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A Systematic Review of the Negative Health Effects of Heated Tobacco Products

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Abstract

As an alternative to conventional cigarettes, heated tobacco products (HTP) are a method of nicotine delivery. For both users and bystanders, HTP tobacco products are offered as a less harmful alternative to conventional cigarettes. There is still a lack of complete knowledge regarding the actual impact of HTP on user health as well as its overall impact on public health. Relevant studies that were published in English between February 2021 and 2015 were identified through a systematic literature search. We used the following databases: Elsevier, PubMed, Scopusand ClinicalKey. We looked at 25 independent studies that were funded by the tobacco industry. Smokers and users of heated tobacco products differed in terms of exposure biomarkers as well as cardiovascular and respiratory biomarkers. Enhancements in clinically important gamble markers, particularly cholesterol, sICAM-1, 8-epi-PGF2α, 11-DTX-B2, HDL and FEV1, were noticed contrasted with relentless cigarette smokers. However, it has been observed that exposure to IQOS alters mitochondrial function, which may exacerbate airway inflammation, remodelingand lung cancer. By increasing microbial adherence to the respiratory tract, these products have the potential to increase oxidative stress and respiratory tract Infections. Compared to traditional smoking, our review suggests that HTP products may reduce the risk of chronic diseases like cancer, respiratory and cardiovascular diseasesand others, but they may still increase the likelihood of their occurrence in nonsmokers. The frequency of HTP use and any potential adverse health effects seem to necessitate research.

Keywords: Heated tobacco products • Heat-non-burn • IQOS • Glo • Ploom • Adverse health effects

Introduction

The dentist has a lot of options for how to consult and treat a tobacco user in the dental office, especially if the tobacco user has some kind of periodontal disease that may have been brought on or exacerbated by tobacco use. The clinician must take into account the unique circumstances and characteristics of each patient with these options, such as behavioral considerations, motivational strategies and clinical presentation. For instance, teeth with extrinsic tobacco staining surrounded by a pink fibrotic gingiva with loss of stippling, deeper probing depths, gingival recession, loss of clinical attachment and less tendency for sites to bleed on probing are a specific clinical presentation of cigarette smokers. Additionally, the microbiology, host/inflammatory responsesand genetic characteristics of each tobacco user should be taken into account when making decisions regarding diagnosis and treatment. To assess and incorporate each of these diagnostic and treatment variables into a personalized approach for each individual patient who uses tobacco in some form, the practitioner must rely on the innate computer of human thought because there is no single widely accepted algorithm to account for all of the specific factors for each patient [1].

Description

Beyond the need to anticipate a higher incidence of adverse periodontal conditions in patients who smoke, the implications for practicing dentists go beyond that. Patients who smoke will experience a decrease in periodontal treatment predictability and overall success. After non-surgical debridement, open surgical debridement, bone grafts, guided tissue regenerationand periodontal plastic surgery; smoking is linked to worse outcomes. Additionally, smoking is a risk factor for implant failure. Every patient's tobacco use status must be determined and documented by the doctor. Patients must be made aware of the increased risk of less favorable treatment outcomes, even though tobacco use is not a contraindication for providing surgical or nonsurgical periodontal therapy. This discussion ought to be embraced as a chance to evaluate - - and upgrade - - the patient's inspiration to stop smoking and for the clinician to satisfy an expert obligation to give steady, compassionate counsel to stop and associate the patient with proof based tobacco end support, as examined in a later segment of this survey [2].

According to PMI statements, more than $3 billion has been spent on research and development over a ten-year period to design and produce new devices like iQOS. In late 2014, pilot programs for iQOS began in Italy and Japan. However, in order to market the device in the United States as a product that was less harmful than continuing to smoke cigarettes in accordance with its commercial objectives, FDA approval was required. On December 5, 2016, PMI submitted modified risk tobacco products (MRTP) applications to the US Food and Drug Administration (FDA) for three distinct iQOS cartridges: Marlboro HeatSticks, Marlboro Smooth Menthol HeatSticksand Marlboro Fresh Menthol HeatSticks. The following are PMI's claims in this application:By significantly preventing exposure to harmful or potentially harmful chemicals, completely switching from cigarettes to iQOS significantly reduces the risk of tobacco-related diseases and would cause less harm than regular smoking. In January 2018, the FDA's Tobacco Products Scientific Advisory Committee discussed the MRTP applications and rejected a proposal to market iQOS as healthier than traditional cigarettes in the United States. However, the product is currently sold in more than 40 countries [3].

Although the high-difficulty C-FiTT produced approximately twice as high Omax in the context of withdrawal (M = $5.25) as opposed to neutral content (M = $2.78) at a trend level (p =.065), the main effect of the C-FiTT condition on Omax was non-significant. The C-FiTT condition had no significant main effects on demand elasticity or intensity. With the exception of Condition 1,

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which is the control condition, it represents specific pairwise comparisons across all outcomes. Pairwise comparisons for each of the five conditions show both the typical and mean consumption and expenditure curves for each of the five C-FiTT conditions, indicating that the results are generally in line with expectations. Utilizing the GraphPad Prism template for rendering work and demand functions for exponentiated demand plots, data were analyzed with a high-density range of prices (KU Applied Behavioral Economics Laboratory). The best fit curve's solved consumption values were transformed into data, which were then multiplied by the high-density price range (interpolated). As depicted, the high-difficulty C-FiTT with withdrawal cues is accompanied by a clear pattern of persistently rising expenditures [4,5].

Active vitamin D inhibits the production of costimulatory molecules and cell surface expression of the major histocompatibility complex (MHC) class II during DC maturation via autocrine and paracrine signals. The activation of B and T cells is also altered. Indeed, adaptive immune cells appear to develop a tolerogenic phenotype in response to locally produced calcitriol. It specifically inhibits the differentiation of Th1 and Th17 phenotypes and promotes Th2 cells by altering the activation of T helper (Th) cells and suppressing T cell proliferation. The hormone that promotes the differentiation of regulatory T cells (Treg), an immunosuppressive population that inhibits the induction and proliferation of other T cells, suppresses the pro-inflammatory state. This tolerogenic environment may be one of the reasons vitamin D helps protect against autoimmune diseases, according to a number of studies. In the event of infection, VDR is upregulated in cytotoxic T lymphocytes (CTL) as well and CYP27B1 is always expressed. However, it is still unclear how the vitamin affects these cells' functions, differentiation and proliferation. B cells without VDR are inactive, but once activated, they upregulate the receptor to proliferate like T cells; B cells also express CYP27B1, which enables the local production of the hormone that appears to be essential for their activity regulation. Without a doubt, it is proposed that calcitriol adversely controls B cell action and separation in plasma cells, lessening autoantibody creation as well and, subsequently, safeguarding from immune system problems.

Conclusion

Based on the evidence presented in this review, we conclude that the use of non-combustible smoking alternatives like e-cigarettes and HTPs, which have been shown to improve levels of BOEs and BOBEs, is supported by the current evidence. Confirmatory data are not yet available, so this remains a fertile research area in the coming years, despite the fact that it may suggest plausible effects on the incidence of diseases related to smoking.

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Conflict of Interest

There are no conflicts of interest by author.

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