Introduction

The Sudden Infant Death Syndrome (SIDS) is the largest cause of infant deaths in western countries. Recently the introduction of a BACK TO SLEEP campaign, recommending the avoidance of the prone sleeping position and preferably placing infants to sleep on their backs, has resulted in a significant and sustained fall in the SIDS rate in Ireland from 2.1/1000 (throughout the 1980s) to 0.7-0.8/1000 live births. This simple, cheap, intervention has resulted in 60-70 less infant deaths in Ireland each year for the past 6 years. Many studies have shown parental smoking increases the risk of SIDS.1,2 and while the overall rate of smoking among adults in Ireland is decreasing, smoking amongst pregnant women remains very common, and may be increasing, with reported prevalence rates of 27-61%. Sweden is an industrialized country, has had a decline in smoking rates and since 1963 anti smoking programmes have been developed including legislation on smoke free environments and a ban on advertising. More interesting is the fact that pregnant women who smoked during pregnancy has decreased from 31% in 1983 to 13% in 1999, which has been attributed to a maternal health project entitled Smoke-free Pregnancy launched in 1992.

The objective of this particular study was to examine the effect of infant cigarette smoke exposure on the risk of Sudden Infant Death Syndrome in a contemporary Irish epidemiological database.

Methodology

A researcher utilising a standardised questionnaire focussing on lifestyle issues and child care practices collected data. A five-year population-based prospective case control study was conducted in the Republic of Ireland between January 1994 and December 1998. All children who die suddenly and unexpectedly (SIDS) are reported to HSEs National Sudden Infant Death Register within 24 to 48 hours. Ascertainment and classification of deaths are conducted by inspection of all coroners certificates. Parental interviews were conducted for each infant who died and four controls were matched for age and geographical location (yielding a total population sample size = 853). Information was collected on sociodemographic details, pregnancy, medical history, parenting practices and lifestyle habits pertaining to the lifetime of infant including the previous 24 to 48 hours. Conditional logistic regression was used to investigate differences between cases and controls with respect to a number of potential risk factors using the statistical package STATA version 6. Multivariate analysis included compiling an index of 5 variables scored as follows: having a medical card-1; no medical card-0; (a low income based free health service entitlement) being in public rented accommodation (excluding private renting) 1; other-0; no car-1; car ownership-0; either parent employed 1; neither employed-1; and finally mother not in receipt of social welfare-1; mother not in receipt of social welfare-0.

Table 1
Sudden Infant Death Syndrome

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cases % (n)</th>
<th>Controls % (n)</th>
<th>Odds Ratio</th>
<th>95CI</th>
<th>P value</th>
<th>Odds Ratio</th>
<th>95CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother smoking during pregnancy</td>
<td>74 (126)</td>
<td>28 (171)</td>
<td>7.34</td>
<td>4.76</td>
<td>&lt;0.001</td>
<td>3.80</td>
<td>2.30</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Father smoking during pregnancy</td>
<td>63 (96)</td>
<td>27 (164)</td>
<td>4.60</td>
<td>3.04</td>
<td>&lt;0.001</td>
<td>2.65</td>
<td>1.49</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Others (excluding father) smoking during pregnancy</td>
<td>29 (46)</td>
<td>7 (44)</td>
<td>6.53</td>
<td>3.73</td>
<td>&lt;0.001</td>
<td>3.32</td>
<td>1.62</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Mother smoking after birth</td>
<td>61 (92)</td>
<td>26 (158)</td>
<td>4.40</td>
<td>2.92</td>
<td>&lt;0.001</td>
<td>2.64</td>
<td>1.49</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Others (excluding father) smoking after birth</td>
<td>27 (42)</td>
<td>6 (39)</td>
<td>6.78</td>
<td>3.75</td>
<td>&lt;0.001</td>
<td>3.31</td>
<td>1.51</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

Results

In total, there were 203 SIDS cases and 608 control infants involved in this study. The data in Table 1 shows that 74% of SIDS infants were smoked by mothers during pregnancy compared to 28% of control mothers giving an odds ratio of 7.34 for increased risk of SIDS in smokers, of 3.80 (CI 2.30-6.25 p<0.001). The data in Table 1 also shows that 63% of fathers of SIDS cases smoked during pregnancy compared to 36% of fathers in the control group. This table clearly demonstrates that more mothers of SIDS infants smoked, 29% compared to 7% in the control group, and the suggestion of a dose response effect with increasing levels of consumption increasing the risk of Sudden Infant Death Syndrome.

Table 2
Dose Response Effect of Smoking during Pregnancy on Risk of SIDS

<table>
<thead>
<tr>
<th>Cases % (n)</th>
<th>Odds Ratio</th>
<th>95CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother smoking</td>
<td>62 (100)</td>
<td>2.79</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Father smoking</td>
<td>61 (92)</td>
<td>2.99</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Results

Table 2 shows a dose response effect with an odds ratio of 2.98 for those smoking 1-10 cigarettes per day (p<0.001), rising to 5.05 for those smoking more than 10 cigarettes per day (p<0.001). The paternal data also shows a dose response effect with odds ratios of 2.08 (p=0.05) for the 1-10 cigarettes per day group, increasing to an odds ratio of 3.21 (p<0.01) for the group smoking more than 10. Table 2 also highlights that when others are smoking in the house and the number of cigarettes is increased to greater than 10, the odds ratio increases from 2.1/1000 (throughout the 1980s) to 0.7-0.8/1000 live births.
Table 4 shows that when adjusted for co-sleeping, maternal alcohol usage did not independently increase the risk of SIDS in non smoking, non drinking mothers (OR 1.00 NS). However, it was the smoking mothers who also drank alcohol, the odds ratio is 5.70(p<0.001). However it was the smoking mothers who also drank that had the highest overall risk of SIDS in this data set (OR 7.17, p<0.001).

Discussion

This study confirms that cigarette smoke exposure is a powerful SIDS risk factor increasing the risk of SIDS in Irish infants almost fourfold and in 2/3 of smokers want to quit only 2% succeed annually, a more realistic strategy for dealing with nicotine dependence needs to be developed. Smoking reduction strategies based on health education have proved largely ineffective. However as nicotine is now recognized to be as addictive as the so called hard drugs such as heroin, and that while the risk associated with smoking increases as the level of the infants exposure increases whether it occurs via an increase in the number of cigarettes smoked daily or via an increase in the number of smokers in the household. This risk is largest but not restricted to maternal smoking alone with paternal smoking having an additional effect. The risk associated with smoking increases as the level of the infants exposure increases whether it occurs via an increase in the number of cigarettes smoked daily or via an increase in the number of smokers in the household. These results demonstrate that smoking is strongly associated with an increased risk of Sudden Infant Death Syndrome. The risk of SIDS is significantly increased by exposure to tobacco smoke whether during pregnancy or after the babies birth. This risk is largest but not restricted to maternal smoking alone with paternal smoking having an additional effect. The risk associated with smoking increases as the level of the infants exposure increases whether it occurs via an increase in the number of cigarettes smoked daily or via an increase in the number of smokers in the household. On multivariate analysis adjusting for co sleeping, alcohol consumption was not found to have an additional independent effect in nonsmokers but the combination of smoking and drinking produced a massively increased risk of SIDS in nonsmokers. This research highlights that there needs to be a move in aiding and empowering individuals to give up smoking and perhaps in the first place not to start smoking. There is a need to combine legislation as a framework for control strategies in relation to smoking inclusive of education, both of which may aid the fight against smoking.

Acknowledgement to the Irish Sudden Infant Death Association under whose aegis the National Sudden Infant Death Register operates.

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References