PASSIVE SMOKING EFFECTS ON WHEEZY BRONCHITIS

Abdulhari Bener, PhD, FRSS; Abdulrahman Al-Frayh, Facharzt; Fatih Ozkaragoz, MD; Taha Qasim Al-Jawadi, MD

Previous epidemiological studies have associated parental smoking with an increased incidence of lower respiratory illness and bronchial asthma. The aim of the present study was to investigate the association between parental smoking habits and diagnosed wheezy bronchitis in schoolchildren in Saudi Arabia. In a cross-sectional study 3,041 schoolchildren ages seven to 12 years were randomly selected in Dammam, Jeddah, and Riyadh; representing three different geoclimatic regions of Saudi Arabia. Standardized questionnaires were used in our study. The results showed that paternal smoking had a significant effect on the frequency of wheezing when paternal and maternal smoking were considered separately. There was no considerable variation in the parental smoking habits in three areas. The association between passive smoking and diagnosed wheezy bronchitis and frequency of wheezing attacks was highly significant (P<0.0001). Overall, the results tend to confirm that there is a real effect of passive smoking on the respiratory health of children and that parental smoking is a risk factor for wheezy bronchitis in children. Ann Saudi Med 1993;13(3):222-225.

Epidemiological research evidence from different parts of the world has stressed the hazards of cigarette smoking as an important factor in the cause of respiratory symptoms in children and adults [1-4]. Passive smoking is associated with increased prevalence and severity of asthma and wheezy bronchitis in children [2-8] and increased respiratory illness and incidence of bronchitis in infants [9,10].

Among the harmful effects postulated for passive smoking is an association between parental smoking and bronchial asthma, wheezing, dry cough, and other respiratory symptoms in children [11-16]. Effects of parental smoking have also been detected in schoolchildren. The most important risk factor for the development of chronic respiratory symptoms, childhood asthma, chronic cough, and wheezing is cigarette smoking [17,18]. Studies in schoolchildren have shown a significant association between parental smoking and the risk of childhood asthma, chronic cough, occurrence of wheeze and respiratory conditions [11-23]. Evidence is accumulating of a relationship between parents smoking and respiratory symptoms in children [24].

The aim of the present investigation was to study the association between passive smoking and diagnosed wheezy bronchitis in Saudi schoolchildren; in addition, to confirm the harmful effects of parental smoking habits on respiratory symptoms in children.

Material and Methods

The schoolchildren studied were the subjects of a cross-sectional population study conducted in three different regions: Riyadh, Dammam, and Jeddah, cities of the Kingdom of Saudi Arabia, between January 1987 and February 1989. Three regions were chosen because they represented three various geoclimatic regions of Saudi Arabia: Riyadh, which has a dry climate, is the capital of Saudi Arabia and has a population of 2.5 million; Jeddah, which has a humid climate, is a city of 1.5 million people on the Western coastal region of Saudi Arabia; then Dammam, which has a less humid climate than Jeddah City and has a population of 1 million people on the Eastern coastal region of Saudi Arabia.
Approval for the study was obtained from the Director of General Education of the Ministry of Education and Medical Ethics Committee of the Faculty of Medicine at the King Saud University in Riyadh. Consent was also obtained from the Regional Director of Education and from individual school principals at selected schools. A signed consent was obtained from a parent of each child prior to this study.

We adopted standardized questionnaires to determine the effects of passive smoking on the prevalence and severity of wheezy bronchitis in Saudi Arabia [25,26]. A cluster sampling technique was performed in this study. A stratification allowed each region and school to be proportionally represented. A standardized questionnaire along with a letter of explanation was distributed among randomly selected students in which each student had the same chance of being selected in three cities. The study was carried out during the spring season. The questionnaire was completed by the students’ parents with the help of senior medical students under the supervision of co-investigators and one clinician. The questionnaires and administrative team were the same in all three areas. A total of 3,300 Saudi schoolchildren between the ages of seven and 12 years were recruited in this study to submit details on personal data such as age, sex, area of residence, social class, father’s occupation, mother’s occupation, history of asthma, history of wheeze, cough, hay fever, eczema, family history of respiratory allergy, family pets (dog, cat, bird, etc), parental smoking habits (separately and overall) and cigarette consumption at home by parents per day.

Children with a positive response to any of the three questions of wheeze, exercise wheeze, or dry night cough were classified as having “respiratory symptoms.” In addition to the question concerning diagnosed asthma, other questions referred to age of onset at which asthma was first diagnosed, the period since the last attack and the number of asthmatic attacks or wheezing during the previous 12 months. Also, at the time of the study, a questionnaire and consent forms were checked for thoroughness and the children were asked whether they had used any medication for asthma during the last 24 hours or whether they had a cold during the past week; replies were recorded on the questionnaire.

Data were analyzed on the IBM computer of the College of Medicine at the King Saud University. The statistical package program SAS was used to calculate chi-square values to assess statistical significance from contingency tables [27,28].

Results

In the population study, questionnaires with a letter of explanation were distributed to the parents of 3,300 children. Parents of 3,041 children (93.3%) gave consent for study. There was no difference in the consent rate in the three cities (Dammam, Jeddah, and Riyadh). The age and sex distribution were identical and the distribution of social status was not significantly different in the three cities. The age range of the children studied was seven to 12 years with a mean of 9.32 years; 56% males and 44% females in Dammam; 47% males and 53% females in Riyadh, and 47% males and 53% females in Jeddah. Also, there were no significant differences in area of residence.

Table 1 shows the prevalence of children’s wheeze related to parental smoking. As can be noted from this table, parental smoking had a significant effect on the frequency of children’s wheeze when maternal and paternal smoking were considered separately and where both parents were smokers or neither parent smoked.

<table>
<thead>
<tr>
<th>Parental smoking habits</th>
<th>Dammam</th>
<th>Jeddah</th>
<th>Riyadh</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sample=918</td>
<td>Sample=1035</td>
<td>Sample=1088</td>
</tr>
<tr>
<td>Number (%)</td>
<td>Number (%)</td>
<td>Number (%)</td>
<td>Number (%)</td>
</tr>
<tr>
<td>Father only</td>
<td>75 (8)</td>
<td>144 (14)</td>
<td>103 (9)</td>
</tr>
<tr>
<td>Mother only</td>
<td>21 (2)</td>
<td>45 (4)</td>
<td>39 (4)</td>
</tr>
<tr>
<td>Both parents</td>
<td>14 (2)</td>
<td>28 (3)</td>
<td>21 (2)</td>
</tr>
<tr>
<td>Neither parents</td>
<td>808 (88)</td>
<td>818 (79)</td>
<td>922 (85)</td>
</tr>
</tbody>
</table>
TABLE 2. Prevalence of wheeze among children who never smoked reporting frequent wheezing attacks (>1/month) and infrequent attacks (<4/year) related to parental smoking. *

<table>
<thead>
<tr>
<th>Parental habit</th>
<th>Frequent wheeze attacks</th>
<th>Infrequent wheeze or no attacks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n ( % )</td>
<td>n ( % )</td>
</tr>
<tr>
<td>Yes</td>
<td>303 ( 82 )</td>
<td>187 ( 7 )</td>
</tr>
<tr>
<td>No</td>
<td>67 ( 18 )</td>
<td>2484 ( 93 )</td>
</tr>
<tr>
<td>Total</td>
<td>370 (100)</td>
<td>2671 (100)</td>
</tr>
</tbody>
</table>

*Significant differences determined by the chi-square method: chi-square=1342.9; df=1; P<0.0001.

TABLE 3. Number of cigarettes smoked by both parents at home/day.

<table>
<thead>
<tr>
<th>No. cigarettes smoked/day</th>
<th>Father</th>
<th>Mother</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td>&lt;5 cigarettes/day</td>
<td>759 (25)</td>
<td>430 (14)</td>
</tr>
<tr>
<td>10 cigarettes/day</td>
<td>250 (8 )</td>
<td>170 (6 )</td>
</tr>
<tr>
<td>About 20 or more cigarettes/day</td>
<td>54 (2 )</td>
<td>63 (2 )</td>
</tr>
<tr>
<td>Non-smoker</td>
<td>1978 (65)</td>
<td>2378 (78)</td>
</tr>
<tr>
<td>Total</td>
<td>3041 (100)</td>
<td>3041 (100)</td>
</tr>
</tbody>
</table>

Chi-square=143.69; df=3df; P<0.0001.

Discussion

The present study revealed that there was no significant variation in parental smoking habits between the three regions. The study showed that paternal smoking had more influence on children's wheeze than maternal smoking. A higher proportion of non-smoking mothers is perhaps related to culture since religion does not consider it less distasteful or unlawful for men to smoke.

However, a few studies have included all four symptoms of wheeze, cough, asthma and bronchitis [18,24]. In this study we have included all four symptoms of wheeze, cough, asthma, and bronchitis. Apart from the prime question of whether passive smoking causes any harmful effects to children of primary school age, the nature of the effects being a secondary consideration, the symptoms are not a manifestation of distinct disease. Analysis of single symptoms may fail to detect a real increase in the prevalence of respiratory ailments. In particular, an effect of passive smoking on asthma may be missed if only a question about asthma is included due to underdiagnosis in many children with wheezes [29].

No data were available on active smoking by the children as the questionnaire was completed by a parent. However, even in the oldest age group, and on the assumption that smoking by the child is strongly associated with parental smoking, the prevalence of active smoking would be too small to account for the differences in the prevalence of respiratory symptoms.

In this study, a statistical analysis showed a number of statistically significant associations between respiratory conditions in children and parental smoking. Other studies have also found significant associations between persistent cough and parental smoking [2,13,22] between bronchial asthma and parental smoking [6,8, 11,12,14,15,17,23,24]. Our demonstration that passive smoking significantly affects wheezy bronchitis is consistent with results obtained in a representative survey of schoolchildren in different parts of the world [1,6,11,17,18,25]. Overall, the present investigation reconfirms a potential relationship between passive cigarette smoking and wheezy bronchitis in Saudi schoolchildren.
PASSIVE SMOKING EFFECTS

Acknowledgment

We would like to thank King Abdulaziz City for Science and Technology for financial assistance. This research was supported by funds provided by the KACST (Project AR-7-45). Also we are very grateful to Dr. N. Pugh for his very helpful comments on the manuscript and Miss Pamela Roberts for her typing at the UAE University Faculty of Medicine.

References