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Viewpoint

Putting tobacco harm reduction in perspective: is it a viable alternative?

Tobacco use is a global pandemic. Worldwide, there are about 1.1 billion smokers[1], and nearly six million deaths annually are attributed to tobacco use[2] and it is recognized to be the single most important cause of avoidable premature mortality in the world mainly from cancer, coronary heart disease, chronic obstructive pulmonary disease and stroke. Tobacco control policies as outlined in the WHO Framework Convention on Tobacco Control[3] (including price and tax increases, pictorial warnings, prevention of smoking in public and work places, monitoring of tobacco use, offering help to quit, tobacco advertisement and promotion ban) have achieved reductions in smoking prevalence of at best1 per cent per year[4]. Additionally, these policies are not very effective if not properly implemented or do not have adequate funding support[5].

Nicotine dependence is a chronic relapsing condition. At an individual level, though most tobacco users want to quit but they are unable to do so because they are addicted to nicotine[6] and relapse rates are staggeringly high. Currently available first line medications for tobacco cessation are known to double or triple this quit rate under experimental conditions but in real world settings these have had low uptake and inferior efficacy[7]. Further, it is increasingly recognized that nicotine is such an addictive compound that millions of people smoking today will be unable to quit[8]. In this scenario, a different approach is required to reduce the harm from cigarette smoking for people who are not ready to or cannot quit. Further, the adverse health effects that accrue from taking tobacco come not from nicotine, but from hundreds of other toxins and carcinogens like nitrosamines in tobacco and in the tar and carbon monoxide and nitrogen oxides in the smoke. Thus, though our primary strategy for reducing harm must be to encourage cessation, at least reducing or minimizing harm for those who are unable to quit may seem like a reasonable strategy. Within this context, the approach of tobacco harm reduction has gained momentum in recent years.

Tobacco harm reduction

Contemporary usage of the term refers specifically to the objective of "minimising the net damage to health for continuing tobacco users and the general population by substituting less harmful tobacco products for more harmful ones, particularly cigarettes"[9]. These harm reduction tobacco products [commonly referred to as Potentially Reduced Exposure Products (PREPs)] include modified tobacco cigarettes, smokeless tobacco (SLT) products and pharmaceutical nicotine (PN) products. Also, reduced exposure may not necessarily translate to reduced risk to the individual user or to the larger population[10].

Modified tobacco cigarettes

The use of modified cigarettes labels suchas "light", "low tar" or "low nicotine" "filter" cigarettes by tobacco industry to convey a sense of reduced harm actually gained momentum in the 1950s when reports relating to the extensive harms of smoking started coming in and scientific studies were published. Filter cigarettes were the first such "reduced harm" products introduced by the industry and were portrayed as devices that reduce exposure to serious toxins. By all accounts these were a huge success and by 1975 these accounted for 87 per cent of cigarettes sold[11]. Filter cigarettes were followed by "light", "low tar" or "low nicotine" cigarettes, all of which were used to convey a sense of reduced harm to smokers.An analysis of tobacco industry documents revealed that the industry knew these "safer" cigarettes were not really so because of compensatory smoking (*e.g*. drawing harder on the cigarette, covering the filter holes, smoking more cigarettes)[12]. Hence these claims

were misleadingly used by the tobacco industry to deter smokers from quitting[13]. This singular experience is the basis on which there is a huge opposition of any form of tobacco harm reduction. Even now, current smokers have a high degree of interest in these products, and falsely assume that these products reduce the risk of tobacco product use.

Electronic or e-cigarettes

E- cigarettes were invented by Chinese pharmacist Hon Lick in 2003[14] and these cigarettes deliver nicotine through the battery-powered vaporization of a nicotine/ propylene-glycol solution. There is no combustion involved in this process and the user inhales vapour not smoke. Though e-cigarettes are considered less harmful than smoking, but some toxins have been detected in e-cigarette fluid and vapour at much lower levels when compared to cigarette smoke. A systematic review by Burstyn[15] has concluded that e-cigarettes do not produce inhalable exposures to contaminants of aerosol that would warrant health concerns. Further, the usage of the product also resembles the act of smoking and may address the behavioural components of cigarette addiction. Bullen *et al*[16] have suggested that e-cigarettes can aid in quitting smoking by attenuating tobacco withdrawal as effectively as nicotine replacement therapy (NRT).

Recently many concerns have been raised regarding electronic cigarette use. Firstly, its production for the large part is unregulated and there may be variation in their chemical and nicotine contents and a marked difference in the quality and reliability of different e-cigarette products available in the market[17]. Further, the long term harms of using these products are not yet clear. Concerns have been expressed about the almost explosive growth of the electronic cigarette market, increasing involvement of multinational tobacco companies and e-cigarette advertisements possibly being attractive to young people and never-smokers[18]. Some experts have expressed concern that tobacco control efforts might be seriously undermined by tobacco industry trying to use the perception of a 'safer' product to its advantage, as they did with the so-called 'light' or 'mild' cigarettes[19]. These concerns have led to international bodies like the World Health Organization (WHO) to call for stiff regulation of e-cigarettes as well as ban on their indoor use[20]. On April 25, 2014, the U.S. Food and Drug Administration (FDA) issued a proposal to regulate e-cigarettes as tobacco products and ban its sale to anyone under 18[21]. In India, e-cigarettes have been declared illegal in the State of Punjab and the Union Health Ministry may propose to ban these products through proper legislation soon[22]. To conclude, currently the evidence regarding the role of e-cigarettes as a potential harm reduction and cessation product is limited.

Low nitrosamine smokeless tobacco products (LNSLT)

Smokeless tobacco products contain nitrosamines and other carcinogens, and are known to produce oral and pancreatic cancer[23]. Smokeless tobacco products manufactured with low nitrosamine contents such as Swedish snus have been suggested as a potential aid to harm reduction or smoking cessation. There is some evidence to suggest that Swedish snus is not associated with a significantly increased risk for oral cancer[24,25]. It has been found to be associated with pancreatic cancer as demonstrated by two studies[26,27]. The use of Swedish snus and smokeless tobacco products have also been found to be associated with stroke[28,29] and adverse reproductive health outcomes[30-32]. Despite these risks, use of low nitrosamine smokeless product is considered less harmful than tobacco smoking, overall by an estimated 90 per cent[33]. Another argument given in favour of its use as a harm reduction product is the finding that in Sweden a marked reduction has been observed in daily smoking prevalence in the past 20 years and mortality from tobacco-related diseases. This has been partly attributed to substitution of smoking by snus use, especially by men[34]. Also, snus was the most common quitting aid used by male smokers in Sweden and was used by 24 per cent during their last quit attempt[35].

Despite the lower risks attributed to these products as compared to smoking, there are three main concerns outlined with their use as a harm reduction product:

(i) Discourage from quitting: There are concerns that the tobacco industry will use LNSLT to discourage smokers from quitting. These concerns are valid because with widespread smoking bans, cigarette manufacturers have marketed these products as something to use when smoking is not permitted[36].

(ii) Dual use: Dual use of both smoking and smokeless tobacco products could theoretically "sustain nicotine addiction, delay cessation and contribute to compensatory smoking of the remaining cigarettes smoked"[37]. Also, not much is known about the safety of dual use and further research is warranted[38]. Research also suggests that dual users are less likely than

exclusive smokers, to be completely tobacco abstinent but then are much less likely to be smoking[39].

(iii) Gateway progression: As far as gateway progression is concerned, research has revealed inconsistent results. The data from Sweden show that although there has been uptake of regular smoking by smokeless users who might not otherwise have smoked (gateway progression), the extent to which this progression has happened is much less than that from regular smoking to snus[40]. However, in the USA, where other forms of smokeless tobacco have also been available for some time, the prevalence of smokeless tobacco use has fallen progressively along with that of smoking to below 5 per cent in men and 1 per cent in women[41]. Further, cigarette companies have promoted dual use of smokeless and smoked tobacco products as a way to get around public smoking bans[42].

It is important to remember that the findings of low nitrosamine smokeless tobacco products do not extrapolate to formulations of "smokeless tobacco" used in parts of Africa and Asia like Sudan and India, which are considered very toxic and produce very high risks for oral cancer and some other cancers, and are responsible for a substantial proportion of tobacco-related morbidity and mortality in these areas[24].

In summary, despite some evidence that the use of LNSLT is associated with lower health risks than smoking in individual users, promotion of smokeless tobacco use as a safer alternative to cigarette smoking may result in dual use of smokeless and cigarettes, and fewer smokers quitting thus increasing the population level harm. Further, there is a lack of controlled trials demonstrating the efficacy of smokeless tobacco to aid in smoking cessation. There is always a real danger of tobacco companies profiting by promoting these as harm reduction products and promoting dual use to subvert public smoking bans. And lastly, such an approach may be negative in developing countries like India where smoking is not the dominant form of tobacco use and where locally-popular smokeless products have higher disease risks than Swedish snus[43].

Medicinal nicotine

The least hazardous harm reduction alternative is medicinal nicotine products which include nicotine replacement therapy like gums, patches, lozenges and inhalers. At present, there is no evidence that medicinal nicotine causes cancer[44,45]. Nicotine though has effects on blood pressure and heart rate, but it presents little if any cardiovascular risk[46]. Though medicinal nicotine is not completely safe, the hazard associated with medicinal nicotine use is very low[47]. Most current NRTs do not replace the unique sensory cues associated with the act of smoking[48,49] making it difficult for smokers to switch to these. Their production is strongly regulated as these are classified as drugs and made available as smoking cessation therapies, These have a short recommended therapy duration and are not seen as attractive long term alternatives to tobacco. The UK NICE (National Institute for Health and Care Excellence) guidelines in June 2013 recommended medicinal nicotine use on a long-term basis when needed to help people abstain from smoking[50]. Of all the choices available, these are the most viable candidates for harm reduction, but for these products to make an impact there is a need to ease the regulations on these products, make these products, cheaper, and widely available.

Conclusion

There is insufficient evidence about long-term benefit to support the use of interventions intended to help reduce tobacco but not quit tobacco use. Perhaps at this stage it is more useful to concentrate on the two known pillars of tobacco control namely prevention and treatment. There should be a further focus of research on effective pharmacological and behavioural treatment modalities. Medicinal nicotine products should be made cheaper, widely available, made more effective and marketed in an attractive manner. The provision of behavioural counselling needs to be expanded. A focus on these strategies in conjunction with strong implementation of legislations like Cigarette and Other Tobacco Products Act (COTPA), 2003[51] in India and better compliance with evidenced based WHO FCTC (Framework Convention on Tobacco Control) regulations[21] may be considered the way forward.

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