



THE ASSOCIATION BETWEEN ILLITERACY OF PARENTS AND REGULAR EXPOSURE OF THEIR CHILDREN TO ENVIRONMENTAL TOBACCO SMOKE AT HOME

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ABSTRACT

Background: Cigarette smoking is a significant problem among both illiterate and educated people. However, it is unknown whether parental education plays a role in the prevention of passive smoking at the presence of their children. The aim of this study is to investigate the relation of parental education and passive smoking of their children and to assess parental knowledge about the adverse health effects of passive smoking on the children. **Methods:** A total of 159 primary school-pupils, 9 to 14 years old, participated in the study. All the pupils were not active smokers. Parents of each pupil filled a questionnaire requesting information about their smoking habits, their educational attainment, whether their children are regularly exposed to environmental tobacco smoke at home or not, and their awareness about the hazards of passive smoking on their child's health. **Results:** A single or both parents were responsible for 70% of second-hand smoke at home and close relatives for the rest. The relation of illiteracy of one or both parents and passive smoking of their child was statistically insignificant. The negative effects of passive smoking on a child's health were known to the majority of all parents in the study group with an insignificant difference between the educated and the non-educated ones. However, awareness of the negative effects on pregnancy and fetal health was significantly higher among the fathers of the non-smoking pupils than the fathers of the passive smokers ($P < 0.001$). **Conclusion:** Illiteracy of the parents has no association with passive smoking of their children and it is not related to a reduced awareness of the adverse effects of the second-hand smoke on child's health. Our results suggest that health education alone is not sufficient for the prevention of cigarette smoking at the presence of children. New legislations with more strict sanctions should be considered to prohibit smoking at the presence of children.

KEYWORDS: Passive smoking, Children, Parents, Illiteracy

INTRODUCTION

Tobacco smoke remains one of the most common avoidable causes of premature death. Many of the chemical substances in the cigarette smoke affect the physiology of most systems in the body. These include particulates (like nicotine and tar) and gases (like carbon monoxide, ammonia, and dimethylnitrosamine). Nicotine which is a weak alkaloid is the most addictive substance in the tobacco smoke. It takes only few seconds to reach the brain following its absorption in the respiratory system. It acts on the cholinergic receptors of the body causing many biological effects.^[1] Carbon monoxide binds tightly to haemoglobin in the red blood cells causing reduction in the oxygen carrying capacity of the red blood cells and therefore predisposes to polycythaemia.^[2] Nitrogen oxides and other oxidants participate in the generation of airway inflammation induced by the cigarette smoking.^[3] The inflammation results in increased mucus production, decreased ciliary movement, increased mucosal permeability to allergens

and therefore increased IgE antibodies & eosinophil count.^[4]

Despite increasing information about the adverse health effects of smoking and the worldwide smoking bans in public places, the use of tobacco continues to increase, especially in the developing countries.^[5] Previous studies in the Sudan showed that about a quarter of the school pupils are regularly exposed to environmental tobacco smoke at home and a considerable proportion of all pupils have one or more parents who are active smokers.^[6] Because many young children spend a long time inside their houses, they may have significant exposure to environmental tobacco smoke there.^[7] The adverse effects of such exposure were well documented in many countries, including the Sudan.^[8-12] Passive smoking causes increased incidence of respiratory tract infections, asthma, impaired lung function, middle ear problems, sudden infant death syndrome, altered lipid profile, and childhood cancers. It is worth noting that

even occasional low level of exposure to cigarette smoke seems to be associated with negative effects on the respiratory system.^[13]

While a long-lasting poor health in childhood is associated with a lower educational attainment, few studies investigated the relationship between parental level of education and passive smoking among their children. Although education is supposed to be associated with awareness of the adverse health effects of passive cigarette smoking, it is unknown whether it plays a role in the prevention of childhood exposure to environmental tobacco smoke in the households. The aim of this study is to investigate the relation of illiteracy of the parents and passive smoking of their children and to assess their knowledge about the adverse health effects of passive smoking on the child's health.

METHODS

A total of 159 school-pupils, 9 to 14 years old, participated in this study. All the pupils live in the same square near their school. All their parents were generally of the average socio-economic class. The fathers were manual workers or employees whereas the majority of the mothers were homemakers. The parents of each pupil

responded to an anonymous questionnaire that requested information about the pupil's age, health problems, smoking habits, exposure to environmental cigarette smoke at home, frequency of exposure, smokers in the house, and knowledge about the adverse effects of passive smoking on child's health. The collected data was analysed using the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL), version 20. The chi square test was used to test distribution of categorical variables. Statistical significance was accepted when P value was less than 0.05. The research conforms to the ethical principles of medical research developed by the World Medical Association Declaration of Helsinki.^[14] Approval was obtained from the Ministry of Education/ Unit of School Health. Permission letters were submitted to the director of the selected school and written consents were obtained from the parents.

RESULTS

Fathers were the major source of environmental tobacco smoke at home (68%), mothers were responsible for 2%, and relatives like brothers and uncles were responsible for about 30% of the indoors tobacco smoke. Other demographics are presented in Table 1.

Table 1: Demographics

Character	Group	Passive smokers n= 71 (100%)	Non smokers n= 88 (100%)	P value
Age	9-11 (y)	31 (44%)	35 (40%)	0.631
	12-14 (y)	40 (56%)	53 (60%)	
BMI	<18.5	58 (82%)	70 (80%)	0.723
	18.5-25	12 (17%)	15 (17%)	
	>25	1 (1%)	3 (3%)	
Source of smoke	Father	48 (68%)	0	0.000
	Mother/ ± father	2 (2%)	0	
	Relatives	21 (30%)	0	
Academic performance	Excellent	8 (11%)	15 (17%)	0.456
	Good-Very good	35 (49%)	45 (51%)	
	Weak	28 (40%)	28 (32%)	

Table 2 shows the relation between educational attainment of the parents and passive smoking within the children. About 13% of the passive smokers' parents and 18% of the non-smokers' parents were illiterate. The association with passive smoking was statistically insignificant.

Table 2: Parental educational attainment and passive smoking among the school pupils

Education	Passive smokers	Non-smokers	P value
Illiterate	9 (13%)	16 (18%)	0.343
Educated	62 (87%)	72 (82%)	
Total	71	88	

Table 3 shows that the health hazards of passive smoking were known to 76% of the passive smokers' parents and 85% of the non-smokers' parents. The difference between the two groups was statistically insignificant. However, parental awareness of the negative effects that could be caused by passive smoking during pregnancy was higher among the group of the non-smokers (100%) compared to the other group (80%); $P < 0.001$ (table 3).

Table 3: Awareness of the adverse health effects of passive smoking

Awareness of adverse health effects		Passive smokers	Non-smokers	P value
to general health of children	Yes	54 (76%)	75 (85%)	0.308
	No	4 (6%)	4 (5%)	
	Not sure	13 (18%)	9 (10%)	
to pregnancy/ fetus	Yes	57 (80%)	88 (100%)	0.000
	No	14 (20%)	0 (0%)	

Table 4 describes the insignificant difference between the two groups in the frequencies of hospital admissions, upper respiratory tract infections, and lower respiratory tract infections.

Table 4: Hospital admissions and respiratory illnesses during the previous year

Factor		Passive smokers n= 71	Non-smokers n= 88	P value
Hospital admissions	Yes	15	21	0.708
	No	56	67	
Upper respiratory tract infections	Yes	31	28	0.288
	No	40	60	
Lower respiratory tract infections	Yes	09	13	0.444
	No	62	75	

DISCUSSION

Tobacco consumption is responsible for about six million deaths each year, including more than 600,000 people who die from passive smoking.^[15] The practice of smoking indoors carries a great risk to the health of children because children spend a long time in their homes and therefore inhale large quantities of the tobacco smoke. The risk will be exaggerated in the presence of poor housing ventilation since this prevents exchange of the indoor air with that of the outdoor, thus increasing the concentration of the smoke particles and prolonging the duration of exposure. Educated parents are supposed to have adequate knowledge and high degree of awareness about the adverse effects of tobacco smoke, especially on the health of their children. However, our findings suggest an insignificant association between parental educational attainment and passive smoking. Another finding is the insignificant difference between parents of the two groups (the passive smokers and the non-smokers) in their awareness about the complications of passive smoking. These results indicate that both educational attainment of the parents and their knowledge about the adverse effects of passive smoking on child's health do not prevent them from smoking at the presence of their children. Similar results were reported by Liem and his colleagues who found that parents of asthmatic children do not quit smoking or stop smoking at home at the presence of their asthmatic child.^[16] Even research trials with interventions to ban parental smoking at home found that parents are unlikely to change their practice in spite of their knowledge about the possible complications on their child's health.^[17,18] On the contrary, Crone and his colleagues reported that educational programs that focus on parental education on the complications of passive smoking on infant health does work.^[19] In our study, the comparison between parents of the two groups regarding their awareness about the tobacco smoking complications during pregnancy showed that a

significant number of the passive smokers' parents were unaware about these complications. The well-known complications include miscarriage, low birth weight, lung function impairment, and increased childhood infections. It is worth noting that, the tobacco smoke has a suppressive effect on the protective functions of the airway epithelium, alveolar macrophages, and other cells of the innate immunity.^[20] In addition, it has a negative effect on the humoral immunity and a direct promoting effect on the microbial pathogens.^[20] These effects explain why both cigarette smokers suffer from a higher incidence of infections when compared with the non-smokers. However, in our sample, the insignificant difference between the two groups in the frequency of hospital admissions and the respiratory tract infections can be explained by other factors that could have negative effects on the general health of all the pupils, irrespective of their smoking status. These factors may include the nutritional status of the pupils, the crowded classes, and the state of ventilation in their classes.

One of the major limitations in this study is the lack of an objective measure to test awareness of the parents about the negative health effects of the tobacco smoke on the child's health. Another limitation is the recall bias about the tobacco smoke exposure.

CONCLUSION

In conclusion, our findings suggest that neither parental educational attainment nor their knowledge about the adverse effects of passive smoking on child's health would prevent passive smoking in children. New legislations with strict sanctions should be considered to prohibit smoking indoors, especially at the presence of children.

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