Smoking, Passive Smoking and Respiratory ill Health in Primary 3-6 Children

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**Prevalence of ever-smoking by age**

**Excess risks of respiratory ill health in ever-smoking children**

**Excess risks of respiratory ill health due to passive smoking at home in never-smoking children**

* p<0.05, ** p<0.01, *** p<0.001

Note: excess risk based on odds ratios, adjusted for gender, age, place of birth and district
1. Introduction

Many studies, mostly from the West and a few studies in Asia, have provided strong evidence that both active and passive smoking in children can cause respiratory ill health.\(^1\)\(^2\) In Hong Kong, a study on Form 1 to 3 students revealed similar findings.\(^3\) For primary school children, the Respiratory Health Study also showed similar finding but this study only included children from two districts (Kwai Tsing and Southern).\(^4\)\(^5\) There have been no other studies on smoking, passive smoking and respiratory health on a population-wide sample of primary school children in Hong Kong. The objectives of the present study were to study whether (a) active smoking and (b) exposure to passive smoking at home was associated with increased risks of respiratory ill health in primary 3 to 6 students in Hong Kong.

2. Methods

This study was a part of the Child Health and Activity Research Group (CHARG) 1995-96 study.\(^6\) A list of 30 randomly selected schools was provided by the Education Department. Of these, 24 participated. Six other randomly selected schools were provided by the Education Department as replacement and all participated. Within each school, 4 classes were randomly selected, one from each of primary 3, 4, 5 and 6.

The questionnaire on respiratory health included questions on respiratory symptoms, smokers living in the same household, and smoking habit of the children. Most of the questions were adopted from previous studies.\(^3\)\(^5\) Data from the other sections of the questionnaire in the CHARG study included gender, year of study, age, place of birth and living district. The questionnaire was administered by two research assistants in the classroom. An overhead projector was used to project the questions and to instruct the students how to answer. Students had to write down their names and class number. A total of 3964 children completed the questionnaire during October 1995 to May 1996. The response rate was 94%.

3. Student characteristics

Fifty four percent were boys (2156), 45% were girls (1779) and 0.7% (27) had missing data. The distribution by class was: Primary 3, 23%; Primary 4, 25%; Primary 5, 26%; Primary 6, 25%; missing, 1%. The age distribution was: 7 years, 0.2%; 8 years, 14%; 9 years, 23%; 10 years, 25%; 11 years, 24%; 12 years, 9%; 13 years, 4%; missing, 1%. About three quarters (78%) were born in Hong Kong, 16% in mainland China and 4% in other places (missing, 2%).

4. Smoking experience of children

The prevalence of smoking is given as the point estimate (%) with its 95% confidence interval in parentheses. Ninety one percent of the children had never smoked (90.9%; 90.1-91.8%), 6.5% (5.7-7.2%) had tried smoking, 0.7% (0.4-0.9%) used to smoke but had quit smoking, 0.5% (0.3-0.7%) smoked less than one cigarette per week, 0.3% (0.1-0.4%) smoked 1-6 per week. 0.3% (0.1-0.4%) smoked more than 6 per week (missing data: 0.9%). Thus, about 8% of the children overall had ever-smoked (ever-smokers).

In boys, the prevalence of ever-smoking increased from 7.0% in primary 3 to 15.8% in primary 6, whereas in girls, it increased from 2.0% to 10.5%. Figure 1 shows that by the age of 13, about one third of the boys and one fifth of the girls had some smoking experience.

5. Smoking in family members

About 36.3% (34.8-37.7%) of the children’s fathers were smokers, 13.1% were ex-smokers, 43.8% had never smoked and 3.9% did not live with the children (3.0% with missing answers). In the mothers, 3.4% (2.8-4.0%) were current smokers, 1.8% were ex-smokers, 89.7% had never smoked and 2.7% did not live with the children (2.5% missing answers). Other smoking family members included grandparents (3.9%), other relatives (3.2%), brothers (2.4%), sisters (0.9%), other family friends (1.4%) and others (3.0%).

On the whole, 32.9% of the children were living with one smoker, 6.6% with two smokers, 2.5% with three smokers, 1.3% with four smokers and 2.1% with five or more smokers, whereas 51.7% had no smoker at home (0.9% missing answers). Assuming (as it is often the case) that the smoking family members did smoke at home, about half (47%) were exposed to passive smoking at home, the main sources were fathers and grandparents, followed by mothers, other relatives and brothers.
6. Smoking experience of children and family smoking

Statistical analysis (by logistic regression modelling) shows that having smoking family members, being a boy, being born in mainland China, and increasing age were associated with ever-smoking experience (Figure 3). The excess risks of having smoked were calculated from the odds ratio [Excess risk in % = (Odds ratio -1) x 100%].

When the number of smokers at home was entered into the logistic regression model (instead of individual smoking member), there was a statistically significant trend with the excess risks of smoking increasing from 79% when there was one smoker at home to 424% when there were two or more smokers at home.

7. Adverse health effects of smoking

Because the number of current smokers was small, ever-smokers (including current and ex-smokers and experimenters) were compared with those who had never smoked (never-smokers). It should be noted that some ever-smokers might have only tried smoking a few times. Also, children with a prior history of medical problems would probably be less likely to take up or tolerate smoking. Therefore, such comparison was likely to be conservative and it tended to under-estimate the excess risks of respiratory ill health due to smoking.

Figure 5 shows that after adjusting for gender, age, place of birth and living district, significant excess risks in ever-smokers were found for nasal symptoms (75%), throat symptoms (50%) and frequent phlegm (88%). There was a non-significant excess risk of frequent cough (26%) and ever having wheezing (39%).

8. Adverse health effects of passive smoking

Among the never smokers, after adjusting for gender, age, place of birth and living district, significant excess risks due to passive smoking were found for nasal symptoms (17%), throat symptoms (35%), frequent cough (54%) and frequent phlegm (44%) (Figure 6). A non-significant excess risk of ever having wheezing (12%) was observed.
The excess risks of each of the four respiratory symptoms above increased with increasing number of smokers at home (Figure 7 (a)-(d)). The increasing trends were statistically significant. Such "dose-response relationships" are strong evidence that the association between respiratory ill health and passive smoking is likely to be causal.

9. Discussion

9.1 The present study is the first on a representative sample of all primary school children in Hong Kong, and the results on the adverse effects active and passive smoking are consistent with those in previous studies both of children in this age group locally and elsewhere.

9.2 The main limitations of the study are as follows:

(a) the cross-sectional design: Because smoking and passive smoking and respiratory symptoms were measured at the same time, the time sequence of the associations observed could not be ascertained for certain.

However, it is very unlikely that respiratory ill health would lead to exposure to increased tobacco smoke. On the contrary, children who have symptoms are less likely to experiment with active smoking or to tolerate passive smoking, and this could result in less active or passive smoking exposure. The strength of the observations observed in a cross-sectional study could therefore be under-estimated, resulting in smaller odds ratios (or excess risks).

(b) Because the questionnaire was not anonymous, some smoking students could have reported themselves as never-smokers, so the smoking prevalence could also be under-estimated.

(c) Because this study was a part of a larger study, many other important risk factors for smoking (such as tobacco advertising) and potential confounders (such as other sources of indoor air pollution, and outdoor air pollution) were not included.
(d) Because of cluster sampling (sampling of schools) and the inclusion of only 30 schools, there may be some limitations in the representativeness of the sample of children. The effective sample size will be smaller and the present analysis did not take into account any clustering effect. However we believe that this is likely to be small and unlikely to have affected the results and conclusions.

9.3 The prevalence of smoking observed in this study cannot be compared with prevalence observed in previous studies because of many methodological differences, such sampling methods, methods of questionnaire administration, anonymity or otherwise, survey settings and timings.

10. Conclusions

10.1 Smoking in primary school children is a very serious problem. By the age of 13, about one third of the boys and one fifth of the girls had smoking experience, including those who had experimented with smoking or were regularly smoking. This prevalence of ever-smoking is likely to be an under-estimate.

10.2 Contrary to what most people, particularly young people, believe, namely that the harmful effects of smoking only occur in old people, young children with a short duration of smoking experience are clearly experiencing more respiratory symptoms, including nose and throat problems, cough, phlegm and wheezing.

10.3 About half of the children were living with one or more smokers. Children exposed to passive smoking at home have more respiratory symptoms. These risks increase with increasing exposure to other people's tobacco smoke.

10.4 Children living with smoking family members are more likely to have smoked than those living with non-smokers.

10.5 Smoking in the family home is therefore a serious risk to children in (a) influencing the children to take up smoking, and (b) exposing children to passive smoking and causing acute and chronic respiratory ill health.

11. Recommendations

11.1 There should be a strong policy to control smoking so as to reduce children's exposure to passive smoking at home, as well as at schools and other public places such as restaurants and playgrounds.

11.2 Specific efforts to target smoking at home are urgently needed to create a smoke-free home environment so as to protect children from taking up smoking and from exposure to passive smoking. A healthy home must be a smoke-free home, and a healthy family must be a smoke-free family.

11.3 Services and counselling facilities must be made available to help smoking parents or grandparents quit smoking.

11.4 Non-smoking parents can play an important role to help other smoking family members quit and to protect their children from exposure to passive smoking. Services and assistance should be readily available to those in need to support their efforts in helping others quit.

11.5 Government should commit more resources to set up such services for smokers and non-smokers so as to reduce smoking and passive smoking in the family in particular and in the community in general.

11.6 All the recommendations above should form an important part of a comprehensive tobacco control and smoking prevention programme which aims to create a tobacco-free society.
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13. References


13.6 CHARG. Smoking, passive smoking and respiratory ill health in primary 3-6 children. Final Report to Health Services Research Committee.