TRAINING PARENTS OR CHILDREN? WHICH IS MORE SUCCESSFUL IN CONTROLLING PASSIVE SMOKING?

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Abstract

INTRODUCTION: Environmental tobacco smoke (ETS) has been shown to have adverse health hazards for children. The objective of this study was to assess the effects of two intervention programs for controlling passive smoking in children based on their serum cotinine level.

METHODS: In this trial, 40 children, aged 8-12 years, who were exposed to ETS were randomly assigned to two groups of equal number. In the first the parents (group P), and in the second group the children (group C) were educated about the harmful effects of passive smoking. Children's blood sample was taken for serum cotinine measurement before and after intervention in both groups. Data were analyzed by SPSSv13/win using paired t-test.

RESULTS: Smoking allowed inside home decreased in both groups; however, this decrease in group C was significantly higher than in group P. Serum cotinine concentration decreased in both groups with a more prominent decrease in group C.

CONCLUSIONS: Education of children can be an effective method for controlling passive smoking. This type of education can be effective for lifestyle change in the entire family.

Keywords: Passive smoking, children, parent, education, prevention.

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Introduction

Environmental tobacco smoke (ETS) refers to the diluted side stream and exhaled smoke released into the atmosphere when cigarettes are smoked. Over the past decade, several reports have concluded that ETS exposure is linked to disease and death.[1-3] ETS, also called passive smoking, has been shown to have adverse effects on the health of children.

Many children live in homes with ETS. Most respondents who smoke report that smoking occurs in the home every day.[4] Children whose parents smoke are at greater risk for otitis media, asthma, bronchitis, and pneumonia, compared with those whose parents do not smoke.[5,6]

There is a well-documented association between long-term ETS exposure and the exacerbation of asthma in children.[7,8]

Children of smokers are more likely to be hospitalized for lower respiratory infections, are more likely to have a tonsillectomy/adenoidectomy, and have more asthma-related emergency department visits compared with children of nonsmokers. Furthermore, children who are exposed to passive smoke have more days of restricted activity and bed confinement and more days of school absence per year, compared with children who are not exposed to passive smoke.[9]

Children's exposure to passive smoke is of particularly great concern because it is involuntary. Few children are able to limit their own exposure, especially younger children, who may be more at risk as a result of chronic exposure and their immature/developing organ systems.[10]

The World Health Organization (WHO) has estimated that the health of almost half of the world's children is threatened by exposure to ETS.[11] In the United States, the prevalence of children living in homes with a smoker has been estimated to be 43%, with state specific estimates of exposure in the home ranging from 12% to 34%;[12] nationally, about 15 million US children and adolescents are exposed.[13]

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Similarly, about 43% of Australian children,[14] 33% of Canadian children,[15] and 41% of British children are exposed to environmental tobacco smoke.[16]
Most smoke exposure occurred in the home; smoking is allowed in the home of 75% of the children who live with a smoker. Restrictions on household smoking have been proposed as an important means for reducing adolescent exposure to ETS.[17]
Cotinine, the major proximate metabolite of nicotine, is the most widely used biological marker of ETS exposure and can be detected in saliva, blood, urine, semen, and hair.
A biomarker, such as cotinine could help the current study better define the effectiveness of a home smoking ban on reducing exposure to ETS.[18-20]
In view of the importance of reducing children's exposure to ETS, we compared the effects of two methods for prevention of passive smoking based on concentration of serum cotinine in children.

Materials and methods

This trial was conducted among 40 children aged 8-12 years with a history of exposure to ETS. The Ethics Committee of Isfahan Cardiovascular Research Center approved the study. The participants were selected from among children referred to health centers for routine health care, and whose parents reported having at least one smoker at home.
The participants were enrolled in the study after oral assent from children and written content from their parents were obtained.
We selected the 8-12-year age group because they were able to read and speak and did not smoke themselves. Then we randomly assigned the children to two groups of equal numbers, i.e. 20 in each group. We trained smoking parents in the first group (group P) and the children in the second group (group C). In both groups, intervention programs included face-to-face education, as well as written pamphlets. The content of the education program concerned the health hazards of smoking and passive smoking, especially its harmful effects on children. During the first three months, training sessions were conducted every two weeks, followed by two sessions for problem solving.
Venous blood samples were taken before and 6 months after the trial for measurement of plasma cotinine level in children.
The blood specimens were collected and kept on ice until centrifuged; 5 ml of the plasma was stored at -20 °C until analyzed. The quantitative analysis of plasma cotinine was made by a high-performance liquid chromatography method[11-13] using a column specifically designed for ion-pair applications.
Reagents were purchased from Sigma Chemical Co. and the extrelut-1 extraction column from Merck Company.
Standard quality control procedures were followed; the inter-assay coefficient of variation was 7%. Based on previous investigations,[21-22] cotinine levels equal to or greater than 14 ng/ml were considered indicative of active smoking and not a result of environmental tobacco smoke exposure.[23-24]
Data were stored in a computer database and were analyzed by the SPSS V_{13}/win (SPSS Inc., Chicago IL) using paired t-test.

Results

The baseline characteristics of the participants are presented Table 1. After intervention, smoking in the home continued in 7 cases in group C and 10 cases in group P; the decrease in the number of cigarettes smoked per day in group C was more marked than in P group. Smoking allowed inside the home significantly decreased in both groups, with a more prominent decrease in group C.
Serum cotinine concentration in both groups before and after the intervention program is shown in Figure 1. The decrease in serum cotinine in group C was significantly higher than in group P.

TABLE 1. Baseline characteristics of participants

Characteristics	Children group (n=20)	Parent group (n=20)	P
Age (years)	9.20(65)	9.5(1.7)	0.7
Gender			
Male	11	12	0.4
Female	9	8	
Educational level of parents			
<6 years	7	8	
6-12 years	9	8	0.6
>12 years	4	4	
Smoking allowed inside the home	19	18	0.4
Number of cigarettes smoked per day	12(3)	4(2)	0.04

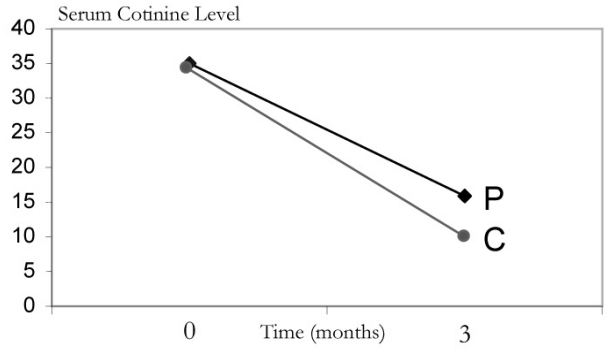

FIGURE 1. Serum cotinine level in both groups before and after intervention program; P: parent group, C: Children group

Discussion

Our findings showed education of the children to be more effective than training the parents in decreasing the ETS; this was confirmed by serum cotinine level. This shows that training children about prevention and control of passive smoking can be a practical and feasible way for decreasing ETS. The intervention program in the study of Emmons et al. led to significantly reduced levels of household passive smoke exposure among low-income families with very young children. Household nicotine concentrations were found to be significantly lower in the intervention groups at both 3- and 6-month follow-up assessments.[25]

In another study conducted by Hovell et al., the children's cotinine concentration decreased slightly (4%) in 12 months in the counseled group, whereas it increased substantially (85%) in children of the control group, suggesting that counseling mothers prevented an increase in exposure to ETS.[26]

Blackburn and colleagues found that banning smoking in the homes was independently associated with a significant reduction in urinary cotinine-to-creatinine ratio in infants.[27]

In the study of Irvine et al., nearly a year after the intervention program, a small decrease in salivary cotinine concentration was found in both groups of children; the mean decrease in the intervention group was slightly less than that in controls. Brief intervention, i.e. advising parents of asthmatic children about the risks from passive smoking was not effective in reducing their children's exposure to ETS.[28]

Educating the children can be effective in controlling smoking and passive smoking in their household; this method can serve as a practical strategy for lifestyle improvement in the entire family.

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