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Prevalence and respiratory function study of passive child smokers in the city of Santa Fe, Paraná and its association with socioeconomic level

Prevalência e estudo funcional respiratório de crianças tabagistas passivo do município de Santa Fé, Paraná e sua associação com nível socioeconômico

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Abstract

When children are exposed to tobacco, they are considered passive smokers and may have frequent respiratory complications. This study aimed to analyze the prevalence of passive smoking in schoolchildren and correlate it with the socioeconomic level of the parents / guardians, as well as to evaluate the lung function and respiratory muscle strength of passive smokers. First, the parents / guardians of the children filled out questionnaires about smoking habits and socioeconomic status. Subsequently, the students were classified as passive smokers or not exposed to tobacco, and submitted to a physical therapy evaluation, manovacuometry, and spirometry. In this way, the study was carried out with 98 children, 28.6% of whom were classified as passive smokers, with at least one smoker in the family, and 71% did not present tobacco exposure. The passive smokers' group had significantly lower MIP, FVC and peak expiratory flow than the group not exposed to tobacco. It was concluded that the prevalence of passive smoking among schoolchildren and the low level of schooling of the heads of the families of the passive smoking group was high. Both groups (passive smokers and the group not exposed to tobacco) presented a reduction in forced vital capacity, peak expiratory flow, and an increased Tiffeneau index; however, when compared, they did not present statistically significant differences.

Keywords: Smoking. Physical therapy. Respiratory System. Spirometry. Health Promotion.

Resumo

Quando as crianças são expostas ao tabaco são consideradas tabagistas passivos e podem apresentar complicações respiratórias frequentes. Este estudo teve como objetivo analisar a prevalência do tabagismo passivo em escolares e correlacioná-la com o nível socioeconômico dos pais/responsáveis, bem como avaliar a função pulmonar e força muscular respiratória das crianças tabagistas passivas. Primeiramente, os pais/responsáveis das crianças preencheram questionários sobre hábitos de fumar e status socioeconômico. Posteriormente, os alunos foram classificados como tabagistas passivos ou não expostos ao tabaco, e submetidos à avaliação fisioterapêutica, manovacuometria e espirometria. Desta forma o estudo foi realizado com 98 crianças, sendo 28,6% classificadas como tabagistas passivos, com presença de no mínimo um tabagista na família, e 71% não apresentaram exposição ao tabaco. O grupo dos tabagistas passivos apresentou a PImáx, CVF e Pico de fluxo expiratório significativamente menores quo o grupo não exposto ao tabaco. Conclui-se que foi elevada a prevalência do tabagismo passivo entre os escolares e baixo nível de escolaridade dos chefes das famílias do grupo tabagista passivo e ambos os grupos (tabagistas passivos e outro grupo de não expostas ao tabaco) apresentaram redução na capacidade vital forçada e pico de fluxo expiratório e aumento do índice de Tiffeneau, no entanto quando comparados, não apresentaram diferenças estatisticamente significativas.

Palavras-chave: Tabagismo. Fisioterapia. Sistema Respiratório. Espirometria. Promoção da Saúde.

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INTRODUCTION

Smoking is considered to be the leading cause of preventable death in the world[1], with an estimated one billion and 200 million of people who smoke[2]. It indirectly affects other individuals, with reports of two billion passive smokers, and of these, 700 million are considered children. When passive, smoking is defined as inhalation of the smoke and toxic substances of the tobacco released by the active smoker[3].

According to Gonçalves-Silva et al.[4], the smoke released by the active smoker ends up being a major household polluter, causing damage to the residents' health. There is evidence that respiratory morbidity is more related to maternal than paternal smoking, and this occurs both during pregnancy and after birth[5]. During pregnancy, the main risks are premature delivery, low gestational weight, and perinatal death, such as after birth[5].

After birth, in mothers who smoke, the child will suffer all the effects of cigarette smoke and consequently receive nicotine through breast milk, and in some cases, there may be intoxication causing agitation, vomiting, diarrhea, and tachycardia. In mothers who smoke 40 to 60 cigarettes, the consequences will be more severe for the child, such as pallor, cyanosis, tachycardia, and respiratory arrest attacks soon after breastfeeding[6]. Berto et al.[7] reported a low presence of some nutrients (folic acid, vitamins A, C, and B12) in the bloodstream of passive smokers, especially in children who have smoker parents or caregivers, due to the oxidative stress caused by daily exposure to nicotine.

Respiratory complications end up being more frequent due to the fact that the child's respiratory system is developing[8], and since it continues even after birth, alveolar multiplication can be observed, both in size and number, up to eight years of age[9].

In postnatal life, the expansion of the gas exchange sites occurs due to alveolarization, about 80 to 85% of the alveoli are formed in this period. It is believed that the fastest phase of alveolar multiplication occurs in the first two years of life, followed by a slower multiplication period up to five years of age. During the rapid multiplication phase, alveolarization occurs at the expense of the secondary septa proliferation, thanks to the disposition of elastin. In the slow phase, it is believed that alveolarization of the distal bronchioles occurs, associated with the centripetal expansion of the gas exchange region; that is, the transformation of the respiratory bronchioles into alveolar ducts, and of the terminal bronchioles into respiratory ones. During the postnatal phase of pulmonary growth, a larger growth is observed both in number and size of respiratory structures (respiratory bronchioles, alveolar ducts, and alveoli) compared to the conducting airways[9].

Smokers who expose their children to smoking increase their incidence of respiratory infections by up to three times[10], with bronchitis, pneumonia, bronchiolitis and asthma being the most frequent complications. Studies have also shown a delay in the learning of seven-year-old children who mothers smoked during pregnancy[2].

A study conducted by Araujo et al.[10] compared the prevalence of symptoms of respiratory diseases in 217 schoolchildren who were passive smokers or non-smokers, with ages between seven and 10 years, of both sexes. They were evaluated by means of the questionnaire on smoking habits of their family nucleus. These authors found that 48.85% of the children had a history of smoking habits in the family and among the children exposed to smoking, 26.41% presented coryza and 24.52% rhinitis.

Considering the above, the objectives of this study were to analyze the prevalence of passive smoking in elementary school students of a public school in the city of Santa Fe, located in the northwest of the state of Paraná, Brazil, and to correlate it with the socioeconomic level of parents / guardians. In addition to this, to evaluate and compare lung function and respiratory muscle strength of children classified as passive smokers and those not exposed to tobacco.

METHODS

A cross-sectional, population-based study was conducted with 276 schoolchildren, aged six to nine years old, enrolled in a public

elementary school in the city of Santa Fe - PR, Brazil.

The study was approved by the Research Ethics Committee (CEP) of the University Center of Maringá (UNICESUMAR) (report no. 324.050 / 2013) and by the directory team of the research site. Both the children and their responsible parents were informed about the project, and those responsible signed the Informed Consent Form (ICF).

As inclusion criteria, the child should be between six and nine years of age and be enrolled in elementary school. Questionnaires were used to assess the socioeconomic conditions of family[11], and a structured questionnaire containing questions related to smoking habits of parents and/ or guardians, and major complications that the child could present resulting from the habits of being passive smokers (Questionnaire for Passive Smokers) prepared by the authors themselves.

In addition to the questionnaires described, a spirometer (Micro Medical Ltda.) was used to evaluate lung function, a manovacuometer (MICRO MPM) for respiratory muscle strength analysis, and the WELLY® brand scale was used for the anthropometric evaluation.

The questionnaires were delivered to parents and/ or guardians in closed envelopes to be self-filled. The structured questionnaire was completed by parents and children together. The students were asked to return them to the school within 48 hours of receiving them so that the necessary analyzes could be carried out.

After the analysis of the questionnaires, the children were divided into two groups: passive smokers and another group of those not exposed to tobacco, and then sent to the physical therapy evaluation, which was composed of completing the previously elaborated evaluation form, manovacuometry, and a pulmonary function test. The physical therapy evaluation form consisted of anthropometric evaluations (weight and height), and questions about family and personal history.

To perform the manovacuometry, the child remained seated in a chair with their back supported, upper limbs resting on their thighs, feet resting on the floor so as to be comfortable and relaxed, and after receiving the instructions the apparatus was held by the evaluator. For MIP (maximal inspiratory pressure) measurements, the subject was instructed to perform a maximum oral expiration and then take a deep breath. For MEP (maximal expiratory pressure) a maximal oral inspiration was performed followed by a complete expiration following the criteria indicated by Rodrigues and Veigas[12]. Measurements of MIP and MEP were performed three consecutive times, with intervals of one minute to rest, and the highest value obtained was considered for analysis. If there was a difference greater than 10% between measurements, another measure was performed.

To compare the values obtained of each child with the normal values, the equation[13] was elaborated for the Brazilian population. For the evaluation of pulmonary function, spirometry was performed, where the positioning was the same as for manovacuometry. The parents / guardians along with the children were advised to avoid the intake of chocolate, soft drinks, and coffee prior to the examination, following the criteria of Dias et al.[14].

During the examination, the child was asked to inhale to their full lung capacity, and then to exhale intensively eliminating all the air from their lungs for six seconds. The test was repeated three consecutive times, with an interval of one minute to rest, the highest values were considered for analysis[14].

Descriptive and inferential statistics were used. Frequency and percentage were used for the categorical variables. For the numerical variables, the normality of the data was initially checked by means of the Kolmogorov-Smirnov test. Proving the normality of the data, the descriptive presentation in mean (x) and standard deviation (dp) was adopted. The independent Student's t-test was used to compare the variables weight, height, age, MIP, MEP, and spirometric values between the groups, and the dependent Student's t test was used for comparison within each group (passive and non-passive).

The chi-square test was used to compare the proportions of the variables sex, educational level, BMI, and PImax and PEmax Classification in relation to the groups. In all tests, a significance level of 5% was adopted, and the R program was used for the analyzes.

RESULTS

The questionnaires were delivered to the 276 enrolled children, of whom 179 were returned for analysis. Of these, 39 were excluded due to the absence of a signature on the ICF by the responsible ones, and 42 were excluded because they did not carry out all the evaluations. Thus, the study was carried out with 98 children, 28.6% of whom were classified as passive smokers and 71% did not present tobacco exposure (Table 1). Comparison of gender and schooling according to exposure to tobacco (passive or non-passive smokers) is shown in table 1.

The structured questionnaire was analyzed only for the children considered to be passive smokers, since the issues addressed were related to habits and information regarding tobacco, except question number 12. Regarding the number of smokers in the residence, 85.7% (24) reported the presence of 1 smoker and 10.7% (3) of 2 smokers. In 25.0% (7) of the cases the mother was a smoker and 25.7% (7) the father. When compared to the type of tobacco used, 78.6% (22) reported industrialized cigarettes, followed by straw cigarettes with 14.3% (Table 3).

When analyzing how many cigarettes the person smoked near the child 28.6% (8) reported one, and 28.6% (8) two cigarettes. Concerning the aggravation caused by cigarette smoke, 82.2% (26) reported feeling uncomfortable, and 7.1% (2) did not feel uncomfortable (Table 3).

When questions 7, 8, and 9 of the questionnaires were analyzed, it was found that 42.9% of the children remained for more than four hours near the active smoker, 57.2% smoked between one and two cigarettes, and the vast majority (92.9%) is disturbed by the smoke (Table 3).

Regarding BMI, the majority of the children in both groups presented adequate values. The group of passive smokers presented MIP, Forced Vital Capacity (FVC), and Peak expiratory flow (PEF) significantly lower than the group not exposed to tobacco. For MIP, the values reached were higher than expected. However, for FVC and PEF, the mean values expected were higher than those achieved. The Tiffeneau Index (FEV1 / FVC) presented an average value above the expected value. For the variables MEP and Forced Expiratory Volume in the first second (FEV1) there was no difference between the expected and achieved values.

In the group of children not exposed to tobacco, a significant difference was observed between MIP, MEP, with values higher than expected. However, for CVF and PEF, the achieved value was smaller than expected. For the FEV1 variable, there was no statistically significant difference.

Despite the statistically significant variations in the isolated groups, when compared, they did not present significant differences between any of the variables described in the previous paragraphs, both for the expected and for the performed ones.

Regarding the classification of manovacuometry, despite the non-significance between the groups, the passive smoker group 32.1% of individuals were classified as having muscle weakness, which was higher than that presented by the non-smoker group (28.6%).

Table 1 – Comparison of sex and level of education among the passive and non-passive smokers. Maringá, PR, Brazil, 2013.

Total		Passive Smokers		Non-Smokers		Total		p-value
		n	%	n	%	n	%	
		28	**28.6**	**70**	**71.4**	**98**	**100**	
SEX	Female	11	39.3	40	57.1	51	52.0	0.169 ns
	Male	17	60.7	30	42.9	47	48.0	

to be continued.....

...continuation - Table 1

Level of	Illiterate	8	28.6	1	1.4	9	9.2	**0.0006****
	4th Grade Elementary	1	3.6	10	14.3	11	11.2	
	Completed Elementary School	5	17.9	11	15.7	16	16.3	
	Completed High School	12	42.9	37	52.9	49	50.0	
	Completed Higher Education	2	7.1	11	15.7	13	13.3	

*significant result (p<0.05), by Chi-squared Test.

Table 2 – Characterization of the passive smoking population in exact numbers and percentage of individuals in relation to questions 3, 4, 5, and 6 of the structured questionnaire. Maringá, PR, Brazil, 2013.

Variable		Passive Smoker	
		N	%
		28	100
No. of smokers in house	0	0	0.0
	1	24	85.7
	2	3	10.7
	4	1	3.6
Who are the smokers?	Grandmother grandfather	6	21.4
	Grandfather/ grandmother/ uncle/ aunt	1	3.6
	Brother	2	7.1
	Mother	7	25.0
	Mother brother	1	3.6
	Father	7	25.0
	Father mother	2	7.1
	Uncle	2	7.1
Who are the smokers?	Straw cigarette	4	14.3
	Paper Cigarette	1	3.6
	Industrial cigarette/smoke	1	3.6
	Industrial cigarette	22	78.6
Smokes next to you?	No	15	53.6
	At home	11	39.3
	At home/indoor	1	3.6
	At home/in the car	1	3.6

Table 3 – Characterization of the passive smoking population in exact numbers and the percentage of individuals in relation to questions 7, 8, and 9 of the structured questionnaire, 2013. Maringá, PR, Brazil, 2013.

Variable		Passive Smoker	
		N	%
		28	100
How much time per day do you remain next to that person? (hours)	1	7	25.0
	2	3	10.7
	3	5	17.9
	> than 4	12	42.9
	Does not smoke near	1	3.6
How many cigarretes do they smoke near you?	0	5	17.8
	1	8	28.6
	2	8	28.6
	4	2	7.1
	More than 5	4	14.3
	40	1	3.6
When someone is smoking near you, does the smoke bothers you?	No	2	7.1
	Yes	26	92.9

DISCUSSION

In the study, the prevalence of passive smoking was observed in 29% of the children evaluated, differing from the results found by Gonçalves-Silva[4], who observed home smoking in 37.7% of the children. The WHO[1] warns that half of the world's children are involuntarily exposed to tobacco. In Brazil, the estimated number is 15 million passive child smokers.

Regarding the socioeconomic factors, the present study shows that when the group of passive smokers was compared with the group not exposed to tobacco, the former group presented a higher percentage of illiterate heads of the family (28.6%), corroborating with reports from Gonçalves- Silva et al.[15 16]. They reported that smoking is strongly influenced by socioeconomic variables, with a higher prevalence in households with lower family income, in which parents have low schooling, and in those in which the residents exercise less-qualified occupations.

When analyzing the weight, height, and BMI variables, the study showed homogeneity among the evaluated groups, with no statistically significant changes between the groups. 64.3% of the passive child smokers and 60% of those not exposed to tobacco presented adequate values for their age. This was contrary to the findings of Gonçalves-Silva et al.15, whose study was carried out with passive smoking children younger than 60 months old, and they observed that children under 5 years of age, of mothers who smoke, had below average weight and height. Gonçalves-Silva4 observed that children under 60 months of age at health clinics in Cuiabá, Mato Grosso (Brazil) exposed

to tobacco smoke had a reduction in the average height for their age when compared to others, disagreeing with the results found in the present study.

Concerning the number of smokers in the household, 85.7% reported the presence of only one smoker and 10.7% (3) of two smokers. Regarding the question "Who are the smokers?", 25.0% of the cases were their mothers, and 25.7% were their fathers. However, the study conducted by Gonçalves- Silva et al.[15] with 1437 children, reported that 35.8% lived daily with at least one smoker at home, 10.8% were exposed to maternal smoking, and 23.5% exposed to the paternal smoking; thus, differing from the results found in the present study, which showed a higher percentage of maternal smokers. According to Borges and Barbosa[17], over the last decades, smoking has increased among women.

When analyzing the number of cigarettes smoked near the child, the majority (57.2%) reported smoking one to two cigarettes a day. According to Bjartneit and Tverdal[18] the daily consumption of the active smoker is about 1-4 cigarettes.

Regarding smoking during gestation and breastfeeding, the mothers reported the presence of tobacco in 28.6% and 28.6%, respectively. According to Filho et al.[19], women who smoked during pregnancy or lived with a smoker may develop serious health risks for the fetus, since all the toxic substances in the cigarette pass through the umbilical cord. Gusmão Filho et al.[20] also reported that the fact that mothers smoke during pregnancy leaves children more pre-disposed to develop respiratory diseases.

In the present study, both groups had higher mean MIP values than expected. In the literature, there are studies that indicate that smokers may present a decrease in the strength of respiratory muscles[21-22]. In relation to MEP, only the group not exposed to tobacco (GNE) had an average value higher than expected, with a statistically significant difference. These data show a good level of respiratory muscle strength, a fact that may be due to the reduced time during the act of passive smoking, near to the active smoker.

The present study proved that both the passive smokers group (GTP) and the group not exposed to tobacco (GNE) had lower values of FVC and PEF, and FEV1/FVC higher values than expected; with a statistically significant difference. Thus, according to Silva et al.[23], these individuals can be classified as having restrictive ventilatory disorders, where they are characterized by a reduction in FVC and an increase in the FEV1/FVC ratio.

The results found do not corroborate with studies performed by Bulhões et al.[24] and Coelho et al.[25]. The former found a reduction in all spirometric variables, except for FVC in the group where the family had a smoking habit. Coelho et al.[25] observed the presence of pulmonary dysfunction in 37% of the 61 children evaluated, with obstructive disorders being the most frequent.

Among the limitations, one that stood out was the number of parents being illiterate, because they had difficulty in answering and understanding the structured questionnaire. In addition, the small sample size prevents us from inferring such findings in the study population. However, the present study contributes to highlight the harmful effects of smoking so that this information may be disseminated to the general population, as well as to prepare Health Promotion policies to this conent in a interdisciplinarity context.

CONCLUSION

Both groups presented normal values of respiratory muscle strength (inspiratory and expiratory), a reduction of FVC and PEF, and an increase in FEV1/FVC, but when compared with each other, there were no statistically significant differences.

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REFERENCES

1 World Health Organization. WHO report on the global tobacco epidemic, 2008: the MPOWER package. 2008.
2 Câncer INd. Tabagismo Passivo2003 23 july 2012. Available from: http://www.inca.gov.br/TABAGISMO/frameset.asp?item=dadosnum&link=mundo.htm.
3 Reichert J, de Araújo AJ, Gonçalves CMC, de Godoy I, Chatkin JM, Sales MdPU, et al. Diretrizes para cessação do tabagismo-2008. J. bras. de pneumol. 2008;34(10):845-80.
4 Gonçalves-Silva RMV, Valente JG, Ferreira MG, Sichieri R. Tabagismo no domicílio e desnutrição em lactentes. Rev. Nutr. 2009;22(1):19-27.
5 Pereira ED, Torres L, Macêdo J, Medeiros MM. Efeitos do fumo ambiental no trato respiratório inferior de crianças com até 5 anos de idade. Rev. Saúde Públ. 2000;34(1):39-43.
6 Ministério da Saúde. Efeitos da fumaça sobre a saúde da criança. Acesso em 23/07/2012. Disponível em: http://www.inca.gov.br/tabagismo/frameset.asp?item=passivo&link=crianca.htm.
7 Berto SJP, Carvalhaes MABL, Moura EC. Tabagismo, estado nutricional e hábitos alimentares em População adulta de um Município Paulista. Rev. Ciênc. Ext. 2011;7(1):57-70.
8 Garcia JD, Suter TC, Oliveira LC, Tutia MH. A influência do tabagismo passivo em crianças com doenças respiratórias da UBS da Vila Margarida de Ourinhos-SP: um estudo comparativo. Rev. Hórus. 2010;4:110-29.
9 Kopelman B, Miyoshi M, Guinsburg R. Desenvolvimento Pulmonar. In: Guinsburg R,editors. São Paulo: Atheneu; 1998. p. 9-10.
10 Araújo AMF, Silva AHMFT, Vabo RV. Prevalência de sintomas e doenças respiratórias em crianças na idade escolar, fumantes ou não-fumantes passivas. Pulmão RJ. 2006;15(1):16-9.
11 Brasil CdC. Critério de Classificação Econômica Brasil. Associação Brasileira de Empresas de Pesquisa (ABEP). 2008.
12 Rodrigues SL, Viegas CAA. Estudo de correlação entre provas funcionais respiratórias e o teste de caminhada de seis minutos em pacientes portadores de doença pulmonar obstrutiva crônica. J. Pneumol, 2002;28(6):324-8.
13 Wilson SH, Cooke NT, Edwards RH, Spiro SG. Predicted normal values for maximal respiratory pressures in caucasian adults and children. Thorax. 1984;39(7):535-8.
14 Dias RM, Chauvet PR, de Siqueira HR, Rufino R. Testes de função respiratória à aplicação clínica com 100 exercícios para o diagnóstico. São Paulo: Atheneu; 2000.
15 Gonçalves-Silva RMV, Valente JG, Lemos-Santos MGF, Sichieri R. Household smoking and stunting for children under five years. Cad. Saúde Pública. 2005;21(5):1540-9.
16 Gonçalves-Silva RMV, Valente JG, Lemos-Santos MGF, Sichieri R. Tabagismo domiciliar em famílias com crianças menores de 5 anos no Brasil. Rev. Panam. Salud. Publica. 2005;17(3):163-9.
17 Borges MTT, Barbosa RHS. As marcas de gênero no fumar feminino: uma aproximação sociológica do tabagismo em mulheres. Ciênc. Saúde Coletiva. 2009;14(4):1129-39.
18 Bjartveit K, Tverdal A. Health consequences of smoking 1–4 cigarettes per day. Tobacco control. 2005;14(5):315-20.
19 Wunsch Filho V, Mirra AP, Mendoza LÓPez RV, Antunes JLF. Tabagismo e câncer no Brasil: evidências e perspectivas. Rev. bras. epidemiol. 2010;13(2):175-87.
20 Gusmão Filho HG, Alves DT, Lima VPd. Prevalência de crianças fumantes passivas em idade escolar na cidade de Diamantina-MG. Rev. Bras. de Fisioterapia. 2010;14(Suppl.):213-.
21 Macedo LB, de Souza Ormond L, Gomes LLA, Macedo MC. Tabagismo e força muscular respiratória em adultos. ASSOBRAFIR Ciência. 2011;2(2):9-18.
22 Pereira CAC. Espirometria. J Pneumol. 2002;28(Supl 3):1-82.
23 Silva LCC, Rubin AS, Silva LMC, Fernandes JC. Espirometria na prática médica. Revista da AMRIGS. 2005;49(3):183-94.
24 Bulhões C, Nogueira-Silva C, Ferreira D, Magalhães MJ, Peixoto V. Análise da exposição tabágica no domicílio e suas repercussões respiratórias em crianças do ensino básico da cidade de Braga. Revista Portuguesa de Medicina Geral e Familiar. 2007;23(6):673-84.
25 Coelho SA, Rocha SA, Jong LC. Consequências do tabagismo passivo em crianças. Ciência, Cuidado e Saúde. 2013;11(2):294-301.

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