Continued increase in the prevalence of asthma and atopy

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Abstract

Aims—To describe the change in the prevalence of wheeze, diagnosed asthma, and atopy in Wagga Wagga, NSW, Australia, between 1992 and 1997, and to compare this to the increase in prevalence reported between 1982 and 1992.

Methods—A cross sectional study of the prevalence of respiratory symptoms and atopy in schoolchildren aged 8–11 years (n = 1016, response rate 71%) in 1997 compared with studies of similar design in 1992 (response rate 83%, n = 850) and 1982 (response rate 88%, n = 769). Main outcome measures were respiratory symptoms measured by parent completed questionnaire and atopy measured by skin prick tests.

Results—Between 1992 and 1997, the prevalence of wheeze increased by 5.1% (95% CI 1.2 to 9.0), asthma diagnosis by 8.1% (95% CI 3.8 to 12.4), and atopy by 6.7% (95% CI 2.2 to 11.2). Similar increases in prevalence had been found between 1982 and 1992.

Conclusions—The prevalence of wheeze, asthma diagnosis, and atopy in Wagga Wagga has continued to increase.

Keywords: asthma; atopy; prevalence

Serial cross sectional surveys of children and young adults in western countries have shown that the prevalence of asthma increased in the 1970s and 1980s.1 That the prevalence of asthma increased in the young adults in western countries have shown that the prevalence of asthma increased in the 1970s and 1980s.1 That the prevalence of asthma increased in the young adults in western countries have shown that the prevalence of asthma increased in the 1970s and 1980s.1 That the prevalence of asthma increased in the young adults in western countries have shown that the prevalence of asthma increased in the 1970s and 1980s.1 That the prevalence of asthma increased in the young adults in western countries have shown that the prevalence of asthma increased in the 1970s and 1980s.1 That the prevalence of asthma increased in the young adults in western countries have shown that the prevalence of asthma increased in the 1970s and 1980s.1 That the prevalence of asthma increased in the young 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Atopic to at least one of D pteronyssinus

Proportional increase = \((1997 \text{ prevalence} - 1992 \text{ prevalence})/1992 \text{ prevalence}\)

Table 3 Change in prevalence (%) of symptoms in atopic* and non-atopic children, 1992–1997

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>1992</th>
<th>1997</th>
<th>Increase 1992–97 (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Atopic</td>
<td>Non-atopic</td>
<td>Atopic</td>
</tr>
<tr>
<td>Wheezed in the past 12 months</td>
<td>37.9</td>
<td>13.3</td>
<td>39.2</td>
</tr>
<tr>
<td>Diagnosed asthma</td>
<td>46.3</td>
<td>21.6</td>
<td>47.4</td>
</tr>
<tr>
<td>Ever had asthma medicine</td>
<td>49.8</td>
<td>26.8</td>
<td>56.0</td>
</tr>
</tbody>
</table>

*Atopic to at least one of D pteronyssinus, rye grass, Alternaria.

of parents who reported having asthma over the whole time period.

There was a significant increase in prevalence of atopy between 1992 and 1997, although the increase between 1982 to 1992 had been non-significant (see table 2). Sensitisation to Alternaria and rye grass pollen increased by 5% and 6% respectively during the 15 year time period 1982–1997 (p < 0.001 for trend).

Comparisons of the increases in prevalence of wheeze and asthma diagnosis between 1992 and 1997 between children atopic to at least one of D pteronyssinus, rye grass, and Alternaria, and in non-atopic children showed that the proportional increases were smaller for the children classified as atopic (see table 3). The same trend was also seen for medication use which increased to a greater extent in non-atopic compared to atopic children.

Discussion

We found that the trend for an increase in the prevalence of asthma and atopy reported for the decade 1982–92 continued to 1997. Importantly, this has been one of the first studies to monitor increases in the prevalence of atopy using objective measurements over a long period of time. In 1997, more than 1 in 4 children were reported to have wheezed in the previous year, almost 4 in 10 had been diagnosed as having asthma, and almost 1 in 2 children had used a medicine for asthma. These figures are surprisingly high and confirm the value of ongoing surveillance studies such as these which incorporate objective measurements to monitor trends in asthma and atopy.

The same standard methods were used to measure symptoms and atopy in the studies. It is unlikely that sample bias substantially affected our estimates of prevalence. In 1982 and 1992, the study participants were from schools selected at random throughout the town. In 1997, only children from schools in western Wagga were selected, but the comparison with the 1996 census showed that this sample was likely to be representative of children in Wagga Wagga. Eleven year old children were not included in the 1982 study, but the prevalence of outcomes in this age group were similar to those found in 8–10 year olds.

The response rates from schools were higher in 1982 and 1992 than in 1997. If parents of children with asthma were more likely to enter their child into the studies, we will have over estimated the size of the increase since 1982. The proportion of parents who had been diagnosed with asthma also increased over the time period. This is consistent with the increase in the prevalence of asthma in young adults which has been reported elsewhere, but it is possible that parents with asthma were more likely to enrol their child into the study. The true prevalence of “wheeze in the past 12 months” in 1997 could lie between the lower confidence limit, calculated on the assumption that all non-participating children did not have asthma (19.2%), and the upper limit, calculated on the assumption that all non-participating children have asthma (48.2%). However, comparison with other studies suggests that bias this extreme is unlikely. The prevalence of “wheeze in the past 12 months” in children was measured in four Australian cities in 1993–94 for the International Study of Allergies and Asthma in Childhood. The prevalence in 10 914 children aged 6–7 years and 12 280 children aged 13–14 years in Melbourne, Sydney, Adelaide, and Perth in 1993/94 was 24.6% (95% CI 23.8 to 25.5) and 29.4% (95% CI 28.6 to 30.2) respectively. These results are similar to the prevalence of wheeze in our study of 27.7%. In addition, the mean annual increase in the prevalence of wheeze in the past year was 0.8% which is within the range of annual increases reported for other comparisons of serial cross sectional surveys.

In this study we were able to standardise the methods used for measuring atopy, and comparison was restricted to allergens manufactured at the same plant to the same concentration. The concentration of D pteronyssinus has been subject to additional quality control procedures and has been licensed as a standardised product in the USA since 1988 (letter from Bayer Australia Ltd, 21/01/2000); the prevalence of sensitisation to this allergen increased by 11.7% between 1992 and 1997. Overall there was a non-significant increase in prevalence of atopy between 1982 and 1992 and a significant increase between 1992 and 1997. In contrast, the prevalence of hay fever increased significantly between 1982 and 1992 but remained the same between 1992 and 1997. There has been one report in the peer reviewed literature of the change in prevalence of atopy measured by skin prick test between cross sectional studies. This report of two cross sectional studies in Leipzig in former east Germany, the prevalence of atopy in children aged 9–11 years increased from 19.3% in 1991–92 to 26.7% in 1995–96 (p < 0.001). The prevalence of hay fever reported by questionnaire also increased over the time period. These increases were attributed to the introduction of a western lifestyle into Leipzig after reunification.

Recent increases in the prevalence of asthma and allergic diseases have been attributed to environmental changes to lifestyle. Although we did not collect information about change in allergen exposure between 1992 and 1997, we found a 4.5-fold increase in the mean numbers of house dust mites in dust samples from homes in Wagga Wagga between 1982 and 1992. Dietary changes in western societies such as the decreased consumption of fresh fruit and vegetables and increased consumption of polyunsaturated fatty acids may affect the immune response and are another possible explanation. It is also possible that the decline in infection rates among infants in western societies has had a detrimental effect on the development of the immune system and increased the likelihood of the development of an atopic response, although it is not a cause for the increase in asthma in non-atopic children.

We found that the proportional increases in wheeze in the past 12 months and asthma
diagnosis were greater for non-atopic than for atopic children between 1992 and 1997. Increased exposure to early childhood infections has been strongly associated with an increased risk of asthma in non-atopic children.17 However, there is no evidence that the incidence of early childhood infection changed in Wagga Wagga between 1992 and 1997.

In this further cross-sectional study, we were able to show that the increasing prevalence of asthma and atopy that was identified in the 1980s has continued in the past decade, so that a high proportion of children now experience respiratory symptoms. This has important implications for the health of future generations of children, and continues to reinforce the message that prevention programmes are needed.

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References