SERUM VITAMIN C LEVEL IN CHILDREN EXPOSED TO ENVIRONMENTAL TOBACCO SMOKE

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ABSTRACT

High levels of free radicals in tobacco smoke are thought to be responsible for decreased levels of serum ascorbic acid in smokers and adults exposed to environmental tobacco smoke. The association of environmental tobacco smoke to serum ascorbic acid in children is unknown. One hundred forty children were selected, 70 children were exposed to environmental tobacco smoke at home by their parents (exposed group 1) and 70 children were not exposed to environmental tobacco smoke at home (control group 2). The serum cotinine levels and serum ascorbic acid level were measured in the two groups of children. The serum cotinine levels were significantly increased in exposed group (p< 0.05) and were positively correlated with the number of cigarette smoked by the household contacts (r 0.54, p < 0.05). The serum vitamin C level was significantly decreased in the exposed group (p< 0.05) and was positively correlated with the serum cotinine level (r 0.63, p< 0.05). Thus we conclude that exposure of children to environmental tobacco smoke leads to significant decrease in serum ascorbic acid level. Therefore, this study further high lights the potential dangers of environmental tobacco smoke to children.

Keywords: Vit C, Tobacco

Introduction and aim of work

The third national health and nutrition examination survey confirm that 43% of children live in a home with at least one smoker (Pirkle et al., 1996).

In children there is strong evidence that exposure to environmental tobacco smoke is associated with increased risk of respiratory illnesses, asthma, anesthesia complication, sudden infant death syndrome and low birth weight (Li et al., 1999, Strachan and Cook, 1998; Sholinick et al., 1998; Anderson and Cook, 1997).

Kallner et al.,(1981) have demonstrated over a 40% increase in ascorbic acid turnover from free radical induced depletion in smokers compared with non smokers. In addition environmental tobacco smoke is associated with lower levels of serum vitamin C in adults (Tribble et al., 1993).

This study was carried out to evaluate the effect of environmental tobacco smoke on the serum vitamin C level in children.
center outpatient clinic by asking the parents about the frequency of smoking and number of cigarettes smoked per day. The total number of cigarettes smoked by household members each day were then calculated.

Nutritional intake was assessed by using 24 hr diet recall for the children. The vitamin C intake was nearly the same for the selected children. Children with multivitamin intake were excluded. The children were classified into 2 groups; group (1) children exposed to environmental tobacco smoke at home.

Serum sample were taken from each child and kept frozen until analysis. Serum cotinine level measured by high performance liquid chromatography (Pichini et al., 1992).

Serum ascorbic acid was also measured by high performance liquid chromatography (Burtis and Ashwood, 1988).

The statistical significance was determined by using student’s test.

RESULTS
Table (1) shows the serum cotinine level in the exposed and non-exposed children. There were statistical significant differences between the exposed children in comparison to the non exposed children (p<0.05).

Table (2) shows the correlation coefficient (r) and (p) value between the serum cotinine levels and the number of cigarettes smoked per day. There was a strong positive correlation between the serum cotinine and number of cigarettes smoked / day in exposed children (r 0.54, p < 0.05).

Table (3) shows the serum ascorbic acid levels in the studied children. There were significant decrease in serum vitamin C level in exposed children in comparison to the non exposed children (p < 0.05).

Table (4) shows the correlation coefficient (r) and (p) value between the serum ascorbic acid and serum cotinine. There was a significant negative correlation between serum cotinine and serum ascorbic acid level (r0.63, p<0.05).

DISCUSSION
In our study the serum ascorbic acid level was significantly decreased in the children exposed to environmental tobacco smoke.
smoke at home in comparison to the children not exposed to environmental tobacco smoke at home (p< 0.05).

The decreased serum ascorbic acid level in the children exposed to environmental tobacco smoke at home may be a result of increased rates of ascorbic acid metabolism or may be attributed to altered dietary preferences in children and families exposed to environmental tobacco smoke. In this study the lower levels of serum vitamin C in children exposed to environmental tobacco smoke at home not caused by lower levels of dietary intake because the reported level of vitamin C intake and fruit consumption were not different among the studied children. This support the concept of increased rates of ascorbic acid metabolism associated with tobacco smoke exposure.

Decreased serum ascorbic acid in those exposed to environmental tobacco smoke is most likely related to the extremely high level of free radicals in tobacco smoke that leads to depletion of biological stores of antioxidants.

These results agreed by (Tribble et al 1993) who have demonstrated that adults exposed to environmental tobacco smoke show significant lower serum levels of vitamin C. In addition (Jendry-Cazko et al., 1993) demonstrated 50% lower ascorbic acid levels in those exposed to environmental tobacco smoke compared with non exposed children.

Richard and Strauss (2001) also stated that after adjusting for age, gender, vitamin C intake and multivitamin use, environmental tobacco smoke exposure significantly associated with lower levels of serum ascorbic acid, they also stated that although there was a trend for lower levels of vitamin C intake in children with higher levels environmental tobacco smoke exposure, this trend did not reach statistical significance.

Our results discharged by Schiffman and Magel (1992) who have documented that environmental tobacco smoke exposure in adult attenuates both taste and smell leading to a preference for fatty foods. Similarly, (Emmons et al, 1995) have demonstrated decreased vitamin C intake as well as decreased fruit and vegetable
intake in adults exposed to environmental tobacco smoke in the workplace.

So we can concluded that children exposed to environmental tobacco smoke at home have lower serum levels of vitamin C in addition to the previously described ailments. This study is, therefore, in direct contrast to continued assertions by the tobacco industry that environmental tobacco smoke causes no damage (Coggins 1996, Repace and Lowery 1992).

Because ascorbic acid protect against plasma lipid and low-density lipoprotein oxidation and also appears to be important in protecting DNA from oxidative damage (Frei, 1991, Fraga et al., 1991), this report further high lights the potential danger of environmental tobacco smoke in children.

REFERENCES:
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