WHAT LIMITS THE EFFECTIVENESS OF SCHOOL-BASED ANTI-SMOKING PROGRAMMES?

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SUMMARY

Backround: It is generally accepted that living in families where there are smokers, children are stressed not only by the harmful physical exposure to second-hand and third-hand tobacco smoke, but also by the negative models of the adult relatives' behaviour, as relatives who smoke can inspire children to imitate this behaviour, influencing attitudes towards, and early experiments with smoking. In this paper, some of the most important results about influence of family smoking on the effects of the anti-smoking educational programme "Non-smoking Is Normal" are described.

Methods: The school-based programme was created by medical and educational specialists and targets children at the first level of primary schools (aged from 6 to 11 years). The data about interesting outcomes of the programme (knowledge, attitudes, behaviour) were collected by anonymous questionnaire, administered twice in each school year: one month before the complex of 5 lectures (pre-tests) and 4–5 months after the last lecture (post-tests). The sample of participants (860–910) was divided into four groups, according to the intervention and family backrounds: (1) programme children from smoking families "P–S"; (2) control children from smoking families "C–S"; (3) programme children from non-smoking families "P–NS"; (4) control children from non-smoking families "C–NS". The differences in the frequency of children's answers were analysed using the tests in statistic Epi Info software, version 6.04a (chi-square, Mantel Haenszel, Yates, Fisher).

Results: In the programme group, the number of children with smoking relatives was significantly higher than in the control group (80.1% vs. 73.0%, $p<0.01$) as well as of those who reported frequent/daily exposure to secondhand smoke at homes and/or in cars (49.5% vs. 40.0%, $p<0.01$). Smoking families significantly influenced the children's seeking of smoking friends (40% vs. 17%, $p<0.01$). The programme has significantly increased the amount of knowledge about health risks of smoking. Both in the programme and control groups of children from non-smoking families, the frequency of critics of adults smoking was significantly higher all the time of the study ($p<0.05$ and 0.01 resp.); however, the programme influenced children's opinions about smoking (criticism) only partially. Children's actual intentions about their smoking in the future was fully influenced by their smoking household environment: the number of "future no-smokers" has decreased in time and was significantly less frequent among children from smoking families ($p<0.01$). The frequency of those willing to smoke significantly increased within the period between 3rd and 5th grades, both in the programme and the control groups ($p<0.01$). An almost linear increase of active experimentations with cigarette smoking in follow-up monitoring was seen, trends of smoking children were steeper in groups from smoking families. The number of experiments with smoking was significantly lower in programme children of non-smoking parents only at the end of the study ($p<0.05$).

Conclusions: Despite of the effort to initiate parental participation on the primary prevention of smoking, we have confirmed that smoking in families decreased the efficacy of anti-smoking intervention targeted on young children at school age.

Key words: educational programme "Non-smoking Is Normal", effects, knowledge, attitudes, opinions, behaviour, schoolchildren 6–11 years

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INTRODUCTION

Living in families where there are smokers, children are stressed not only by the harmful physical exposure to second-hand (1) and third-hand tobacco smoke (2), but also by the negative models of the adult relatives' behaviour. Exposure to thousands chemicals in environmental tobacco smoke is associated with the exacerbation of many illnesses (such as respiratory and middle ear infections, asthma, etc.), and increased hospital admissions. Due to higher morbidity, children may have poorer school attendance and performance associated with social and health inequalities later in their life (3–5). The bad model of smoking parents and the other close relatives can inspire children to imitate this behaviour. It is generally accepted that a family with smokers is the most important factor influencing the positive attitudes towards, and early experiments with smoking among children, as many previous and the newest studies have repeatedly described (6–10). Children do not generally have the ability to effectively avoid time spent in a polluted environment or to move away from the vicinity of smokers and to protect themselves (11). Thus, protecting children is generally more important than protecting adults (10).

The scientific approaches to tobacco control, specifically targeted on children, involve not only increasing their knowledge, but also influencing their opinions on desirable (i.e. non-smoking) behaviour and training the skill of protection themselves against active and passive smoking (12). While the children's education is carried out mostly through trained teachers at school, their opinions and behaviour are influenced mainly by families, peers

and broader society. Environment tolerating the smoking may decrease the effects of anti-smoking activities. Contemporary tobacco control presents many individual strategies and recommends using the mixture of them as the most effective approach (13). Specifically the school-based anti-smoking programmes try to attract parents for active co-operation. Some of them seek the more vulnerable children living in the smoking families and/or experimenting with smoking early in their life, and create different levels of intervention for them (14).

The Czech educational programme "Non-smoking Is Normal" was created by medical and educational specialists and targets children at the first level of primary schools (aged from 6 to 11 years). It continuously links up with programmes for kindergarten ("We Do Not Want to Smoke") and for the second level of primary school children ("Smoking and Me"). The programme includes a broader spectrum of factors of life style: except of smoking also healthy nutrition, adequate physical activity, friendly relationships within the school community of pupils and teachers. The design of the programme also initiates the active co-operation of parents, asks for their support and help on certain "homeworks". In a special brochure ("How to make sure your child does not smoke") parents received detail information about the risk of passive smoking for children and about the importance of the adult model role as well as advices on "talking about smoking" with children. The influence of programme on children's knowledge, attitudes and opinions about smoking, and on the frequency of their first experiments with smoking was evaluated in the semilongitudinal studies (pilot and broader) in schools which made the programme part of the school curriculum and compared with control schools in the same region. In this paper, some most important results about anti-smoking intervention are described.

MATERIALS AND METHODS

Data and interesting outcomes of programme were collected by anonymous questionnaire, administered twice each school year. Children filled them one month before the complex of 5 lectures (pre-tests) and 4−5 months after the last lecture (post-tests). At 1st and 2nd grades, the data were collected by structured interview with teachers and painting pictures of "healthy" and "unhealthy" life-style factors, and then coded for PC by the same researcher. Some questions were repeatedly asked at each stage:

- exposure to smoking environment (smokers in close and extended family, rules about smoking at homes and in the cars);
- opinions about adult men/women smoking (admiring – neutral – critical);
- actual speculations about himself/herself smoking in the future (will smoke – will not smoke – does not know yet);
- first experiments with smoking (single attempt – repeated smoking).

Beside the above, some questions were asked only on some occasions to obtain the feedback information about special topics (change of coming into contact; smoking and other drugs consumption; the reasons why to smoke and why not to smoke; sources of cigarette(s) and surroundings of the first attempts to smoke; the subjective perceptions after smoking the first cigarette).

The whole sample of participants was divided into four groups, according to intervention and family backround:

- programme children from smoking families "P–S"
- control children from smoking families "C–S"
- programme children from non-smoking families "P–NS"
- control children from non-smoking families "C–NS".

The differences in the frequency of children's answers were analysed using the tests in statistic Epi Info software, version 6.04a (chi-square, Mantel Haenszel, Yates, Fisher).

RESULTS

The number of children who filled in questionnaire at different stages varied from 860 to 910, almost equally in programme and control group; the reasons for the different numbers of filled questionnaire at different times were due to absence of some children at school when the data were collected. No one refused to participate.

The exposure of children to smokers within their families was extremely high: 28% of children have smoking parents, another 9% of children have both smoking parents and grandparents, and 22% of children have smoking grandparents (together 59%). Additionally, about 17% of children are in frequent contact with other smoking relatives (siblings, uncles, aunts). In the programme group, the number of children reporting smoking relatives was significantly higher than in the control group (80.1% vs. 73.0%, $p<0.01$) as well as the number of those reporting their often/daily exposure to secondhand smoke at homes and/or in cars (49.5% vs. 40.0%, $p<0.01$). Even in families in which the adult members do not smoke, children may be occasionally exposed when smoking is allowed to visitors; in our study, about 10% of children described such situations.

Smoking families significantly influenced the children's seeking of smoking friends (40% vs. 17%, $p<0.01$). Smoking relatives frequently offer to children a chance to train skills to manipulate cigarettes. Even in pre-school age, about 10% to 15% of children in our group whose parents smoked were asked to carry or light cigarettes, compared to 2−3% children of non-smoking parents.

Neither initial, nor followed-up knowledge about health risks of smoking reported by children were influenced by smoking family backround. There were no differences between programme and control group in the frequency of free formulated answers on questions about smoking and its health hazards when the programme began. However, the programme has significantly increased the scope of participant's knowledge on the subject (Table 1). Similarly, children from the programme group were better informed that majority of smokers can be dependent (80.2% vs. 67.3%, $p<0.001$).

Attitudes to smoking were found out by the "classification" of smoking of adult men and women: children expressed their admiration (marks 1+2), criticism (marks 4+5), and neutral (mark 3) opinions. There were clear associations with the family environment: children of smoking parents were more tolerant and less of them were critical. In the groups of children from non-smoking families, the frequency of critics was significantly higher for all the time of the study ($p<0.05$ and 0.01, respectively) (Fig. 1, 2). Children from the programme group contrary to those from the control one often described their critical attitudes than in control group, but significant differences were seen only in the 4th grade (more critics of women's smoking, $p<0.01$) (Fig. 1).

Table 1. *Frequency of answers about health risks of smoking (%)*

Topics	Pre-test			Post-test		
	Programme	Control	p<	Programme	Control	p<
Smoking is a risk for health	97.8	97.9	ns	98.2	99.0	ns
Smoking causes						
Cancer	23.7	23.2	ns	55.2	31.3	0.001
Heart diseases	6.5	2.7	ns	64.1	16.5	0.001
Lung diseases	26.6	22.1	ns	70.5	30.1	0.001
Teeth diseases	2.6	1.2	ns	26.4	0.6	0.001

Notice: the statistic significance of differences between programme and control groups

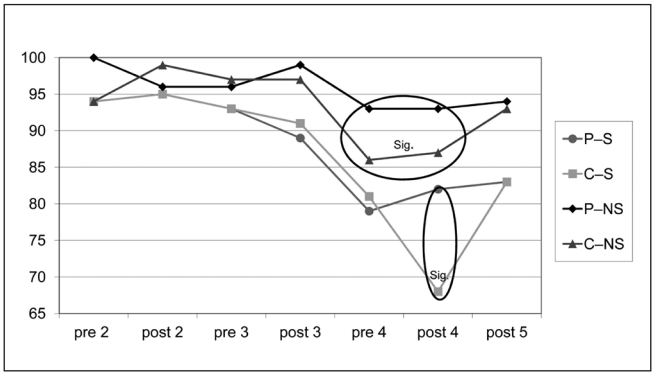

Fig. 1. *Critics of women's smoking.*

Symbols:
P–S programme group of children from smoking families
C−S control group of children from smoking families
P–NS programme group of children from no-smoking families
C–NS control group of children from no-smoking families
The significant differences in the frequency of critics between children from no-smoking and smoking families occurred at the 3rd grade (from the post-test 3, p<0.01). The positive effect of the programme was seen during the 4th grade, when the numbers of critics were significantly higher in the programme groups (p<0.05; 0.01 respectively.)

The continual decrease of critics in follow-up measurements was matched by the enhanced number of admirers (especially children from smoking families) and indifferent opinions (namely children from no-smoking families).

The attitudes to smoking were also measured by children's actual intentions about their smoking in the future. As in previous case, number of "future no-smokers" has decreased in time. Significantly less frequent answers "I will not smoke" were described by children from smoking families (p<0.01); differences between programme and control groups were not significant (Fig. 3).

In all measurements (except of the post-test 2), the highest prevalence of those who will like to smoke in the future was in the programme group of children from smoking families. While the number of "future smokers" was stable in groups of children from non-smoking families, the frequency of children from smoking families significantly increased within the period between post-test 3 and post-test 5, both in the programme and control groups (p<0.01) (Fig. 4).

In all four analysed groups, the almost linear increase of experimentations with cigarette smoking in the follow-up

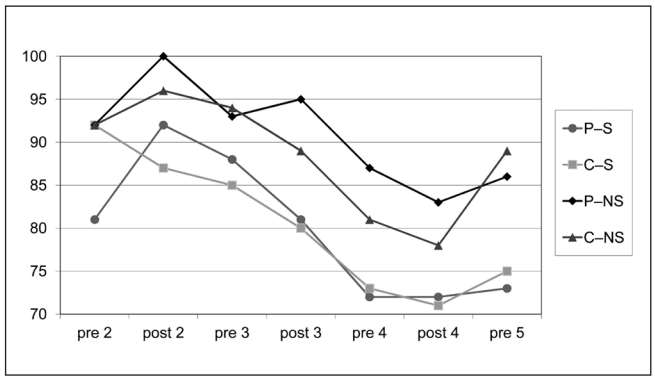

Fig. 2. *Critics of men's smoking.*

Symbols:
P–S programme group of children from smoking families
C−S control group of children from smoking families
P–NS programme group of children from no-smoking families
C–NS control group of children from no-smoking families
The lowest frequency of critics at the beginning of the measurements was in the programme group of children from smoking families (p<0.05). Later on, no influence of programme on children from smoking families was seen. The number of critics from no-smoking families was significantly higher from the pre-test at 3rd grade (p<0.05), but the differences between programme and control groups were not significant.

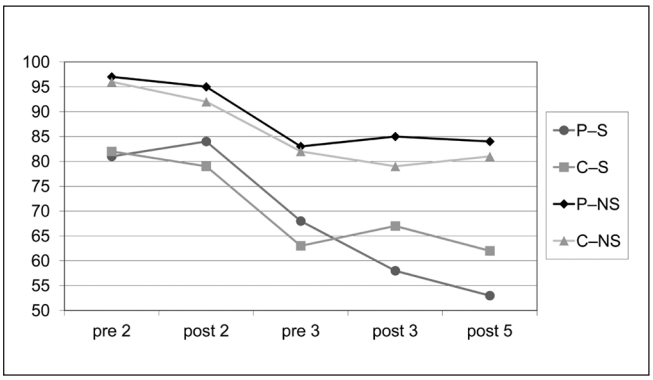

Fig. 3. *The intention "not to smoke in the future".*

Symbols:
P–S programme group of children from smoking families
C−S control group of children from smoking families
P–NS programme group of children from no-smoking families
C–NS control group of children from no-smoking families
The significantly more children from no-smoking families declared their willing "not to smoke in the future" at each measurement, compared with children from smoking families (p<0.01). The differences between programme and control groups were not significant.

Table 2. *Smoking initiation (% of the whole groups of children)*

Time of the measurement	Smoked	Smoked repeatedly	Increasing of smokers
pre-test 2	8.5		
post-test 2	8.7		+0.2
pre-test 3	13.4		+4.7
post-test 3	14.7		+1.3
pre-test 4	22.9	6.8	+8.2
post-test 4	23.1	10.3	+0.2
pre-test 5	28.3	13.0	+5.2
post-test 5	32.6	15.4	+ 4.3

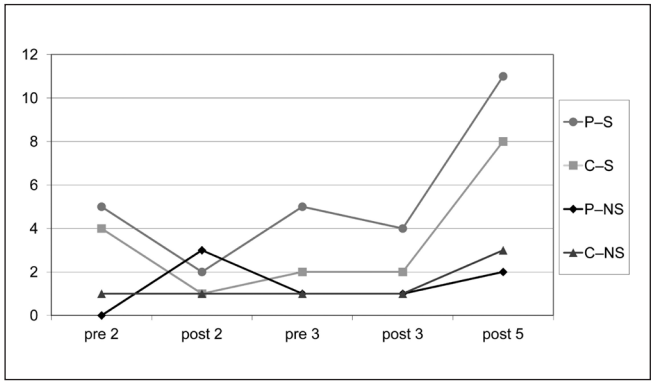

Fig. 4. *The intention "to smoke in the future".*

Symbols:
P–S programme group of children from smoking families
C−S control group of children from smoking families
P–NS programme group of children from no-smoking families
C–NS control group of children from no-smoking families
In all measurements (except of the post-test 2), the highest number of those who will like to smoke in the future were in the programme group of children from smoking families. In the period between the post-test 3 and post-test 5, the significant increasing of "the future smokers" occurred among children from smoking families ($p<0.01$), while the trends remained stable in the groups of children from no-smoking families.

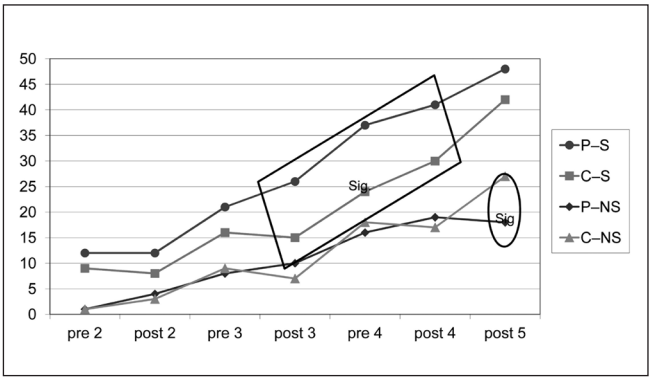

Fig. 5. *Smoking attempts.*

Symbols:
P–S programme group of children from smoking families
C−S control group of children from smoking families
P–NS programme group of children from no-smoking families
C–NS control group of children from no-smoking families
Almost linear increasing numbers of those who tried to smoke was seen in all groups. The prevalence of initiators was the highest in the programme group of children from smoking families in all measurements, event in the comparison with the control group: the differences were significant during the period from the post-test 3 to the post-test 4. The beneficial effect of the programme has occurred at the post-test 5, when the significantly lowest prevalence of smokers was in the programme group of children from no-smoking families.

monitoring was seen (Fig. 5). Trends of smoking children were steeper in groups from smoking families and significantly more often smoked children from programme group (at grade 4th; $p<0.05$). The programme had one positive effect in groups from non-smoking families, reporting significantly lower number of experiments with smoking in the programme group ($p<0.05$).

While in the 2nd and 3rd grades children were asked if they ever tried to smoke, even only one puf, in the 4th and 5th grades, children described if they had only one single attempt or if they had smoked repeatedly (Table 2). Smokers in 2nd grade were only children having smoking parents. The step increase of the number of initiators occurred always between the last post-test and next pre-test during the summer holidays.

DISCUSSION AND CONCLUSIONS

The school-based educational programme "Non-smoking Is Normal" is one part of the unique set of anti-smoking educational programmes designed in the Czech Republic targeting children from pre-school age to secondary school age. It focuses on influencing the way of life among younger school children aged from six to eleven. Using intervention and the control groups of children makes possible to monitor developmental trends of certain aspects of the risk behaviour, their determinants and their accumulation at a time at which the children are still influenced to a significant extent by their families and schools.

To explain the health risks of smoking to such small children, stories and marionettes (Heart, Tooth, Brother Lungs, and Cigarette) were used for the personalization of the problem. The Squirrel Věrka accompanied lectures during the first three years as a symbol of health. When children became older, the Faust Story was used to explain the problem of addiction: Devil (tobacco) can offer some benefits and pleasures, and asks the highest price for such services in the future – life. Such approaches very successfully increased children's knowledge in the programme group.

Better knowledge about health risks of smoking can enhance children's perceived susceptibility about this dangerous behaviour and influence their behavioural decision-making processes (15). Unfortunately, many children, especially those who are living in a smoking environment, do not believe that the long-term health serious risks do exist (8). Therefore, smoking health related problems should be stressed upon when designing school-based

programmes (12). It also seems that the emphasis on the harmful effects of passive smoking is better approach. In a longitudinal study, adolescent perceptions of passive smoking risks deterred from their taking up smoking. Adolescents who reported the highest estimates of risks for personal and parental exposure to second-hand smoke were 0.25 (and 0.26, respectively) as likely to smoke as those who provided the lowest estimates of such risk. These effects were over three times as large as an influence by smoking peers. On the contrary, the perception of theoretical second-hand smoke risks did not have such an effect (16). Thus, communicating and personifying the risks associated with second-hand smoke may be an effective part of antismoking educational strategies. The approach about concern both for one's body and well-being and also for risks posed upon people within a person's social environment is included in the Health Beliefs Model (16).

Although education is the basis for the rational and autonomic choice of decision, it is not a sufficient factor for actual and future behaviour. The opinions and attitudes express the view of the person on the positives and negatives of certain behaviour. They can help a great deal in decision making because they include not only the cognitive and rational points of view, but also the affective − emotional levels. The social influences by ideas, feelings, actions and norms of others are also very important (17).

It is generally accepted that before becoming a daily smoker, the most people move through the stages from contemplation, initiation of first cigarette smoking, experimentation with repeated smoking and regular smoking which is infrequent at the beginning (18). Several studies reported that the exposure of children to second-hand smoke in their homes and/or also in cars is significantly associated with both initiated, experimented, and current smoking (19–22). On the other hand, household smoking bans can send an anti-smoking message to children which may lead to stronger perceived risks and unacceptability of smoking with consequent lower smoking prevalence (23, 24). Previous research has discussed the potential reasons for the associations between exposure of children to second-hand smoke and their active smoking: besides the role of the adult smokers' model and societal acceptance, an increased susceptibility for nicotine dependence is suggested (25).

The educational programme "Non-smoking Is Normal" has confirmed previous foreign results. It had only a partial effect on attitudes and behaviour of children in the intervened group. Although the signs of higher level of critics in the programme group were seen all the time, significant influences were found only in the 4th grade among children from non-smoking families. Similar trends were seen in monitoring of children's intentions about their smoking in the future and their initiation and experimentation with smoking. The school intervention could not break the power of the family smoking environment. The other signs of the family influence are the step-increasing numbers of children's experiences with smoking which repeatedly have occured during summer holidays.

Smoking in homes and/or in cars are the factors fully controlled by parents and therefore modifiable. Results about links between exposure of children to second-hand smoke and their both poorer health and active smoking are consistent. In spite of common acceptance of higher children's vulnerability to passive smoking, previous classification of second-hand smoke as a "class A" human carcinogen (26), traditions of individualism and autonomy present serious barriers to effective reduction of children's exposure to passive smoking in their homes and cars. Second-hand smoke in private homes remains unregulated and home smoking restrictions are applied only on a voluntary basis (27). A pro-smoking social environment has also decreased the tobacco control efforts. Thus, there is an urgent need to reduce the exposure of children to such harmful environment using the wide mass media campaigns and introducing appropriate legislation (22, 28–30).

We could confirm that smoking in families decreased the efficacy of anti-smoking intervention targeted on children at school age.

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