

## Perspective

### Tobacco harm reduction policy: The old wine in a new bottle

Tobacco use is one of the major risk factors for many chronic diseases, including cancer, lung disease, cardiovascular disease, and stroke. It is one of the leading and most dangerous mortal threats worldwide. Smoking is the most common type of tobacco use, and it is popularly done in the form of 'Cigarettes'<sup>1</sup>. Cigarette smoke contains thousands of different chemicals that are harmful to human health<sup>2</sup>. Nicotine, the main ingredient of tobacco, is so addictive that the addiction is comparable to that of heroin. Due to this, two-thirds of smokers wish to quit smoking, and about a third try each year, of which only two per cent succeed<sup>3</sup>. According to the World Health Organization (WHO), every year, tobacco kills more than eight million people, and an estimated 1.3 million non-smokers are exposed to second-hand smoke<sup>1</sup>. In the year 2020, 22.3 per cent of the world's population used tobacco, with prevalence rates of 36.7 per cent among men and 7.8 per cent among women<sup>1</sup>. As per the Center for Disease Control and Prevention (CDC), cigarette smoking is the leading cause of preventable disease, disability, and death in the United States<sup>4</sup>. In India, tobacco use is one of the major causes of death, accounting for nearly 1.35 million deaths each year. About 267 million adults aged 15 years and above consumed tobacco in 2016-17, making up almost a third of the population in that age group. Moreover, India is the second largest producer and consumer of tobacco<sup>5</sup>.

#### The harm reduction policy of the tobacco industry

The harm reduction policy of tobacco industries to promote their new products as safe alternatives to cigarettes worldwide is not a new approach<sup>6,7</sup>. With a similar claim, filtered cigarettes were introduced many decades ago (from the 1860s to 1920s). They invaded the market in 1931 as safer alternatives to tobacco smoking. However, neither tobacco harm has been, nor the incidence of lung cancers or other tobacco-related diseases decreased anywhere in the world. On the other hand, these filtered cigarettes with many added flavours became very popular due to the perception of safety.

They helped the industry to grow and expand from one per cent in 1950 to more than 90 per cent in 2002<sup>7-9</sup>. Despite being labelled the 'deadliest fraud in the history of human civilization,' filter tips now feature on almost every mass-produced cigarette smoked across the globe<sup>7</sup> and are expected to have a cumulative annual growth rate (CAGR) of nearly seven per cent between 2024 and 2030<sup>9</sup>.

#### The renewed approaches of tobacco harm reduction

*1. The introduction of e-cigarettes:* An e-cigarette is nothing but an 'Electronic Nicotine Delivery System,' a battery-operated device used to 'Vape' a flavoured solution called an 'e-liquid' containing varying concentrations of nicotine, flavouring agents, and vaporisers. Here, it must be noted that 'Nicotine' is considered one of the most addictive substances. The age of first exposure and administered dosage add to the potential risk to a person addicted to it throughout life<sup>3,10</sup>. There is strong evidence that e-cigarette use by non-smokers increases the risk of smoking conventional tobacco by about three times, thus acting as a gateway. Moreover, tobacco smokers who switch to e-cigarettes continue dual use and do not truly benefit from quitting tobacco smoking<sup>11-13</sup>. So far, nowhere on earth has the e-cigarette been approved as a smoking cessation product like pharmaceutical nicotine replacement products<sup>11</sup>.

Since the emergence of e-cigarettes in the mid-2000s, they have been promoted and marketed by the tobacco industries as safer alternatives to conventional cigarettes and/or an effective way to stop smoking. However, the majority of global research does not conclusively support this claim<sup>10-14</sup>. Thus, many countries around the globe, including India, have banned e-cigarettes and related products<sup>15</sup>.

*2. The 'Heat-Not-Burn' tobacco products and devices:* These are new nicotine delivery systems commonly referred to as 'Heat-Not-Burn' (HNB) by the tobacco industry. The HNB tobacco products are

non-combusted cigarettes consisting of an electronic source that heats the tobacco instead of burning it. The HNB device works with the same technology as e-cigarettes, only replacing the e-solution/e-liquid with dry processed tobacco as the source of nicotine. With the tobacco industry's active marketing strategies of many popular brands, the sales of these products are on the rise, with the perception of being less toxic, as claimed by the tobacco industry. However, the evidence does not support the claimed 90-95 per cent reduction in harmful and potentially harmful substances and toxicity in the HNB<sup>16-19</sup>.

Moreover, there is strong evidence that studies conducted by the tobacco industry or by researchers funded by them are not free of conflict of interest and thus cannot be trusted. There is clear proof that the studies sponsored by the tobacco companies did not disclose the high concentrations of particulate matter, tar, acetaldehyde, acrylamide, acrolein metabolite, and formaldehyde in their studies on emissions from heated tobacco. The tobacco industry data investigated by independent researchers shows that there are 22 and seven harmful or potentially harmful substances that were more than 200 per cent and 1000 per cent higher than in reference cigarette smoke<sup>17</sup>. Furthermore, no statistically detectable differences were found between users of heated tobacco and conventional cigarettes for 23 of the 24 biomarkers of potential harm. The studies performed by the tobacco industry on both animals and humans also showed that there was no evidence of improvement in pulmonary function or inflammation in smokers who switched to heated tobacco. Moreover, there is a possibility of hepatotoxicity, cardio-toxicity, and adverse effects on the cardiovascular system due to heated tobacco<sup>17,18</sup>.

Evidence from independent researchers showed that substantial amounts of carcinogenic tobacco-specific nitrosamines, as well as toxic and irritant substances and potential carcinogens<sup>17,18</sup>, were emitted from the HNB tobacco products. Almost equal proportions of nicotine and tar were found, and acenaphthene quantity, a potentially carcinogenic substance, was nearly three times higher than that of conventional cigarettes. It was also found that the release of formaldehyde cyanohydrins was of great concern due to its high level of toxicity at very low concentrations<sup>17-19</sup>. *In vitro* studies have reported that emissions from heated tobacco cause damage to human bronchial epithelial cells, potentially increasing

oxidative stress, inflammation, infections, airway remodelling, and epithelial-mesenchymal transition-related changes in the airways<sup>17,18</sup>. Experimental animal studies have found that there is decreased blood vessel function due to exposure to heated tobacco, which is comparable to that induced by cigarette smoke. Studies have also reported that the users of heated tobacco are required to smoke at a rapid pace, which could lead to an increase in the intake of carbonyls which are potentially carcinogenic, and nicotine, which may induce nicotine dependence<sup>16-18</sup>. There is no convincing evidence that heated tobacco products are an efficient smoking cessation aid. Dual use, as observed with other harm-reduction products such as e-cigarettes and snuff/snus, also occurs. Studies have reported heated tobacco use by non-smokers in about 45 per cent of cases. However, there are limited data on the health effects of long-term use among switching smokers, dual users, as well as novice exclusive users<sup>16,17,19,20</sup>. In contrast, the e-cigarettes and the HNB tobacco products market is growing exponentially around the globe. Currently, the largest share of revenue from the sale of heated tobacco products is reported from the Asia-Pacific region, with use concentrated in the 18-39 yr age group<sup>16</sup>.

Given the potential threat to public health at the population level, the Government of India banned e-cigarettes and related products by promulgating the PECA 2019 (The Prohibition of Electronic Cigarettes [Production, Manufacture, Import, Export, Transport, Sale, Distribution, Storage and Advertisement] Act, 2019). However, despite the comprehensive ban, e-cigarettes and related products are still easily accessible, especially to young people, leading to continuing public health challenges in the country<sup>15,16</sup>.

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