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A randomised controlled trial of a health education intervention provided by nurses to mothers of sick children

Key Messages

1. Environmental tobacco smoke exposure is a serious health hazard to children and occurs commonly in Hong Kong.
2. Brief health education intervention by nurses in a busy clinical setting produced short-term effects in terms of (a) raising awareness in mothers and motivating them to protect their children from the exposure; (b) helping fathers to quit; (c) reducing fathers' cigarette consumption; (d) initiating quit attempts in the fathers; and (e) ultimately reducing the exposure of environmental tobacco smoke in their sick children. However, these short-term effects were not sustained at the 12-month follow-up.
3. More intensive interventions are necessary for long-term effects and need testing in new trials. The short-term effects from brief intervention are nevertheless worthwhile, though reinforcement may be needed. Stronger tobacco control measures to promote a non-smoking culture in homes and among children are needed. Nurses can play key roles in providing individual counselling and advocacy of smoke-free homes in Hong Kong.

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Introduction

Environmental tobacco smoke (ETS) represents a serious health hazard and is a major risk factor for acute respiratory illness in children.[1] Environmental tobacco smoke is composed of exhaled mainstream smoke from the smoker, side-stream smoke emitted from smouldering tobacco, contaminants (emitted into the air during the puffs), and contaminants that diffuse through the cigarette paper and mouth ends between puffs.[2] The toxic/carcinogenic effects of ETS and smoking are qualitatively similar[1]; both causing lung cancer and other serious illness.[3] The children of smokers are more prone to bronchitis, pneumonia, and chest infections than those of non-smokers.[4]

In Hong Kong, smoking is a significant risk factor for respiratory illness among children whose parents smoke.[4] However, as not all mothers were aware of the health risks from passive smoking to their children, they are an important target for health education. Nurses are in a particularly advantageous position to provide effective education for these mothers.

Aim

This study assessed the effectiveness of a nurse-led health education intervention targeted at mothers of sick children, which aimed to reduce exposure to ETS in their offspring and provide them with the resources to help the father quit smoking.

Methods

Study design

This study was conducted from September 1997 to August 1999. A multi-centred randomised controlled trial was conducted in the general paediatric wards of four major hospitals in Hong Kong.

Intervention

The intervention was a two-step health education programme in which (a) nurses gave materials and advice to non-smoking mothers of sick children and (b) the mothers then passed on the materials and advice to their smoking partners, encouraging them to quit smoking. The nurses supplied standardised health advice (two purpose-designed booklets) to the intervention group. All mothers in the intervention group were followed up with a telephone reminder 1 week after receiving the educational material. Mothers in the control group received usual care and advice from ward nurses.

Subjects

All the subjects were non-smoking mothers of sick children admitted to the paediatric ward of one of the four major acute care hospitals of the Hospital Authority of Hong Kong. Additional inclusion criteria were that: (i) the child's father was a current smoker; (ii) mother, father, and child lived together in the same household; (iii) the mother was able to speak and read Cantonese/Chinese. Mothers of children admitted to the hospital by relatives (ie not the mother) or by maids were not eligible.

Table 1. Cessation of smoking by fathers at the 3-, 6-, and 12-month follow-up (n=1483)

Cessation of smoking*	Intervention group, n=752 No. (%)	Control group, n=731 No. (%)	P value
Point prevalence			
At 3-month	56 (7)	35 (5)	0.03
At 6-month	70 (9)	60 (8)	0.45
At 12-month	85 (11)	68 (9)	0.21
Consecutive prevalence			
At 6-month	39 (5)	25 (3)	0.09
At 12-month	31 (4)	20 (3)	0.14
Sustained prevalence			
At 6-month	17 (2)	10 (1)	0.20
At 12-month	13 (2)	8 (1)	0.30

* Point prevalence: father not smoked for past 7 days at the time of follow-up (3, 6, and 12 months). Consecutive prevalence: at 6-month (father not smoked for 7 days at 3-month and also at 6-month follow-up), at 12-month (father not smoked for 7 days at 3-month, 6-month and also at 12-month follow-up). Sustained prevalence: at 6-month (father not smoked for 7 days at 3-month and also at 6-month and total duration of not smoking ≥150 days), at 12-month (father not smoked for 7 days at 3-month, 6-month and also at 12-month and total duration of not smoking ≥180 days)

Table 2. Mother advising the father to quit smoking at the 3-, 6-, and 12-month follow-up

Quit attempts*	No. (%)		P value
	Mother did not advise the father	Mother advised the father	
At 3-month			
Intervention	192 (26)	552 (74)	
Control	249 (34)	478 (66)	<0.001
At 6-month			
Intervention	294 (40)	444 (60)	
Control	330 (46)	394 (54)	0.03
At 12-month			
Intervention	353 (47)	393 (53)	
Control	349 (48)	379 (52)	0.81

* Intervention: n=752, control: n=731

Sample size

The sample size was estimated to be 513 mothers in each group, and was based on the number of fathers expected to successfully quit smoking. A total of 1483 women were eventually randomised into the intervention (n=752) and control (n=731) groups.

Study instruments

A standardised questionnaire was used to record baseline characteristics of the child and family before the intervention. A follow-up questionnaire was used to record the main outcomes.

Main outcome measures

Outcomes were assessed at 3, 6, and 12 months after the intervention using a standardised telephone follow-up questionnaire. The outcomes of interest were: the father's quit rate, the mother's attitude towards ETS, and any change in family smoking habits. Following the US Clinical Practice Guideline, the 7-day point prevalence quit rates (ie not smoking for 7 days at the follow-up interview) at 3, 6, and 12 months were the main outcome measures.[5] Consecutive and sustained prevalence quit rates were also recorded (Table 1). Data were analysed by intention-to-treat analysis (carry-forward method).

Results

Baseline comparison showed no significant differences between the intervention and control groups in the socio-demographic characteristics of the children, mothers or fathers, the fathers' smoking behaviour, or the mothers' attitude to protect the child from ETS exposure. More than one third (37%) of the fathers reported not smoking near the child.

At baseline, the most frequently reported actions taken by the mother to protect their child from ETS at home included: opening the windows (44%), asking the father (a) not to smoke near the child (42%), (b) to smoke less or quit smoking, and (c) move the child away from the smoke (33%). There were no significant differences between the intervention and control groups in terms of the mothers' attitudes, previous actions, and methods used to help the father quit.

The 12-month follow-up rate was 86% in the intervention group and 85% in the controls.

At 3-month follow-up, more fathers in the intervention group than the controls had stopped smoking (7-day point prevalence: 7% vs 5%; P=0.03). However, the difference was not significant at 12 months (11% vs 9%; P=0.21). No significant differences were found for the consecutive and sustained prevalence of fathers quiting smoking at 6 and 12 months (Table 1). At 3 months, more fathers in the intervention group than the controls reduced the extent of smoking (36% vs 26%; P<0.001); more fathers attempted quitting (13% vs 8%; P<0.001); more mothers (78% vs 71%; P=0.01) took action to move the child away from smoke exposure, and had advised the father to quit (74% vs 66%; P<0.001). At 6 months, fewer mothers advised the father to quit, but the difference between the two groups was still significant (60% vs 54%; P=0.03) [Table 2]. No statistically significant difference was found at 12 months.

When the mothers were asked about the duration of the child's ETS exposure at home at follow-up, more mothers in the intervention group reported that the child was not exposed to ETS at home as compared to the controls. The results were statistically significant at the 3-month (63% vs 57%; P=0.02) and 12-month (48% vs 42%; P=0.03) follow-up. Overall, at 12 months, consistently more mothers in the intervention group had taken action to help the father quit as compared to the controls; there were significant differences with respect to: placing a 'No Smoking' sign at home (28% vs 8%; P<0.01), asking father to read a quit-smoking booklet (11% vs 5%, P<0.01), and telling father that by not

Table 3. Mothers helping fathers to quit smoking at the 12-month follow-up

Mothers' action	Intervention group, n=752 No. (%)	Control group, n=731 No. (%)	χ^2	P value
Helped him set a date to quit	3 (0.4)	1 (0.1)	-	0.63
Placed a "No Smoking" sign at home	212 (28)	62 (8)	96.46	<0.01
Asked him to read a quit smoking health education booklet	84 (11)	37 (5)	18.66	<0.01
Asked him to seek help from heath care professionals	2 (0.3)	4 (0.5)	-	0.45
Told him that by not smoking, his child would be healthier and less likely to become a smoker	324 (43)	275 (38)	4.89	0.03
Talked to him and to understand his needs in quitting	36 (5)	31 (4)	0.27	0.61

smoking, his child would be healthier and less likely to be a smoker (43% vs 38%; P=0.03) [Table 3].

Discussion

Cigarette smoking is the single most preventable cause of premature mortality and morbidity. Smoking has strong behavioural and addictive qualities and is extremely difficult to treat.[6] When compared to the Prochaska's[7] readiness to change estimates for a population, our study population was quite different. We estimated that about 50% of the fathers were in the pre-contemplation stage and 50% in the contemplation stage. Although 66% of the fathers at baseline expressed no intention to quit and more fathers in the intervention than the control group had tried to quit at the 3-month follow-up, the effect was not sustained. This does not mean the intervention was totally ineffective as the move from smoking to not-smoking is indirect.[6] A matched staged intervention approach may be more effective with smokers, but this needs to be properly tested.

Changing behaviour through brief interventions by nurses who are too busy in the ward setting is difficult. Short-term effects from such interventions are unlikely to be sustained, if there is no further reinforcement. There is also a need for tobacco control measures aimed at changing the community attitudes towards a non-smoking culture, particularly in the home. If it was widely accepted that smoking in a home with children is a kind of child abuse, there would be stronger motivation for fathers to quit. Without such changes, the effects of intervention by nurses and other health care professionals are bound to be limited.

Our results indicate that the fathers do not change their quitting behaviour easily. More effort by health care professionals is needed to facilitate the fathers' movement towards not smoking through the stages of readiness. Helping patients progress one stage in 1 month doubles the chance that they will not be smoking 6 months later.[7] Further research is needed to evaluate which interventions are most influential with regard to fathers' readiness to quit and movement through these stages.

Conclusions

The simple health education intervention provided by nurses to the mothers in a busy clinical setting produced short-term effects in terms of helping the father to quit, reducing his cigarette consumption, and improve the mother's actions in protecting the child from ETS. However, the effects were not sustained at 12-month follow-up. Further research, preferably a randomised controlled trial involving more intensive and direct interventions targeting both the mothers and fathers, is needed.

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