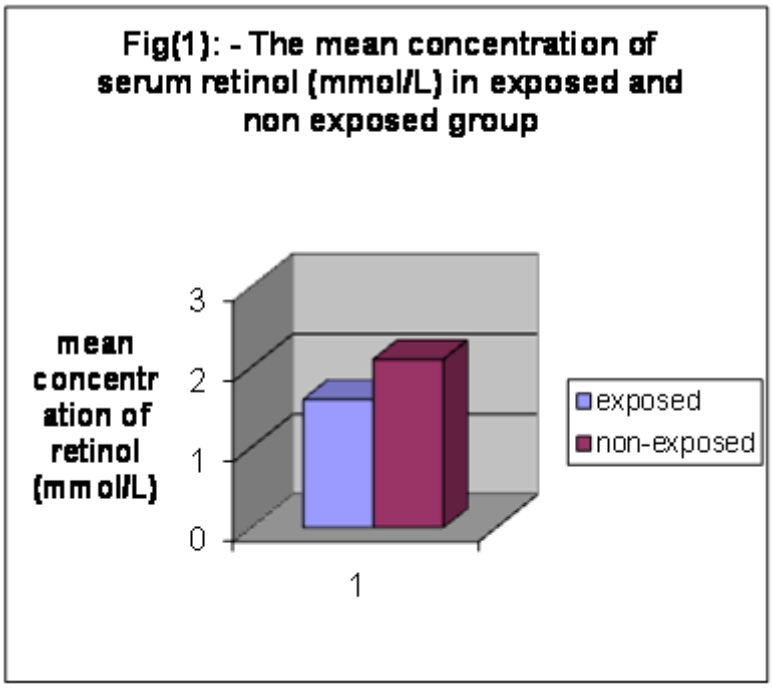
Serum retinol concentration were significantly lower in those exposed to household passive smoking than in those not exposed (14,15). In this study serum retinol concentration were significantly higher in persons not exposed to household passive smoking.

Conclusion: -

Passive smoke exposure, as a source of oxidative stress, could result in lowered circulating micronutrient concentrations by directly depleting antioxidant micronutrient. Our finding was that non-smokers exposed to passive smoking at home tended to have lower concentration of carotenoids than did those with no smokers at home.

Table that show the mean concentration of serum micronutrient in µmol/L in the two groups (M±SD)

parameter	Exposed group	Non exposed group	P- Value
Retinol	1.876 ± 0.019	2.095 ± 0.037	P<0.05
αtocopherol	36.82 ± 0.84	40.238± 0.514	P<0.05
γtocopherol	6.652 0.58	8.965 0.682	P<0.05
Total carotenoids	1.236± 0.162	2.097± 0.026	P<0.05
αcarotene	0.056± 0.011	0.084± 0.014	P<0.05
β carotene	0.225± 0.017	0.312± 0.009	P<0.05


Fig(1): - The mean concentration of serum retinol (mmol/L) in exposed and non exposed group
mean concentration of retinol (mmol/L)
3
2
1
0
1
exposed
non-exposed

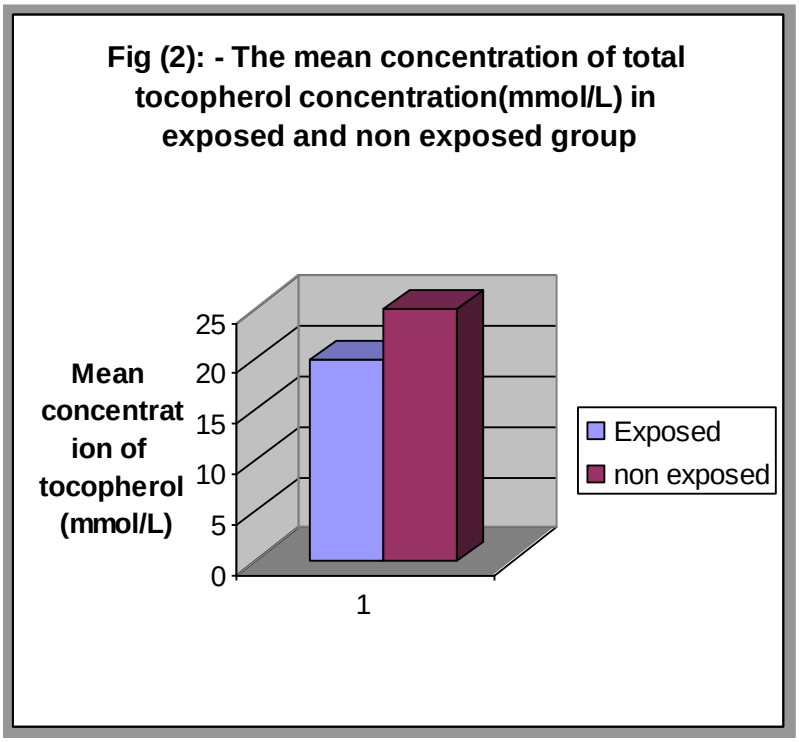
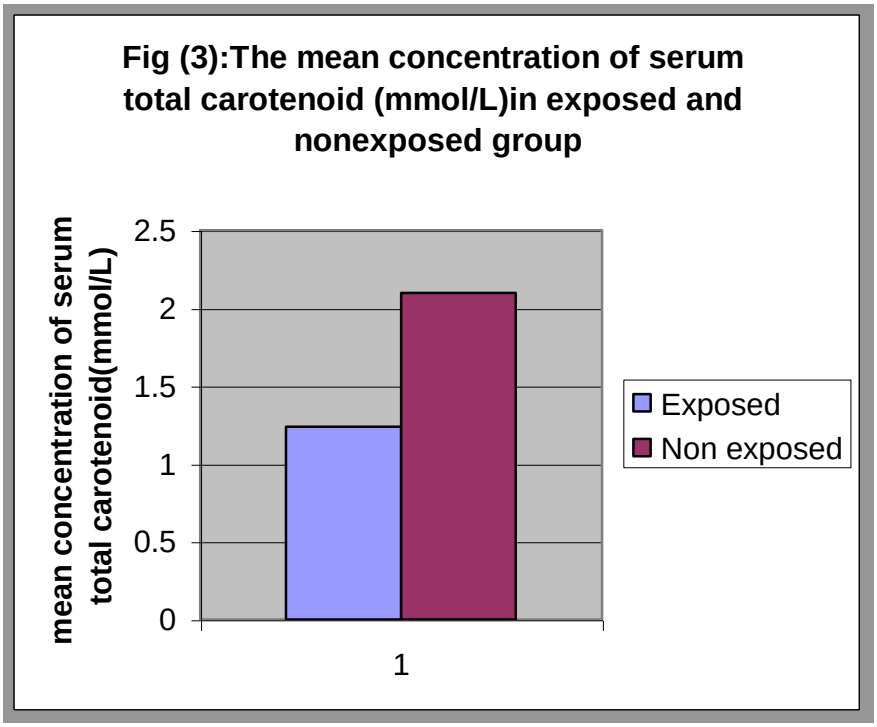


Fig (2): - The mean concentration of total tocopherol concentration(mmol/L) in exposed and non exposed group
Mean concentration of tocopherol (mmol/L)
25
20
15
10
5
0
1
Exposed
non exposed



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