

Is Smoking in an Open Area Enough to Protect Children?

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Fumar em Área Aberta é o Suficiente para Proteção das Crianças?

¿Basta Fumar en una Zona Abierta para Proteger a los Niños?

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INTRODUCTION

The World Health Organization (WHO)¹ warns that approximately 603 thousand people die every year in the world due to secondhand smoking. Of those, 168,840 (28%) are children. In adults, secondhand smoking increases the risk of lung cancer, heart attack, stroke and respiratory system diseases. Children, on the other hand, usually present respiratory infections, ear infections, allergies, increased risk of sudden infant death and increased chances of becoming smokers in their adult life. Smoking during pregnancy may lead to congenital malformation, low weight upon birth and, during the breastfeeding period, reduction in the levels of prolactin and tendency to early weaning. Despite information, an expressive number of children in the whole world are exposed to tobacco smoke, especially within the family circle².

According to data from the National Research of the Student's Health (PeNSE) conducted in 2019, about 25% of Brazilians aged 13 to 15 years old lived with smokers in their homes, in the seven days prior to the research³. A worldwide research conducted in 142 countries showed a prevalence of secondhand smoking in the home environment of 33.1%, a little higher than in Brazil. It also observed that secondhand smoking in the home environment is more prevalent among women, low-income, and younger people, which corresponds to the most vulnerable population, who tend to suffer more with issues from secondhand smoking⁴.

To confirm this picture, The Global Burden of Disease (GBD)⁵ warned that approximately 47 thousand

children younger than 5 years old died due to secondhand smoking. This does not consider the impact in the health of newborns of mothers who were exposed to secondhand smoking during the pregnancy, which stimulates further studies and actions towards strengthening the guidelines of the National Program of Tobacco Use Control (PNCT) and the spread of information on these hazards.

DEVELOPMENT

The substances released during the burn of tobacco products cause harm for both smokers and passive smokers. This smoke forms an aerosol of gases, vapors and liquid particles that spread homogeneously in the atmosphere, in a way that anyone is exposed to relevant concentrations of those substances, regardless of being far or near the smoke source¹.

Environmental tobacco pollution (ETP) is a mixture of those components released by the burn of tobacco products. Of the seven thousand substances released, 69 are potentially cancerous. ETP comes from two sources: mainstream smoke, which is the environment smoke that has been exhaled by the active smoker; and sidestream smoke, which is the environment smoke produced spontaneously by the burning tip of a cigarette, for instance. The sidestream smoke has higher amounts of carcinogenic substances, since it is not filtered, and, as it forms in low temperatures, its burn is incomplete. The main sources of pollutants with tobacco products are paper cigarettes, hookahs, cigars, smoking pipes and vapes⁶.

Secondhand smokers are people who don't smoke, but live with a smoker, being forced to breathe the air composed

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of toxic and cancerous particles of tobacco or are exposed while in the uterus through the blood-placental pathway¹. A new concept that has been gaining emphasis in research refers to third-hand smoking (THS), which consists of being exposed to a combination of volatile compounds and adsorption of gases and particles related to tobacco in different surfaces, such as furniture, walls and toys, upholstery or that are present in the smoker them-self (clothes, hair and hands). Such substances may linger for a time that can vary from minutes to months, even when we can no longer see or smell the smoke⁷. The build-up of residual nicotine on surfaces becomes increasingly toxic, reacting to nitrous oxide, ozone and formaldehyde from the environment, creating cancerous nitrosamines⁸.

Laboratory evidence indicate that exposure to THS negatively affects developing organs and systems. It can occur due to dust ingestion, dermis absorption and inhalation of volatile components. Children and babies that have finer skin and immature respiratory and immune systems are the most vulnerable to deleterious effects of THS exposure. Moreover, they stay at home for most of the time, crawling, touching surfaces, interacting with the environment and putting their hands to their mouths, ingesting 0.25 solid residues a day (the double of an adult, on average), often contaminating themselves^{1,9}, which can reinforce the idea that the simple act of smoking in isolated and/or open areas is not enough to protect children from being exposed to the harms of smoking^{1,6}. The exposure to secondhand and third-hand smoking inside smokers' automobiles, given the tight space, is extremely high⁶.

Unlike adults, children are not capable of regulating their exposure to tobacco smoke, being obligated to live in the environment that is provided to them. Myths such as that smoking close to a window, in a room with the door closed or even in open or ventilated spaces is enough to avoid exposure are still rooted among the population¹.

A study conducted in Israel pointed that people have different perceptions on the exposure of tobacco. Some people think exposure happens only when smoke can be seen or smelled, while others have a broader understanding of what exposure is. This perception can influence smokers in the decision of smoking or not smoking near children¹⁰.

Measuring the exposure of children to the tobacco smoke may be complex, since it depends on the family having information on the topic, which can often be inaccurate or under notified. In this context, a questionnaire that uses images and vignettes of hypothetical situations with the aim of assessing the perception of parents on the exposure of children to tobacco smoke (PPE) has been developed and validated in Israel¹⁰. Currently, there are no other instruments capable of such assessment.

Studies conducted with the application of that questionnaire showed that smoker parents scored lower, which can suggest a minor awareness or concern with the issues addressed in the instrument. On the other hand, non-smoking parents scored higher, as well as former smokers, indicating that people who can quit smoking have a perception and behavior more alike those of people who never smoked^{10,11}.

This instrument has been translated and adapted to the Brazilian context¹¹ and is available for use by health professionals as a strategy to guide and help reduce the exposure of children to secondhand and third-hand smoking, since the questions can map the probable situations of exposure, and thus, identify the possible deficiencies in the understanding of what is considered exposure.

The American Academy of Family Physicians and the American Academy of Pediatrics reinforce that education and guidance on the harmful effects of secondhand and third-hand smoking are one of the best strategies for preventing exposure, since, when parents are well-informed of the harms and hazards of exposing their children to tobacco smoke, they will undoubtedly strive to provide smoke-free homes and automobiles¹². It is worth stressing that there are no safe levels of exposure to smoking, including the smoke that comes from electronic cigarettes.

Despite the prohibition of smoking cigarettes, cigars, pipes, hookahs, and other tobacco products in collective spaces that is enforced by Law 9,294/1996¹³, with changes to article 49, Law 12,546/2011¹⁴ and Decree 8,262/2014¹⁵, there is still no strict law that specifically protects babies and children from being exposed to tobacco smoke at home. Should a legislation approach be constituted, children health professionals would be the most advisable in defending this cause¹².

CONCLUSION

By identifying how parents perceive the exposure of children to tobacco smoke, health professionals can offer direct guidance to mitigate the most frequent doubts, as well as stimulate parents to quit smoking and perform early interventions with children, so they do not become smokers like their parents. In addition, a new legislation is needed to ensure a smoke-free home for children, thus collaborating with the National Program of Tobacco Use Control.

CONTRIBUTIONS

Maria Alice Santos Tavares, Raquel de Souza Ramos and Agnaldo José Lopes have substantially contributed to

the study design, acquisition, analysis and interpretation of the data, wording, and critical review. Leandro Alberto Calazans Nogueira, Ney Armando de Mello Meziat Filho, Renato Santos de Almeida, Camila Drumond Muzi, Raphael Mendonça Guimarães, Gisele Fragoso Mendes, Selma Cristina de Jesus Mesquita, Manassés Moura dos Santos, Maria Victória de Jesus Mesquita Palazzo and Juliana Miranda Batista Moura dos Santos have contributed to the wording and critical review. All the authors approved the final version for publication.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interest to declare.

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