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Research Article

Characterization of Children Under 15 Years Old Passive Smokers

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Abstract

Background: Passive smoking is defined as the inhalation of smoke from tobacco product by non-smokers who are in daily contact with smokers in closed spaces. Children, especially in early years of life, are a vulnerable population to environmental tobacco smoke.

Objective: To characterize children passive smokers under 15 years old.

Methods: An observational descriptive study was carried out in Guáimaro between June of the 2017 and May of 2018. The universe was formed by with 52 children less than 15 years old exposed to tobacco smoke.

Results: It found that the majority the children passive smokers belonged at the group of the one to four year old and male sex. A third part was exposed to the tobacco smoke during intrauterine live. Two fifth parts of the father were smokers and moreover, around half of children were exposed at 10 and 20 cigarette smoke. A third part suffered of bronchial asthma.

Conclusion: I concluded that there was predominance of the passive smokers in the preschooler children of male sex who were exposed to the tobacco smoke from intrauterine live. Children were exposed with most frequency to the tobacco smoke of the father. The total amount of cigarettes smoked per day in presence of the children oscillated between 10 and 20. The most frequent disease in the children exposed was the bronchial asthma.

Keywords: *Passive Smokers; Children; Respiratory Tract Infection*

Introduction

Breathing the smoke of other people's cigarettes is called passive, involuntary smoking or second-hand smoking, formerly also called environmental tobacco smoke, includes: the mainstream which is smoke that has been inhaled and exhaled by the smoker and the secondary current smoke of the burning tip of the cigarette [1].

Passive, involuntary or second-hand smokers have a significant morbidity and mortality due to exposure to smoking. Among the populations with the highest risk of exposure to passive smoking, the pediatric, especially vulnerable in the segment from the fetal period to the third year of life, stands out. This era is characterized by anatomical and physiological immaturity and longer exposure to the domestic environment. After the first years of life, the exposure time is reduced as a result of the start of school activity and the extension of the child's social circle. During this period the effects, usually cumulative to the previous ones, manifest themselves in the short, medium and long term [2].

Smoking is the cause of death of almost six million people a year, of which more than five million are direct consumers and more than 600,000 are non-smokers exposed to the smoke of others. Children are victims of 31% of the 600,000 premature deaths attributable to the smoke of others, or 170,000 occur in children [3].

At least about 700 million children, that is, almost half of the world's children, breathe air contaminated by tobacco smoke; while 40% of children have at least one smoking parent [4]. In England 12.7% of children are exposed to secondhand smoke, in Portugal 62.9% and in the United States 25.3% [5-7].

In Cuba, children are the most exposed to secondhand smoke, four out of ten children under 15 years old, live with more than one smoker. The provinces with the highest percentages of children exposed are Havana City with 67.5%, where two out of 10 children live with three or more smokers; Cienfuegos with 57.6%, Santiago de Cuba and Pinar del Rio with 56.1% each [8].

Infants and preschoolers, who spend most of their time at home and also have an immature organism, whose defense mechanisms are not sufficiently developed, are the most vulnerable to the harmful effects of environmental smoke. The harmful effects are more pronounced in maternal active smoking and its magnitude is proportional to the number of cigarettes consumed, as well as the number of active smokers at home. Respiratory disease in general, and episodes of bronchial obstruction in particular, constitute one of the main causes of outpatient consultation and hospitalization in exposed children. Exposure to tobacco smoke multiplies the risk of suffering a respiratory syncytial virus infection by four, increasing the risk of wheezing from 30% to 80% and asthma from 21% to 85%. The detrimental effects of exposure to environmental tobacco smoke in children also include growth and development disorders, neoplastic and cardiovascular diseases [9-11].

Characterize passive smokers under 15 years belonging to the municipality of Guáimaro.

Methodological Design

A descriptive observational study was carried out in the Guáimaro municipality in the period from June 2017 and May 2018 with the objective of characterizing passive smokers under 15 years of age. The study universe consisted of 52 children under 15 years of age who were passive smokers who met the established inclusion criteria.

Inclusion criteria:

1. Willingness of parents to participate in the investigation
2. Children exposed to tobacco smoke.
3. Parents aware of smoking in the presence of the child.

The information was obtained from the interview and the medical history. Once the child exposed to tobacco smoke was identified by living with a smoker, the mother or father was interviewed to determine the child's age, which was expressed in years (< 1 year, 1 - 4, 5 - 9, 10 - 14), sex (male/female), smoking during pregnancy (yes/no), household smokers (yes/no), the degree of kinship with the passive smoking child (mother, father, grandfather, other), number of cigarettes consumed per day in the presence of the child, the amount was obtained by adding the number of cigarettes for each active smoker per day (< 10, 10 - 20, > 20). Information on diseases related to exposure to tobacco smoke was collected from the individual health history. All information was collected in a data collection form that was prepared in response to the research objectives. Once completed, this instrument constituted the primary record of the investigation.

The information was analyzed with descriptive statistics and the results were presented textually and in simple frequency distribution tables, using summary measures for qualitative variables absolute frequencies and percentages. To carry out the study, the approval of the ethics and teaching and research committees of the institution was obtained. The mothers of the study were informed of the reasons for the study, their duties and rights, and their approval was requested in writing by signing the informed consent form to the mother.

Results

Table 1 shows the age and sex of passive smoking children. As observed 24 (46.2%) of passive smokers were between 1 - 4 years, 13 (25%) in the group of 5-10 years, 11 (21.2%) in the group of more than 10 years and 4 (7.6%) under one year. Regarding sex, 31 (59.6%) of those exposed to tobacco smoke were male and 21 (40.4%) of female. Table 2 shows that 17 (32.7%) of passive smokers were exposed to tobacco smoke during intrauterine life.

Age groups	Sex					
	Male		Female		Total	
	No	%	No	%	No	%
Under 1 year	2	3,8	2	3,8	4	7,6
1 - 4 years	13	25,0	11	21,2	24	46,2
5 - 10 years	9	17,3	4	7,6	13	25,0
10 - 14 years	7	13,5	4	7,6	11	21,2
Total	31	59,6	21	40,4	52	100,0

Table 1: *Passive smokers by age and gender groups.*

Maternal smoking during pregnancy	No	%
Yes	17	32,7
No	35	77,3
Total	52	100,0

Table 2: *Antecedent of maternal smoking during pregnancy.*

Table 3 shows that 21 (40.4%) passive smoking children lived with smoking parents, 14 (26.9%) with smoking mothers, 9 (17.3%) mother and father and 8 (15.4%) with others. Table 4 shows that 29 (55.8%) smokers who lived with the child consumed between 10 and 20 cigarettes in the presence of the passive smoker, 12 (23.1%) smoked less than 10 cigarettes and 11 (21.2%) more than 20 cigarettes.

Relationship	Frequency	%
Mother	14	26,9
Father	21	40,4
Mother - father	9	17,3
Other	8	15,4
Total	52	100,0

Table 3: *Parent of passive smoker with active smoker in the home.*

Number	No	%
< 10	12	23,1
10 - 20	29	55,8
> 20	11	21,2
Total	52	100,0

Table 4: *Number of cigarettes consumed in the presence of passive smoker.*

Table 5 shows the diseases suffered by passive smoking children, among the respiratory ones it can be observed that 17 (32.7%) suffered from bronchial asthma, 11 (21.2%) from recurrent wheezing 9 (17.3 %) of otitis media, 7 (13.5%) of pneumonia, 6 (11.5%) of bronchitis and 5 (9.6%) of laryngitis. It can also be seen that in 20 (38.5%) passive smokers non-respiratory diseases were diagnosed, 12 (23.1%) suffered from caries, 6 (11.5%) of obesity and 2 (3.9%) of arterial hypertension.

Respiratory diseases	No (52)	%
Bronchial asthma	17	32,7
Caries	12	23,1
Recurring wheezing	11	21,2
Otitis media	9	17,3
Pneumonia	7	13,5
Bronchitis	6	11,5
Obesity	6	11,5
Laryngitis	5	9,6
High blood pressure	2	3,9
No	6	11,5

Table 5: *Diagnosed diseases in passive smokers.*
Source: Individual health history.

Discussion

The result of this investigation is consistent with that of Siqueira Sigaud CH., *et al*. [12] in Brazil, which indicates an average age of participants of 3.5 years with a predominance of the male sex. However, Carvalho Ribeiro FA., *et al.* [13] at the University Center of Anapolis in Brazil when studying 95 passive smoking children reports that the average age was 9.2 years and 56% females, a result that differs from the result of the present study.

Regarding sex, the works of Valdés Naranjo SI [14] at the Center for Dental Clinics of the University of Talca in Chile and Sedano Cerrón MA [15] in Peru agree that the majority of the exposed were male.

Half of the pregnant women in the country are passive smokers at home and among them, four out of 10, exposed to more than one smoker. In six provinces: Pinar del Rio, Havana City, Matanzas, Holguín, Granma and Santiago de Cuba, pregnant women exposed to the highest level of exposure are reported: three and more smokers at home [8].

Mateos-Vílchez PM., *et al.* [16] reports that the prevalence of smoking during pregnancy was 21.6% in Andalusia, Spain and Nahabedian S., *et al.* [17] in Argentina, the prevalence of smoking during pregnancy in the surveyed sample of 678 pregnant women was 19.8%, lower percentages than found in the present study.

As for the smoking mothers during pregnancy, Sedano Cerrón MA [15] after studying 105 children diagnosed with childhood asthma notes that almost half of the series has a history of a smoking mother in pregnancy and highlights the statistically significant association with Childhood asthma.

Ciria Martín A., *et al*. [18] in a study in the Allergology service of the William Soler University Pediatric Hospital, it indicates that the history of a smoking mother during pregnancy increases the risk of asthma in the child by almost five times because the exposure to tobacco smoke from pregnancy in the intrauterine stage causes alterations in airway function, expressed by decreased expiratory flows,

higher prevalence of recurrent wheezing and formal diagnosis of asthma, bronchial hyperreactivity, higher frequency of hospitalization and recurrent respiratory infection.

Regarding the consumption of tobacco during pregnancy, Galbe Sánchez-Ventura J., *et al.* [19] mentions that it results in a lower weight of the fetus and a greater number of obstetric complications derived from fetal hypoxemia that leads to an increased risk of cell mutations, ectopic pregnancies, increased perinatal mortality, endocrine alterations and of the child's respiratory function.

According to Kandel ER., *et al.* [20] nicotine exposure during pregnancy activates the expression of nicotinic receptors that influence the child or adolescent to initiate tobacco use, this means that with passive exposure to tobacco smoke, addiction to tobacco has been programmed. Nicotine of the passive smoker and as soon as the conditions occur they will begin to consume.

Pregnant women who smoke are up to twice as likely to have preterm birth, up to 10 times more likely to have young children for their gestational age and 20 to 60% higher risk of stillbirth [21]. The relationship between maternal smoking during pregnancy with the onset of bronchiolitis and its severity is also known [22].

One of the effects of prenatal exposure to nicotine that appear later in life is the abuse of addictive substances during adolescence and that exposure to nicotine during adolescence can preferentially interfere with the limbic circuit, producing an increased vulnerability to nicotine addiction. It has also been shown that nicotine acts as a gateway for the subsequent consumption of cocaine and other drugs as observed in the study by Muñoz-Méndez J., *et al* [23].

Regarding the influence of passive smoking Ciria Martín A., *et al.* [18] when studying 320 children in the allergology office, he finds that 75% of the children are exposed to tobacco smoke from some of the family's smokers and 72.5% of them are their parents.

Concha Pérez JD., *et al.* [24] in a study carried out in Valdivia, he found that in 51.8% of the children's homes a smoking member was declared. Regarding the characteristics of families with smoking members, it is worth noting that 56% of fathers smoke and 53.5% of mothers.

In Sao Paulo, Brazil, Schvartsman C., *et al*. [25] points out that 57 children with wheezing were 55.9% of their parents and 52.5% of their parents. When comparing the risk of wheezing in the school-age child according to maternal and paternal smoking, he notes that maternal smoking is associated with the risk of recurrence of wheezing at the age of four years.

Sedano Cerrón MA [15] points out that 38.1% of passive smoking children have a smoking mother, 28.6% have the father and the same proportion have other relatives, thus concludes his report that having a habitual smoking mother is associated with Statistically significant with the presence of childhood asthma.

Galbe Sánchez-Ventura J., *et al.* [19] in a study in the city of Zaragoza finds that more than 50% of children under 14 years old lived in homes where tobacco smoke was present by some of their parents, and add that this exposure is equivalent to the consumption of four to ten cigarettes per day or between 60 - 150 cigarettes per year.

Passive smoking children are affected by their respiratory function and may suffer respiratory infections more frequently, a situation that increases when both parents smoke in the presence of the child, causing an average of 12.1 consultations/year, which is explained by the increase in bacterial adhesion to the respiratory mucosa, decrease in nasal mucociliary clearance and in the area and alterations in humoral and cellular immunity caused by exposure to tobacco smoke [26].

Maternal smoking has been associated with reduction in lung function, the development of asthma and reduction of lung function during childhood and adolescence, in this regard Wang Z., *et al*. [27] indicate that if the mother smokes there is a two to four increase in the risk of asthma.

The study by Carvalho Ribeiro FA., *et al.* [13] in Brazil, it indicates that the average number of cigarettes they smoked in the presence of the child was 20.1 per day.

In Sao Paulo, Brazil Schvartsman C., *et al.* [25] when studying 57 children with wheezing, they found that they were exposed to 23 cigarettes per day per day.

Concha Pérez JD., *et al.* [24] in a study carried out in Valdivia, the child was exposed to the smoke of more than 8 cigarettes per day, because the average daily cigarette consumption of the parents was 5.1 ± 4 and of the smoking mothers of 2.8 ± 2.6.

Regarding the number of cigarettes per day in the presence of the child, the study by Shargorodsky J., *et al.* [28] reports a significant association between the number of cigarettes smoked by parents and the number of bronchospasm episodes that have been exposed in one year.

The exposure to tobacco smoke, greater than 10 cigarettes per day, is a factor associated with the development of asthma independent of the other known factors. This association is explained by the following biological mechanisms: greater predisposition to recurrent respiratory infections; increased reactivity of the respiratory mucosa of the lower airways; increased risk of childhood atopy, serum IgE level and risk of allergic asthma; increased permeability of the respiratory mucosa secondary to irritation/inflammation and secondarily, permeability to respiratory allergens [29].

Ciria Martín A., *et al.* [18] in a study in the Allergy Service of the "William Soler" University Pediatric Hospital reports that exposure to tobacco smoke increases the risk of asthma by almost four times in exposed children and is a risk factor for recurrent wheezing in children under five years passive smokers.

A study conducted in Sao Paulo, Siqueira Sigaud CH., *et al.* [12] report that 62.8% of children exposed to tobacco smoke have a respiratory disease predominantly otitis media and pneumonia, a result similar to the one presented in the investigation.

Upper respiratory infections are more frequent in children exposed to tobacco smoke, especially if the mother is a smoker, and this results in 70% more upper respiratory infections, an increased risk of otitis and of pharyngitis [21].

Children passively exposed to tobacco smoke are prone to respiratory infections, such as bronchiolitis, *Staphylococcus pneumoniae* and *Haemophilus influenzae* hemorrhages because they have fewer organisms that hinder the growth of these bacteria (common flora), compared to children with non-parents. smokers and alterations that induce exposure to tobacco smoke in the immune response, both cellular and humoral, decreases circulating levels of immunoglobulins, blood and pulmonary counts of CD4+ lymphocytes and increases CD8+, inhibits the response of antibodies to various antigens and decreases phagocytic activity [30,31].

The report by Valdés Naranjo SI [14] confirms the higher prevalence of caries presented by those exposed compared to unexposed children and adds in its report that those exposed not only have a greater experience of caries, but also have a greater severity in the injuries found. In this regard, Tanaka K., *et al.* [32] points out that passive smoking decreases the immune response, which increases susceptibility to caries and presents alterations in levels of salivary compounds, which would help the optimal formation of dental biofilm, increasing the risk of caries. Sanabria JS., *et al.* [33] point out the existence of a causal association for the development of overweight or obesity in children exposed to cigarette smoke by both the mother and the father, being the magnitude of association with the parental smoking lower than that of the mother.

Conclusion

It is concluded that pre-school passive smokers predominated, male without a history of smoking during intrauterine life, who lived with smoking parents and received the smoke of 10 - 20 cigarettes per day. Bronchial asthma was the most frequent respiratory disease, non-respiratory caries and most received some income.

Annex Data Collection Sheet

1. Age
   - < 1 Year__
   - 1 - 4 Years__
   - 5 - 9 Years__
   - 10 - 14 Years__
2. Sex
   - Male__
   - Female__
4. Maternal smoking during pregnancy
   - Yes__
   - No __
5. Parentage of smokers with the youngest
   - Mother
   - Father
   - Brother
   - Other___
6. Number of cigarettes per day in the presence of the child.
   - < 10 ____
   - 10 - 20 ___
   - > 20 ___
7. Respiratory diseases
   - Otitis media ___
   - Bronchopneumonia___
   - Bronchial asthma___
   - Bronchitis___
   - Other___
8. Non-respiratory diseases
   - Obesity___
   - Arterial Hypertension___
   - Caries ___
   - Others ___

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