

Necessity of Preventing Cardiovascular Disease by Smoke-Free Policies

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Among the available improvements of lifestyle habits for the prevention of hypertension, quitting smoking and avoiding second-hand smoke are essential items listed in hypertension guidelines around the world.¹ It is well recognized that the effects of nicotine in cigarette smoke on blood pressure (BP) are transient, lasting 30 minutes, and this is through norepinephrine release² and by impairing NO-dependent vasodilation.³ However, despite the transient effect of cigarette smoke on BP, tolerance does not develop, and each exposure is associated with an increase in BP.⁴ Exposure to tobacco smoke and higher BP in epidemiological studies indicate that tobacco smoke exposure is a risk factor for hypertension in addition to its known associations with cardiovascular risk and cancer.

A cross-sectional study in Beijing, China, showed that >2 hours of daily second-hand smoke exposure (ie, passive smoking) was significantly associated with higher systolic BP (by 4.2 mm Hg) and diastolic BP (by 2.1 mm Hg).⁵ In the GBD (Global Burden of Disease) Study 2013, passive smoking was the 16th-ranked risk factor, on the basis of the number of disability-adjusted life years, attributable to stroke for both sexes combined in 21 regions.⁶ Although over the past 20 years, the stroke-related disability-adjusted life years for second-hand smoke decreased globally by 30%, second-hand smoke remains an essential and nonnegligible risk factor for cardiovascular disease. A meta-analysis of epidemiologic studies showed that passive smoking was consistently associated with an increased relative risk of coronary heart disease in cohort studies (relative risk, 1.21; 95% confidence interval, 1.14–1.30).⁷ In Scotland, smoking has been

prohibited by law in all enclosed public places since March 2006. After the legislation banning smoking, the incidence of acute coronary syndrome decreased in Scotland by 17% compared with a 4% decrease in England, which has no smoking law. A total of 67% of the decrease in Scotland involved nonsmokers.⁸ Smoking cessation because of local laws in communities has also made a great contribution to the prevention of cardiovascular diseases in such communities.

In this issue of the *Journal of the American Heart Association (JAHA)*, Mayne and colleagues⁹ describe their analyses of longitudinal data from 2606 black and white US nonsmoking adult participants in the CARDIA (Coronary Artery Risk Development in Young Adults) Study (1995–2011). The CARDIA Study examined the state-, county-, and local-level 100% smoke-free policies in bars, restaurants, and nonhospitality workplaces on the basis of the cohort members' residential census tracts.⁹ However, although studies have touched on this issue, little is known about whether smoke-free policies are associated with reductions in BP in nonsmokers. In the study by Mayne et al,⁹ the participants who lived in areas with smoke-free policies had lower adjusted-average systolic BP at the end of >15 years of follow-up compared with those in areas without policies, and the location-specific reductions in BP were as follows: restaurants, –1.14 mm Hg; bars, –1.52 mm Hg, and workplaces, –1.41 mm Hg. Smoke-free policies in restaurants and bars were associated with the adjusted mean within-person reductions in systolic BP of –0.85 mm Hg and –1.08 mm Hg, respectively. Only restaurant policies were associated with a significant within-person reduction in diastolic BP of –0.58 mm Hg. Thus, smoke-free policies in bars, restaurants, and workplaces contributed small, but significant, between-person differences and within-person reductions in systolic BP among a cohort of black and white US nonsmokers.

Mayne and colleagues also used the same study participants (3783 black and white adults) to examine the association between 100% smoke-free policies and lower risk of cardiovascular disease among middle-aged adults.¹⁰ The estimated preventive fraction was 25%, 24%, and 46% for restaurant, bar, and smoke-free workplace policies, respectively, during a median follow-up of 20 years. In addition, among older US adults, increases in the price of cigarettes

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over time were associated with reduced risks of current smoking and heavy smoking, a reduction in the number of cigarettes smoked per day by heavy baseline smokers, and an increase in smoking cessation.¹¹ In models assuming a linear trend, smoking bans were associated with reductions in both current smoking and smoking intensity and an increased likelihood of smoking cessation trials. The association between smoking bans and current smoking was the largest among the participants with an educational level above a bachelor's degree.

According to the institutional characteristics associated with the adoption of tobacco- and smoke-free policies among US postsecondary educational institutions, 35.2% of those institutions prohibit all tobacco product use on campus, 10.1% prohibit smoking but not other tobacco product use on campus, and 53.7% did not have tobacco- or smoke-free policies.¹² The prevalence of tobacco- and smoke-free policies among US postsecondary educational institutions is rather low. In the summer of 2018, the US Department of Housing and Urban Development started to prohibit the smoking of cigarettes, cigars, and pipes in all public housing units and common areas. The restriction also applies to areas within 25 feet of public housing grounds. Electronic cigarettes have not been banned yet.

In Great Britain, the new Tobacco Control Plan points out that 7.3 million adults still smoke and that >200 people per day die because of tobacco.¹³ A goal was set to lower the smoking rate of British adults from 15.5% to <12% and the pregnant women's smoking rate from 10.5% to <6%. More than 40% of adults with severe mental illness in Great Britain smoke, and the British government set a goal of making all mental health inpatient service sites smoke free by 2018.¹⁴ A campaign to make all of the National Health Service's facilities smoke free was launched in 2006, but this task has not been completed.¹⁵

Asia has a particularly high smoking rate. In Japan, the revised national law will ban smoking at public facilities in April 2020 before the Tokyo Olympic Games and Paralympics, but there are loopholes allowing smoking outside the facilities, and smoking is banned only inside restaurant establishments >100 m² (which accounts for approximately half of the restaurant sector).¹⁶ The passive smoking legislation resulted in a half-finished result, although the Ministry of Health, Labour, and Welfare proposed a strict antismoking bill aiming to stub out smoking at most indoor facilities. In the Passive Smoking Prevention Ordinance of Tokyo, which was established in June 2018, 84% of restaurants will be targeted, but the national regulation is ineffective. Under the revised law, "heated cigarettes" that are rapidly spreading are also eligible, but the restriction is lower than for cigarettes. Cigarettes cost only ≈\$4 a pack in Japan and carry modest health warning labels sparingly. Partial smoking bans are widespread in many

countries, including Japan. It has been estimated that <46% of men and 20% of women in East Asia are exposed to passive tobacco smoke at workplaces and at home.¹⁷ The World Health Organization has given East Asia, including Japan, its lowest rating for efforts to prevent passive smoking.¹⁸

A 2016 survey in Japan compared complete and partial workplace smoking bans.¹⁹ The survey's results showed that partial workplace bans might not be any more effective for Japanese employees than no ban. A complete smoking ban at workplaces is thus strongly recommended. Moreover, a systematic review and meta-analysis investigating the implementation of the World Health Organization's recommended tobacco control policies showed that smoke-free legislation was also associated with substantial benefits to child health.²⁰

Comprehensive smoke-free legislation covers 55 countries (ie, almost 1.5 billion people), which is 20% of the world's population.¹⁸ The only preventive method for protecting individuals against the health damage caused by second-hand smoke is the establishment of environments that are entirely smoke free, regardless of age and sex, without exception. Negative economic impacts of the laws/regulations to prevent passive smoking have been pointed out; employment and sales in service industries, such as restaurants and taverns, may be affected, but the economic impact of these regulations has not become negative.¹⁸

The World Health Organization named 6 major policies that are described as "MPOWER," drawn from the regulations and measures included in a Framework Convention.¹⁸ The MPOWER contents are as follows: Monitor (tobacco use and policy monitoring), Protect (people from smoke), Offer (cessation of smoking cessation/treatment), Warn (warning and danger of tobacco), Enforce (advertisement, promotion, and sponsorship of tobacco prohibition), and Raise (raising tobacco tax). In addition, measures to prevent tobacco product sales to minors, efforts to educate and raise awareness about tobacco hazards, and the education and training of the stakeholders involved in countermeasures are necessary.

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