

Passive Smoking in Children: The Unknown Victims

Neel P. Shah^{1*} Shruti Patel² Kena Desai³ Zeal Vyas⁴

¹Intern, Darshan Dental College and Hospital, Udaipur, Rajasthan, India.

²Consulting Dentist, Ahmedabad, Gujarat, India.

³Intern, Darshan Dental College and Hospital, Udaipur, Rajasthan, India.

⁴Consulting Oral Surgeon, Civil Hospital, Lunavada, Gujarat, India.

ABSTRACT

Background: Smoking Tobacco is one of the most preventable health risks in the world. There are two types of tobacco smoke, mainstream smoke which is directly inhaled by the mouth of a smoker and side stream smoke or second-hand smoke or passive smoking which comes from burning tip of cigarette mixed with surrounded air. Second-hand smoke is sometimes referred to environmental tobacco smoke. It is a combination of the smoke exhaled by a smoker and the smoke that comes from the end of a burning cigarette. When someone breathes in this smoke, it is often referred to as passive smoking. Even if you don't smoke, breathing in someone else's smoke can be deadly too. Children breathing secondhand smoke in their own homes are at risk of a lot of deformities / diseases. Secondhand smoke can be especially harmful to children's health because their organs are still developing. The fact that there are harmful effects of second hand smoke on the oral health and development of the children has been well established. Passive smoking in babies doubles the risk of tooth decay.

Keywords: Passive Smoking, Children, Oral Health.

INTRODUCTION

Smoking is considered to be one of the most preventable causes of death all over the world. Smoking is killing billions of people globally; either directly or indirectly. Smoking affects almost all the body systems, leading to many diseases and ill health of smokers and non-smokers through Secondhand Smoke (SHS) ⁽¹⁾. Passive smoking is recognized as involuntary smoking, second hand smoking, exposure to environmental tobacco smoke (ETS), is defined as inhalation of the cigarette smoke of another individual or the exhale of a smoker ⁽²⁾. Children are particularly at risk for the effects of second-hand smoke because their bodies are still growing and they breathe at a faster rate than adults. It has been revealed that passive smoking among children leads to acute respiratory illness in children as pneumonia, bronchitis, middle ear problem, cough & wheeze ⁽³⁾. Children are comparatively more vulnerable to secondhand

smoke effects because of higher breathing rates per body weight, immature lungs and more lung surface area compared with adults ⁽⁴⁾. Children are most probably exposed to SHS at home, since exposure may be so extensive, yet moderately small increase in disease risk might cause a significant disease burden in infancy and childhood ⁽⁵⁾. Second Hand Smoke has been shown to increase the rate of caries among children too. It has been found that those who experienced passive smoking at four months were twice as likely to have one decayed, missing or filled baby tooth by the time they were three ^(6,7). This review will hence emphasize the susceptibility of children to Passive Smoking, effect of Passive Smoking on oral health, and prevention of Passive Smoking exposure to children.

SHS and Dental Caries in Children:

A definite association between Passive Smoke / Environmental Tobacco Smoke / Second Hand Smoke exposure and Dental Caries in children has

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*Correspondence Dr. Neel P. Shah.

Darshan Dental College and Hospital, Udaipur, Rajasthan, India.

Email: neelshah2014@gmail.com

already been established ⁽⁴⁾. Some studies have shown that Nicotine increases the proliferation of cariogenic bacteria like *S. Mutans* in a Smoker's (Mother's) oral cavity which gets transferred to their infants. Also, nicotine somehow decreases the levels of vitamin C, which again is linked with the *S. Mutans* proliferation causing an increase in the caries risk. Second Hand Smoke exposure predisposes Infants / Children to infections through immune system suppression or modulation such as lower salivary IgA levels and higher sialic acid levels with higher activity ^(8,9). Sialic acid eventually is known to promote *S. Mutans* agglutination, leading to Dental Plaque formation and also caries ⁽¹⁰⁾. Cariogenic bacterial colonization on rough tooth surfaces might be exaggerated by Passive Smoke. Nicotine has also been shown to reduce pH, flow and the buffering capacity of saliva and also increases the lactobacilli count ^(11,12). Secondary smoking negatively affects the dental development through numerous mechanisms for instance interference with reciprocal induction of oral ectomesenchymal tissues, interference with tooth mineralization owing to oxidative stress and nutritional deficiency caused by unfavorable effect of SHS on appetite ⁽¹³⁾. Enamel hypoplasia in primary and permanent dentition and caries in the primary dentition is also linked to passive smoke exposure in children ⁽¹⁴⁻¹⁹⁾.

SHS and Oral Health of Children:

Environmental Tobacco Smoke contains more than 4000 chemical agents which deteriorates the oral health ⁽²⁰⁾. The nicotine biomarker - Cotinine level measurement is the most reliable, objective and quantitative screening tool for Second Hand Smoke exposure determination ^(20,22). Passive smoking alters the flora of oral cavity and nasopharynx which leads to upper airway infection ⁽²³⁾. The smoke products causes edema and inflammation by the activity of pro-inflammatory agents and local vasoconstriction. Systemically, these products reduce saliva IgA, serum IgG levels and suppress T helper cells activity in host immunity responses ⁽²²⁾. These mechanisms and oxidative stress may cause oral periodontal diseases, alveolar bone density reduction and ultimately tooth loss. Besides, cigarette smoke produces carbon monoxide and cyanides which delays wound healing moreover nicotine content restrain cell proliferation,

osteoblastic activity and stimulate alkaline phosphatase activity. It unfavorably affects fibroblast activity and reduces their fibronectin and collagen production. Passive smoking produces vascular destruction, endothelial inflammation, atherosclerosis, pH shift and cytokines production which eventually bring about implant failure ⁽²⁴⁾. Gingival pigmentation is increased by indirect stimulation of melanocytes by activity of polycyclic amines like nicotine and benzopyrene in cigarette smoke which go inside the blood circulation following inhalation ⁽²⁵⁾.

Prevention:

The worldwide reports have mentioned that around 40 % children and 30% non smokers are the victims of second hand smoke ⁽²⁶⁾. The monetary burden of smoking addiction and resultant morbidity and mortality is also rising. However, if the smokers are acknowledged about the ill effects of second hand smoke on children, they can be persuaded to quit ⁽²⁷⁾. Dentistry is transforming from treatment management to prevention and hence, most likely etiological risk factors or behaviors related with caries development and progression have to be considered. Dental health professionals can promote tobacco cessation by counseling patients during the oral examination part of dental visits or Tobacco Cessation Clinics can be developed ^(28,29). The American academy of pediatric dentistry advocates screening for tobacco use, tobacco dependence treatment, tobacco use prevention in children and adolescents and educating the public on mammoth health and societal costs of tobacco ⁽³⁰⁾. Global health organizations should focus on smoking issue to resolve the public health dilemma and start implanting restrictions and bans as required to curb the menace of secondary smoke ⁽³¹⁾. Smoking in home, closed public spaces or cars should not be allowed because smoke concentration increases and it will be considered as a normal behavior by child. ⁽³²⁾

CONCLUSION

To promote dental health in children and adults, it is important for the adults / Parents especially to quit. The Research from different areas of the world conducted have proved the direct association between oral health diseases in children and exposure to passive smoke. Most of the studies have

demonstrated a possible etiological alliance. Hence it is necessary to create awareness amongst the adult smokers regarding the same which can eventually lead to a better oral health of children.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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