Theme: Enhancing Tobacco Control in South-East Asia

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Tobacco use leads to more than 7.2 million deaths globally, and majority of these deaths happen in low- and middle-income countries.[1]

Tobacco is a proven threat to overall development in direct and indirect ways. Direct impact is economic burden resulting from health-care costs for the treatment of illnesses caused by tobacco use and exposure to second hand smoke; and indirect impact is through loss of productivity, damage to environment, and trade-offs from food, education, and health. While a rapid increase in tobacco consumption might inflate economy in the short term through both increased investment and private expenditures on tobacco and higher public spending financed by higher tobacco tax revenues, such a boost would be dwarfed by a subsequent rise in morbidity, disability, and mortality among tobacco users in their productive years, thus causing overall loss of productivity.[2]

On the other hand, tobacco control is highly cost-effective and is economically beneficial to all countries, especially low- and middle-income countries. The World Health Organization’s Framework Convention on Tobacco Control (WHO FCTC) is an evidence-based treaty which consists of demand reduction and supply reduction measures. The treaty has also been recognized as one of the implementation targets (target 3a) under the sustainable development goals-3 to be achieved by 2030.[2] Tobacco is regarded as a threat to sustainable development. Effective tobacco control, therefore, could be a powerful mean to improve not only population health but also environment protection, socioeconomic development, social equalizer, education enhancer, as well as hunger and poverty reduction.

The WHO South-East Asia Region (SEAR) is home to world’s one-fourth smokers (nearly 246 million) and more than 80% of the world’s smokeless tobacco users (290 million). More than 1.3 million persons die each year as a result of tobacco use. The tobacco control remains a challenge in the region in view of countries having contrasting geographic patterns, diverse populations and ethnicity, wide range of political systems, sociocultural norms, rampant tobacco industry interference, and variety of tobacco products being consumed.

The SEAR member states are working toward achieving the voluntary target of 30% relative reduction in the prevalence of current tobacco use in persons aged 15 years and above by 2025 as enshrined in their respective National Noncommunicable Diseases (NCD) Action Plans under the Global NCD Monitoring Framework. For more than a decade of the WHO FCTC implementation in the SEAR, member states have achieved many milestones. The countries have progressed in implementing the WHO MPOWER package and “best buys” strategies to reduce the demand of tobacco and are constantly taking steps to enhance various tobacco control initiatives.[3]

There are many best practices in tobacco control in the region. Thailand has strengthened its smoke-free laws and further raised taxes on tobacco products; Bangladesh, Bhutan, India, and Sri Lanka have taken initiatives to build and expand capacity for tobacco cessation, Nepal has the largest graphic health warnings on tobacco packs, India has “tobacco-free movies” legislation in place, and Maldives also raised tax on tobacco products.

Still, the way forward for the countries of the SEAR in tobacco control is fraught with challenges in view of rampant tobacco industry interference, resource constraint, and low priority to tobacco control by concerned nonhealth sectors. There is a huge scope for opportunities to learn from global and regional best practices and improved coordination at all levels to accelerate implementation of the WHO FCTC, including the supply side interventions. Building national capacity, in particular in implementing tobacco control interventions, as well as mainstreaming tobacco control as socioeconomic development agenda is subject of urgent attention. Research in tobacco control is a glaring gap in SEAR. The WHO has supported and encouraged research at the regional and country level to create local evidence for facilitating tobacco control policies and programs. A robust unified approach that engages all stakeholders, including the researchers, civil society organizations, international and intergovernmental organizations, and the academia and involves increased investment in tobacco control by the governments of the SEAR is the need of the hour. Only such an approach would meaningfully contribute toward a tobacco-free SEAR.

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Regulating Smokeless Tobacco and Processed Areca Nut in South-East Asia Region: The Journey So Far and the Road Ahead

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Summary

South-East Asia Region (SEAR) has more smokeless tobacco users as compared to smokers. The growing prevalence and cultural acceptance of consumption of flavored areca nut and related products, for example, supari and pan masala in many countries are confounding the scenario. The prevalence of a variety of tobacco products makes regulation a challenge which gets more complicated in view of weak enforcement of regulatory policies aggressive marketing of such products by the tobacco industry. Some countries have attempted to regulate smokeless tobacco and related products by enforcing bans. However, limited evidence base along with lack of technical and regulatory capacities have restricted the SEAR countries to effectively implement product regulation in respect of smokeless tobacco and related products. This paper lays out specific priorities for research and need to enhance regulatory capacity for smokeless tobacco and processed areca nut in the SEAR countries. A systematic and comprehensive search was conducted to identify all original published literature related to regulating smokeless tobacco and processed areca nut. Studies reporting on the same were obtained through searches in relevant academic databases. Relevant World Health Organization (WHO) documents and reports on tobacco products regulation were consulted. Generating the right evidence along with the need to build the capacity of the countries to test the smokeless tobacco and processed areca nut products by establishing testing facilities and providing practical guidelines is of paramount importance. The countries of the SEAR need to prioritize the implementation of Articles 9 and 10 of the WHO Framework Convention on Tobacco Control to strengthen the regulation of smokeless tobacco and processed areca nut products.

Key words: Areca nut, product regulation, smokeless tobacco, South-East Asia Region

INTRODUCTION

Smokeless tobacco users outnumber the estimated number of smokers in the South-East Asia Region (SEAR). In many countries of the region, while the prevalence of smoking is decreasing, the use of smokeless tobacco is on the rise. The growing prevalence and cultural acceptance of consumption of areca nut, a Group 1 human carcinogen, including products such as supari (dried fragmented areca nut blended with flavoring agents) and pan masala (a preparation of areca nut, catechu, cardamom, lime, and a number of natural and artificial perfuming and flavoring materials) are confounding the scenario. Flavoring agents and sweeteners are added to reduce harshness and improve taste and palatability of these harmful products. Regulation of smokeless tobacco and related products is a sizeable gap in overall tobacco control in SEAR. This is all the more significant in light of a large variety of smokeless tobacco and related products consumed across the region and weak enforcement of existing smokeless tobacco regulatory laws. The recent aggressive marketing of smokeless tobacco and areca nut products such as supari and pan masala by the industry, especially in countries attempting to enforce some sort of ban on these products have further challenged the regulation of these products. Limited evidence base along with lack of technical and regulatory capacities has restricted the SEAR countries to effectively implement product regulation in respect of smokeless tobacco and related products. To take

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this agenda forward, this paper lays out specific priorities for research and need to enhance regulatory capacity for smokeless tobacco and processed areca nut in SEAR countries.

**Setting the Context for the South-East Asia Region**

The eleven countries in the SEAR have over 290 million smokeless tobacco users, nearly 90% of the global number. Smokeless tobacco users outnumber the estimated number of smokers in the SEAR. In many countries of the region, while the prevalence of smoking is decreasing, the use of smokeless tobacco is on the rise. The situation calls for urgent, focused attention to counter the ongoing epidemic. Notably, the region has myriad varieties of smokeless tobacco and areca nut products prevalent in many countries. These products range in complexity from tobacco only products to products containing numerous chemical ingredients, flavoring agents, and additives. Smokeless tobacco products can be grouped into those used for chewing, sucking, gargling, sniffing, and as dentifrice. Some products are commercially available; in other cases, users can prepare the desired product for consumption from ingredients freely available in the market. The growing prevalence and cultural acceptance of areca nut consumption which has been classified as Group 1 human carcinogen-including products such as supari (dried fragmented areca nut blended with flavoring agents) and pan masala (a preparation of areca nut, catechu, cardamom, lime, and a number of natural and artificial perfuming and flavoring materials) are further confounding the scenario. Flavoring agents and sweeteners are added to improve taste and thus palatability of these harmful products. Masking harshness of these products with flavors contributes to promoting and sustaining tobacco use by the current users and attract new users into tobacco use. Certain additives accelerate the absorption of these products from the oral mucosa and their delivery into the circulatory system contributing to increased addictiveness to the modified products.

**The Regional Scenario**

Many countries in SEAR have initiated steps to regulate smokeless tobacco. Bhutan has banned manufacture and sale of tobacco products, including smokeless tobacco products. Thailand has ban on import of smokeless tobacco products. A comprehensive legislation in individual states in India invoked food safety laws (regulation 2.3.4 of the Food Safety and Standards regulations, 2011 mandating tobacco and nicotine not to be used as ingredients in any food product) to ban “gutka” and “pan masala containing tobacco”, which are one of the most commonly used smokeless tobacco products. India also has examples of sub national ban on production and sale of flavored and packaged smokeless tobacco products with some state governments imposing such bans for regulating smokeless tobacco. Nepal has banned the use of smokeless tobacco products in public places. Myanmar has banned the use of betel quid chewing in government premises. Democratic People’s Republic of Korea (DPRK) has banned smokeless tobacco products through a recent legislation. However, in particular, the region lacks effective policies and strategies to regulate smokeless tobacco and related products. This is all the more significant in light of a large variety of smokeless tobacco and related products prevalent across the region, weak enforcement of existing smokeless tobacco regulatory laws, and recent aggressive marketing of areca nut products such as supari and pan masala by the industry, especially in countries attempting to enforce some sort of ban on smokeless tobacco products.

The international tobacco control fraternity has recognized the need to regulate smokeless tobacco for effective tobacco control. The SEAR countries favored effective implementation of Articles 9 and 10 of the World Health Organization (WHO)-Framework Convention on Tobacco Control (FCTC) with special emphasis on smokeless tobacco products in the discussions held during the recently concluded seventh session of the Conference of the Parties (COP 7) to the WHO-FCTC. The Region has strongly called for prioritizing issues concerning smokeless tobacco products by the working group involved in the development of partial guidelines for the implementation of Articles 9 and 10 of the WHO FCTC and specifically for improvements needed in standard testing methods, specific product standards, and testing regimens concerning these products. These efforts should ideally be coordinated by the region through the existing platforms of the WHO Tobacco Laboratory Network (TobLabNet) and the WHO Study Group on Tobacco Product Regulation (TobReg). WHO TobLabNet is a global tobacco testing laboratory network for advancing tobacco control by combining testing and research at the global level, created to match the tobacco industry’s expert product testing capabilities. WHO TobReg includes leading scientists in the field, carries out research, and drafts recommendations for the WHO’s Member States on the issue of establishing regulatory frameworks for the design and manufacture of tobacco products basically to address the regulation of products. Still, insufficient research base, absence of standard guidelines, and inadequate technical and regulatory capacities have restricted the countries of the region to effectively implement the provisions of Articles 9 and 10 of the Convention, more so in respect of smokeless tobacco products.

The first meeting of the Global Tobacco Regulators’ Forum, coordinated by the WHO in April 2017, also brought up these gaps in regulating flavored smokeless tobacco and related products globally and especially prevalent in SEAR. The Global Tobacco Regulators’ Forum is a network of tobacco regulatory agencies from various jurisdictions across the world which is envisioned as a platform for knowledge exchange and learning between tobacco regulatory agencies of different countries and provides an opportunity for regulators to identify avenues for collaboration. At present, there is no testing facility for tobacco products in the region. India has been making efforts to establish tobacco testing laboratories for more than a decade. Once established the laboratories can serve as regional reference as well as
testing laboratories for all sorts of tobacco products. Thailand and DPR Korea have put the onus of testing the tobacco products on the industry for regulation purpose.

The Global Knowledge Hub on Smokeless Tobacco Products in accordance with the decision FCTC/COP6(10) adopted by the COP at its sixth session has been setup in India with support from the WHO FCTC Secretariat and Indian Ministry of Health. This hub strives to address the existing research gaps in respect of smokeless tobacco products, including identifying the ingredients of a wide range of these products available in the market, fixing standards and validation methods to test the contents of different smokeless tobacco products, characterizing the properties of different constituents of these products, and the methods of manufacturing the same, and estimating the health impact and characterizing the properties of different constituents of carcinogenic, culturally-acceptable, nontobacco smokeless products that are frequently used in conjunction with tobacco products, such as areca nut (betel nut) and related products such as supari and pan masala.

**Priorities for Research**

Generating the right evidence is of paramount importance to take the agenda of regulation of smokeless tobacco and processed areca nut forward in the SEAR.

A growing body of evidence suggests feasibility of implementation of standards for the levels of toxic and carcinogenic constituents in smokeless tobacco products and supports the likelihood of public health benefits from the establishment of such standards. Thus, excluding or monitoring the potential sources of contamination with these constituents can control their levels in these products. For this to happen, factors influencing the levels of major toxicants and carcinogens in smokeless tobacco products ought to be studied in detail, especially in the context of prevailing socioeconomic and cultural determinants in the SEAR. However, in the absence of well-established standards, robust legislative provisions, regulatory mechanisms, and technical knowhow, the levels of these carcinogens continue to vary significantly in different smokeless tobacco products across the region.

In particular, biomarkers of exposure account for a variety of factors that affect constituent intake by smokeless tobacco users, including patterns of use and the extent of constituent extraction from the product; therefore, they can provide valuable information on constituent uptake from products that differ in content of harmful and potentially harmful constituents (HPHC). Moreover, tobacco constituent biomarkers can serve as an important tool to support TobReg. Unfortunately, to date, human exposure studies investigating the effects of variations in the levels of specific HPHCs in smokeless tobacco products are limited, and most of the studies have been focused on tobacco-specific nitrosamines (TSNA), and specifically, 4-(methylamino)-1-(3-pyridyl)-1-butanone (NNK). Still, the available evidence strongly suggests that reducing HPHCs in smokeless tobacco products will result in reduction of human exposures to these constituents.[13]

To date, neither clinical nor epidemiological or longitudinal studies have been conducted to investigate the effects of smokeless tobacco products with differing levels of HPHCs on risk for disease. However, several studies showed a significant dose response relationship between the biomarker-assessed systemic doses of some HPHCs and cancer risks in cigarette smokers, and it is not unreasonable to extrapolate these results to smokeless tobacco users. Another way to determine if exposure to HPHCs are associated with disease risk in smokeless tobacco users is to examine the incidence of smokeless tobacco-related disease across countries that market products that differ in levels of these harmful constituents. The countries of the SEAR, given the wide varieties of smokeless tobacco and processed areca nut products available across the region, ought to be prioritized for such an approach.

Currently, for the smokeless tobacco products, the WHO Study Group on TobReg recommends that the concentrations of NNN plus NNK should be limited to 2 μg/g of dry weight and benzo[a]pyrene should be limited to 5 ng/g of dry weight.[14] As an initial step, this group focused on TSNA and polycyclic aromatic hydrocarbon because these constituents might explain the diversity in cancer risks observed across different regions of the world as a result of smokeless tobacco use, and the limits were considered to be achievable. However, strictly speaking, there is a lack of single compendium that brings together all the information on different toxicants found in smokeless tobacco products and the available standardized methods to analyze them. In this background, it is imperative that the countries of the region work in close collaboration with the Global Knowledge Hub on Smokeless Tobacco Products and the recently formed Global Tobacco Regulators’ Forum. In particular, the future research should be directed toward the collection of scientific information on the chemicals in contents and emissions of smokeless tobacco products that contribute to their toxicity, addictiveness, and attractiveness, the analytical methods used to measure them, and the levels found in these products in the markets across the SEAR; finalization of the standard operating procedures for measuring nicotine and TSNA; applicability of the WHO ToLabNet standard operating procedures to measure humectants and ammonia in smokeless tobacco products; and identification of any available technical approaches to reduce toxicants in smokeless tobacco.[12] In addition, given the regional context, efforts should be made to estimate the health impact and characterize the properties of different constituents of carcinogenic, culturally-acceptable, nontobacco smokeless products that are frequently used in conjunction with tobacco products, such as areca nut (betel nut) and related products such as supari and pan masala.[15-17]

**Priorities for Regulatory Action**

During COP7, most of the countries of the SEAR were of the view that their current levels of technical capacity and
scientific knowledge do not allow them to meaningfully engage in discussions centered on the regulation of addictiveness reduction in smokeless tobacco products.[10]

To address this situation, apart from undertaking new research on priority agendas as underscored in the previous section, two clear action points stand out. First, there is a need to establish tobacco testing laboratories in the region wherein the declarations made by the tobacco industry regarding the contents and emissions of various smokeless tobacco products and claimed nontobacco products such as supari and pan masala could be verified and the actual chemical constituents of these products could be reliably tested. Second, till full-fledged guidelines and “state-of-the-art” tobacco testing laboratories are available, it is important to develop practical and scalable guidelines for testing and measuring the “main” contents of popular and commonly prevalent smokeless tobacco products in the SEAR and for setting up a “basic” tobacco testing laboratory within the resources available at the country level to test and measure these contents.

Any suggested reduction of toxicant levels in smokeless tobacco products, i.e., a toxicity regulatory approach, is fraught with possibilities of potential misuse in the SEAR, even in the presence of likely safeguards, unless there is strong regulatory capacity available with the countries to monitor and regulate such levels and guard against their possible misuse by the Industry.[10]

In this context, the recommendations in the partial guidelines for implementation of Articles 9 and 10 of the WHO FCTC hold tremendous significance.[19] The countries of the SEAR should explore legislative measures to regulate, by prohibiting or restricting, ingredients that may be used to increase palatability, addictiveness, or attractiveness of smokeless tobacco and related products such as supari and pan masala. Ingredients indispensable for the manufacturing of these products and not linked to attractiveness should be subject to regulation according to strong, clear, and comprehensive national laws. In the present scenario, recommendation to reduce the appeal of smokeless tobacco and several nontobacco smokeless products such as supari and pan masala by banning or regulating sweeteners and flavoring substances (including herbs, spices, and flowers) does hold a lot of ground for SEAR countries.

To conclude, the countries of the SEAR need to prioritize the implementation of Articles 9 and 10 of the WHO FCTC which is currently lacking due to paucity of rigorous research, regulatory capacities, and technical tools and guidance. The time may not be more opportune to take this important tobacco control agenda forward with special focus on the priorities for research and regulatory approaches identified in this paper.

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Electronic nicotine delivery systems (ENDS) are being marketed to tobacco smokers for use in places where smoking is not allowed or as aids similar to pharmaceutical nicotine products to help cigarette smokers quit tobacco use. These are often flavored to make them more attractive for youth – ENDS use may lead young nonsmokers to take up tobacco products. Neither safety nor efficacy as a cessation aid of ENDS has been scientifically demonstrated. The adverse health effects of secondhand aerosol cannot be ruled out. Weak regulation of these products might contribute to the expansion of the ENDS market – in which tobacco companies have a substantial stake – potentially renormalizing smoking habits and negating years of intense tobacco control campaigning. The current situation calls for galvanizing policy makers to gear up to this challenge in the Southeast Asia Region (SEAR) where the high burden of tobacco use is compounded by large proportion of young vulnerable population and limited established tobacco cessation facilities. Banning ENDS in the SEAR seems to be the most plausible approach at present. In the SEAR, Timor-Leste, Democratic People’s Republic of Korea, and Thailand have taken the lead in banning these products. The other countries of the SEAR should follow suit. The SEAR countries may, however, choose to revise their strategy if unbiased scientific evidence emerges about efficacy of ENDS as a tobacco cessation aid. ENDS industry must show true motivation and willingness to develop and test ENDS as effective pharmaceutical tools in the regional context before asking for market authorization.

Key words: Electronic cigarettes, electronic nicotine delivery systems, regulation, Southeast Asia Region

INTRODUCTION

Electronic cigarettes (ECs) or the electronic nicotine delivery systems (ENDS) were formally introduced in 2007.[4] They are battery-powered devices that simulate tobacco cigarettes by vaporizing nicotine and other chemicals into an inhalable vapor. A range of products are now in the market, with new improved ones promised, and something almost unheard of in tobacco use – self organizing groups of users who call themselves “vapers” because they inhale vapor, not smoke – are advocating for these products and sharing their experiences. Lately, Electronic Nonnicotine Delivery Systems (ENNDS) are also becoming increasingly popular. ENNDS devices are labeled as not containing nicotine (though labeling may not always be accurate). In practice, these devices are closely related to nicotine addiction because they deal, at least partly, with the behavioral and sensory aspects of smoking addiction (e.g., hand mouth movement).

ENDS are being marketed to tobacco smokers for use in places where smoking is not allowed, such as smoke-free pubs or restaurants, or as an aid similar to pharmaceutical nicotine products to help cigarette smokers quit tobacco use.[2-3] However, as the vapor is often flavored which can make them more appealing to youth, there are concerns that ENDS use will lead young nonsmokers to take up cigarettes or other tobacco products. Many youngsters who start with ENDS may be condemned to struggling with a lifelong addiction to nicotine and conventional cigarettes.[4]

The safety of these products has not been scientifically demonstrated. Besides, the current lack of regulation means...
that there is no way for consumers to find out what is actually delivered by the product they have purchased. The chemicals used in ENDS have not been fully disclosed, and there are no adequate data on their emissions. To further aggravate the scenario, sales of ENDS in countries such as United States have been doubling every year since 2007.\(^5\)

The current situation calls for galvanizing policy makers to gear up to this challenge in countries such as those of the Southeast Asia Region (SEAR) where the high burden of tobacco use is further compounded by large proportion of young vulnerable population, limited established tobacco cessation facilities, and lack of regulatory provisions for ENDS. This review aims to analyze all relevant evidence based on ENDS and suggest plausible measures to regulate this slowly evolving but potentially catastrophic phenomenon in the SEAR.

**Toxicology**

Studies measuring the content of ENDS cartridges have found varying nicotine levels as well as unlabeled, dangerous ingredients.\(^6\) ENDS brands not only differ in their efficacy but also in their consistency of nicotine vaporization.\(^7\) Potentially harmful constituents have been documented in some ENDS cartridges, including irritants, genotoxins, and animal carcinogens.\(^8\) Nicotine concentration in e-liquid is not well related to nicotine in vapor.\(^9\) To further complicate the scenario, an increase in (ultra) fine particles (FP/UFP) and volatile organic compounds (VOC) could be determined after the use of the ENDS. Prominent components in the gas phase are 1,2-propanediol, 1,2,3-propanetriol, diacetin, flavorings, and traces of nicotine. "Passive vaping” may thus be associated with the consumption of ENDS.\(^10\) More rigorous chemical analyses of these products and their emissions are urgently needed.\(^11\)

**Health Effects**

The health effects of vaping include the potential negative impact of nicotine on adolescent brain development, risk for nicotine addiction, and initiation of the use of conventional cigarettes or other tobacco products.\(^12\) An addictive substance, nicotine use can lead to increased blood pressure and heart rate as well as nausea, sweating, and diarrhea, according to the National Institutes of Health.\(^12\) Spain’s Association of Pneumology and Thoracic Surgery says that ENDS immediately increase the airway resistance and decrease the power to draw air through, and this effect is greater in the group of nonsmokers and healthy smokers. It is well documented that nicotine contributes significantly to the harms to the developing fetus, probably through direct effects on the placenta as well as from passing across the placenta into the fetus.\(^13\) Furthermore, generally, ENDS require stronger vacuums (suction) to smoke than conventional brands and the effects of this on human health could be adverse.\(^14\) Besides, with design modifications, next generation ENDS would have the potential to deliver nicotine like a true combustible cigarette with a highly titratable (and escalating) dose potential direct to the brain. Such products would greatly change the equation in terms of cardiac safety, misuse, and addiction.\(^15\) Latest research corroborates the neurologic effects of ENDS on human brain beta-2 nicotinic acetylcholine receptors, likely contributing to abuse liability by providing adequate alternative nicotine delivery system for cigarette smokers.\(^16\) In terms of long-term health effects, it takes decades to look at the effects researchers are interested in. Thus, we have to understand that what comes out of ENDS is probably less toxic, but it is definitely more toxic than breathing clean air.\(^13\)

Addition of flavoring agents to the e-liquid in ENDS/ENNDS to make these products more attractive to youth contributes to potential health hazards. Notably, close to 8000 e-liquid unique flavors have been reported. The health effects of heated and inhaled flavorings used in e-liquids have not been well-studied. Heated and inhaled popcorn, cinnamon, and cherry flavorings are potentially hazardous, with the limited literature on the topic indicating that most flavorings may pose appreciable health risks from long-term use, especially those that are sweet.\(^1\)

The adverse health effects for third parties exposed cannot be excluded because the use of ENDS leads to the emission of fine and ultrafine inhalable liquid particles, nicotine, and cancer-causing substances into the indoor air. A recent systematic review of the health risks from passive exposure to exhaled aerosol from ENDS/ENNDS users – or secondhand aerosol (SHA) concluded that “the absolute impact from passive exposure to EC vapor has the potential to lead to adverse health effects."\(^13\) A WHO-commissioned review found that while there are a limited number of studies in this area, it can be concluded that SHA is a new air contamination source for particulate matter, which includes fine and UFP as well as VOC, some heavy metals, and nicotine.\(^17\)

**Electronic Nicotine Delivery Systems for Smoking Cessation**

The main argument put forward by the tobacco companies in some countries is that the ENDS can be used as devices for smoking cessation. These companies are putting these arguments quite subtly because they are careful not to make health claims which would lead to regulation of these products as medicines – as is the case in many countries such as Denmark, Lithuania, and Slovenia.\(^18\) Studies also claim that ENDS are rarely, if at all, used by people who have never used tobacco.\(^19\) Tobacco companies try to downsize anticipated addiction to ENDS by citing studies that show thousands of former smokers addicted to nicotine gum – the same is not considered a major public health problem.\(^20\) Actually, those in support of ENDS have now focused on the potential of these products to serve as the centerpiece of a harm reduction strategy, with the argument that ENDS can drive down smoking faster.\(^21\)
However, the Cancer Research UK-commissioned study identified four broad areas of uncertainty pertaining to the harm reduction use attributed to ENDS. These include the effects pertaining to the individual, tobacco control movement, political environment, and philosophical issues. The report highlights questions raised by the tobacco control and public health community relating to the involvement of the tobacco industry, personal choice, political decisions, and the question of how ethical it is to promote an addictive product.\

As of now, ENDS are not proven cessation aids. In fact, the role of ENDS is not clearly established. They are perceived in some quarters as smoking cessation aids and in others as a starter or dual-use (to maintain nicotine addiction) product. Very few studies have assessed them as a harm reduction or cessation aid and that too with conflicting findings. One of the largest studies to date was based on a sample of 5939 current and former smokers across four countries. It found that ENDS users were not more likely to quit smoking than nonusers. Similarly, a New Zealand-based study also talks with uncertainty about the place of ENDS in tobacco control. Research shows that drugs that contain nicotine are unattractive and not very effective in aiding cessation. In fact, the vast majority of people who quit smoking do so without help.

Public health enthusiasts for ENDS see their promise as a way to get smokers to quit or reduce toxic exposure, but they seem blasé about the other possible effects. Many impassioned, vocal testimonies that ENDS have helped many people who quit smoking do so without help.

Marketing and Advertising Strategies

In their present unregulated state, manufacturers are free to promote ENDS in any way they choose. They are being promoted on social media including cable TV, the web, and YouTube by sexy movies and rock stars, who urge the youth to “take their freedom back.”

Big tobacco, adept at targeting young consumers, is eyeing the ENDS market. The tobacco industry sees a future where ENDS accompany and perpetuate, rather than supplant, tobacco use, especially targeting the youth. Fears therefore arise that a new generation of youth who would not otherwise take up smoking could be enticed by ENDS into nicotine addiction and subsequent tobacco use. New ENDS’ outlets are appearing, in some cases beside schools, in Slovenia. ENDS marketing (including television commercials) encourages the use of the products anywhere, specifically in smoke-free environments in an effort to reestablish positive social norms for nicotine addiction.

Furthermore, online publicity presents particular difficulties – websites can be set up outside a country’s jurisdiction, for instance, and website age protection remains rudimentary. The current swathe of ENDS marketing is chillingly reminiscent of the early days of tobacco advertising; this past experience suggests that there is a good reason to be deeply concerned.

Studies show that these adverts exert a strong influence on the targeted audience – NJoy’s Super Bowl ad in US prompted a 40% uptick in sales in the five markets where it ran. An unquantified amount of advertising uses deceptive health claims, targets youth, and incites rebellion against smoke-free policies. There are also concerns that some companies are using or might use ENDS/ENNDS advertising to promote smoking, advertently, or unintentionally.

Notably, Internet sales, as opposed to those in retail stores, accounted for one-third of the worldwide market in 2014. In three regions – Asia Pacific, Australasia, and Latin America – Internet sales accounted for the largest share of the market (70%, 85%, and 94%, respectively).

In SEAR, ENDS are currently marketed as “health cigarettes” and are mostly available online, including on social networking and e-commerce sites. They are becoming more visible in shopping malls and kiosks, mostly in the metros. The marketing messages mislead consumers to believe that these products have been proven to be safe, both for users and for people.
who would be exposed to secondhand emissions. The situation is reminiscent of the ENDS market in the UK and the US 5–6 years back, and given the past trends in these countries, these products could be burgeoning across the SEAR within the next couple of years.[40]

**The Way Forward for the Southeast Asia Region**

Worldwide, countries have adopted various regulatory strategies with respect to ENDS/ENNDS, such as an outright ban on their manufacturing, importation, distribution, and sale; the adoption of regulation similar to that applicable to medicines; their control as tobacco products; or their control as consumer products with tobacco control-like measures, while there are other countries that have not regulated these products at all. Thus, different countries regulate ENDS differently, resulting in legal complexity, possible uncertainty, and regulatory gap. Excessive regulation could marginalize ENDS in favor of conventional cigarettes. On the other hand, deficient regulation might contribute to the expansion of the ENDS market – in which tobacco companies have a substantial stake – potentially renormalizing smoking habits and negating years of intense tobacco control campaigning.[41] If prior interest of the tobacco industry in reduced-risk products serves as a precedent, their interest lies in maintaining the status quo for as long as possible. The promotion of ENDS comes with such messages some of which are difficult to harmonize with the core tobacco control message and others are simply incompatible. Findings’ support increased monitoring and regulation of ENDS marketing to prevent deceptive marketing tactics and ensure consumer safety.[42] Use of ENDS in places with established indoor smoking laws could be a step backward for public health when it comes to air quality as well as a negative for someone who may have otherwise quit nicotine. Several health organizations recommend that the use of ENDS be prohibited in public places and in workplaces.[43] The current evidence shows that the legitimacy of these products is fragile and regulations should be based on careful discursive management.[44]

Tobacco control in itself is an enormous public health challenge in SEAR. In the absence of established facilities for tobacco cessation, ENDS provide an opportunity to the industry to tap the large population of tobacco users in SEAR who want to quit tobacco use. Besides, given the rapid increase in their use and youth’s susceptibility to social and environmental influences to use these products, developing strategies to prevent marketing, sales, and use of ENDS among youth is most critical. It may be relevant to mention here how the public health community was fooled by the concept of light cigarettes when the tobacco industry deceptively manipulated cigarettes to decrease the amounts of toxic compounds measured by smoking machines. It took many years to show that light cigarettes were in fact as dangerous as regular cigarettes. The countries of the SEAR cannot allow ENDS to establish themselves the way light cigarettes did and many years from now when all the scientific questions are answered, try to stuff the genie back in the bottle.

The countries of the SEAR may, however, choose to revise their strategy if unbiased scientific evidence emerges about efficacy of ENDS as a tobacco cessation aid. In the long run, the countries of the SEAR should be open to more research. Such an open approach would create real incentives for the ENDS industry to conduct research and to generate adequate scientific knowledge about the quality, efficacy, and safety of these products. Just as it is for all other drugs and medical devices, ENDS industry must show true motivation and willingness to first develop and test ENDS as effective pharmaceutical tools in the regional context before asking for market authorization.

In this background, the decision FCTC/COP7(9) adopted at the seventh session of the Conference of the Parties to the WHO Framework Convention on Tobacco Control (COP7) should serve as a guide for the countries of the SEAR to effectively regulate ECs/ENDS.[45] The countries of the SEAR should consider regulatory measures to holistically ban manufacture, importation, distribution, presentation, sale, and use of ENDS/ENNDS, as appropriate to their national laws. Regardless of whether these products contain nicotine or not, ENDS/ENNDS mimic smoking and should be considered as a (direct or indirect) promotion of tobacco use.

In SEAR, law provides for ban on ENDS in Sri Lanka and Timor-Leste. Maldives and Nepal also regulate ENDS. India has some examples of ban on ENDS at subnational level. Certain States/Union Territories in India such as Karnataka, Maharashtra, Punjab, and Chandigarh have banned ENDS under the relevant provisions of the Drugs and Cosmetics Act, 1940. In view of challenges involved in implementing tobacco control laws, rampant tobacco industry interference, large proportion of vulnerable youth population, negligible support available for tobacco cessation, ban on ENDS/ENNDS is a plausible and cost-effective approach subject to effective implementation and monitoring. The member states should follow the examples set by other countries within the region and should ban ENDS/ENNDS in the larger interest of public health and well-being. However, the actual success of such a ban strategy will eventually depend on how the countries of the SEAR control illicit trade and cross-border internet sales of ENDS/ENNDS.

**Disclaimer**

The opinions or views expressed in this article are solely those of the authors and do not express the views or opinions of the organization to which the authors are affiliated.

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There are no conflicts of interest.

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Youth Tobacco Use in South-East Asia: Implications for Tobacco Epidemic and Options for Its Control in the Region

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Summary

Nearly half of all male population and two in every five females in the WHO South-East Asia Region (SEAR) consume some form of tobacco. Preventing initiation among adolescents is critical for overall tobacco control. We assessed the trends in youth tobacco use and policies in SEAR. Data are used from school-based youth (Global Youth Tobacco Survey and global school student-based health survey) and adult (Global Adult Tobacco Survey, STEPS) tobacco surveys and the WHO Framework of Convention of Tobacco Control (FCTC) implementation database. More than 10% of 13–15-year-old adolescent students reported tobacco use in 8 out of 11 countries. The prevalence of smokeless tobacco exceeded that of cigarettes except in Indonesia, Thailand, and Timor-Leste. No consistent declining trends in tobacco use were observed in any of the countries with 3 or more data points. More than half of all daily smokers aged 20–34 years initiated “daily” smoking before 20 years of age. 19% (Bangladesh) to 55% (Timor-Leste) of 13–17-year old students tried their first cigarette before their 14th birthday. Majority of adolescent students in most of the SEAR countries reported purchasing their cigarettes from store/shop/vendor and as single sticks, with few exceptions and purchased them as “single” cigarette. There is a limited change in affordability of cigarettes in SEAR over time. Tobacco use remains high among youth in SEAR. Efforts should be strengthened to fully implement/enforce recommended policy measures (legal minimum age, fiscal measures to reduce tobacco affordability; prohibiting sale of single cigarettes, etc.) and to explore new measures (e.g., tobacco-free generation).

Key words: Cigarettes, smokeless tobacco, surveillance, tobacco, trends, youth

Introduction

Tobacco continues to be a leading preventable cause of death worldwide and in South-East Asia Region (SEAR). Given its public health importance, one of the global goals for prevention and control of noncommunicable diseases is 30% relative reduction in the prevalence of current tobacco use by 2025 compared to baseline levels in 2010.[1] Implementation of tobacco control measures figures prominently in the new sustainable development goals (SDGs). The WHO SEAR with more than one-fourth of world’s population (26%) has among the top tobacco-consuming and tobacco-producing countries in the world. Embedded in the sociocultural practices, nearly half of all male population and two in every five females in SEAR consume some form of tobacco (smoked or smokeless).[2] The region has 250 million tobacco smokers and a nearly equal number of smokeless tobacco users.[2] In addition, the number of smokeless tobacco users seems to be growing, a cause of concern in many SEAR countries.[3,4]

The global evidence suggests that most of the current adult tobacco users initiate tobacco use during adolescence, which is continued into the adulthood. As per the global estimates, nearly 9 out of 10 smokers start before 18 years of age and 98% start smoking by age of 26 years. About 3 out of 4 adolescent smokers become adult smokers.[5] The higher sensitivity and vulnerability of children and adolescents to nicotine addiction implies that the earlier the smokers start smoking, the more likely they are to become addicted. Recognizing the difficulty in forcing existing users to quit, preventing initiation of tobacco use among adolescents has become critical to inform any policies and measures to stem the overall tobacco epidemic.

Using data from different sources, this paper reviews the current status and trends in youth tobacco use and in the policy
measures put in place to control it in SEAR. It also discusses the potential options to prevent future generations from initiating the tobacco use.

**The study context**

The WHO SEAR comprises 11 countries with a total population of about 1.9 billion or about 26% of the total global population. Adolescents (10–19 years) constitute an important sociodemographic group in the WHO SEAR accounting for almost one-fifth or 18.8% (362.2 million individuals) of the total regional population. Of this, 13–17-year-old adolescents comprise 181 million or nearly one-tenth (9.4%) of the total regional population. It is a culturally, religiously, and economically diverse region. While India and Nepal have predominantly Hindu populations, Bangladesh, Indonesia, and Maldives are predominantly Muslim countries and Myanmar, Sri Lanka, and Thailand have a large proportion of populations that practice Buddhism.

**Data and Methods**

The data on youth tobacco use come from nationwide school-based youth tobacco prevalence surveys conducted as part of the Global Youth Tobacco Surveys (GYTS) initiative or integrated youth risk factor surveys implemented as part of global school student-based health survey (GSHS) initiative among middle to high school students aged 13–15 years (GYTS) or 13–17 years of age (GSHS).

In addition, data on age at initiation are presented from the household Adult Tobacco Prevalence Surveys (done as part of Global Adult Tobacco Prevalence surveys initiative (Global Adult Tobacco Survey) among 15+ population or as integrated noncommunicable disease (NCD) risk factor surveys (STEP surveys) done among population of 18–69 years of age.

Both these surveys included a follow-up question “how old were you when you first started smoking daily” to the respondents who reported daily tobacco smoking.

Data are also used from the WHO FCTC (WHO Framework of Convention for Tobacco Control) implementation database and other qualitative policy databases collected by the WHO from members state to assess the trends and current status of implementation of selected tobacco control policies.

Conceptually reduction in tobacco use among adolescents may result from:

- Reduction in supply (article 16 of FCTC): Reduced availability of single cigarettes and from vendor sales, reduced availability of promotional products, reduced access (from stricter implementation of minimum age laws for tobacco purchase)
- Reduction in demand: Reduced affordability of tobacco through increased prices (article 6 of FCTC), nonprice demand reduction measures such as pictorial health warning, reduced exposure to people smoking article 8, 11, 12, and 13 of FCTC
- Reduction in other risk factors that predispose adolescents to overall substance use (e.g., bullying at school, family environment, mental health issues, etc.).

This paper reviews the current status of selected policy options only along the first two bullet points but does not go in depth for policies under bullet point 3.

**Results**

**Trends in tobacco use among adolescents**

**Tobacco use prevalence among adolescents in South-East Asia Region**

Figure 1 shows the trends in tobacco use among 13–15-year-old students as reported in anonymously administered GYTS surveys. More than 10% of 13–15-year-old school-going adolescents reported tobacco use in 8 out of 11 countries in the WHO SEAR [Figure 1]. The prevalence exceeded 20% in Bhutan, Nepal, and Timor-Leste. Only in Bangladesh and Sri Lanka, the prevalence was <10% [Figure 1]. The Democratic Republic of Korea (DPRK) has no comparable data available, but it reports no tobacco use among adolescents aged 16 years and younger, the minimum legal age for selling tobacco products in the country.

Cigarette use is common; exceeding 10% in Bhutan, Thailand, and Timor-Leste, the prevalence of smokeless tobacco is higher than that of cigarettes in most of the countries in SEAR with the exception of Indonesia, Thailand, and Timor-Leste [Figure 1].

No consistent declining trends in tobacco use (either smokeless or smoked) were observed in any of the countries where at least 3 data points were available, though a sudden drop in overall tobacco use was observed in Sri Lanka in 2015 compared to previous 3 rounds in 2003–2011, mainly due to decline in smokeless tobacco use [Figure 1]. In some countries, a substantial increase (e.g., Nepal and Bhutan) was observed from one round to another for smokeless products, while a substantial drop was observed in Sri Lanka and Thailand which needs to be investigated further.

**Age at initiation of daily tobacco smoking in South-East Asia Region**

The mean age for initiating daily smoking among 20–34-year-old current daily smokers ranged from 17 years in Nepal to 18.9 years in Bhutan. More than half of all current daily smokers aged 20–34 years of age in all countries initiated daily smoking before their 20th birthday, with such proportion exceeding 75% in Indonesia, Nepal, and Thailand [Table 1]. The lower proportion reported in Bhutan (58%) and Timor-Leste (54%) needs investigation as this is not consistent with very high youth tobacco use reported from these countries as shown in Table 1.

Another source of information on early initiation of smoking in the WHO SEAR comes from nationwide school-based surveys of 13–17-year-old students implemented as part of the Global School Health Student-based surveys (GSHS). Table 1 shows
Consistent with the data presented on age at initiation of daily smoking among 20–34-year-old population, a very high proportion of students who ever tried cigarettes, tried their first cigarette very early before turning 14 years of age, ranging from almost one in four students in Bangladesh to more than half of all ever-smokers in Timor-Leste.

**Current status and trend in selected policies**

*The minimum age of legal access*

The article 16 of the WHO FCTC aims at restricting access and supply of tobacco to adolescents and requires parties to adopt and implement measures to prohibit sales of tobacco products to and by minors as well as other measures limiting the access of underage persons to tobacco products.¹³
All the countries in SEAR have specified legal minimum age for tobacco sales. As of 2016, DPRK and Timor-Leste have the lowest minimum legal age at 16 and 17 years, respectively, while Sri Lanka has the highest legal minimum age of 21 years. Thailand became as a close second with raising of minimum legal age to 20 years (from 18 years previously) in their new tobacco products control act (article 26) passed in 2017. The remaining countries have 18 years of age as the legal minimum age for tobacco sales.

Enforcing the minimum age of legal access and patterns of tobacco purchase by adolescents

The percentage of adolescents who got their cigarettes by purchasing them from a store, shop, or vendor in the last 30 days varied greatly across countries in the WHO SEAR, ranging from just 20% in Sri Lanka to over 80% in Bangladesh [Table 2]. A specific question “during the past 30 days, did anyone refuse to sell you cigarettes because of your age?” was included in GYTS survey to assess enforcement of minimum legal age for purchasing tobacco. Similarly, while only 14% of students were refused from buying cigarettes in Bangladesh because of their age being less than minimum legal age for tobacco purchase, more than 60% of students were refused on the same grounds in Sri Lanka [Table 2]. This reflects the variation in the enforcement of legal minimum age for purchasing tobacco in the Region. Finally, in many countries such as Bangladesh, Indonesia, Myanmar, and Sri Lanka, majority of adolescents are purchasing cigarettes mainly as individual sticks, which perhaps make them more affordable. Only in Thailand, only 20% reported buying them as individual sticks [Table 2].

Sale of single cigarettes

Single cigarette market neutralizes four important tobacco control strategies: protecting minors, pictorial warning, and support quitting and effective taxation.[14,15] An easy affordability of loose cigarettes is an enabling factor for student and minors which perhaps make them more affordable to them. The article 16 (sales to and by minors) of the World Health Organization (WHO) Framework Convention on Tobacco Control states that countries “shall endeavor” to prohibit sale of single stick and “kiddie packs” (soft packs of 10 cigarettes) as it makes them more affordable for minors.[13]

As of 2016, Bangladesh, Maldives, Indonesia, and Sri Lanka do not prohibit single sticks sale, but some SEAR countries have made good progress with Thailand and Timor-Leste passing legislations to prohibit sale of cigarettes as individual sticks in 2017 and 2016, respectively. In addition, 11 states and union territories in India have issued orders/notifications banning the sale of loose cigarettes under section-7 of COTPA, 2003 in 2016.

However, the survey data as presented in Table 2 show that majority of adolescents in many SEAR countries such as Bangladesh, Indonesia, Myanmar, and Sri Lanka are purchasing cigarettes mainly as individual sticks [Table 2].

Trends in tobacco prices and affordability

While the WHO FCTC recommends raising taxes to more than 75% of the retail price and is considered to be most powerful and most cost-effective tobacco control intervention, only three countries in SEAR (Bangladesh, Sri Lanka, and Thailand) met the goal of 75% tax rate of retail price as of 2016. More importantly, the tax increases in most of the SEAR countries have not been sufficient to impact affordability of tobacco products in most of the countries as measured by price of the pack divided by the GDP per capita [Table 3]. The affordability of the tobacco products was estimated by dividing reported price of 20-cigarettes pack of most sold brand in 2014 in GTCR survey[24] and GDP per capita as reported in World Bank WDI indicator database.[25] Higher the percentage of GDP required to buy 100 packs of 20-cigarettes each, higher is the unaffordability.

Status of youth tobacco use surveillance

Adolescent tobacco use is included as an indicator in global monitoring framework for NCDs (WHO 2014), but only one country in the region (Indonesia) has included smoking

### Table 2: Patterns of purchasing cigarettes among current smokers (13-15 years) and refusal because of being underage, Global Youth Tobacco Surveys in World Health Organization South-East Asia Region

<table>
<thead>
<tr>
<th>Country</th>
<th>Survey year</th>
<th>Current smokers who obtained cigarettes by buying them from a store, shop, or street vendor in the past 30 days (%)</th>
<th>Current smokers who bought cigarettes as individual sticks in the past 30 days (%)</th>
<th>Current smokers who were refused from buying cigarettes because of their age in the past 30 days (%)</th>
<th>Current smokers who were refused because of being underage in the past 30 days (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>2013</td>
<td>88.4</td>
<td>13.9</td>
<td>84.8</td>
<td></td>
</tr>
<tr>
<td>Bhutan</td>
<td>2013</td>
<td>54.5</td>
<td>52.2</td>
<td>53.1</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>2009</td>
<td>47.0</td>
<td>43.8</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>2014</td>
<td>64.9</td>
<td>35.5</td>
<td>74.3</td>
<td></td>
</tr>
<tr>
<td>Maldives</td>
<td>2011</td>
<td>34.0</td>
<td>24.0</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Myanmar</td>
<td>2016</td>
<td>54.5</td>
<td>24.0</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Nepal</td>
<td>2011</td>
<td>27.1</td>
<td>37.1</td>
<td>61.9</td>
<td></td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>2015</td>
<td>20.5</td>
<td>63.1</td>
<td>62.1</td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>2015</td>
<td>67.4</td>
<td>56.0</td>
<td>19.6</td>
<td></td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>2013</td>
<td>82.7</td>
<td>53.3</td>
<td>44.8</td>
<td></td>
</tr>
</tbody>
</table>

Source: Global Youth Tobacco Health Surveys of various years. NA: Data not available
prevalence among children <18 years as one of the key indicators to assess the performance of district mayors as part of its National Medium-Term Development Plans (RPJMN) for 2015–2019. Youth tobacco surveillance in SEAR is mainly undertaken as part of GYTS initiative funded by the CDC (USA) in the form of school-based surveys. All the countries in SEAR have implemented at least three rounds of such surveys, and some have done even 4–5 rounds over last 15 years (e.g., Myanmar and Sri Lanka). However, the surveillance remains ad hoc and highly donor dependent and the current methodology excludes out of school youth in most of the member states in SEAR.

**Table 3: Change in relative affordability of most sold brand of cigarettes (percentage of GDP per capita required to purchase 100 packs [of 20 cigarettes each] of most sold brand of cigarettes) between 2007 and 2014 (GTCHR data)**

<table>
<thead>
<tr>
<th>Country</th>
<th>2007 (%)</th>
<th>2010 (%)</th>
<th>2012 (%)</th>
<th>2014 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>India</td>
<td>11</td>
<td>11</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Indonesia</td>
<td>6</td>
<td>5</td>
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<td>5</td>
</tr>
<tr>
<td>Maldives</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Myanmar</td>
<td>NA</td>
<td>NA</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Nepal</td>
<td>21</td>
<td>19</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>17</td>
<td>12</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Thailand</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>NA</td>
<td>NA</td>
<td>11</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: Authors calculations based on reported price of 20-cigarettes pack of most sold brand in GTCR and GDP per capita (taken from the World Bank WDI indicator database). Higher the percentage of GDP required to buy 100 pack, higher is the unaffordability. NA: Not available.

The factors increasing youth tobacco initiation may vary across countries, but some commonly documented factors include others smoking in their presence, tobacco use by parents or peers; exposure to tobacco advertising; acceptability of tobacco use among peers or in social norms advertised in movies or tobacco commercials; having depression, anxiety, or stress; and higher accessibility and lower prices of tobacco products.

Cultural taboos or resistance explain to some extent low tobacco use among female population. This suggests promoting tobacco-free society as a norm will go a long way in reducing tobacco use. Most of the policy measures, hence, should aim at changing social norms around tobacco use (or make it look bad) or make it increasingly difficult for adolescents to use tobacco (e.g., by making it too unaffordable or restricting the supply).

The review of policy data showed that SEAR countries are yet to fully implement and/or enforce regulations to reduce the affordability and accessibility of tobacco products, including taxation, sale of single cigarettes or loose tobacco products, and the minimum legal age for tobacco sales.

The data presented in Table 1 clearly show that most adolescent and adult tobacco users initiate tobacco use very early. One of the options to reduce early tobacco use initiation and progression to regular tobacco use may be to increase the minimal legal age to 21 years from the current 18 years in effect in most of the SEAR countries. In the past 2 years, new evidence has emerged that suggests that minimal legal age laws are effective, enjoy very high levels of public support and have minimal economic impact on revenues in the short term. Limiting youth access to cigarettes by increasing the legal purchase age to 21 years is expected to reduce adult smoking prevalence in the long term by having a larger drop in youth smoking prevalence, but this will require high-level advocacy efforts including mobilizing public support for raising the tobacco sale age to 21 years by increasing public awareness about the susceptibility and rapid addiction of youth to nicotine.

In addition to increasing the minimum legal age to purchase tobacco, more concerted efforts are needed to enforce these underage laws. The data presented in Figure 1 and Table 2 clearly demonstrate that the underage laws are not well enforced in SEAR countries and adolescents have rather easy access to tobacco from shops and stores, etc., Greater attention to enforcing and monitoring retailer compliance with all tobacco regulations will be important for tobacco underage laws to be effective in reducing youth access to tobacco products.

Many advocates are also pushing for tobacco-free generation, which aims at completing restricting the sale of tobacco to people born after a certain date. Feasibility and applicability of this concept may also be explored in countries in SEAR.
The evidence supporting the negative impact of increased prices or unaffordability especially on youth tobacco use is well established both within SEAR countries and outside.\textsuperscript{[21-23]} Tobacco pricing is crucial to address the youth tobacco epidemic, as adolescents are particularly sensitive to tobacco pricing. The good news is that there is still sufficient room in most of SEAR countries to implement appropriate fiscal measures, especially raising taxes to increase prices of tobacco products.

Member states must institutionalize youth tobacco surveillance preferably as part of integrated risk factor surveys and should ensure inclusion of out of school youth which comprises substantial proportion in some countries such as Bangladesh and India. Finally, these regulations and the surveillance measures must include all tobacco products including smoked tobacco products other than cigarettes and smokeless tobacco products (whose use outpaces the smoked tobacco products use in many countries in SEAR). The adolescent tobacco use should be included as a key indicator of overall development as well as of progress toward to control of NCD diseases and mortality.

**CONCLUSION**

The youth tobacco use remains high with early age of initiation in most of the SEAR countries with no consistent signs of decline over the last 10–15 years. The recommended policy measures are not yet fully implemented/enforced in any of the member states. Efforts should be strengthened to fully implement these policy measures and exploration of new measures (e.g., tobacco-free generation).

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**Conflicts of interest**

There are no conflicts of interest.

**References**


Smokeless Tobacco and Public Health in Bangladesh

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Summary

Despite the high prevalence of smokeless tobacco (SLT) use among adults in Bangladesh, SLT was not included in the Tobacco Control Law till 2013. Information on SLT use among Bangladeshi people is inadequate for policymaking and implementing effective control measures. With the aim to identify the prevalence and trends of different SLT products, health and economic impacts, manufacture, and sales of and policies related to SLT in Bangladesh, we carried out a literature review, which involved literature search, data extraction, and synthesis. Evidence suggests that in Bangladesh, SLTs range from unprocessed to processed or manufactured products including Sada Pata, Zarda, Gul, and Khoinee. Over 27% of Bangladeshi adults aged 15 years and older use SLT in one form or other. SLT use is associated with age, sex, education, and socioeconomic status. SLT consumption has reportedly been associated with increased prevalence of heart diseases, stroke, and oral cancer and led to around 320,000 disability adjusted life years lost in Bangladesh in 2010. No cessation service is available for SLT users in public facilities. Compared to cigarettes, taxation on SLT remains low in Bangladesh. The amendment made in Tobacco Control Law in 2013 requires graphic health warnings to cover 50% of SLT packaging, ban on advertisement of SLT products, and restriction to sale to minors. However, implementation of the law is weak. As the use of SLT is culturally accepted in Bangladesh, culturally appropriate public awareness program is required to curb SLT use along with increased tax and cessation services.

Key words: Bangladesh, determinants of smokeless tobacco use, prevalence of smokeless tobacco, smokeless tobacco, tobacco tax

INTRODUCTION

The term “smokeless tobacco” (SLT) implies the use of any unburned tobacco in the finished product[1] that can be consumed orally or nasally. There is a great diversity of SLT products and their use patterns across the globe, and it refers to more than thirty different products, broadly categorized as “spit tobacco” or “chewing tobacco,”[2,3] Its use is relatively high in South and South-East Asia where one-third of tobacco is consumed in smokeless form.[4] Tobacco is being chewed in multiple forms and modes in South Asia such as betel leaf with areca nut, betel leaf alone, Zarda and Gul,[5] and the pattern of consumption varies across countries by differing sociocultural norms, habits, peer influences, availability, accessibility, and legislations in place.

Current SLT use prevalence is especially high (>15%) among adults in Myanmar, Bangladesh, India, Bhutan, Nepal, Pakistan, and Sri Lanka.[6] A quarter of adults in Bangladesh and India use SLT,[7] SLT use is considered as the predominant form of tobacco use in Bangladesh, whereas 23% of adults smoke and 27% of adults use SLT.[4] Despite its popularity, there is little information available on SLT, making it difficult for policymakers to develop and implement effective control measures for these products. Against this backdrop, we carried out a review to explore the situation of SLT manufacture, trade, tax structure, consumption in Bangladesh. More specifically, we explored various types of SLT products commonly available, the patterns of consumption, the prevalence of its use among populations, health and economic impacts, the key determinants and drivers that are influencing its use, and the legislation, policies, and tax structure related to SLT in Bangladesh.

METHODS

We carried out a literature review to identify the prevalence and trends, health and economic impacts, manufacture,
distribution and sale of SLT, and control measures in Bangladesh. A range of published written materials including books, journal articles, and research reports was reviewed. The review process involved three distinct stages: literature search, data extraction, and synthesis. A series of key search terms was used in the review process, which were broadly grouped into the following themes: “SLT,” “chewing tobacco,” “tobacco,” “SLT in Bangladesh,” and “SLT in South Asia.” PubMed and ResearchGate were the major databases searched for this purpose. Websites of WHO, Government of Bangladesh, and relevant research organizations had been searched. Reference lists of published articles/report/books also helped to identify relevant articles and documents. Filtering abstracts or executive summaries of all materials identified were reviewed. All abstracts were assessed against predefined inclusion and exclusion criteria. The search strategy was guided by the understanding of languages (English only because literature in Bengali is unheard of) and the period (1990–2016) restrictions.

Results
Types and prevalence of smokeless tobacco use in Bangladesh
A diverse range of SLT products is used in Bangladesh including unprocessed, processed, or manufactured products. They vary in their composition, methods of preparation, and consumption pattern [Table 1].[7]

The prevalence of tobacco use was found 43.3% among the adult population (aged 15 and above), of which SLT use was higher at 27.2% [Table 2], exceeding the prevalence of smoking (23%) in Bangladesh.[8]

Other studies also suggest that dry tobacco leaf (Sada Pata), Zarda, and Gul were found being popularly used in country[13,14,16] and in terms of quantity of sale in Bangladesh.[15] Different brands of Zarda and Gul are available in local markets, of which six brands of Zarda and three brands of Gul are popular.[16]

Although the prevalence of smoking is high among males (26.4%) than females (1.5%), use of SLT is slightly higher among females than among males in Bangladesh.[8,17-19] SLT use is high among both men (44%) and women (42.5%) aged 55–64 years.[20] The average age at onset of SLT consumption was found 31.5 years.[21] The prevalence of current use of SLT among boys is 7.1% and among girls is 3.7% aged 13–15 years. A recent study suggests a significantly increasing trend in the prevalence of current SLT use among Bangladeshi men aged 15–49 years (20.2%–23%, P = 0.03).[22]

The average length of SLT use varies by types. Average daily use of Sada Pata (7.1 times/day) was found higher than that of Zarda (6.3) and Gul (4.5).[11] Daily betel quid (Paan) chewing frequency was higher among those who chewed with tobacco (mean 5.6, standard deviation 3.9) than those who chewed without tobacco.[21]

SLTs in Bangladesh are also used in combination with smoking products. Dual users constituted 20% among all tobacco users.[13,20] Prevalence of “smoking only,” “smokeless only,” and “dual use” of tobacco was found 40.6%, 15.2%, and

<p>| Table 1: Popular smokeless tobacco products in Bangladesh: Ingredients, forms, and consumption |</p>
<table>
<thead>
<tr>
<th>---------------------------------------------</th>
<th>---------------------------------</th>
<th>---------------------</th>
<th>------------------------</th>
<th>---------------------</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zarda</td>
<td>Tobacco, lime, spices, vegetable dye, areca nut</td>
<td>Manufactured commercially</td>
<td>Chewed with betel leaf, lime, and areca nut</td>
<td>24.3</td>
</tr>
<tr>
<td>Gul</td>
<td>Tobacco powder, molasses</td>
<td>Manufactured commercially</td>
<td>Applied to teeth and gum</td>
<td>5.3</td>
</tr>
<tr>
<td>Sada Pata</td>
<td>Sun-dried or cured raw tobacco leaf</td>
<td>Processed but unpacked</td>
<td>Chewed with betel leaf, lime, and areca nut</td>
<td>1.8</td>
</tr>
<tr>
<td>Khoinee</td>
<td>Tobacco, slaked lime, menthol, flavorings, and areca nut</td>
<td>Manufactured commercially or prepared by user themselves</td>
<td>Kept in mouth between lips and gum</td>
<td>1.5</td>
</tr>
<tr>
<td>Any form of SLT</td>
<td>Manufactured commercially, or processed but unpacked, or prepared by user</td>
<td>As above</td>
<td>27.2</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from Siddiqi et al., 2015; WHO, 2009. SLT: Smokeless tobacco

<p>| Table 2: Prevalence (%) of smokeless tobacco usage estimated in different national level studies |
|---------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|</p>
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Health cost study 2004 (15 years or older)[9]</th>
<th>STEPS 2006 (25–64 years)[10]</th>
<th>GATS 2009 (15 years or older)[8]</th>
<th>STEPS 2010 (25 years or older)[11]</th>
<th>STEPS 2013 (25 years or older)[12]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of men who use SLT</td>
<td>14.8</td>
<td>24.1</td>
<td>26.4</td>
<td>29.4</td>
<td>28.5</td>
</tr>
<tr>
<td>Percentage of women who use SLT</td>
<td>24.4</td>
<td>34.2</td>
<td>27.9</td>
<td>33.6</td>
<td>29.5</td>
</tr>
<tr>
<td>Percentage of men and women who use SLT</td>
<td>19.7</td>
<td>28.6</td>
<td>27.2</td>
<td>31.7</td>
<td>28.7</td>
</tr>
</tbody>
</table>

SLT: Smokeless tobacco
14.2%, respectively.\textsuperscript{[13]} The average age of dual users was found 46.7 years old compared to 43.4 and 52.3 years for smokers and SLT users, respectively.\textsuperscript{[13]}

**Price of smokeless tobacco in Bangladesh**

Price of the SLT products varies. The cheaper variety of *Zarda* is sold for <0.60 Taka per gram, which is comparable to the *biri* price per stick, and the higher-price variety sells for 0.60–1.00 Taka per gram, which is higher than *biri* price per stick.\textsuperscript{[23]} On average, the price of *Zarda* per gram is less than half of the price per stick of the cheapest brand of cigarette. The price of *Gil* is relatively skewed centering around 0.10 Taka per gram.\textsuperscript{[23]}

**Socioeconomic determinants of smokeless tobacco use**

The use of SLT was found to be associated with age, sex, education, and socioeconomic status.\textsuperscript{[8,14,17,20,21,24]} The SLT use rate increases persistently with age, ranging from 6.6% in the age group of 15–24 years to 56.4% in the age group of 65 years and above.\textsuperscript{[8]}

Over half of SLT users in Bangladesh have no formal education. Individuals belonging to households with educated heads or owning more than 200 decimals of land consumed less tobacco in proportion to those with illiterate heads or were landless.\textsuperscript{[20]} Farmers (33.8%), the unemployed (31.9%), and laborers (30.9%) use SLT at a higher rate.\textsuperscript{[21]}

Dual users also had lower educational achievement, rural residence, lower intake of fruit, and higher intake of alcohol.\textsuperscript{[13,18]} They were socioeconomically deprived as measured by wealth quartiles constructed out of household assets and more undernourished as indicated by a thin body mass index compared to nonusers and smokers.\textsuperscript{[8,13,18]}

Global Adult Tobacco Survey (2009) suggests that SLT use is more prevalent in rural (28.8%) than urban areas (22.5%),\textsuperscript{[8]} whereas Flora \textit{et al.} observed that SLT was 1.5 times more likely to occur in rural residents and *Gil* usage was 3.6 times more likely to occur in urban residents.\textsuperscript{[25]}

The quantity demanded of SLT products depends not only on price but also on other factors such as seasonality, the time of month, and festivals. During winter, SLT sales increase whereas it declines during the summer.\textsuperscript{[16]}

### Table 3: Related risk and population attributable risk of diseases for smokeless tobacco usage from the hospital survey

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Related risks</th>
<th>Population attributable risk (%)</th>
<th>Related risks</th>
<th>Population attributable risk (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic heart disease</td>
<td>2.6</td>
<td>32.5</td>
<td>1.7</td>
<td>22.6</td>
</tr>
<tr>
<td>Stroke</td>
<td>2.1</td>
<td>23.8</td>
<td>2.6</td>
<td>41.2</td>
</tr>
<tr>
<td>Buerger’s disease</td>
<td>1.8</td>
<td>16.1</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
<tr>
<td>Oral cancer</td>
<td>4.9</td>
<td>48.1</td>
<td>4.7</td>
<td>59.3</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>1.2</td>
<td>3.9</td>
<td>12.6</td>
<td>82.7</td>
</tr>
<tr>
<td>Laryngeal cancer</td>
<td>1.5</td>
<td>10.2</td>
<td>7.8</td>
<td>73.1</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>1.7</td>
<td>15.0</td>
<td>1.8</td>
<td>24.6</td>
</tr>
<tr>
<td>Pulmonary tuberculosis</td>
<td>1.9</td>
<td>18.8</td>
<td>3.5</td>
<td>51.0</td>
</tr>
<tr>
<td>All</td>
<td>1.5</td>
<td>12.9</td>
<td>2.0</td>
<td>33.1</td>
</tr>
</tbody>
</table>

Source: WHO, 2009

**Smokeless tobacco-related mortality and morbidity**

Although a large number of studies assessed the adverse health effects associated with smoking tobacco, only a few researches have been focused on SLT-related mortality and morbidity in Bangladesh. SLT consumption has been found to be associated with increased prevalence of high blood pressure in the adult male in rural Bangladesh.\textsuperscript{[21,26]} Chewing betel quid has been linked to obesity and cardiovascular disease,\textsuperscript{[21]} oral cancer and stroke,\textsuperscript{[5,18]} and hypertension.\textsuperscript{[21]}

Dual use of tobacco, especially in men, increases the risk of some cancers and carries a higher risk of ischemic heart disease (IHD) in Bangladeshi and other populations.\textsuperscript{[13]}

A population-based study in Bangladesh has shown that tobacco use and hypertension are significant ($P < 0.05$) factors for IHD in rural and agricultural free living population with traditional lifestyle and thin body mass index.\textsuperscript{[27]} Zaman \textit{et al.} suggest that the overall related risks and population attributable risks of diseases vary by gender for SLT usage [Table 3].\textsuperscript{[9]}

In 2010, SLT use led to a total of 320,000 disability-adjusted life years lost and 13,329 deaths due to cancers of mouth, pharynx, and esophagus and ischemic heart disease in Bangladesh.\textsuperscript{[7]}

**Availability of cessation services**

Despite high prevalence of SLT use and associated morbidity and mortality, there are no cessation services available for SLT users in different tiers at public health-care facilities in Bangladesh. Huque \textit{et al.} showed that cotinine concentration among SLT users in Bangladesh is very high, thus pointing toward a high level of addiction and importance of effective tobacco control policies to help SLT cessation.\textsuperscript{[28]}

A recent study showed that tobacco cessation by a simple counseling can be very successful in a village level clinic, especially for SLT use, where its prevalence dropped from 33.2% to 0.4% from 1\textsuperscript{st} to 5\textsuperscript{th} counseling session.\textsuperscript{[29]} This has a high potential generalization that community clinics in Bangladesh would be important organizations for tobacco cessation services. National Heart Foundation, a leading hospital and research institute in Bangladesh, jointly with...
hypertension clinic has started a tobacco cessation clinic. Its experience is yet to be reported.

**Attitudes and misbelieves**

In Bangladesh and other South Asian countries, though traditional values and social norms do not favor smoking by the young or by women, there is no such taboo against SLT, being incorporated in traditional values, spirituality, beliefs, festivals, lifestyle, and rituals such as marriage and popular entertainment. An estimated 20%–30% of women in the rural areas use SLT as a tradition, serve it to their guests in cultural celebrations, and equate it to confectionary.

Many myths and misconceptions are attached to SLT use which are deeply rooted, especially in the rural populations such as SLT helps to aid digestion if taken after meal, pain relief, curing toothache, headache and stomach ache, to cope with boredom, frustration and for mental relaxation purposes, relieving tension, aiding concentration, combing bad breath, protection from snake and scorpion venom, and its use is less harmful than smoking. Some forms are believed to make women feel better from morning sickness during pregnancy. Curiosity, peer pressure, and offers by friends and acquaintances contribute to initiation of SLT use. Some parents even encourage their children to use SLT. This is reflected in Global Youth Tobacco Survey, indicating a high prevalence of SLT use among 13–15 year olds in Bangladesh.

**Supply chain of smokeless tobacco**

A number of actors are involved in the production and sale of processed SLT products including farmers, raw tobacco retailers, manufacturers, wholesaler/wholesaler dealers, and SLT retailers. However, the supply chain is not straight forward as many of the actors are interlinked.

**Production, export, import, and illicit trade**

A significant proportion of smuggled and counterfeit SLT products are available in the market in Bangladesh. Siddiqi et al. (2015) suggest that 88% of the SLT products sold by vendors surveyed in a study were produced locally whereas the rest were products from neighboring countries. Tax and custom evasion led to rapid increase in smuggling of SLT products across India and Nepal border, after the introduction of value added tax (VAT) in 1997. One study indicates that about 14% of the SLT products sold in the country are foreign smuggled, 45% of which are smuggled through land ports whereas 26% are smuggled through air ports. Increased availability of illicit products lowers consumer prices through tax evasion, which in turn increases consumption and threatens both tobacco control efforts and excise tax collection by governments.

**Regulation and legislation**

Bangladesh has constantly shown commitment toward tobacco control. Tobacco Control Law was enacted in 2005 and was further strengthened in 2013 by including SLT and various other provisions. In real sense, the comprehensive movement against SLT started only in 2013 because SLT was not covered by the 2005 version of the act. The impacts of the 2013 amended version of act are yet to be visible because its rules have been approved only in March 2015.

Various legislations exist in Bangladesh, which can indirectly affect SLT tobacco production and consumption. For example, Metropolitan Police Ordinances which prohibit spitting at public places can be used to curb SLT use as SLT users frequently spit. However, the enforcement of the law is currently weak.

A recent study shows that though 53% of SLT products collected from the markets had a written health warning, 44% among them had low visibility due to very small font, 22% had warning in English only, 11% had these tactfully hidden in the packaging, and 11% had misleading information. Nearly 11.8% of products had a label saying “not suitable for children,” whereas 41.2% of products printed ingredients on their labels, of which only 57% mentioned “tobacco” as an ingredient.

Inadequate knowledge about existing law relating to SLT, inadequate training of law enforcers, unclear roles and responsibilities of different government departments, and inadequate resources for enforcement are some of the barriers in implementing existing legislations. In Bangladesh, Standard and Testing Institute for food safety is not responsible for checking and monitoring SLT in food products, which needs attention of the policymakers and respective authorities.

**Media image**

SLT advertising is ban in Bangladesh. The current law prohibits advertising tobacco products including SLT in print (local and international magazines and newspapers), and electronic media (national and international radio and television and internet), and in any other forms such as advertising at point of sale and using billboards and outdoor advertising. Current law requires fines for violations of direct advertising bans.

**Tax**

One of the major challenges in regulating SLT products is their low tax and the consequent low price, thus making it readily accessible, especially to the youth. Compared to cigarettes, taxation on SLT remained generally low in Bangladesh. However, the government recently increased excise tax on SLT. Currently, tax on cigarette ranges from 66% to 80% of the retail price, whereas tax on Zarda and Gul is 116%, thereby the tax rate on SLT looks good. However, the flaw is that the tax base for SLT is “ex-factory price” – which is far less than the retail price. This makes tax burden on SLT real low. National Board of Revenue collects tax from twenty SLT manufacturers only, whereas many SLT manufacturers are not registered and doing business illegally, and they remain out of paying taxes and VAT to the government.

The complex ad valorem tax structure and weak tax administration result in high tax evasion. Sale of SLT products in informal establishments, often in unpacked forms, and diverse nature of the manufactured products in different-sized...
Table 4: Tax on smokeless tobacco in Bangladesh

<table>
<thead>
<tr>
<th>Year</th>
<th>SD (%)</th>
<th>VAT (%)</th>
<th>Health development surcharge (%)</th>
<th>Total (%)</th>
<th>Total tax collection from VAT and SD (million Taka)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-2011</td>
<td>20</td>
<td>15</td>
<td>-</td>
<td>35</td>
<td>57.2</td>
</tr>
<tr>
<td>2011-2012</td>
<td>30</td>
<td>15</td>
<td>-</td>
<td>45</td>
<td>79.5</td>
</tr>
<tr>
<td>2012-2013</td>
<td>30</td>
<td>15</td>
<td>-</td>
<td>45</td>
<td>87.5</td>
</tr>
<tr>
<td>2013-2014</td>
<td>30</td>
<td>15</td>
<td>-</td>
<td>45</td>
<td>106.3</td>
</tr>
<tr>
<td>2014-2015</td>
<td>60</td>
<td>15</td>
<td>1</td>
<td>76</td>
<td>175.5</td>
</tr>
<tr>
<td>2015-2016</td>
<td>60</td>
<td>15</td>
<td>1</td>
<td>76</td>
<td>69.2 (up to October, 2015)</td>
</tr>
<tr>
<td>2016-2017</td>
<td>100</td>
<td>15</td>
<td>1</td>
<td>116</td>
<td></td>
</tr>
</tbody>
</table>

*The tax base is ex-factory price. SD: Supplementary duty, SLT: Smokeless tobacco, VAT: Value added tax

Pack also increase the possibility of tax evasion. Absence of annual systematic inflation-adjusted increase in tobacco taxation, inadequate understanding of tax policies within health ministry, poor coordination between governmental departments, lack of appropriate training and resources within implementing agencies, lack of knowledge with respect to the absolute and relative prices of tobacco products (smoked and smokeless), and lack of recognition of the implications of the current price structure of tobacco products for overall tobacco consumption are some of the other constraints identified in this policy area.[23]

Nargis et al., 2014, estimated the price elasticity of lower price brands of Zarda at −0.64 and of higher priced brands at −0.39, and the cross price elasticity of Zarda with respect to cigarette price at 0.35. This implies that the tax increase on SLT needs to be greater than the tax increase on SLT to bridge the wide price differential between the two types of products that currently encourages downward substitution from smoked to SLT and discourages quitting behavior.[23]

Discussion and Way Forward

Tobacco use is intimately linked to poverty either as a cause or effect. Therefore, SLT control strategies should be an integral part of poverty reduction to establish equity and social justice. Despite high prevalence of SLT use, little attention has been paid by policymakers and researchers on the issue in Bangladesh. We carried out a rapid assessment of the SLT use in Bangladesh through document review.

Prevention of smokeless tobacco consumption through gender-based culturally accepted strategies

Although evidence is limited in Bangladesh, a number of studies showed strong and consistent evidence to indicate significant risk of oral cancer and pharyngeal cancer, oral neoplasia, esophageal cancer, and pancreatic cancer, poor oro-dental health, risk of hypertension and cardiovascular diseases, and adverse effects on reproductive health (especially during pregnancy with birth complications, fetal loss, low birth weight, and prematurity) with SLT use in India and other Asian countries.[6,24] The risk of these conditions is found to increase with increasing dosage and frequency of SLT use. Evidence also suggests that SLT caused 7.1% of deaths from all medical causes in India.[43]

Prevention of SLT consumption could, therefore, be an important intervention in preventing the ongoing upswing in the prevalence of these diseases.

Several studies confirmed that SLT use is high among women in Bangladesh which is similar in India, Thailand, Cambodia, Malaysia, Vietnam, and some African countries, such as South Africa, Mauritania, and Sierra Leone.[6,24] The inverse relationship between socioeconomic status and tobacco consumption found in Bangladesh is also consistent with findings in other South Asian countries. This highlights the importance of developing different tobacco control strategies to target men and women and for different socioeconomic status. As the use of SLT is culturally accepted in Bangladesh, culturally appropriate public awareness is required to curb SLT.[18]

Impose high tax on smokeless tobacco

Easy availability, low price and affordability, misconceptions regarding its useful health effects, increasing population, lack of tobacco control regulations, and weak enforcement of existing regulations contribute to the increase in tobacco consumption in Bangladesh.

Bangladesh would require effective tobacco control programs to combat the tobacco epidemic along with national plans of actions. Imposition of higher tax on SLT and changing the tax base for SLT to retail price is essential. Measures to bring all the tobacco products under tax and price measures should be sought for, to avoid substitution of one tobacco product by another. Moreover, a specific excise system replacing the existing ad valorem excise tax can substantially contribute to the revenue collection performance from SLT products.[23]

Creation of public awareness about health hazards of SLT is also necessary.

Mapping and developing surveillance system

Availability of locally reliable population-based data on tobacco use burden and tobacco-attributable morbidity and mortality, as well as their predictors, are helpful in advocating for national tobacco control strategies. Understanding the population burden of tobacco use contributes to the development of effective interventions and policies to reduce tobacco use; measuring changes in population. Such data can help in determining specific strategies for intervention.[18]
A mapping of SLT manufacturers is required to understand the market share of SLT and the coverage for tax. The mapping should be done by administrative area and by type and volume of SLT production.

Research need

It is important to identify the existing subsidies or incentives for tobacco cultivation in Bangladesh and the factors that influence increased land use for cultivation of tobacco. Government should take initiative to encourage farmers in producing other crops. Estimating the illicit trade of SLT products and the potential ways to stop illicit trade needs to be investigated.

Lack of monitoring and surveillance data in relation to SLT use and its impacts and unknown chemical contents of different types of SLT products available in Bangladesh are constraining designing of appropriate strategy and intervention for reducing SLT consumption. A comprehensive analysis of the contents of locally produced different types of SLT products and harmful effects of consumption of such products is needed to monitor and regulate the emission and ingredients among all smoked and SLT products used in the country. The third International Conference on Smokeless Tobacco held in Stockholm in 2002 emphasized on research needs in assessing the chemistry and constituents of SLT products.[40] Similar analysis in India suggests significant variation in nicotine content across products[44,45] where nicotine content in SLT products ranged from 0.8 to 50.0 mg/g.[45]

There is a need for research on effectiveness and cost-effectiveness of innovative cessation treatments for SLT users in Bangladesh.

Conclusion

Tobacco use is intimately linked to poverty either as a cause or effect. Therefore, SLT control strategies should be an integral part of poverty reduction to establish equity and social justice. As use of SLT is culturally accepted in Bangladesh, culturally appropriate public awareness is required to curb SLT.[19]

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Conflicts of interest

There are no conflicts of interest.

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Huque, et al.: Smokeless tobacco in Bangladesh


Using Public Interest Litigation for Tobacco Control: Insights from India

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Summary

The Indian notion of “Public Interest Litigation (PIL)” represents a moral and humane process for providing justice to an individual or a group in matters relating to infringement of fundamental rights or denial of civil privileges. The goal of PIL in India is to counter governmental lawlessness, administrative deviance, and exploitation of disadvantaged groups by denying them their rights and entitlements. Although this paper selectively describes the use of the PIL mechanism for ensuring implementation of large graphic health warnings on packages of tobacco products in India, there is a sufficient published literature to corroborate the successful use of this mechanism in India in different tobacco control settings. In fact, over the years, this legal tool has allowed the tobacco control community in India, to extensively promote human rights approach to tobacco control. In the wake of growing interference of tobacco industry worldwide, this paper explores PIL as a potent and effective tool for claiming public health rights related to tobacco control. The PIL has considerable potential to be used for enforcement of tobacco control measures and for stopping tobacco industry from engaging in activities which are detrimental to the health of the people at large. It is important to continuously identify potential avenues through which lessons and recommendations pertaining to PIL could be incorporated into the WHO Framework Convention on Tobacco Control implementation plans and guidelines, with special focus on different intercessional mechanisms that are available from time to time. To set the ball rolling, the authors suggest two such avenues.

Key words: Graphic health warnings, health rights, India, public interest litigation

Tobacco Control in India

India is the second largest consumer of tobacco products worldwide with more than 275 million adults consuming different tobacco products, including myriad of smokeless tobacco (ST) products.[1] It has a comprehensive tobacco control Act, “the Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply, and Distribution) Act (COTPA 2003),” in place. Section 7 of this act provides for depiction of pictorial health warnings on packages of all tobacco products. In 2004, India ratified the WHO Framework Convention on Tobacco Control (WHO FCTC), the first international public health treaty negotiated under the auspices of the WHO. Unfortunately, the tobacco industry interference continues to be one of the greatest threats in advancing tobacco control in India. The industry claims that the future of thousands of bidi workers and tobacco farmers across India would be at stake if effective tobacco control measures are implemented.[2] Likewise, the growing interference of ST tobacco conglomerates in policy formulation is particularly worrisome.[3]

Concept of Public Interest Litigation

The concept of public interest litigation (PIL) first emerged in the United States. However, the prime focus of PIL in the United States is on public participation in governmental decision-making. Besides, PIL in the United States requires a great deal of expenditure, thus limiting its exercise to individuals and firms with adequate financial resources, that too in limited legal remedies.[4] In contrast, the Indian notion of PIL represents a moral and humane process in providing justice to an individual or a group in matters relating to infringement
of fundamental rights or denial of civil privileges. The goal of PIL in India is to counter governmental lawlessness, administrative deviance, and exploitation of disadvantaged groups by denying them their rights and entitlements. Notably, in India, the Supreme Court rules of locus standi, or the eligibility of a person to invoke the jurisdiction of the courts, are so relaxed that anyone asserting a violation of fundamental rights can file a claim in one of the appellate courts.[4] A PIL in India may be introduced in a court of law either by the court itself (suo motu) or by any public-spirited individual or a nongovernment organization (NGO). Although social and economic rights given in the Indian Constitution under Part IV are not legally enforceable, courts have creatively read these into fundamental rights thereby making them judicially enforceable. For instance, the “right to life” in Article 21 of the Indian Constitution has been expanded to include “right to health.”[5] The substantive recognition of the right to health as essential to living with human dignity has thus allowed the judiciary to directly address human suffering by guaranteeing the social entitlements and conditions necessary for good health. Litigation has played an important role in catalyzing government action on issues for which no specific legal framework existed and often serves as precursor for developing appropriate legal frameworks or better enforcement of existing legal frameworks.[6]

**IMPACT OF TOBACCO PACK PICTORIAL WARNINGS**

There is ample scientific evidence to suggest the positive impact of health warnings on cigarette packs, including tobacco users’ intentions to quit, their thoughts about health risks, and their engaging in cessation behavior.[7-9] Studies indicate that the impact of health warnings depends on their size and design, whereas obscure text-only warnings appear to have little impact, pictorial health warnings that elicit strong emotional reactions are significantly more effective.[10] Although comprehensive evidence on the effectiveness of these warnings on packages of ST products is currently lacking,[11] available research suggests positive impact of such warnings on users of ST products.[12,13]

**INDIAN SUCCESS STORY**

The Government of India was stuck in a long-drawn legal battle with the tobacco industry, once rules and guidelines were published to implement different provisions of COTPA.[14] On the issue of implementing the provisions of section 7 of this act, the judiciary came to the government’s rescue when an order was passed by the High Court of the State of Himachal Pradesh on a PIL, thereby making it possible for the government to enact the “Packaging and Labeling Rules” in 2006. The rules mandated health warnings to be displayed on packages of all tobacco products, occupying at least 50% of the principal display area (PDA) on both sides of the panel and to be rotated every year or earlier. Again, the tobacco industry made hue and cry by arguing the impending loss of livelihood of tobacco farmers and workers.[15] The government was forced to constitute a “Group of Ministers” to examine the issue. The “Group of Ministers” eventually decided to water down the strong pictorial warnings. Consequently, the “Packaging and Labeling Amendment Rules” were enacted in March 2008, mandating the warnings to occupy 40% of the PDA, limited only to the front panel of the packages of tobacco products. Separate pictorial and text warnings were published for the smoking and smokeless forms of tobacco products packages. However, these rules could come into effect only on May 31, 2009 when the Supreme Court of India intervened on a PIL filed by a NGO, thus deciding the legal battle in favor of the government. Still, the tobacco industry did not rest and mounted pressure from various fronts, forcing the government to increase the interval for rotation of the pictorial warnings from 1 year to 2 years.[16] At the same time, the manufacturers of tobacco products were given the flexibility of choosing the pictorial warnings from a set of four warnings. Ironically, such flexibility is not in alignment with the provisions of COTPA or the rules enacted under it.

In light of the growing global and regional best practices, the government constituted a “Committee of Experts” in 2014 to review the issue of pictorial health warnings on tobacco products packages. Based on its recommendations, the “Packaging and Labeling Amendment Rules 2014” were enacted on October 15, 2014, mandating display of pictorial health warnings on 85% of the PDA of tobacco product packs on both sides (60% for picture and 25% for text). A minimum size of the pack warnings was also mandated to counter the industry’s tactic of manipulating the mandatory warnings by changing the size and shape of packs of various tobacco products. A set of two strong and field-tested warnings, each for smoking and ST products, were published. The said rules came into effect since April 1, 2015. However, the tobacco industry, especially the bidi industry, once again mounted pressure and opposed larger pictorial warnings by bringing the livelihood issue of tobacco farmers and workers to the center stage.[16] In March 2015, succumbing to the pressure, the government referred the matter to a “Parliamentary Committee on Subordinate Legislation.” The committee was assigned to scrutinize the extant rules and submit a report to the parliament. The government deferred implementation of these rules in view of the matter being under examination. Meanwhile, a PIL was filed in the High Court of the State of Rajasthan against this deferment. In the larger public interest, the high court stayed the operation of the corrigendum and directed the government to enforce the rules with immediate effect. On September 24, 2015, the government relented by deciding that the new rules on “tobacco pack pictorial warnings” would come into effect from April 1, 2016. Thus, eventually, the new rules came into force from April 1, 2016.

**LEVERAGING THE CONCEPT OF PUBLIC INTEREST LITIGATION IN DIFFERENT TOBACCO CONTROL SETTINGS**

Although this paper selectively describes the use of the PIL mechanism for ensuring implementation of large graphic
health warnings on packages of tobacco products, there is a sufficient published literature to corroborate the successful use of this mechanism in India, in different tobacco control settings. Notably, litigation as a tool for tobacco control has been in existence for years in the United States and recently in countries such as Brazil and South Africa.[17] However, as already discussed, the Indian notion of PIL is categorically different with greater emphasis on the moral and humane process in providing justice in matters relating to infringement of fundamental rights or denial of civil privileges.[4] Over the years, this has allowed the tobacco control community in India, to extensively use this mechanism to promote human rights approach to tobacco control-public smoking was declared violative of article 21 of the constitution;[18] the Supreme Court banned smoking in all public places and public transports;[19] tobacco manufacturers were restrained from using plastic in the packaging of ST products;[20] PIL in various states led state governments to ban gutkha, an ST product;[6] subsequent litigations resulted in the Supreme Court of India directing the state governments to file compliance reports on their efforts toward effectively banning gutkha in their jurisdictions;[6] and a PIL resulted in a court order that not only prevented the participation of the government in a global tobacco industry event but the court also instructed the government to enact a policy to prevent future tobacco industry influence on government decisions.[6]

Notably, all these PILs were initiated by individuals or NGOs working on tobacco control and were generally decided within a short time with outcomes in favor of the petitioners. In the wake of growing interference of tobacco industry and lack of sustained political will,[20] litigation appears to be a potent and effective tool for claiming public health rights related to tobacco control. In fact, the PIL has a considerable potential to be used for enforcement of tobacco control measures and for stopping tobacco industry from engaging in activities which are detrimental to the health of the people at large. Thus, it is important to continuously identify potential avenues through which lessons and recommendations pertaining to PIL could be incorporated into FCTC implementation plans and guidelines, with special focus on different intersessional mechanisms that are available from time to time.

In the present context, to set the ball rolling, the authors would like to suggest two such avenues.

First, one of the mandates of the expert group on article 19 of the WHO FCTC was to identify available options for developing legislation for parties in the areas of civil and criminal liability. Notably, the working group in its final report during the seventh session of the “Conference of Parties” (COP) the governing body of the WHO FCTC comprised of all the parties to the convention, identified adopting legislation to enable litigation to be pursued for enforcing existing tobacco control laws as one of the options for the parties. The expert group felt that litigation need not only be aimed at obtaining compensation but also can complement numerous other tobacco control measures, including enforcement of tobacco control laws.[21] Thus, moving a step further, it is important that the countries of the world, including those of the Southeast Asia Region, take note of the recent example from India and attempt to develop legal tools based on the Indian concept of PIL. The convention secretariat, in turn, needs to encourage and support parties to introduce necessary legislation, similar to the Indian notion of PIL, which can be subsequently used as an effective tool by parties to advance tobacco control in their respective jurisdictions. The convention secretariat should facilitate identification of potential expertise among international organizations and parties to assist countries in need of legal expertise for developing such legal tools largely based on India’s PIL model and promote exchange of such expertise across regions to provision the required assistance to parties in need.

Second, the working group on sustainable measures to strengthen implementation of the WHO FCTC in its report during the seventh session of the COP7 identified tobacco industry interference in tobacco control policy development as one of the constraints impeding successful implementation of the provisions of the WHO FCTC globally.[22] Reasonably, based on India’s example, it may be appropriate on part of the working group to be established to develop a draft medium-term strategic framework to guide the implementation of various provisions of the WHO FCTC, as per decision FCTC/COP7(13) of COP7,[23] to recognize PIL as an effective tool to counter tobacco industry interference worldwide and to accordingly recommend to the parties to introduce necessary legislation to develop a legal mechanism, using India’s PIL model as a prototype.

Disclaimer
The opinions or views expressed in this article are solely those of the authors and do not express the views or opinions of the organization to which the authors are affiliated.

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There are no conflicts of interest.

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Kaur, et al.: Using public interest litigation for tobacco control


**Abstract**

**Background:** Tobacco and alcohol use are important preventable risk factors for noncommunicable diseases and need to be addressed in primary health care. **Objectives:** To find the effectiveness of Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST)-based brief intervention for alcohol and tobacco in a primary health-care setting in Karnataka. **Methods:** This study was conducted in 2012 where one primary health center (PHC) in Karnataka was an intervention site and the other the control site. One hundred patients each in both control and intervention PHCs took part in the study. In the control PHC, patients were administered the ASSIST questionnaire and given an information pamphlet on tobacco- and alcohol-related harm. In the intervention PHC, ASSIST-based brief intervention was provided for both tobacco and alcohol cessation. At the 3rd month, ASSIST questionnaire was re-administered to record their follow-up score. Chi-square test, paired t-test, and independent sample t-test were used for statistical analysis. **Results:** Following the initial assessment and intervention, there was statistically significant reduction in mean ASSIST scores for tobacco in both the PHCs. For alcohol, though there was reduction in scores in both PHCs, it was statistically significant only in intervention PHC. There was also a significant reduction in the number of heavy alcohol users in the intervention PHC following assessment and intervention. **Conclusions:** This study shows that with minimal intervention, there is reduction in the degree of both tobacco and alcohol use and calls for wider and stringent research on the same topic.

**Key words:** Alcohol intervention, brief intervention, tobacco cessation

**INTRODUCTION**

Tobacco and alcohol are two of the most widely used addictive substances that affect lakhs of people and are one of the leading causes of death and disability worldwide. Both have hazardous health consequences resulting from their chronic use, which if left untreated, would create enormous toll of suffering, disability, and economic loss. Studies have shown that tobacco and alcohol use frequently co-occur, both environmental and genetic factors contributing to the overlap. Integrating cessation interventions for tobacco and alcohol into primary care is the most viable approach for closing the treatment gap and ensuring that people get the kind of care they need. Specialist tertiary and secondary care are costly, difficult to access, and offer services mainly to persons with severe problems while primary care is affordable and accessible. Numerous countries have successfully integrated tobacco and alcohol cessation interventions into primary care. Cessation intervention in primary care settings for tobacco and alcohol seems to offer promising results. Psychosocial or nonpharmacological cessation interventions are cost-effective and can be easily done in primary care with proper training. To achieve the same, cessation intervention would have to be brief in nature.

Numerous trials in various settings have shown the efficacy of brief alcohol cessation intervention. Many systematic reviews and meta-analysis consistently indicate that brief alcohol cessation intervention conducted in primary care is effective in reducing alcohol consumption. Preliminary data support the possibility that integrated cessation intervention for tobacco and alcohol seems to offer promising results. Psychosocial or nonpharmacological cessation interventions are cost-effective and can be easily done in primary care with proper training. To achieve the same, cessation intervention would have to be brief in nature.

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reduces both tobacco and alcohol use. In India, there have been only a few studies on brief intervention for alcohol and tobacco cessation carried out in the primary health-care setting. Such studies have independently addressed either tobacco or alcohol cessation. One study done in Indian community setting reported that brief cessation intervention had a slight advantage over simple advice in excessive users of alcohol. In a similar study done to assess the effectiveness of brief intervention for smoking cessation, counseling by non-doctor health professional (NDHP) resulted in significantly higher smoking abstinence rates. The present study was carried out to find the effectiveness of integrated brief intervention for tobacco and alcohol cessation in primary care setting in Karnataka.

**Materials and Methods**

**Study design**

The study followed a case–control approach to study the effectiveness of integrated brief tobacco and alcohol cessation intervention in a primary health-care setting in Karnataka, India. Two primary health centers (PHCs) near Bangalore, Yemalur, serving a population of 26,240 were selected as the intervention PHC and Doddakannahalli serving a population of 32,752 as the control PHC. There was no blinding done. Ethical clearance for the study was obtained from the Institutional Ethics Committee of the National Institute of Mental Health and Neurosciences, Bengaluru.

**Participants**

One hundred consecutive patients aged between 18 and 75 years, who answered positively to the question “do you use tobacco/alcohol?” and provided informed consent, were recruited for the study from each PHC during the period of January–April 2012. Patients suffering from terminal illnesses, severe psychiatric disorders, and addiction to other substances were excluded from the study.

**Assessment tools**

1. World Health Organization-Alcohol, Smoking, and Substance Involvement Screening Test (WHO-ASSIST): This tool, developed with support of the WHO, is designed to be used in primary care settings. ASSIST (version 3.1) is an 8-item questionnaire that takes 5–10 min to administer. For the purpose of this study, we used only the questionnaire pertaining to tobacco and alcohol. ASSIST determines a risk score for each substance which is used to start a discussion (brief cessation intervention) with clients about their substance use. The score obtained for each substance falls into “lower” (alcohol = 0–10 and tobacco = 0–3), “moderate” (alcohol = 11–26 and tobacco = 4–26), or “high” (both alcohol and tobacco >27) risk category which determines the most appropriate intervention.

2. “Brief intervention for substance use: A manual for use in primary care” by the WHO is a short intervention lasting 3–15 min given to clients who have been administered the ASSIST. The risk scores are recorded on the feedback report card which is used to give personalized feedback and associated health problems. This cessation intervention is based on FRAMES technique and motivational interviewing.

**Study procedure**

**Planning stage of the study**

During this phase, through a face-to-face interview with the PHC staff, those who appeared to have basic knowledge, aptitude, and interested to be part of the study were included in the study. Although it was initially planned to involve the doctors in providing brief advice and the NDHPs in providing cessation interventions, due to logistic reasons, study focused only on the later.

**Training stage of the study**

Training of the NDHP was carried out before initiating the cessation intervention. In the control PHC, one staff nurse and two junior health assistants took part in the training. In the intervention PHC, two junior health assistants and laboratory technician took part.

**Supervision and monitoring of the study**

PHC staffs were constantly supervised and monitored. Mobile phones were given to them to be constantly in communication with the first author. Weekly, PHCs were visited and problems faced by the staff in carrying out the assessment and interventions were addressed.

**Baseline assessments and intervention**

In both PHCs, NDHPs asked male patients falling under the inclusion criteria whether they used tobacco or alcohol in their lifetime. If the patient answered yes and consented to participate, he was included in the study. Sociodemographic details were collected, ASSIST questionnaire applied, and the scores were calculated. A feedback report card was given along with leaflets containing information about risks of tobacco and alcohol use. In addition, in the intervention PHC, ASSIST-linked brief cessation intervention lasting 10–15 min was provided. The NDHP was advised to refer patients with high-risk scores to the Centre for Addiction Medicine, National Institute of Mental Health and Neurosciences. Every patient was enquired about their tobacco/alcohol use pattern after 1 month of initial contact by the NDHP. No assessment was done at this stage. However, the patients were explained that they would be contacted after a period of 3 months by author 1. He contacted each patient telephonically and applied ASSIST questionnaire to record their follow-up score.

**Statistical analysis**

The completed questionnaires were scrutinized; scores re-checked and entered into data sheet. The software package used for data entry and analysis was SPSS for Windows, Version 16.0. Chicago, USA, SPSS Inc. The change in severity status of patients with tobacco and alcohol use from baseline to follow-up was analyzed using Chi-square test. The comparison of tobacco and alcohol scores over time in control and intervention PHCs was analyzed by independent sample
Ridhur, et al.: Integrated tobacco and alcohol use interventions in PHC setting

RESULTS
Sample selection, attrition, and description
One hundred patients each were studied in both the control and intervention PHCs. In the control PHC, 82 patients reported tobacco and 51 had alcohol use. In the intervention PHC, 84 reported tobacco and 38 alcohol use. Eighteen patients in control PHC were using only alcohol, 49 only tobacco, and 33 both alcohol and tobacco. In the intervention PHC, 16 were using only alcohol, 62 tobacco, and 22 using both alcohol and tobacco. Of the 82 patients with tobacco use in the control PHC, 65 (79%) and 69 out of 84 (82%) in intervention PHC were telephonically contactable 3 months after the intervention. Out of the 51 patients with alcohol use in the control PHC, 38 (74.5%) and 31 out of 38 (81.5%) in intervention PHC were contactable at 3 months. Patients were lost to follow-up mainly because they had either changed their mobile numbers or were not contactable.

Both the groups were comparable at baseline, with a mean age of 38 years, mostly married (80%), educated up to 10th standard (42%), and comprising unskilled laborers (61.5%). The participant characteristics are summarized in Table 1.

With respect to the tobacco users, a significant proportion was in the age group of 20–35 years (49.08%). Across all age groups, a majority of tobacco users fell under the moderate-risk category of ASSIST. Unskilled laborers constituted a majority (59.88%) of high-risk category tobacco users.

Alcohol users tended to be older, with a higher proportion (44.94%) in the age group of 35–60 years. A majority (59.88%) of high-risk category tobacco users.

As with tobacco use, a majority of alcohol users (68.54%) with moderate- or high-risk scores were unskilled laborers with low levels of education. The group using tobacco had a higher proportion of unemployed individuals (13.77%) as compared to the alcohol group (6.74%).

Outcome
With regard to tobacco use, the percentages of high-risk category of tobacco users at baseline (6% and 8.3% in the control and intervention PHC, respectively) declined to 1.5% and 4.3% at follow-up. While 94% in the control PHC and 91.7% in the intervention PHC scored in the moderate-risk category at baseline, at follow-up, the moderate-risk group constituted 98.5% and 94.2% in the respective settings.

In both control and intervention PHC at baseline, nearly a third had high-risk scores on alcohol (37.3% and 28.9%, respectively). High-risk users at follow-up reduced to 34.2% and 19.4% in the respective groups. Alcohol users with moderate-risk scores constituted the majority (53% and 60.5%, respectively) at baseline. At follow-up, the percentage of alcohol users with moderate-risk scores dropped from 53% to 50% in the control PHC and from 60.5% to 45.2% in the intervention PHC. Correspondingly, there was an increase in percentage of scores in lower risk in PHCs, from 15.8% to 35.5% in intervention PHC and from 9.8% to 10.5% in control PHC.

Change in severity status of patients with tobacco and alcohol use from baseline to follow-up
In the control PHC, there was an increase in the number of tobacco users with moderate scores from 61 at baseline to 64 at follow-up, as a consequence of the high-risk category tobacco users at baseline (4) falling into the moderate-risk category at follow-up. However, these changes were not statistically significant. In the intervention PHC, there was a similar increase in the moderate-risk category from 64 at baseline to 66 at the follow-up due to 4 tobacco users moving from high-risk category at the baseline to moderate-risk category at follow-up. These changes were also not statistically significant.

With respect to alcohol use, in the control PHC, four alcohol users from moderate-risk and one from high-risk category at the baseline fell into the low-risk category at follow-up. Similarly, there was fall in the number of alcohol users in moderate-risk category from 23 to 19 at the follow-up and 14–13 in the high-risk category at the follow-up. These changes were not statistically significant on Chi-square analysis. In the intervention PHC, 7 alcohol users from the moderate-risk category at baseline fell into low-risk category at the follow-up; the number of moderate-risk users fell from 18 at baseline to 14 at the follow-up and high-risk scores from 9 at the baseline to 6 at the follow-up. These changes were statistically significant.

Change in tobacco and alcohol scores over time
In the control PHC, there was a statistically significant reduction in mean tobacco scores from baseline (18.89) to follow-up (16.60), and there was reduction in mean alcohol scores as well (baseline mean = 23.50 and follow-up
mean = 21.05), which approaches statistical significance. In the intervention PHC, there was statistically significant reduction in both the mean tobacco score (baseline mean = 20.14 and follow-up mean = 17.17) and alcohol score (baseline mean = 20.25 and follow-up mean = 17.16, from baseline to follow-up. Analysis was done using paired t-test [Table 2].

Paired t-test was used to compare the mean differences in the change of severity scores for tobacco and alcohol between the baseline and 3rd-month follow-up for the intervention and control groups. Although the mean difference in the tobacco severity score was higher in the intervention PHC (2.91) as compared to the control PHC (2.09), the difference was not statistically significant. Similarly, for alcohol, the difference in alcohol severity score between the baseline and 3rd-month follow-up was higher for the intervention PHC (3.09) as compared to the control PHC (2.45). However, the differences were not statistically significant [Table 3].

**Discussion**

This study explored the feasibility of trained NDHPs providing brief tobacco and alcohol cessation interventions in PHC settings. It is striking that a majority of the patients who participated in this study 82%–84% and 38%–51% reported the use of tobacco and alcohol, respectively. At present, no routine cessation interventions are carried out for tobacco and alcohol at most PHCs, and there is a huge treatment gap. This needs to be urgently addressed, considering that both are important preventable risks for noncommunicable diseases.

ASSIST which was used in this study has been found to be feasible to use in primary care in a number of cultures. Studies have also demonstrated that ASSIST items were reliable.[17-19] A multisite study demonstrated that ASSIST showed good concurrent, construct, and discriminative validity and can screen adequately for low-, moderate-, and high-risk use for most substances.[20] It is a relatively brief, low-cost tool, comprising eight items, covering 10 substances.

**Changes in the severity scores following intervention**

**For tobacco**

There was a reduction in the high-risk scores on tobacco use in both control (4.5%) and intervention (4%) PHCs and this resulted in an increase in the proportion of tobacco users with moderate-risk scores in both control and intervention PHC. A proportion of heavy users of tobacco had moved into the moderate-risk category. This was consistent with other studies[14,21-23] which show favorable outcome with brief intervention for tobacco use though the reduction in severity scores in these studies was not statistically significant.

**For alcohol**

The postintervention change in the severity of alcohol use was significant in the intervention group. Although there was a similar improvement in the control PHC, it was not statistically significant. It can be inferred that there was a significant reduction in the severity of the alcohol use behavior in the intervention PHC when compared to control PHC. The brief cessation intervention has worked in reducing the severity of alcohol use in those who received it more than in those who did not receive it. Contrary to the previous studies[24] which have found that brief cessation intervention has efficacy in primary care for patients with harmful use of alcohol but not that efficacious for those with heavy use or dependence, in this study, there was reduction in the percentage of patients with high-risk scores of alcohol also (9.5% reduction in intervention and 3.1% in the control PHC). Since both the baseline scores and the follow-up scores of the control and intervention PHC were not statistically different, it can be interpreted that the difference in scores at baseline did not influence the changes in scores following the intervention [Table 4].

**Comparison of mean Alcohol, Smoking, and Substance Involvement Screening Test scores for tobacco over time**

In the control PHC, mean ASSIST score for tobacco at baseline was 18.89 (standard deviation [SD] 4.99). This reduced to 16.60 (SD 4.90) and the reduction was statistically significant. Similarly in the intervention PHC mean ASSIST

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control PHC</th>
<th>Intervention PHC</th>
<th>Paired t-test</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco</td>
<td>Baseline Score Mean (SD)</td>
<td>18.89 (4.99)</td>
<td>20.14 (5.55)</td>
<td>0.050</td>
</tr>
<tr>
<td></td>
<td>Follow-up Score Mean (SD)</td>
<td>16.60 (4.90)</td>
<td>17.17 (5.68)</td>
<td>0.001</td>
</tr>
<tr>
<td>Alcohol</td>
<td>Baseline Score Mean (SD)</td>
<td>23.50 (7.22)</td>
<td>20.25 (7.69)</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Follow-up Score Mean (SD)</td>
<td>21.05 (8.37)</td>
<td>17.16 (9.19)</td>
<td>0.014</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Difference in scores between baseline and follow-up</th>
<th>Control PHC</th>
<th>Intervention PHC</th>
<th>Independent t-test</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>38</td>
<td>2.45</td>
<td>0.014</td>
<td>0.87</td>
</tr>
<tr>
<td>Tobacco</td>
<td>65</td>
<td>2.91</td>
<td>-1.059</td>
<td>0.292</td>
</tr>
</tbody>
</table>

**Table 2: Comparison of tobacco and alcohol scores over time in control and intervention primary health center**

**Table 3: Differences in the tobacco and alcohol scores between control and intervention primary health center**

**PHC:** Primary health centre, **SD:** Standard deviation
score for tobacco at baseline was 20.14 (4.55) reduced to 17.17 (SD 5.68) at the 3rd-month follow-up. This reduction was also statistically significant. It is encouraging that just assessment with ASSIST questionnaire along with a leaflet explaining the health hazards of tobacco use as well as brief cessation intervention has led to statistically significant reduction in the mean tobacco scores.

Even though there was reduction in mean ASSIST score in both the groups, the mean difference between baseline and follow-up was greater in the intervention PHC (2.91, SD 4.87) when compared to control PHC (2.09, SD 4.03). However, this difference in the mean difference between intervention and control PHC was not statistically significant. There have been studies which did not find much difference between minimal cessation intervention (3 min advice) when compared with advanced intervention (four 30 min counseling sessions). In the current study also there seems to be not much difference between the minimal intervention (ASSIST questionnaire with leaflet) and brief cessation intervention in the tobacco users. Another notable point is that patients from the high-risk category moved to the moderate-risk over a period of 3 months. It is known that retaining patients in treatment improves outcomes. A study of patients provided tobacco cessation interventions, showed that the percentage of tobacco users becoming abstinent increased over successive follow-ups.

**Comparison of mean Alcohol, Smoking, and Substance Involvement Screening Test scores for alcohol over time**

The mean ASSIST score for alcohol at baseline in the control PHC was 23.50 and reduced to 21.05 at the follow-up. This again suggests that just asking about the use of these substances in a systematic manner and providing information. This study demonstrated a significant reduction in the use of alcohol and tobacco on the ASSIST assessment between baseline and 3 months in both control and intervention groups, with a statistically significant reduction in the number of heavy users of alcohol.

**Implications and future directions**

Our study shows that with minimal cessation intervention, there can be reduction in the severity of both alcohol and tobacco use. This calls for wider and rigorously planned research in this area. Considering that many PHCs in the country have very heavy patient loads, with better training and monitoring, NDHP may play a crucial part in offering cessation intervention. This would be an important strategy for reducing risk for noncommunicable diseases. Whether such interventions require specialized counselors or can be managed by PHC staff is another important area of enquiry.

Hand-holding the NDHPs as well as follow-up assessments was done in this study using mobile phones. The use of modern technology in training, assessments, and intervention is surely gaining ground. Studies have shown that the use of phone calls for intervention was as effective as interventions carried out in person.

**Strengths of the study**

This was a community-based study that used the WHO-validated tool. Not many studies have been done on integrated tobacco and alcohol cessation intervention in primary care setting, and this study has attempted to address this lacuna. An important strength of this study was that it was carried out in a natural PHC setting, using the PHC staff themselves.

**Limitations of the study**

Purposive sampling was followed due to logistic reasons. PHCs chosen were semi-urban in character and do not represent average Indian PHC, mostly rural in character. Study design was such that the baseline assessment and the 1st-month follow-up were done by the NDHPs and the 3rd-month follow-up by the researcher. However, this is likely to have reduced the bias that might have resulted if the NDHPs themselves conducted the follow-up.

**Conclusions**

The NDHP can bring about a significant reduction in the use of tobacco and alcohol in the primary health care setting by just asking about the use of these substances in a systematic manner and providing information. This study demonstrated a significant reduction in the use of alcohol and tobacco on the ASSIST assessment between baseline and 3 months in both control and intervention groups, with a statistically significant reduction in the number of heavy users of alcohol in the intervention PHC. The findings support a greater role for the NDHPs in the assessment and cessation intervention for substance use at the PHC.

**Acknowledgment**

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Conflicts of interest
There are no conflicts of interest.

REFERENCES


Tobacco Industry Interference: A Review of Three South East Asian Countries

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Abstract

Background: The WHO Framework Convention on Tobacco Control (FCTC) Article 5.3 requires governments to protect tobacco control policies from the commercial interest of the tobacco industry (TI). TI interference is the biggest barrier to implementing comprehensive tobacco control measures. Objective: This paper reviews the extent of the TI’s interference in tobacco control policy development in three countries, Thailand, Myanmar, and Indonesia, and the governments’ efforts to protect these policies. Methods: The paper draws on incidents of TI interference reported in the 2016 Tobacco Industry Interference Index: ASEAN Report on Implementation of the WHO FCTC Article 5.3. Base data were obtained through a questionnaire on twenty most commonly reported incidents of interference from the FCTC Article 5.3 Guidelines recommendations. A scoring system was developed. Results: All three countries faced varying levels of TI interference. Thailand, though known for its stringent tobacco control measures, still faced interference while Myanmar remains vulnerable. Indonesia faced the highest industry interference which may explain why it is lagging behind in tobacco control and remains a nonparty to the WHO FCTC. The TI gains access to government officials through offers of technical assistance and its corporate social responsibility activities. Transparency in dealing with the TI is needed in all three countries. Most governments have not set up disclosure procedures when dealing with the TI. Conclusion: Outside the Department/Ministry of Health, other departments remain unaware of Article 5.3, not utilizing its strength to regulate the TI. More concerted effort is needed to implement Article 5.3 to achieve greater success in tobacco control.

Key words: Article 5.3, Framework Convention on Tobacco Control, interference, tobacco industry

INTRODUCTION

The tobacco industry (TI) interferes with governments’ efforts in protecting public health through various tactics to deter and thwart their efforts. There are a wide range of interference activities which the TI uses. However, they all seek to lobby and dissuade governments from developing and implementing stringent tobacco control policies that are effective in reducing tobacco use. The WHO Framework Convention on Tobacco Control (FCTC) Article 5.3 Guidelines[6] provides a set of recommendations that governments can undertake to shield their policies from industry influence.

The Southeast Asia Tobacco Control Alliance (SEATCA) has documented how governments have fared in implementing the FCTC Article 5.3 in the Tobacco Industry Interference Index (the Index).[2,3] The index provides examples of the TI’s interference activities in nine countries in the ASEAN region and a ranking for the countries [Figure 1]. The nine countries are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, and Vietnam [inset Figure 1].

This report will focus on three countries in South East Asia, namely, Thailand, Myanmar, and Indonesia[4] which are at different phases of tobacco control. Thailand is world renowned for its strong tobacco control measures,[5] Myanmar is making progress in FCTC implementation[6] and Indonesia is lagging behind.[7] According to the index, these three countries demonstrate different levels of interference from the TI and...
how the governments have responded to these activities. The industry in Thailand tries to undermine the progress made in tobacco control, whereas in Indonesia, it has a free hand to influence the government. Myanmar is encouraging foreign investments which include the TI; hence, it is open to the TI despite tobacco control efforts from the Ministry of Health and Sport. These three country situations provide a good basis for comparison. Since the recommendations in Article 5.3 Guidelines are consistent with the principles of anti-corruption, they are applicable to Indonesia although it is not a party to the FCTC.

**Materials and Methods**

This review draws on the incidents of TI interference reported in the 2016 Tobacco Industry Interference Index: ASEAN Report on Implementation of the WHO FCTC Article 5.3. A questionnaire was administered by respondents in the countries who consulted with advocates, partners, and government and nongovernment organizations. Questions were based on the top twenty most commonly reported incidents of TI interference in the South-east Asian countries and referenced to specific FCTC Article 5.3 Guidelines recommendations. Respondents were required to provide publicly available evidence to support each answer. The lower the score, the better, as it indicates a lower level of interference. The scores for Indonesia, Myanmar, and Thailand were extracted and used in this review. In addition, this review also refers to the SEATCA FCTC Scorecard which provides a measurement of the WHO FCTC implementation in the ASEAN region.

**Results**

**Thailand**

Thailand, which has been demonstrating good progress in halting TI interference over the years,[8,10] was subject to strong interference in 2016. Thailand’s Excise Department received technical assistance from the International Tax and Investment Center (ITIC) on excise tax reform.[11] The Convention Secretariat of the FCTC has issued two notes verbale on nonengagement with ITIC to parties to the WHO FCTC.[12] The ITIC is a known TI lobby group[13] which makes industry-friendly recommendations to governments. For example, the ITIC opposes substantial excise tax increases on tobacco claiming it encourages smuggling.

In 2015, the Thai government had accepted and acted on a proposal from the Thai Tobacco Monopoly (TTM) to investigate and reorganize Thai Health Foundation. The investigation resulted in negative press for Thai Health.[14,15] Thai Health is recognized as an international success case study of health promotion funded by dedicated tobacco and alcohol tax revenues. Thailand’s experience demonstrates that even when a government is vigilant to halting TI interference, the industry will find ways to undermine the gains achieved in tobacco control polices and measures.

The Thai government faces a conflict of interest problem since the TTM is a state enterprise. Retired senior government officials are routinely appointed as TTM board members. Retired military personnel and political appointees occupy senior management position.[16] A retired army Lieutenant General is the current Chairman of TTM. Government officials such as a senior officer from the Excise Department and the Ministry of Finance are board members of the TTM. These appointments are seen as normal. The objectives of the government to reduce tobacco use and the requirement of Article 5.3 are lost in the aim of TTM. In TTM’s 2015 Annual Report, the Chairman expressed “sincere appreciation to tobacco farmers, entrepreneurs, relevant government agencies, tobacco consumers as well as TTM executives and employees of their coordination and support of TTM’s success which will lead to TTM sustainable growth in the future.”[17]

Early 2016, the government increased tobacco excise tax as a measure to reduce smoking. Following the tax increase, the Managing Director (MD) of TTM in February 2016 stated cigarette sales fell 3% after the tax rise and will lead to a drop in revenue of around 1 billion baht ($27.5 million) per month for the company. The MD announced cheap cigarettes to counter the sales drop. “The price will be about 40 baht per pack to target the market of low-income consumers, and help them afford cigarettes.”[18] While this promotion would frustrate the government’s aim to reduce tobacco use among the poor, there is little they can do to address TTM’s business tactics.

The Thai Ministry of Health has a Department of Regulation that outlines specific circumstances under which Health officials can meet with the TI.[19] Although the government has avoided attending social functions of the industry, it has created opportunities for interaction by providing technical assistance to the government such as in the enforcement of curbing the illicit trade in tobacco products. Previously, the TI was not involved nor contributed to any enforcement activities in Thailand. However, now the TTM provides an incentive to the government to seize illicitly traded tobacco.[20]

One way to curb TI influence as recommended in the Article 5.3 Guidelines is through a code of conduct or guidelines...
for officials when dealing with the TI. Thailand prohibits the acceptance of all forms of contributions from the TTM, including offers of assistance, policy drafts, or study visit invitations to the government and its officials; however, this applies only to the TTM. The government has set up an Article 5.3 Committee and is now developing a procedure to raise awareness within its departments on policies relating to FCTC Article 5.3 Guidelines.

**Indonesia**

Indonesia, still a nonparty of the FCTC, regards the TI like any other industry and welcomes it as a stakeholder. In this regard, Indonesia continues to face strong TI participation and interference in tobacco control policy development. The TI intervention is not always initiated by the TI. In many circumstances, the government requests for input from the TI before formulating regulations or during the legal drafting process.

The TI uses corporate social responsibility (CSR) activities to gain access to high-level government officials. The Indonesian government accepts, endorses, and participates in CSR activities of the TI. In April 2015, the Minister of Youth and Sports officially opened the National Djarum Circuit (Djarum SIRNAS) for badminton in Li Ning Sulawesi Open 2015. In his speech, he said: “Hopefully, Djarum SIRNAS is able to bring back young athletes who will restore the glory of the Indonesian badminton in the future as they were before, which is very important in Indonesian badminton being followed by the world.”[21] In December, the Head of Ecosystem Restoration Directorate General of Conservation, Natural Resources and Environment Ministry, participated and spoke at Djarum’s “Trees for Life” project. Philip Morris International spends a significant amount of its CSR dollars (US $6 million) in Indonesia.

The Indonesian government is “open” about their interactions with TI as they see such interactions as “normal.” However greater transparency is needed because details about the interaction are not publicly available. The public is eventually informed of pro-industry legislations. For example, the pro-TI bill introduced for debate in parliament in 2014 was rejected by the end of the previous administration. However, to the public’s surprise, the bill re-emerged in the 2014–2019 period, listed among the priority bills in 2015, and has been revised by adding protection of farmers as its main objective.

Indonesia has general guidelines to address conflict of interest (Administrative and Bureaucratic Reforms Minister No. 37/2012) which prohibits government officials from working with any types of industries/establishments outside the government services. However, this prohibition is not extended to the period immediately following their retirement when they still command respect. The former Director General of Customs and Excise, Ministry of Finance, Eddy Abdurrahman, has held many senior positions in various government agencies, including Advisor to the Finance Minister for International Economic Relations and Secretary of the Coordinating Minister for Economic Affairs. In 2015, Abdurrahman was appointed as an Independent Commissioner to the Board of British American Tobacco (BAT)/Bentoel.[22] Raden Bagus Permana Agung Dradjattun before his appointment as independent Commission of Sampoerna was Indonesia’s Ministry of Finance Expert Staff for International Relations and Economic Cooperation.[23]

Despite the huge tobacco-related death toll, Indonesia treats the TI like any other industry and still does not see the need to accede to the FCTC. The concept of “TI interference” remains foreign and not seen as a problem. This opens the door for government officials to engage in unnecessary interaction with the TI. The Article 5.3 Guidelines makes several recommendations discouraging government officials from attending TI’s social functions and to reject partnerships and offers of assistance from it. In Indonesia, there were incidents of senior government officials attending industry functions, handing out awards, and conducting factory visits. For example, in June 2016, officials of several departments and the former governor of East Java officiated at the opening ceremony of a cigarette factory in Sidoarjo Regency, a regency of East Java.[24]

In 2016, Indonesia took a step forward in addressing TI interference and approved the Health Minister Regulation No. 50/2016 Guidelines for managing conflict of interest with the TI in the Ministry of Health. This regulation will assist the Health Ministry when it strengthens tobacco control measures.

**Myanmar**

Currently, Myanmar does not have an overall policy to implement Article 5.3. While the Myanmar government is open to the investment from TI, however, it has not accepted any offers of assistance from the industry in implementing tobacco control policies. Myanmar is moving forward in developing policies compliant with the FCTC.

Myanmar has banned TI related CSR activities since 2006. However, in September 2015, Japan Tobacco International (JTI) Myanmar met with the Secretary of Myanmar Investment Commission and made a small donation toward helping flood victims.[25] In February 2016, Myanmar approved legislation for pictorial health warnings (PHW) on cigarette packs to come into effect September 1, 2016. In March, JTI Myanmar, along with BAT, met with the Myanmar Investment Commission about delaying the PHW;[26] although, this department has nothing to do with the public health measure.

The Myanmar government’s recent experience with JTI illustrates the need for transparency and record keeping when interacting with the TI. Although Myanmar has a comprehensive ban on tobacco advertising promotion and sponsorship, in October 2016, JTI ran a half page colored advertisement of its prominent brands in a local newspaper supposedly meant to be a “public notice” to inform its customers about new graphic PHW on cigarette packets. JTI claimed it had approached the Department of Health and obtained permission to publish the “public notice” that the announcement as it appeared in
the newspaper “was formally approved by the Deputy Director General of the Public Health Department.”[27] However, a Senior Public Official from the Department of Health refutes the department giving permission, calling JTI “liars” and referring to the “public notice” as opportunistic advertising. When a journalist attempted to get a copy of the written permission from JTI, it did not respond to the journalist’s request.[28] Clearly JTI had used this opportunity to do some advertising and had taken advantage of the department’s lack of experience. If the government had a procedure in place to disclose meetings with the TI, records of minutes and outcomes of the meetings, it would be in a stronger position to counter any misunderstanding or lies from the industry.

**DISCUSSION**

Article 5.3 is a general obligation in the FCTC, and its implementation is vital to strengthen overall tobacco control efforts. While there may be some efforts toward raising awareness on the relevance of Article 5.3 Guidelines, these are not carried out in a systematic nor consistent manner. Hence, most government departments outside the Ministries of Health have little or no knowledge of FCTC Article 5.3 Guidelines and treat the TI like any other business or investor. Hence, they can even be manipulated to undermine the Health Ministry’s tobacco control as seen in the case of Myanmar.

Lack of transparency remains an issue across all the three countries. The governments do not publicly disclose meetings nor have a procedure for disclosing records of interactions with the TI and its representatives. If efforts toward record keeping of interactions is stepped-up and done systematically, it will assist governments toward better implementation of Article 5.3 Guidelines.

Most governments have not set up rules nor procedures for the disclosure or registration of TI entities, affiliates organizations and individuals acting on their behalf. Such a register would be helpful to governments to identify the industry as increasingly the tobacco companies’ lawyers, hired consultants, and third party entities are approaching governments to lobby on its behalf.

Tobacco companies have increased their spending on CSR in the ASEAN region as governments adopt comprehensive bans on tobacco advertising, promotion and sponsorship, or severely restrict them. Thailand has just banned TI-related CSR activities and joins Lao PDR and Myanmar who have already banned them. However, top Indonesian leadership continues to remain vulnerable to such activities.

This review provides information on the extent of the TI’s influence in Indonesia which can help explain Indonesia’s obstacle in acceding to the FCTC.

**Limitations**

As stated in the methodology, this review is based on the publically available information. It is possible that interactions may have occurred or incentives given to the TI which has not been included in this review because there are no publically available evidence to reference. Transparency is flagged as an issue in all three countries. Some information are sensitive in nature and cannot be used in this review.

**CONCLUSION AND RECOMMENDATIONS**

The recommendations in Article 5.3 Guidelines provide clear measures governments can implement to curb industry meddling and disruption. The guidelines were adopted in 2008 and this review shows Governments have to step-up their efforts in implementation dramatically. Outside the Ministries of Health, other government departments remain largely unaware of Article 5.3 and have not utilized its strength to regulate the TI. More concerted effort is needed to publicize the importance of implementing Article 5.3 to achieve greater success in tobacco control. The following are some recommendations:

- A whole-of-government approach is vital for Article 5.3 implementation. Governments need to record and document all meetings with the TI and their outcomes. Ministries of Health need to work more closely with ministries of trade to address this. A way forward is to adopt a code of conduct for government officials
- Procedures should be put in place to reduce TI participation in policy development
- Transparency is needed in dealing with the TI
- Ban all TI related CSR activities
- Require tobacco companies to disclose and report on all expenditure on marketing, retailer incentives, lobbying, and political contributions
- Indonesia must accede to the WHO FCTC as soon as possible to implement stringent tobacco control measures and halt interference from the TI.

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**Conflicts of interest**

There are no conflicts of interest.

**References**


Tobacco Use among Thai Students: Results from the 2015 Global Youth Tobacco Survey

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Abstract

Background: Tobacco use often starts in adolescence and is a leading cause of premature mortality. Two previous rounds of the global youth tobacco survey (GYTS) found that a significant proportion of Thai youth currently smoke. Objectives: We conducted the third round of GYTS in Thailand in 2015 to monitor trends in tobacco use. Methods: We selected 31 public and private secondary schools using random sampling based on probability proportional to school enrolment. In each school, we selected 1–3 classes (Grades 7–9) by random sampling. All students in these classes from 30 schools (one school declined) completed a self-administered standard questionnaire in the Thai language. The association between tobacco use and independent variables was examined using univariate and multivariable logistic regression analysis. Results: Of 1876 students, 1721 were aged 13–15 years. Overall, 15% of students currently used tobacco; boys 21.8% and girls 8.1%. The prevalence of current cigarette smoking was 11.3%; 3.3% students currently used electronic cigarettes. Exposure to secondhand smoke (SHS) at home, school, and in enclosed public places was reported by 33.8%, 47.9%, and 38.6%, respectively. Among current smokers, 44% were not stopped from purchasing cigarettes despite being underage. Higher tobacco use was associated with being older, male, exposed to SHS, in possession of an object with a tobacco logo, and being offered a free tobacco product by a tobacco company. Conclusion: Tobacco and cigarette use among Thai students remains high. Underage current smokers have easy access to cigarettes. Urgent steps are needed to curb the access of youth to tobacco.

Key words: Cigarette smoking, electronic cigarettes, global youth tobacco survey, prevalence, shisha, Thailand, tobacco, youth

Introduction

Tobacco use is a leading cause of preventable morbidity and premature mortality worldwide.[1,2] The World Health Organization estimates that >6 million people die each year from smoking or exposure to secondhand smoke (SHS).[3] Tobacco use remains a serious public health and development issue in Thailand. According to the Global Burden of Disease study, tobacco use accounts for >10% of the disease burden in Thailand.[4] In 2013, the total economic burden from smoking was 75 billion Thai Baht, amounting to 18.2% of total health expenditure and 0.8% of the national gross domestic product.[5]

Adolescence is a vulnerable period for initiation of smoking – most smokers begin using tobacco before the age of 18 years.[6] Therefore, tobacco companies spend billions to market their products to the young. Nearly, four out of five Thai adults start smoking during their teen years.[7] The overall trend in cigarette use among adults has decreased fairly steadily since 1991 and has plateaued in recent years.[8] However, the trend in cigarette use among youth has not decreased in the past decade. In the previous two rounds of the Global youth tobacco survey (GYTS) in 2005 and 2009, the prevalence of current cigarette use remained high at about 11%.[9] In another nationally representative population-based survey among adolescents, tobacco use increased from 12% to 18.3% between January 2005 and March 2008.[10] In addition, the National Statistical Office survey in 2011 found that the starting age of recent smokers was as low as 6 years of age.[11]

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Reducing tobacco use among youth is a key to ending the tobacco epidemic. Trends in the prevalence of tobacco use among youth indicate trends in new smokers – this is an important indicator that needs to be systematically monitored. GYTS, a systematic youth tobacco survey, is a globally standardized, robust tool for monitoring the prevalence of tobacco use as well as for examining tobacco control measures.\(^{[12]}\) Data from the GYTS can provide the evidence base needed for policy formulation and implementation to better control tobacco use among youth. We conducted the third round of GYTS in Thailand, to estimate the prevalence of tobacco use, exposure to SHS, access to tobacco products, and other important indicators among youth.

**Materials and Methods**

We conducted the third round of GYTS from November to December 2015 using the standard methodology.\(^{[12]}\) We carried out a cross-sectional survey among students aged 13–15 years corresponding to Grades 7–9 in sampled public and private secondary schools from all over Thailand. We used a two-stage cluster sampling methodology to produce a representative sample of students. The sampling frame consisted of all public and private schools from all over Thailand with students in the age group of 13–15 years. A total of 11,503 schools were included in the sampling frame. In the first stage, we selected 31 schools using probability proportional based on the size of school enrollment. Schools having <40 students were excluded from the study. At the second stage, we randomly selected classes within each selected school. All students in the selected class were invited to participate in the survey irrespective of age. A total of 1876 eligible students in 65 classes completed the survey.

The standard core questionnaire (42 multiple-choice questions) with a set of optional questions (15 questions) was adapted to meet country needs and translated into the Thai language and back into English independently to check for accuracy. The questionnaire covered the following topics: tobacco use (smoked and/or smokeless); cessation; SHS; pro-and anti-tobacco media and advertising; access to and availability of tobacco products; and knowledge and attitudes regarding tobacco use. Questions on the use of e-cigarettes were included for the first time in this third round of GYTS.

Using standard definitions (Centers for Disease Control, GYTS questionnaire guide, version 1.0, 2012), “ever use” was defined as the use of tobacco even once in the lifetime. “Current use” was defined as the use of tobacco within 30 days of the survey. Tobacco use included smoking cigarettes, *shisha* and e-cigarettes, or use of smokeless tobacco, such as chewing shredded tobacco, inhaling through the nose, and chewing betel leaves with tobacco.

Data were analyzed using SUDAAN 9.0 (Research Triangle Institute, Research Triangle Park, North Carolina, USA), which computed standard errors of the prevalence estimates and produced 95% confidence intervals (CIs). A weighting factor was applied to each student record to account for nonresponse by school, class and student, and probability of selection at the school and class levels. Among 31 sampled schools, one school declined to participate. Therefore, the school response rate was 96.8%. The class response rate was 100% and the student response rate among 30 schools was 89%, nonresponse being due to the absence of some students on the day of the survey. Thus, the overall response rate was 86.1%.

To assess the association between tobacco smoking and selected variables, we carried out univariate and multivariable logistic regression analysis. Tobacco use was the dependent variable (dichotomous variable) in our model and we included a number of predictor variables: age, gender, parental tobacco use, exposure to SHS, possession of objects with tobacco logo, exposure to tobacco advertisement on internet and at point of sale, being approached by tobacco company representative, and exposure to anti-tobacco messages in the media. There was no significant multicollinearity observed among the predictor variables. The predictive power obtained from the Cox-Snell $R^2$ for the dependent variable was computed using Taylor linearization methods assuming with replacement design. Although the $R^2 = 0.152$ was comparatively lower than the desired level for behavioral studies like this one, our model was fitted to the data very well according to goodness-of-fit tests. Adjusted odds ratios (AOR) and 95% CIs were computed using SUDAAN. $P < 0.05$ was considered statistically significant.

The institute for the development of human research protection provided ethics approval for the GYTS. Anonymity, confidentiality, and willingness of the participants were ensured, and consent obtained from each participant and their parents.

**Results**

**Tobacco use and exposure to secondhand smoke**

Of 1876 students who participated in the survey, 1721 were aged 13–15 years (51.2% boys and 48.2% girls). Overall, 15.0% (95% CIs: 11.2–19.8%) of students were current tobacco users and 11.3% (95% CI: 8.2–15.3%) currently smoked cigarettes \[^{[1]}\] . Smokeless tobacco was much less used than smoked tobacco (2.7% vs. 14.0%). Use of new tobacco products such as electronic cigarettes was reported for the first time. A total of 3.3% (95% CI: 2.2–5.1%) of students currently used electronic cigarettes and 5.6% (95% CI: 3.7–8.2%) were current *shisha* smokers. The use of all forms of tobacco was three times more common among boys than girls. In all, 7.4% (95% CI: 5.6–9.7%) of never smokers mentioned that they may start using tobacco in the future.

Exposure to SHS at home, school, and in enclosed public places was reported by 33.8% (95% CI: 29.6–38.3%), 47.9% (95% CI: 41.9–54.0%), and 38.6% (95% CI: 33.5–44.0%) students, respectively. More than three-fourths of students (77.6%; 95% CI: 74.7–80.4%) thought that SHS was harmful to them and a similar proportion of students (78.9%; 95% CI: 76.1–81.4%) was in favor of banning smoking at outdoor public places.
Table 1: Prevalence of tobacco use and exposure to secondhand smoke among students aged 13-15 years, by gender, Global Youth Tobacco Survey, Thailand, 2015

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<tr>
<th>Indicators</th>
<th>Overall</th>
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<td>Tobacco use</td>
<td></td>
<td></td>
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<tr>
<td>Current tobacco users</td>
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<td>Current tobacco smokers</td>
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<td>7.1</td>
</tr>
<tr>
<td>Current cigarette smokers</td>
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<td>17.2</td>
<td>5.2</td>
</tr>
<tr>
<td>Current smokers of other tobacco</td>
<td>6.3</td>
<td>8.9</td>
<td>3.6</td>
</tr>
<tr>
<td>Current smokeless tobacco users</td>
<td>2.7</td>
<td>4.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Current e-cigarette smokers</td>
<td>3.3</td>
<td>4.7</td>
<td>1.9</td>
</tr>
<tr>
<td>Current shisha smokers</td>
<td>5.6</td>
<td>7.9</td>
<td>3.1</td>
</tr>
<tr>
<td>Ever tobacco users</td>
<td>34.9</td>
<td>46.6</td>
<td>22.6</td>
</tr>
<tr>
<td>Ever tobacco smokers</td>
<td>33.1</td>
<td>44.7</td>
<td>21.1</td>
</tr>
<tr>
<td>Ever cigarette smokers</td>
<td>29.0</td>
<td>39.5</td>
<td>18.2</td>
</tr>
<tr>
<td>Ever smokers of other tobacco</td>
<td>13.3</td>
<td>18.2</td>
<td>8.2</td>
</tr>
<tr>
<td>Ever smokeless tobacco users</td>
<td>4.7</td>
<td>6.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Ever tried e-cigarette</td>
<td>5.4</td>
<td>7.7</td>
<td>3.0</td>
</tr>
<tr>
<td>Ever tried shisha</td>
<td>13.9</td>
<td>17.8</td>
<td>9.8</td>
</tr>
<tr>
<td>Secondhand smoke exposure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposed at home</td>
<td>33.8</td>
<td>31.3</td>
<td>36.6</td>
</tr>
<tr>
<td>Exposed inside any enclosed public place</td>
<td>38.6</td>
<td>31.3</td>
<td>46.5</td>
</tr>
<tr>
<td>Exposed at any outdoor public place</td>
<td>37.7</td>
<td>32.1</td>
<td>43.7</td>
</tr>
<tr>
<td>Exposed at schools (saw anyone smoking in the school area)</td>
<td>47.9</td>
<td>50.5</td>
<td>45.2</td>
</tr>
<tr>
<td>Thought secondhand smoke is harmful to them</td>
<td>77.6</td>
<td>72.6</td>
<td>83.0</td>
</tr>
<tr>
<td>Favored banning smoking at outdoor public places</td>
<td>78.9</td>
<td>76.5</td>
<td>81.3</td>
</tr>
<tr>
<td>Susceptibility (among never smokers)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Susceptible to tobacco use</td>
<td>7.4</td>
<td>9.6</td>
<td>5.8</td>
</tr>
<tr>
<td>Who thought they might enjoy smoking a cigarette</td>
<td>4.3</td>
<td>7.0</td>
<td>2.5</td>
</tr>
</tbody>
</table>

CI: Confidence interval, n: Sample size

Initiation of tobacco smoking, access, and purchasing pattern

The majority of ever smokers (39.6%; 95% CI: 33.1%–46.4%) initiated cigarette smoking between the age of 12 and 13 years [Table 2]. Over half the students smoked more than one cigarette a day. Girls smoked fewer cigarettes than boys. Two-thirds (67.4%; 95% CI: 58.5%–75.3%) of current smokers purchased cigarettes from stores, small groceries, stalls, flea markets, or convenience stores. Importantly, nearly half (44.0%; 95% CI: 31.7%–57.1%) of them faced no difficulty in buying cigarettes because they were underage. One in five current cigarette smokers purchased loose cigarettes as individual sticks and another 19% bought cigarettes in a divided packet [Table 2].

Smoking cessation

Four out of five current smokers (79.4%; 95% CI: 70.0%–86.3%) had tried to quit smoking in the past 12 months. In addition, nearly three-fourths (72.2%; 95% CI: 59.8%–81.9%) wanted to stop smoking. However, only 29.3% (95% CI: 22.5%–37.2%) had received help or advice to stop smoking [Table 2].

Exposure to pro-tobacco advertising

Thai students are frequently exposed to pro-tobacco marketing from different channels [Table 3]. Nearly, three-fourths of students (72.6%; 95% CI: 69.0%–75.9%) had seen someone using tobacco on television, videos, or movies. About one-third of students (30.9%; 95% CI: 27.4%–34.6%) noticed tobacco advertisements at points of sale. Nearly, two out of five students (38.1%; 95% CI: 33.5%–42.8%) noticed advertisements of cigarettes or other tobacco products, and over one-fourth of students (27.0; 95% CI: 23.7%–30.6%) noticed electronic cigarette advertisements on the internet or other online media. In all, 10.5% (95% CI: 8.8%–12.4%) students owned something with a tobacco logo on it and 7.3% (95% CI: 5.3%–9.9%) were offered a free tobacco product from a tobacco company representative.

Exposure to anti-tobacco messages

Three-fourths of the students (74.9%; 95% CI: 70.6%–78.7%) saw or heard anti-tobacco messages in the media such as television, radio, internet, billboards, posters, newspapers, magazines, or movies. The majority of the students mentioned that they were taught about the dangers of tobacco use in their school.

Knowledge and attitudes toward tobacco

The majority of students thought that other people’s smoking was harmful to them and was in favor of a ban
on smoking. However, in contrast, more than one-fourth (27.7%; 95% CI: 25.6%-29.9%) of the students felt that smoking tobacco helps people feel more comfortable at celebrations, parties, and social gatherings, and 16.6%...
(95% CI: 14.6%–18.9%) of students thought that it would be difficult to quit once someone started smoking tobacco [Table 2].

**Factors associated with smoking**

Tobacco use increased with age and almost was 3 times higher in boys than in girls [Table 4]. Students who were offered a free tobacco product by a company representative were significantly more likely to use tobacco than those who were not (54.5% vs. 11.5%; AOR = 5.0, 95% CI: 3.7–6.9). Other factors associated with higher odds of using tobacco were possessing an object with a tobacco logo on it and exposure to SHS. On the other hand, learning about the harms of tobacco use at school and exposure to anti-tobacco messages in the media protected youth from smoking.

**Discussion**

We found that tobacco use remains high among Thai youth, with one out of six students currently using tobacco. As shown

<table>
<thead>
<tr>
<th>Factors</th>
<th>Tobacco use</th>
<th>Crude OR (95% CI)</th>
<th>Adjusted OR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>57 (10.1)</td>
<td>486 (89.9)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>98 (14.6)</td>
<td>630 (85.4)</td>
<td>1.5 (0.9-2.6)</td>
<td>1.4 (0.8-2.4)</td>
</tr>
<tr>
<td>15</td>
<td>79 (22.5)</td>
<td>280 (77.5)</td>
<td>2.6 (1.2-5.9)</td>
<td>2.5 (1.0-6.1)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>73 (8.1)</td>
<td>813 (91.3)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Male</td>
<td>161 (1.8)</td>
<td>581 (78.2)</td>
<td>3.2 (2.0-4.9)</td>
<td>2.9 (1.8-4.8)</td>
</tr>
<tr>
<td>Parents/guardian smoked</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>141 (5.9)</td>
<td>771 (84.1)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>One parent</td>
<td>84 (13.2)</td>
<td>599 (86.9)</td>
<td>0.8 (0.6-1.1)</td>
<td>0.8 (0.5-1.1)</td>
</tr>
<tr>
<td>Both parents</td>
<td>9 (28.4)</td>
<td>26 (71.7)</td>
<td>2.1 (0.6-7.5)</td>
<td>2.0 (0.7-6.0)</td>
</tr>
<tr>
<td>Exposed to secondhand smoke</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>69 (10.3)</td>
<td>643 (89.7)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>165 (18.9)</td>
<td>744 (81.1)</td>
<td>2.1 (1.5-2.9)</td>
<td>2.8 (1.8-4.1)</td>
</tr>
<tr>
<td>Had an object with a cigarette brand or logo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>163 (12.1)</td>
<td>1268 (87.9)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>55 (35.7)</td>
<td>104 (64.3)</td>
<td>3.8 (2.3-6.3)</td>
<td>2.2 (1.2-3.9)</td>
</tr>
<tr>
<td>Exposed to advertisement of cigarettes or other tobacco products on the internet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>120 (12.4)</td>
<td>890 (87.6)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>113 (19.3)</td>
<td>502 (80.7)</td>
<td>1.7 (1.2-2.4)</td>
<td>1.4 (1.0-2.0)</td>
</tr>
<tr>
<td>Exposed to point-of-sale tobacco advertisement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>131 (12.3)</td>
<td>1011 (87.7)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>97 (20.2)</td>
<td>385 (79.8)</td>
<td>1.7 (1.1-2.6)</td>
<td>1.5 (1.0-2.2)</td>
</tr>
<tr>
<td>Offered a free tobacco product by a tobacco company</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>165 (11.5)</td>
<td>1332 (88.5)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>58 (54.5)</td>
<td>52 (45.6)</td>
<td>8.7 (6.5-11.6)</td>
<td>5.0 (3.7-6.9)</td>
</tr>
<tr>
<td>Exposed to anti-tobacco messages in media</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>69 (18.3)</td>
<td>329 (81.7)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>155 (13.2)</td>
<td>1061 (86.8)</td>
<td>0.6 (0.4-0.9)</td>
<td>0.6 (0.4-0.9)</td>
</tr>
<tr>
<td>Learned about dangers of tobacco at school</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No I don’t know</td>
<td>74 (20.2)</td>
<td>302 (79.8)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>158 (13.3)</td>
<td>1093 (86.7)</td>
<td>0.6 (0.4-0.8)</td>
<td>0.7 (0.5-0.9)</td>
</tr>
<tr>
<td>Believe that people’s smoking is harmful to them</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probably or definitely not</td>
<td>39 (30.2)</td>
<td>92 (69.8)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Definitely or probably yes</td>
<td>192 (13.4)</td>
<td>1302 (86.6)</td>
<td>0.4 (0.2-0.6)</td>
<td>0.6 (0.3-1.1)</td>
</tr>
<tr>
<td>Perception that smoking makes people more comfortable at social gatherings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less comfortable/no difference whether smoking or not</td>
<td>145 (12.8)</td>
<td>1027 (87.2)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>More comfortable</td>
<td>85 (20.8)</td>
<td>352 (79.2)</td>
<td>1.8 (1.2-2.7)</td>
<td>1.4 (0.9-2.3)</td>
</tr>
</tbody>
</table>

OR: Odds ratio, CI: Confidence interval
in previous surveys, boys were significantly more likely to use tobacco than girls. The overall prevalence of tobacco use and current cigarette smoking has not declined since the previous GYTS in 2009.\textsuperscript{[13]} Newer products such as electronic cigarettes, which were assessed for the first time in this survey, are also being used by the youth. Cigarette smoking, the predominant form of tobacco use, has remained unchanged at 11% since the previous two rounds.\textsuperscript{[9,13]} Of concern is the fact that there was an increase in cigarette smoking among girls, from 3.8% in 2009 to 5.2% in this round.

Tobacco use is much higher in Thai schoolchildren compared to their peers in India, Myanmar, Nepal, and Sri Lanka.\textsuperscript{[14]} Thailand has been an example of progressive tobacco control policies and legislations. Yet, cigarette smoking among Thai youth remains high and has not declined in the past decade. There may be several explanations for this. First, cigarettes, particularly “roll your own” cigarettes are inexpensive and affordable in Thailand. Moreover, cigarettes are sold as single sticks or divided packets, which makes it even more easy for students to purchase them. Sale of single cigarettes is a risk factor for smoking among youth. In Malaysia, more than half of the male students surveyed reported that they bought cigarettes as single sticks or in divided packets, and 82% of these students used their school pocket money to purchase cigarettes.\textsuperscript{[15]} Tobacco use among the youth is price-sensitive. Nearly, 40% of students in our study bought single sticks or divided packets, indicating that the price of the cigarettes mattered to them. Second, cigarettes are easily available to the youth at various grocery stores and convenience stores where they are sold illegally to underage children. Despite laws that ban the sale of tobacco products to minors, 67.4% of current smokers could easily buy tobacco products, showing a continuing upward trend, from 38.1% in 2005 to 47.9% in 2009. The proportion of current smokers who were not prevented from buying cigarettes despite being underage also increased from the last two rounds of GYTS; 28.3% in 2005, 38.3% in 2009, and 44.0% in 2015. These data indicate weak enforcement of existing laws and are a major contributor to the continuing high rate of smoking among the youth. Finally, indirect tobacco advertisements and promotion by the tobacco industry are undermining tobacco control in Thailand. In our study, students who were offered a free product by a tobacco company representative were five times more likely to use tobacco than those who were not. Furthermore, students who owned an object with a tobacco logo were more likely to use tobacco. Furthermore, we found that a significant proportion of Thai students is being exposed to pro-smoking media campaigns and tobacco marketing as well as to “point-of-sale” advertisements. These data indicate an urgent need to “de-normalize” tobacco use in society.

The new Tobacco Product Control Act, which was recently passed on March 3, 2017, includes a number of provisions to address some of the above challenges that are undermining tobacco control in Thailand. These include increase in the minimum age of purchase of cigarettes from 18 to 20 years; ban on sale of single cigarettes or divided packets; provision for standard packaging; total ban on advertising, including total ban on display of tobacco product at point of sale; expansion of the scope of definition of tobacco to include e-cigarettes and water pipes; and stricter penalties for noncompliance with the law.

Our survey also shows a number of areas where progress has been made since the previous GYTS. There has been a significant increase in the proportion of children learning about the harms of tobacco use in school from 59.6% in 2009 to 76.2% in this survey. Furthermore, three-quarters of the students reported noticing anti-tobacco messages in the media. Our multivariable analysis shows that learning about dangers of tobacco in school and exposure to anti-tobacco measures in the media protected the youth from smoking. These positive changes may have resulted from the implementation of a number of school-based interventions and policies by the ministries of health and education, along with non-governmental organizations such as ASH Thailand and Thai Health. Furthermore, these agencies have been running hard-hitting anti-tobacco media campaigns. Another positive finding was that exposure to SHS at home or inside any enclosed public place dropped dramatically from 67.6% in 2009 to 38.6% in 2015. Exposure to tobacco smoke at any outdoor public place, which was reported for the first time in this survey, was also similarly low at 37.7%. These findings reflect the impact of the government’s 2010 policy of a total ban on smoking in all public places (including a total ban in schools).

Study limitations and strengths

Our study should be interpreted in the light of at least two limitations. First, the survey questionnaire was self-administered; therefore, the results reflect self-reported data. It is possible that students may have under- or over-reported their behaviors or attitudes. Although we were not able to validate the responses during this survey, studies conducted elsewhere indicate good reliability of the methods.\textsuperscript{[16]} Second, because GYTS is limited to youth attending school only, it may not be representative of all adolescents aged 13–15 years. However, as only a small proportion of Thai youth are out of school at this age, this may not affect the results significantly. Moreover, student response rates were very high, suggesting that bias attributable to absence or nonresponse would be minimal.

Despite these limitations, the survey provides valuable information on a wide range of potential determinants of cigarette smoking among Thai youth and is an important tool for identifying areas that need to be strengthened further. This is a nationally representative survey with a high student response rate that used a robust internationally standardized methodology. The questionnaire and methodology used in this survey were similar to those used in the previous rounds, allowing comparison of findings over time.

Conclusion

The third round of Thailand’s GYTS provides evidence of continuing high use of conventional tobacco products among
Thai youth and the emerging use of electronic cigarettes among youth for the first time. With the recent passage of the landmark new Tobacco Product Control Act, it is an opportune time to step up actions to curb tobacco use among the youth. While the new legislation includes a number of measures to protect youth from smoking, it will be effective only if it is enforced strongly. It is critical to strengthen mechanisms of law enforcement in Bangkok as well as in the provinces, and closely monitor adherence to and compliance with the law. Stringent law enforcement together with improved tax measures and periodic monitoring using GYTS should go a long way in preventing smoking initiation by Thai youth – the key to stopping the tobacco epidemic.

Acknowledgments

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Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES


Effect of a Brief Smoking Cessation Intervention on Adult Tobacco Smokers with Pulmonary Tuberculosis: A Cluster Randomized Controlled Trial from North India

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Abstract

Background: An association between smoking and poor tuberculosis (TB) treatment outcomes has been globally established. Various smoking cessation interventions (SCIs) have been proven worldwide to curb smoking behavior. There is a need for evidence to assess if SCI increases the chance of successful treatment outcome among TB patients. Objectives: To assess the effectiveness of a brief SCI: The Ask, Brief, Cessation support (ABC) package, on treatment outcomes and smoking cessation in smear-positive adult pulmonary TB patients. Methods: A cluster, randomized controlled trial was conducted wherein 17 designated microscopic centers of Chandigarh, India were randomly assigned using a computer-generated randomization sequence to receive SCI within directly observed treatment, short (DOTS) services, or existing standard of care. Eligible and consenting smokers (15 + years) registered as smear-positive pulmonary TB for DOTS (n = 156) between January and June 2013 were enrolled. Smoking cessation (self-reported) was assessed at intervals till the end of treatment. End TB treatment outcomes were extracted from patient records. Results: Treatment success was lower in intervention arm (83.6%) as compared control arm (88.2%), but the difference was statistically insignificant (P = 0.427). Smoking cessation was higher in intervention arm (80.2%) compared to comparison arm (57.5%) (adjusted incidence risk ratio = 1.56; 95% confidence interval = 1.24–1.93; P < 0.0001). Conclusions: SCI is effective in inducing smoking cessation among TB patients. No association of SCI with TB treatment outcomes could be detected.

Key words: Advice, India, smoking cessation, tobacco control, tuberculosis

Introduction

Tuberculosis (TB) is a leading cause of death worldwide, alongside HIV and was responsible for 1.4 million deaths in 2015.[1] India accounts for more than a quarter of the global TB load.[1] As an established risk factor of TB, tobacco smoking has increased substantially over the past three decades, especially in developing countries.[2] The WHO has strongly recommended coordination between national TB and tobacco control programs.[3] Observational studies have shown association between smoking and poor TB treatment outcomes such as increased loss to follow-up rate, increased severity of disease.[2,4-10] So logically drawing from it, smoking cessation efforts should lead to quitting and thus reduce the incidence of unfavorable TB treatment outcomes.

However, Jeyashree et al. in their systematic review had identified no randomized controlled trials to support the effect of smoking cessation on TB treatment outcomes and had stressed the need for the same.[1] The authors hypothesized that smoking cessation intervention (SCI) would be associated with favorable TB treatment outcomes. Hence, among smear-positive pulmonary TB patients in Chandigarh city, India, the present study aims to assess the effect of SCI on smoking cessation and TB treatment outcomes.
Materials and Methods

Study design
This was a two-arm parallel cluster randomized controlled trial.

Study settings
The study was carried out in all the seventeen Designated Microscopy Centre (DMC) under three TB units (TUs) of Chandigarh. DMC is a health facility with TB diagnostic facility through sputum smear examination, catering to a population of 50,000–100,000 which is routinely staffed with a medical officer, TB health visitor (TBHV), and a laboratory technician. Cluster randomization technique was used in the study, and the clusters were defined at the DMC level so as to reduce contamination between clinics. DMCs were randomized based on computer-generated block randomization sequence (block size 4) ensuring equal allocation in both arms.

Study population
All sputum smear-positive pulmonary TB patients, males and females, aged 15 years and above, registered for treatment under Revised National TB Control Program (RNTCP) in two-quarters (January till June 2013) in various DMCs of Chandigarh were the target population in the study. Among those registered, consenting current and occasional smokers ($n = 152$) were enrolled into the study. They were followed up till completion of the study period (i.e., December 2013).

Data collection
TBHV of the intervention DMCs were trained by the investigators to deliver ABC package[11] while those in the control arm continued to provide the existing standards of care for the smokers in their area. Data were collected by two field investigators who were blinded to the allocation of DMCs.

Enrolling tuberculosis patients and classification into smokers and nonsmokers
The smoking history among TB patients was obtained from all smear-positive pulmonary TB patients using a structured questionnaire, and the smokers were thereafter enrolled in the study. Their basic sociodemographic characteristics, prevalence, and smoking history were also obtained.

Follow-up of smokers in two arms
The participants from both arms were followed till the end of 6 months follow-up period. The outcomes for the two arms were analyzed and compared for assessing the effectiveness of the SCI on TB treatment outcomes.

ABC intervention: Ask, brief advice, and cessation support
The intervention by the International Union against TB and Lung Disease (The Union) “Smoking Cessation and Smoke-free Environments for TB Patients 2010” was used in the study. [11] “ABC for TB” is an intervention that guides the health-care provider to Ask about smoking habit, give brief advice on smoking cessation and provide cessation support. It can be delivered by any health-care worker. The intervention is delivered systematically within the existing program activities and can be done within as little as 2–5 min. These services are delivered at the time of registration of the patients and during his/her sputum reexamination visits (2 months, 5 months, end) [Figure 1].

Outcome measures
Treatment outcome (as per WHO 2013 revised guidelines)
Treatment outcomes were recorded as treatment success or treatment failed.

Treatment success was a sum of cured (a pulmonary TB patient with bacteriologically confirmed TB at the beginning of treatment who was smear- or culture-negative in the last month of treatment and on at least one previous occasion) and treatment completed (a TB patient who completed treatment without evidence of failure but with no record to show that sputum smear or culture results in the last month of treatment either because tests were not done or because results are unavailable and on at least one previous occasion were negative). Treatment failed was a TB patient whose sputum smear or culture is positive at month 5 or later during treatment.

Smoking behavior
Smoking cessation was recorded as positive and negative. Smoking cessation was recorded as positive if patient had not smoked at all in the last 2 weeks and negative if patient smoked in the last 2 weeks and did not attempt to quit smoking since their last sputum examination visit (quit attempt was defined patient who tried to quit and succeeded for at least 24 h).

Data analysis
Two key statistical approaches used for the analyses of trial results were “clusterlevel” parametric analysis of summary measures estimated for each cluster and “individual-level” parametric analysis adjusted for clustering at TU level. The intraclass correlation coefficient (ICC) of baseline smoking habit was calculated using Stata (loneway command). At individual-level univariate analysis, Chi-square test was used. Multivariate analyses of incidence risk ratios (IRRs) or simply relative risks for quit of smoking at follow-up in the 2 study arms adjusted for TU-level clustering as well as important covariates were carried out by generalized estimating equations (GEE; using log Poisson as well as binomial regression models with exchangeable correlation and robust variance estimates). The linear mixed model was also used to predict follow-up treatment outcome in the two-study arms adjusted for covariates. Analyses were both per protocol (PP) and intention-to-treat (ITT; latter included all randomized participants). Missing smoking status data on follow-up were imputed by the “last observation carried forward” method. Using two-tailed statistical tests, $P < 0.05$ was taken as statistically significant. Stata version 11.0 (Lakeway Drive, College Station, TX 77845, USA) was used for analyses.

Ethical considerations
Appropriate permissions were taken from the State TB cell Chandigarh to access the data of the TB patients. The data were...
kept confidential with access restricted only to the principal investigator. The trial was ethically approved by the Institute Ethics Committee, PGIMER (Histopath/NK/EC/46-102 DATED 8/1/2013).

RESULTS
There were a total of 17 clusters (DMCs) with 685 smear-positive pulmonary TB patients enrolled from January to June 2013. Of 685, 152 (22.7%) smokers (current daily and occasional smokers) were enrolled to the study. The smokers were assigned in the intervention \( (n = 78) \) and control arm \( (n = 74) \). Postintervention status of smoking could not be done in 13.8% (21/152) subjects—16.6% (13/78) in intervention arm and 10.8% (8/74) in comparison arm [Figure 2]. Nonetheless, baseline characteristics did not differ statistically between subjects with and without missing follow-up data \( (P > 0.05) \) when analyzed by Chi-square.
Goel, et al.: Smoking Cessation Intervention and TB outcome

The test of significance for each variable separately. The ICC was estimated from a one-way random effects model using the analysis of variance method. The mean sum of squares between TU clusters was 0.304, and mean sum of squares within the centers was 0.170, which resulted in an ICC of 0.019 (95% confidence interval (CI) = 0.00–0.050). The majority of participants were males (96.7%), in the age bracket of 30–44 years (37.9%), educated (70.5%), and having some occupation (97.3%). The baseline characteristics of smokers in intervention and control arm did not differ significantly except for the age [Table 1]. Factors determining nicotine dependence in both arms were found to be statistically insignificant, reflecting similar smoking habits in both arms.

**Smoking cessation and treatment outcome**

Treatment outcome was defined as cured ($n = 113$), treatment completed ($n = 6$), treatment failed (failure/on treatment/MDR) ($n = 12$), died ($n = 6$), loss to follow-up ($n = 7$), and not evaluated ($n = 8$). The intervention group reported 83.6% successful outcomes compared to the control group that reported 88.2% successful outcomes. More adverse outcomes were noted in the intervention (11, 16.4%) as compared to the control group (8, 11.8%), but the difference was not statistically significant ($P = 0.427$).

To measure the association between quitting and treatment outcomes, regression model was run between the last status of smoking (noted on month 7 or end sputum examination day) and treatment outcome between the two arms. The association between smoking and treatment outcome was done adjusting for age and nicotine dependence variables to exclude the possibility of confounding by these variables. The

**Figure 2:** Patient flow diagram for cluster trial.
Smoking cessation and intervention

At the end of the treatment, 57 (80.2%) patients in the intervention arm had quit smoking as against 42 (57.5%) in the control arm. After adjusting for confounders such as age, socioeconomic, and nicotine dependence variables [Table 1], the relative risk of quitting on follow-up was significantly higher in the intervention arm as compared to the comparison arm for both PP analysis (adjusted IRR = 1.56; 95% CI = 1.24–1.93; \( P \leq 0.0001 \)) and ITT analysis (adjusted IRR = 1.52; 95% CI = 1.19–1.87; \( P < 0.0001 \)) by GEE analysis with log Poisson regression [Table 2].

It was also found that the percentage of quitters were significantly higher in intervention arm (as compared to comparison arm); after first counseling session (\( P < 0.0001 \)), after second counseling session (\( P < 0.0001 \)), and after third counseling session (\( P = 0.008 \)). Overall, 69.2% (\( n = 54 \)) of smokers had quit and the quit rate increased progressively from the first follow-up to the end of anti-TB treatment.

### Discussion

This is the first randomized controlled trial conducted in India that investigated the effect of a SCI on tobacco smoking behavior and on the treatment outcomes of new smear-positive pulmonary TB patients. The intervention did not affect the treatment outcome of the patient difference in treatment outcome was found to be insignificant between intervention and control arm. This finding could be due to the fact that for an intervention to bring positive treatment outcome, the total time spent for each session should be relatively more. This idea can be verified with the finding from a study done in Rio de Janeiro, Brazil, which stated that a dose–response relationship exists between the length of a session by person-to-person contact and successful treatment outcomes.[12] Repeated brief cessation advice has been shown to be a feasible and inexpensive addition to routine TB case management in this study and others.[13] Basu et al. had also concluded that in spite of evidence that tobacco control may be highly relevant to the future control of TB; such control has not been integrated into most TB control programs.[14]

We also found that the smokers who received SCI were more likely to quit smoking as compared to those who received...
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Table 2: Smoking cessation status among intervention and comparison arm using regression model adjusted for clustering and covariates at individual level

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Generalized estimating equation</th>
<th>Adjusted for age, sex, education, occupation, nicotine dependence variable (Table 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention versus comparison arm</td>
<td>Smoking status at follow-up (per protocol)</td>
<td>IRR 1.56 Robust SE 0.18 P (95% CI) &lt;0.0001 (1.24-1.93)</td>
</tr>
<tr>
<td>Intervention versus comparison arm</td>
<td>Smoking status at follow-up (intention to treat)</td>
<td>IRR 1.52 Robust SE 0.17 P (95% CI) &lt;0.0001 (1.19-1.87)</td>
</tr>
</tbody>
</table>

IRR: Incident risk ratio, CI: Confidence interval, SE: Standard error

standard advice on smoking in TB case management under RNTCP. The findings observed in our study with respect to smoking cessation are consistent with other studies conducted in Bangladesh (82%), Indonesia (66.8%), Sudan (67%), and Malaysia (78%) which has also showed increase in quit percent in TB patients by simplified SCI.[15-18] A study conducted on TB patients in Kerala, India observed that almost one-third patients relapsed among the quitters during the first 4–8 weeks of treatment, unlike our study which had zero relapse during intervention.[19] The high quit rate and absence of relapse during the entire course of treatment in our study may have occurred due to many reasons. First, standardized cessation intervention supplemented with adequate training support to existing health force may have led to positive outcomes in our study. Second, person-to-person delivery of intervention for four or more sessions appeared to be especially effective in increasing abstinence rates. A study in Brazil has also documented that minimal interventions lasting <3 min increases overall tobacco abstinence rates.

A study by Kaur et al. conducted in India found that by offering “brief advice” for tobacco cessation based on five A’s approach advocated by the WHO and the Union, resulted in a quit percentage of 67.3% among smokers at the end of 6 months treatment period from baseline.[20] A cohort of newly diagnosed TB cases was followed up from their discharge after completion of treatment, and it was found that smoking was associated with the relapse of TB with odds ratio = 2.53 (95% CI: 1.23–5.21), even after adjustment for the socioeconomic variables.[10] Although there is lack of evidence on the direct effects of smoking cessation on TB treatment outcomes, available data suggest that smokers are less adherent to TB treatment, and thus at higher risk for default and persistent infectivity.[16,21]

We found that there was not much difference observed in the percentage of quitters from month 5 till the end of treatment in the intervention arm. This could be because of the fact that repeated reinforcements on quitting are most effective during the initial period of treatment. None of the sociodemographic factors contributed as a factor to quit smoking which is unlike the findings of many other studies where high socioeconomic status, high family income, literacy, and sex are potential determinates for quit attempts of tobacco.[22-24]

The treatment success was found to be higher among quitters (74.7%) as compared to smokers (25.2%) in the present study; the difference was found to be significant. Merely, one study documented that advising patients with TB to stop smoking also help them to complete their TB treatment and to respond better to that treatment.[25]

Strengths
The study was conducted under routine program conditions, and the wide coverage with disaggregated data of patients registered in RNTCP of an entire Union Territory makes the study conditions representative of programmatic conditions in India. Second, the study used robust methodology, which included predefined operational definitions for the study population and variables, and also adhered to CONSORT guidelines for conducting and reporting on randomized controlled trials. Third, involvement of health workers throughout the treatment of patients helped in sustenance of smoking cessation care within RNTCP. The intervention is not time or resource intensive as it can be done by existing health-care staff in routine settings. All health centers were located in the community which made the informal visits of health workers to monitor progress easier.

Limitations
In intervention arm, we approached family members to ascertain whether patient quit smoking or not, however in control arm we just relied on the response of the patient. This may be the reason of over reporting of quit percent in control arm. Smokeless tobacco users were excluded from the study. While the sample size was adequate to detect an association between SCIs and smoking cessation, the power of the study to detect an existing association between SCI and TB treatment outcome was small.

Conclusions
Interventions such as “ABC intervention” that are based on the principal of stepped approach of health education have proved to be useful in reducing smoking practices among smokers and should be recommended as a part of national TB control programs.

Financial support and sponsorship
The study was supported by North Zonal Task Force on Tuberculosis, India.

Conflicts of interest
There are no conflicts of interest.
REFERENCES

Tobacco Use among Young Adolescents in Myanmar: Findings from Global Youth Tobacco Survey

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Abstract
Background: Tobacco consumption among youths poses significant public health problem in developing countries. This study utilized the available data of Global Youth Tobacco Survey (GYTS) to assess the prevalence of tobacco use among Myanmar adolescents. Objectives: We have conducted the fourth round of the GYTS in Myanmar during 2016 to monitor trends in tobacco use. Methods: We have selected 51 schools using random sampling based on probability proportional to school enrollment. In each school, we selected grades 9–11 by random sampling. All students in these classes completed a self-administered standard questionnaire. Results: A total of 3633 students who were participated in the survey 2621 students were 13–15 year. Overall 13.6% of students currently used tobacco; boys 26.3% and girls 3.7%. The prevalence of current cigarette smoking was 8.3%; boys 17.0%, girls 1.5%, whereas 5.7% of students currently smokeless tobacco users; boys 11.0%, girls 1.5%. Exposure to secondhand smoke (SHS) at home, in enclosed public places, and school was reported by 33.2%, 28.4%, and 64.5%, respectively. More than four out of 5 (83.4%) students had noticed someone using tobacco on television, videos or movies, and 42.3% had noticed tobacco advertising at points of sale. Among current smokers, 62.9% were not refused by purchasing cigarettes because of their minor age. Conclusion: Myanmar has higher prevalence of tobacco use among students, especially among boys. The study provides evidence-based information for developing comprehensive tobacco control programs – both education and policy interventions to reduce smoking rate among young people in Myanmar.

Key words: Adolescents, cigarette smoking, Global Youth Tobacco Survey, Myanmar, secondhand smoke, smoking pattern, tobacco prevalence

INTRODUCTION
Tobacco use by adolescents remains a major public health concern worldwide, and some evidence suggested that the majority of smokers, who begin using tobacco products before the age of 18 years, continue to be permanent smokers.[1] Tobacco smoking is a preventable public health problem which leads to premature deaths worldwide.[2] Adolescence is the phase of transition from a “child” into an “adult.” It is also a period of change in a person’s way of thinking. Smoking is a lifestyle habit which is associated with morbidity and mortality. It is therefore important to determine the factors associated with cigarette smoking in this age group to institute preventive measures and health policies to protect these adolescents early.

The Global Youth Tobacco Survey (GYTS) is a systematic youth survey among 13–15-year-old school going students. Myanmar systematically monitored tobacco use among youth and conducted four rounds of GYTS since 2004.[3] The data points from these rounds used to compare tobacco use prevalence among youth and gave an evidence support which needed for policy formulation and implementation to better control of tobacco use.

This study aims to use data from different rounds of GYTS conducted in Myanmar to determine the prevalence of tobacco use among young adolescents, secondhand tobacco smoke

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exposure, initiation of tobacco use, accessibility and use of tobacco pattern, and knowledge of the harmful effects of smoking in these adolescents.

**Materials and Methods**

In 2016, Myanmar has conducted their fourth round of GYTS. The survey was cross-sectional among aged 13–15 years corresponding to grades 9–11. Two-stage stratified sampling methodology used to produce a representative sample of students for all over the country. In the first stage, 51 schools have been selected in 12 states and divisions using probability proportional based on the size of school enrollment and schools having <40 students were excluded. At the second stage, classes have been selected by systematic sampling with a random start. All students in the selected class were invited to undertake the survey irrespective of age. Out of 3633 students from 70 selected classes, 2621 students were included in this study as they were belonged to age group of 13–15 years (44.4% of boys and 55.6% of girls).

The survey used standard core questionnaires with a set of optional questions. The questionnaires covered tobacco use (smoked and/or smokeless); cessation; secondhand smoke (SHS); pro- and anti-tobacco media and advertising; access to and availability of tobacco products; and knowledge and attitudes regarding tobacco use.

“Ever user” was defined who had ever used any tobacco product even once in the lifetime, while a “current use” was defined as the use of tobacco product in the past 30 days preceding the day of survey. Tobacco use included smoking cigarettes, cheroot, cigar and pipe and use of smokeless tobacco, such as tobacco leaf, hsay hsay, hsay paung, chewing tobacco leaf or applying tobacco.

Data were analyzed using SUDAAN Ver. 9.0 (Research Triangle Park, NC, United States), which computed standard errors of the prevalence estimates and produced 95% confidence intervals. A weighting factor was applied to each student record to account for nonresponse by school, class, and student, and probability of selection at the school and class levels. The school and class response rate were 100%, and the student response rate was 95.5%. Thus, the overall response rate was 95.5%.

**Results**

**Tobacco use**

The overall current cigarette smoker rate (the weighted percentage of respondents who reported having smoked a cigarette any time during the previous 30 days) showed an increased that was not statistically significant from 4.9% in 2007 to 8.3% in 2016. Among males, the rates were statistically significant increased to double from 8.5% in 2007 to 17% in 2016. Rates of ever cigarette smoking (ever taking a puff on a cigarette) significantly increased from 14.7% in 2007 to 22.3% in 2016, and moreover, among males, the rate increased nearer to double from 23.4% in 2007 to 41.1% in 2016. In addition, the overall rates for frequent cigarette smoking (smoking on 20 or more days of the previous 30 days) in 2016 were 0.6% and 1.1% among males.

The overall smokeless tobacco user rate was 6.5% in 2007 and 5.7% in 2016, a decrease that was not statistically significant and remained higher among males than females.

The tobacco use rate (either smoked or smokeless) also showed a decrease that was not statistically significant, from 15.3% in 2007 to 13.6% in 2016, and remained higher among males than females. The overall ever tobacco users (ever taking either smoked or smokeless) were more than double to current tobacco users in 2016.

The overall current tobacco smoking rate (any tobacco smoking product) is significantly higher among males (21.1%) than females (2.4%). Overall ever tobacco smokers (27.3%) were almost triple from current tobacco smokers (10.6%) in 2016, whereas it was more than double in boys (46.2% vs. 21.1%) and five times more in girls (12.2% vs. 2.4%).

The overall current tobacco smoking other than cigarette rate (e.g., cheroot, cigar, and pipe) has decreased, from 10.1% in 2007 to 4.1% in 2016. Among males, the rates were decreased from 14.1% in 2007 to 7.5% in 2016; among females, the rates were decreased 6.2% and 1.3%, respectively [Table 1].

**Exposure to secondhand smoke (SHS)**

Exposure to SHS at home, inside enclosed public place, and any outdoor public place were reported by student 33.2%, 28.4%, and 29%, respectively, in 2016. Importantly, three in five (64.5%) students saw anyone smoking inside school or near to school premises [Table 2].

**Initiation of tobacco smoking, accessibility of tobacco, and smoking pattern**

In 2016, overall around two in five students who were ever cigarette smokers reported that they first tried a cigarette at the age of <10 years. Mostly, two in five (40.8%) students initiated cigarette smoking between aged 12 and 13 years followed by 30.9% of students started between aged 14 and 15 years. Over half of (58.4%) students smoked less than one cigarette a day. More than one-fourth (27%) of the students responded that they used to smoke one cigarette per day followed one in ten students reported 2–5 cigarettes per day. The accessibility of cigarettes and other tobacco products increased and become more than double from 23.7% in 2007 to 54.5% in 2016. Tobacco products seem easily available in Myanmar because 38.8% of students reported that they purchased cigarettes from a street vendor. Importantly, more than half (62.9%) current cigarette smokers not prohibited from buying cigarette though they were minors. Three in five (61.9%) current cigarette smokers purchased loose cigarettes as individual sticks [Table 3].

**Exposure to pro- and anti-tobacco messages, knowledge, and thinking about tobacco use**

Over two in five (42.3%) students who visited and noticed tobacco advertisement at the point of sale and over four in five (83.4%) students who watched television, videos, and movies and saw anyone who was smoking. On the
Table 1: Prevalence of tobacco use among students aged 13-15 years, by gender, Global Youth Tobacco Survey, Myanmar, 2007 and 2016

<table>
<thead>
<tr>
<th>Attributes</th>
<th>2007</th>
<th>Percentage (95% CI) (n=sample size)</th>
<th>2016</th>
<th>Percentage (95% CI) (n=sample size)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall</td>
<td>Males</td>
<td>Females</td>
<td>Overall</td>
</tr>
<tr>
<td>Currently use any tobacco product</td>
<td>15.3 (12.4-18.7)</td>
<td>22.5 (18.1-27.4)</td>
<td>8.2 (5.9-11.3)</td>
<td>13.6 (11.2-16.3)</td>
</tr>
<tr>
<td>Ever used any tobacco products</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>31.4 (26.8-36.5)</td>
</tr>
<tr>
<td>Currently smoke any tobacco product</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>10.6 (8.5-13.1)</td>
</tr>
<tr>
<td>Ever smoked any tobacco products</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>21.7 (23.3-31.1)</td>
</tr>
<tr>
<td>Current cigarette smokers</td>
<td>4.9 (3.6-6.5) (1889)</td>
<td>8.5 (6.2-11.6) (838)</td>
<td>1.3 (0.6-2.6) (1040)</td>
<td>8.3 (6.4-10.5) (2534)</td>
</tr>
<tr>
<td>Ever cigarette smokers</td>
<td>14.7 (11.5-18.6) (1927)</td>
<td>23.4 (17.9-30.1) (865)</td>
<td>6.3 (4.8-8.2) (1051)</td>
<td>22.3 (18.8-26.2) (2571)</td>
</tr>
<tr>
<td>Frequent cigarette smokers(^{b})</td>
<td>0.4 (0.2-0.9) (1889)</td>
<td>0.7 (0.3-1.6) (838)</td>
<td>0.1 (0.0-0.7) (1040)</td>
<td>0.6 (0.3-0.9) (2534)</td>
</tr>
<tr>
<td>Currently smoke tobacco products other than cigarettes</td>
<td>10.1 (7.9-12.9) (2005)</td>
<td>14.1 (10.8-18.2) (902)</td>
<td>6.2 (4.3-8.7) (1091)</td>
<td>4.1 (3.0-5.5) (2561)</td>
</tr>
<tr>
<td>Currently use smokeless tobacco product(^{c})</td>
<td>6.5 (5.1-8.3) (1993)</td>
<td>10.3 (7.7-13.5) (899)</td>
<td>2.7 (1.9-3.9) (1082)</td>
<td>5.7 (4.5-7.2) (2572)</td>
</tr>
</tbody>
</table>

Overall sample size may be different from adding up of males and females as some students not responded their gender in the survey. *0.07% chewed tobacco or sniff on 1 or more days of the past 30 days/2016 number of respondents who used any smokeless tobacco products in the past 30 days, **Who smoked cigarettes on 20 or more days of the past 30 days. NA: Indicator was not included in survey, CI: Confidence interval.
2011–54.5% in 2016. The percentage of students who not prevented from buying cigarettes because of their minor age also become high as three students out of five reported that they were not stopped to buy cigarettes. More than half of current smokers were able to buy the individual sticks which mean tobacco laws need to be reinforced.

The national survey of diabetes mellitus and risk factors for noncommunicable diseases (NCDs) in Myanmar shows about 44% of current smokers tried to quit smoking. This survey was done among adults aged 25–64 years in 2014.[5] The GYTS 2016 revealed that 74.5% current smokers tried to stop smoking in the past 12 months. The attempts of trying to stop smoking are higher in youth than adult which is good sign. However, less than half current smoker received help or advice from a program or professional to stop smoking. This shows that the cessation services and clinic should be feasible and accessible to the young generation in the country. Apart from that training for tobacco cessation to all the level of health-care providers and the tobacco cessation topic should include in the curriculum of all health-care course.

According to the GYTS results, over one-third of students are exposed to tobacco smoke at home and it is constantly same since 2001. However, exposure to tobacco smoke at public place has decreased. This shows that law implemented effectively, but still the awareness on harmful effects of SHS should be increase to save youth at home.

Myanmar signed the directive in 2016 to increase the size of health warning signs on tobacco packs to 75% and it is implementing.

### Table 2: Prevalence of secondhand smoke among students aged 13-15 years, by gender, Global Youth Tobacco Survey, Myanmar, 2016

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Percentage (95% CI) (n=sample size)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall (n=521)</td>
</tr>
<tr>
<td></td>
<td>Males (n=436)</td>
</tr>
<tr>
<td></td>
<td>Females (n=82)</td>
</tr>
<tr>
<td>Exposed to tobacco smoke at home during the past 7 days</td>
<td>33.2 (28.2-38.5) (2617)</td>
</tr>
<tr>
<td></td>
<td>37.7 (32.3-43.4) (1157)</td>
</tr>
<tr>
<td></td>
<td>29.5 (24.1-35.6) (1457)</td>
</tr>
<tr>
<td>Exposed to tobacco smoke in enclosed public place during the past 7 days</td>
<td>28.4 (24.6-32.5) (2614)</td>
</tr>
<tr>
<td></td>
<td>32.8 (27.7-38.4) (1154)</td>
</tr>
<tr>
<td></td>
<td>24.8 (20.7-29.4) (1457)</td>
</tr>
<tr>
<td>Exposed to tobacco smoke at outdoor public place during the past 7 days</td>
<td>29.0 (24.5-34.0) (2599)</td>
</tr>
<tr>
<td></td>
<td>34.3 (29.2-39.9) (1143)</td>
</tr>
<tr>
<td></td>
<td>24.8 (19.8-30.6) (1453)</td>
</tr>
<tr>
<td>Saw anyone smoking inside the school building or outside on school property in the past 30 days</td>
<td>64.5 (59.8-69.0) (2614)</td>
</tr>
<tr>
<td></td>
<td>55.7 (50.5-60.7) (1154)</td>
</tr>
<tr>
<td></td>
<td>71.6 (65.1-77.3) (1457)</td>
</tr>
</tbody>
</table>

Overall sample size may be different from adding up of males and females as some students not responded their gender in the survey. CI: Confidence interval

### Table 3: Initiation of tobacco smoking, accessibility of tobacco and smoking pattern among students aged 13-15 years, by gender, Global Youth Tobacco Survey, Myanmar, 2016

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Percentage (95% CI) (n=sample size)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall (n=521)</td>
</tr>
<tr>
<td></td>
<td>Males (n=436)</td>
</tr>
<tr>
<td></td>
<td>Females (n=82)</td>
</tr>
<tr>
<td>Initiation age of tobacco smoking (years) among ever cigarette smokers</td>
<td></td>
</tr>
<tr>
<td>&lt;10 years</td>
<td>17.2 (13.0-22.5)</td>
</tr>
<tr>
<td></td>
<td>15.3 (11.0-20.9)</td>
</tr>
<tr>
<td></td>
<td>28.3 (15.6-45.6)</td>
</tr>
<tr>
<td>10 or 11 years old</td>
<td>11.1 (8.4-14.5)</td>
</tr>
<tr>
<td></td>
<td>9.7 (6.7-14.0)</td>
</tr>
<tr>
<td></td>
<td>17.3 (9.3-30.0)</td>
</tr>
<tr>
<td>12 or 13 years old</td>
<td>40.8 (35.6-46.1)</td>
</tr>
<tr>
<td></td>
<td>41.4 (36.6-46.4)</td>
</tr>
<tr>
<td></td>
<td>38.1 (27.0-50.6)</td>
</tr>
<tr>
<td>14 or 15 years old</td>
<td>30.9 (25.1-37.4)</td>
</tr>
<tr>
<td></td>
<td>33.6 (26.9-41.0)</td>
</tr>
<tr>
<td></td>
<td>16.3 (7.1-33.2)</td>
</tr>
</tbody>
</table>

**Access and availability (among current cigarette smokers who obtained the cigarettes they last smoked during last 30 days)**

<table>
<thead>
<tr>
<th></th>
<th>Percentage (95% CI) (n=sample size)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchased cigarette from street vendor</td>
<td>38.8 (62.3-45.8) (182)</td>
</tr>
<tr>
<td></td>
<td>40.6 (33.3-48.4) (162)</td>
</tr>
<tr>
<td></td>
<td>23.6* (19)</td>
</tr>
<tr>
<td>Purchased cigarette from a store, shop, or street vendor</td>
<td>54.5 (47.3-61.5) (182)</td>
</tr>
<tr>
<td></td>
<td>54.7 (46.3-62.9) (162)</td>
</tr>
<tr>
<td></td>
<td>48.7* (19)</td>
</tr>
<tr>
<td>Not refused because of their minor age</td>
<td>62.9 (51.4-73.0) (139)</td>
</tr>
<tr>
<td></td>
<td>64.7 (52.4-75.3) (122)</td>
</tr>
<tr>
<td></td>
<td>46.7* (17)</td>
</tr>
<tr>
<td>Purchased cigarettes as individual sticks (singles)</td>
<td>61.9 (52.8-70.2) (142)</td>
</tr>
<tr>
<td></td>
<td>65.3 (54.0-75.2) (124)</td>
</tr>
<tr>
<td></td>
<td>35.6* (17)</td>
</tr>
</tbody>
</table>

**Access and availability (among current cigarette smokers who obtained the cigarettes they last smoked during last 30 days)**

<table>
<thead>
<tr>
<th></th>
<th>Percentage (95% CI) (n=sample size)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking pattern (among current cigarette smokers)</td>
<td></td>
</tr>
<tr>
<td>&lt;1 per day</td>
<td>58.4 (50.4-66.0)</td>
</tr>
<tr>
<td></td>
<td>55.7 (47.6-63.5)</td>
</tr>
<tr>
<td></td>
<td>81.9*</td>
</tr>
<tr>
<td>1 per day</td>
<td>27.0 (21.5-33.4)</td>
</tr>
<tr>
<td></td>
<td>28.6 (22.5-35.6)</td>
</tr>
<tr>
<td></td>
<td>13.0*</td>
</tr>
<tr>
<td>2-5 per day</td>
<td>10.4 (7.0-15.2)</td>
</tr>
<tr>
<td></td>
<td>11.0 (7.5-15.9)</td>
</tr>
<tr>
<td></td>
<td>5.1*</td>
</tr>
<tr>
<td>6 or more per day</td>
<td>4.1 (2.0-8.6)</td>
</tr>
<tr>
<td></td>
<td>4.6 (2.2-9.5)</td>
</tr>
<tr>
<td></td>
<td>0.0*</td>
</tr>
</tbody>
</table>

Overall sample size may be different from adding up of males and females as some students not responded their gender in the survey. *CI not calculated because <35 cases. CI: Confidence interval.
Tobacco use is the major risk factor for NCDs and rising of diseases, diabetes, and chronic respiratory diseases) is 24%. and 70 years) due to four major NCDs (cancers, cardiovascular\npremature mortality (the probability of dying between age 30\nwhere 59% of total deaths are estimated due to NCDs. The\nMyanmar is also one of the countries with high NCDs burden\nstudents were in favor of banning smoking at public places.\npeople’s tobacco smoking is harmful to them and almost all\nof tobacco use as near to two-third of the students thought other\nWeakness of the enforcement of the tobacco law.
This is also the reflection of the\nand four in five students noticed tobacco advertisement at points of sale\nPromotion by the tobacco industry. More than two in five\nAttributes

Table 4: Exposure to pro- and anti-tobacco messages, knowledge, and attitudes toward tobacco use and smoking\nceSSION

implementation. Myanmar still needs to follow the commercial\ntax law which was legalized in 1990. At the time of the\nimplementation of the pictorial health warnings, the amendment of\nthe control of smoking and consumption of tobacco product\nand commercial tax law should be the priority areas for the\ngovernment to reduce the tobacco prevalence.

The study found that a significant proportion of students are\nbeing exposed to pro-smoking media campaigns and tobacco\npromotion by the tobacco industry. More than two in five\nstudents noticed tobacco advertisement at points of sale\nand four in five students noticed anyone using tobacco on\ntelevision, videos, or movies. This is also the reflection of the\nweakness of the enforcement of the tobacco law.

The survey also shows that students are aware of harmful effects\nof tobacco use as near to two-third of the students thought other\npeople’s tobacco smoking is harmful to them and almost all\nstudents were in favor of banning smoking at public places.

Myanmar is also one of the countries with high NCDs burden\nwhere 59% of total deaths are estimated due to NCDs. The\npremature mortality (the probability of dying between age 30\nand 70 years) due to four major NCDs (cancers, cardiovascular\ndiseases, diabetes, and chronic respiratory diseases) is 24%.[7]\n
Tobacco use is the major risk factor for NCDs and rising of

Conclusion

Undoubtedly, smoking behavior among adolescents in\nMyanmar is associated with some determinant factors such
as availability of tobacco product, easy access, or lack of preventive laws and other factors such as family and peer smoking. Despite the known health problems associated with tobacco use through family health education and anti-smoking messages, young people in country continue to initiate and develop regular patterns of tobacco use.

School-based interventions and tobacco education are necessary to prevent initiation and cessation of tobacco use. Legislations related to tobacco control should be enforced to decrease availability, accessibility, and affordability of tobacco products. Social norms of tobacco use among parents and others at home as well as at public place should be modified to curb the tobacco use among school students.

Prohibiting initiation of cigarette smoking among young people is crucial because the earlier the age of smoking, the probability of nicotine addiction is higher. To meet reduced prevalence of NCDs and meet a 30% relative reduction in the prevalence of current tobacco use in persons aged 15+ years by 2025, reducing the prevalence of cigarette smoking among youth are crucial, and therefore, Myanmar should accelerate its comprehensive tobacco control activities.

This is very alarming because youth tobacco use causes not only immediate damage but also long-term bad consequences. The earlier the age of tobacco use, the more likely that they will be addicted, especially nicotine addiction.\(^{[10]}\)

Therefore, the control of using tobacco products in school youths needs to be prioritized for adolescent health and tobacco control.

**Strengths and limitations of study**

The major strength is dataset used is a nationally representative, which was specifically designed to collect tobacco survey among young people in Myanmar. This study can be generalizable to the young population in the same age with tobacco use in Myanmar. Our analysis highlights the importance of implementation of national tobacco law to support education and behavioral change interventions. However, our research has some limitations. One limitation has been the type of study, which is a cross-sectional study that allows us to only analyze the association, but not the cause and effects. Another limitation has been the potential of recall bias due to the data are self-reported and not including out of school students.

**Acknowledgments**

The authors acknowledge the guidance of Director General and Deputy Director General of Department of Public Health of Ministry of Health and Sports Myanmar and collaboration and technical support of the World Health Organization (Myanmar country office and SEARO) and financial and technical support of the Centers for Disease Control and Prevention (CDC), Atlanta, United States. The authors sincerely thank to the students, teachers, and field workers who helped contribute to the survey.

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Nil.

**Conflicts of interest**

There are no conflicts of interest.

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1. Preventing Tobacco Use Among Young People: A Report of the Surgeon General (Executive Summary), MMWR 43(RR-4);1-10; Centers for Disease Control and Prevention. Available from: [https://wonder.cdc.gov/wonder/prevguid/m0030927/M0030927.asp. [Last accessed on 2017 Jun 13].


Opening Gambit: Strategic Options to Initiate the Tobacco Endgame

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Summary

Endgame strategies to rapidly hasten the decline of tobacco are already well within reach; a few plausible policy options are outlined herein for policy practitioners, tobacco control advocates, and public health specialists. The implementation of these measures which already exist within the gamut of existing legislation requires the galvanization of political will. The options we essay include liquidating existing public investments in tobacco, holding tobacco companies accountable within the jurisdictions of their operations, fixing liability for injury and the imposition of realistic costs on insurance providers.

Key words: Endgame, tobacco control, tobacco epidemic

INTRODUCTION

In chess and other tactical games, a gambit (from early Italian gambetto, meaning “to trip”) is the opening move in which a player uses strategies to gain an advantageous position. The efforts of tobacco control advocates and the tobacco industry is an evolving game of strategies with each trying to outwit the other. The price paid of course is very real and is in terms of lives lost prematurely, several generations wasted, and hidden economic costs that are borne by governments, tax payers, and the public at large. With each new initiation into tobacco use and a build-up of lifetime addicts of tobacco contribute to tobacco industry’s ever increasing profits. Governments too perversely benefits from the tax they exact from the tobacco industry and tobacco users. Several countries with progressive tobacco control programs have offered insight on how a package of policies on tobacco control can work. To this end, six evidence-based policies were put together and launched in New York City by the WHO on February 7, 2008, and called MPOWER, which has since become an internationally-applicable and recognized package of essential tools for tobacco control. Tobacco industry in the meanwhile has continued its nefarious games to perfidiously sell its noxious products to underage and vulnerable populations and has launched a series of new products to entice users.

Since 2010, several countries with mature tobacco control programs have proposed an “endgame” for tobacco use. These comprise several alternative futures. Countries that have proposed endgame strategies include New Zealand, Singapore, Australia, Norway, and Finland, some states within countries like Tasmania in Australia. Certain preconditions are needed for a serious consideration of endgame policy proposals. Typically, endgames are plausible for countries where existing prevalence has historically been low or where there has been a sharp decline in tobacco use in recent years, and where there is public support and demonstrated political commitment to reduce tobacco use. A range of options has been suggested, from eliminating tobacco production and distribution by finding alternative crops to tobacco and supporting alternative livelihoods for those employed in the tobacco sector.

Such recommendations are politically challenging and difficult to implement, but new strategies including tobacco-free generations and the elimination of the...
production and distribution of tobacco products\textsuperscript{[2]} have been proposed in countries with a low prevalence of tobacco use. While there are many options on the table at the tactical level, planning an effective end game will need to examine and disentangle existing relationships between the tobacco industry and the national economy. This is an essential departure point for any end game as it forecloses spaces of interdependence, collaboration (direct/indirect), and collusion (explicit/tacit) between the state and industry. This will avoid conflicts of interest, lead to coherent policies that prioritize public health over commercial profit, needed to anticipate, and counter any number of the devious measures that tobacco industry will deploy to undermine endgame efforts. Governments need to scrutinize and dissolve the links between their economies and the tobacco industry before adopting policies that will actually lead to elimination tobacco use.

**STOP PUBLIC INVESTMENT IN TOBACCO**

Tobacco companies have always had easy access to capital, being highly profitable entities. Governments continue to furnish tobacco companies with valuable capital through subsidies and investments (directly or through bonds or pensions) as well as tax incentives. This is a veritable “tragedy of the commons” situation: Monies from the public treasury are used for industry to produce a substance that the public consumes (tobacco), the use of which results in health costs collectively that are imposed on the national economy and the exchequer. This is reprehensible. As a first step, governments must stop investing in tobacco cultivation and industry, and plan disinvestments from tobacco companies. This will signal that it may no longer be profitable for private investors to invest in the industry. Donors and socially responsible investing institutions should ensure that their monies do not support the tobacco industry in any way\textsuperscript{[3]} and eliminate conflicts of interest.\textsuperscript{[4,5]} It is a fact that even public health orientated multilateral institutions functioning at the level of the United Nations have, until very recently, actually invested in tobacco-related projects. Governments continue to benefit from tobacco companies either as promoters, investors, shareholders or through management participation (exceptions include New Zealand and Norway). To put it plainly, it is time to de-normalize investment in tobacco. Countries considering end games must lead the way. In 2015, a new nonprofit initiative has taken on a mission “to inform, prioritize and advance tobacco-free investment by eliminating tobacco from investment portfolios across the globe,”\textsuperscript{[6]} and as of August 2016, according to the British newspaper the guardian, “had already persuaded 35 Australian superannuation funds, as Australians call their private pension funds, controlling nearly half the total funds under management to shun tobacco.”\textsuperscript{[7]}

**FIX LIABILITY FOR INJURY**

According to the Oxford Medical Companion (1994), tobacco is the only legally available consumer product which kills half its users when used entirely as intended by the manufacturer. Despite this, few countries have been able to hold tobacco companies responsible for the deaths caused by their deadly products, which continue to be sold widely. Since both legal systems and underlying philosophies vis-a-vis liability differ across countries and often are uneven with regard to the degree of compensation to victims for the loss of life and injury, this remains a challenge for tobacco control. Many developed countries have successfully initiated litigation against tobacco companies to pay for deaths and disease, but this is yet to happen in developing countries.

Ironically, some tobacco companies based in developing countries pay for damages in developed countries, while not doing so in their parent state. Since 1999, for example, India’s largest cigarette maker, ITC, has been paying more than one million dollars to the US government toward health damages under the Master Settlement Agreement and another million dollars toward their tobacco buyout program.\textsuperscript{[8]} Unfortunately, government-owned insurance companies in India are major stakeholders in tobacco companies like ITC. They continue to benefit from tobacco companies either as promoters, investors, shareholders, or management participation.

However, there is a glimmer of hope. In April 2014, South Korea’s national insurer sued the two largest private cigarette makers and the government-owned domestic cigarette maker to offset treatment costs for smoking-related illness.\textsuperscript{[9]} Litigation such as that initiated in South Korea no longer needs to be an exception but must become the rule in developing countries too. This is urgent – tobacco companies are investing in low- and middle-income countries to take advantage of the youth demographic and to capture this market for many years to come. This form of litigation has the potential to send a strong message to people, investors, and markets that tobacco is a toxic asset.

**HOLD TOBACCO COMPANIES ACCOUNTABLE WITHIN THE COUNTRIES WHERE THEY OPERATE**

The sale and use of tobacco industry products typically cause death in country A due to direct consumption, but the industry moves profits from country A to country B – due to lax enforcement at various levels. Capital mobility made possible by financial globalization is a phenomenon known as transfer pricing and is a common strategy of multinational companies in other sectors of the economy. Tobacco companies are also aggressive at tax avoidance. British American Tobacco, for example, owns over 200 companies in tax havens.\textsuperscript{[10]} At this stage, it may be too much to expect a global consensus for harmonized global accounting standards that require companies to break down their accounts on a country-by-country basis, improve transparency, and reduce capital flight. Nevertheless, there is a need for political will to arrest capital flight from sales of tobacco from poor and developing countries.
**Impose Real Costs on Insurance Providers for the Real Costs of Tobacco**

Tobacco use takes away many productive years from individuals, firms and therefore a country’s entire population. A 2013 study found that in the United States, the difference in terms of annual health insurance premiums for insuring a smoker as opposed to a nonsmoker is estimated to be $5816.[11] This difference reflects the actual health costs that will be incurred due to tobacco use but will necessarily be borne by public resources.

However, this reality is rarely reflected in the actual policies sold and premium collected. While insurance companies fix premium prices for smokers and nonsmokers differently, collusion between insurance companies, firms, and employees ensures that many smokers hold policies with premium on par with those covering nonsmokers.[12] This underpricing causes a market distortion, ultimately imposing costs on the public health system. Such a scenario requires the intervention of the state or a regulator to ensure that accurate costs are built into the processes of risk-assessment and sale of policies in the insurance marketplace. Clearly, a fair risk-assessment process is not only economically efficient but also reduces moral hazard and adverse selection.

The strategies we present here confront the strengths of the tobacco industry which operate at a structural level – their enormous financial clout and their deceptive goodwill with governments, institutions, and investors. To truly make tobacco history will require bold steps by governments especially those in developing countries. These will need to be in terms of policies that will make structural shifts in the market and influence behavior of its people. These policy steps often require the equivalent of incremental policy innovation with variations on existing themes using existing legislation from the policymakers’ menu of existing options. Creative extensions of legislation, backed up by strong political will and transparent processes to upgrade the importance of public health issues and doing so publicly, will prove effective. In countries like India, the demographic dividend stands to be compromised without bold measures such as the implementation of policies that lead to an endgame for tobacco.

**Financial support and sponsorship**
Nil.

**Conflicts of interest**
There are no conflicts of interest.

**References**

Gynecological effects due to smokeless tobacco exposure are not well studied. This cross-sectional study was undertaken with the objective to evaluate the urinary cotinine levels in women of reproductive age with gynecological complaints. The study was conducted in 2015 at the outpatient clinic of the Department of Obstetrics and Gynecology, University College of Medical Sciences and Guru Teg Bahadur Hospital, Delhi. A total of 192 consecutive women presenting with gynecological complaints (pelvic inflammatory disease (PID), infertility, and menstrual abnormality) were recruited. Their demographic details and tobacco exposure were recorded. All of them denied exposure to any form of tobacco. Urinary cotinine level of each participant was measured. The mean urinary cotinine level was 23.60 ± 12.00 ng/ml. PID was the most common gynecological complaint. Women with PID had significantly higher urinary cotinine levels compared to those with menstrual complaints and infertility: 24.9548 (±12.259) ng/ml versus 20.2042 (±10.9248) ng/ml. This study highlights the importance of addressing the issue of secondhand smoke exposure and reproductive morbidities in women.

Key words: Abnormal uterine bleeding, infertility, pelvic inflammatory disease, secondhand smoke, smokeless tobacco, urinary cotinine, women
women of reproductive age residing in East Delhi who sought treatment from gynecological outpatient clinic of Guru Teg Bahadur Hospital. The hospital caters to patients living in urban slums in Nand Nagri, Seema Puri, and Seelampur. The population density in these areas is very high, with congested living conditions. Majority belong to low-income group.

This was an exploratory study to assess the urinary cotinine levels in women with common gynecological conditions to provide a background for future well-planned studies to evaluate any association.

This cross-sectional pilot study was conducted in January 2015 at the outpatient clinic of the Department of Obstetrics and Gynecology, University College of Medical Sciences and Guru Teg Bahadur Hospital, New Delhi.

A sample size of 192 was planned after taking into account the available finance. Approval was obtained from the Institutional Ethical Committee. A total of 192 consecutive women presenting at gynecological clinic were recruited for the study over 5 days. After obtaining written informed consent, each participant was interviewed for demographic details and tobacco use or exposure (any form) in self or family members based on a preset pretested questionnaire. The gynecological complaint necessitating hospital visit was also recorded. Spot urine sample was collected in a clean dry 100 ml plastic container for quantitative estimation of cotinine. The sample was maintained at room temperature. Urinary cotinine was measured by the ELISA technique (Calbiotech Cotinine ELISA Kit) within 4 h of sample collection at the Department of Biochemistry, University College of Medical Sciences, which is attached to the hospital. The study was conducted from part funds received from the World Health Organization for a project related to urinary cotinine estimation in pregnant women.10

Pelvic inflammatory disease (PID) was diagnosed based on syndromic approach, i.e., pain lower abdomen with one of the following – cervical motion, uterine, or adnexal tenderness. Infertility was defined as inability to conceive despite 1 year of unprotected intercourse. Menstrual flow outside of normal volume, duration, regularity, or frequency was considered AUB.

Statistical analysis was done using SPSS Version 20 (Armonk, NY: IBM Corp). Characteristics were compared between SHS and unexposed women by Chi-square or Fisher’s exact test for categorical variables and by t-test for continuous variables. All levels of significance were set at P < 0.05.

All the 192 participants were included for final analysis. Broad categories of gynecological presentations included PID, infertility, and AUB. The mean age of women was 24.9 ± 4 years, with 44% being illiterate and 98% being homemakers.

None of the participants admitted to smoking or use of SLT. Fifteen percent (30/192) admitted to SHS.

Urinary cotinine levels in women not exposed to SHS (162/192) ranged widely from 8.09 to 63.44 ng/ml with a mean of 23.60 ± 12.00 ng/ml [Table 1]. Seventy-six percent (124/162) of these women had urinary cotinine values between 10 and 40 ng/ml while 14% (23/162) and 11% (18/162) had levels <10 ng/ml and >40 ng/ml, respectively. Mean urinary cotinine levels in women exposed to environmental tobacco smoke (SHS) was 23.82 ± 12.67 ng/ml, 80% (24/30) had urinary cotinine levels between 10 and 40 ng/ml, while 10% had levels >40 ng/ml.

This demonstrates that there was no significant difference in cotinine levels in the two groups, i.e., those exposed and not exposed to SHS.

PID (n = 139) was the most common gynecological complaint. Eighty-six percent (26/30) of SHS exposed women, and almost 90% (19/21) women with urinary cotinine >40 ng/ml had complaints of PID [Table 2]. Women with PID had significantly higher urinary cotinine level 24.95 ± 12.259 ng/ml as compared to women without PID: 20.20 ± 10.9248 ng/ml (P = 0.0144) (unpaired Student’s t-test).

Comparison of urinary cotinine levels in the three categories of gynecological complaints showed that mean urinary cotinine levels in PID were 24.95 ± 12.26 ng/ml which was significantly higher than that in women with menstrual complaints (19.32 ± 10.29 ng/ml, P = 0.029). Mean urinary cotinine levels in infertile women were 22.42 ± 12.72 ng/ml.

Tobacco use (including the type) in spouse is given in Table 1.

Secondhand exposure in overcrowded urban settlements, consumption of SLT products unknowingly may explain for the majority (76%) of the women having urinary cotinine levels ranging 10–40 ng/ml, since all the women had confirmed not using tobacco of any form. Locally manufactured tobacco containing toothpaste used due to misconceptions regarding its benefit in dental problems is also known in these localities (about 8.4% in our earlier study).10

The mean urinary cotinine values in pregnant women (nonusers) in our earlier study was 24.37 ± 20.14 ng/ml,10 which is comparable to the levels observed in nonpregnant women in the current study (23.60 ± 12.00 ng/ml). Women with PID had

| Table 1: Secondhand smoke exposure from spouse in women |
|---|---|---|---|
| **Exposure** | **Husband (%)** | **Wife (n=192) (%)** | **Mean cotinine level (ng/ml) (95% CI)** |
| Smoking (Bidi) | 30 (15.6) | 30 (15.6) (secondhand exposure) | 23.83 (19.09-28.56) |
| Smokeless tobacco product (Khaini, Gutkha, etc.) | 21 (11) | 0 | |
| Unexposed | 141 (73.4) | 162 (84.4) | 23.61 (21.74-25.48) |

CI: Confidence interval
significantly higher mean cotinine levels compared to those with infertility or menstrual complaints. Although association of reproductive outcomes and smoking has been well studied,[11] there is scant literature on the association of SLT or passive smoking and PID. Smoking has been identified as the strongest factor associated with PID in other studies.[12,13] Possible mechanisms include the impairment of immune response to infection and altered tubal ciliary function, resulting in poor resistance to the ascending pathogenic organisms.[13]

Studies evaluating menstrual complaints and smoking suggest a close association between the two. Dysmenorrhea and amenorrhea were found to be higher among current smokers compared to those who had never smoked.[14,15] Pan et al. studied the effect of passive smoking on menstrual abnormalities in 3466 unmarried women and concluded that passive smoking at home and at work was positively associated with menstrual dysfunction and dysmenorrhea (P < 0.01) and there was a dose–response relationship (P < 0.05).[16] No significant association was found between cotinine levels and menstrual complaints in the present study. Association between current cigarette smoking and increased risk for both primary and secondary infertility attributable to fallopian tube dysfunction has been reported.[17] Comparable cotinine levels in infertility and PID groups in our study suggest possible association of latter as a cause of infertility.

Urinary cotinine values in the range of 10–40 ng/ml in majority of the women suggest possibility of SHS or use of a product containing SLT (locally made toothpaste, pan masala). Safe levels of cotinine have not been identified as yet. SHS puts these women unwittingly at risk of harmful systemic effects of tobacco. A well-designed study with a larger sample size is needed to confirm the association of elevated urinary cotinine levels due to nonsmoked forms of tobacco exposure with PID and other problems of female reproductive morbidity. Ground work is required to understand the locally prevalent SLT products in use before undertaking such a study. It is also necessary to address other confounding factors such as nutrition, sexual practices, and habituation to other drugs while planning future projects. This was the limitation of our study.

Urinary cotinine level is a noninvasive and cost-effective method to assess tobacco exposure. The current study raises the possibility of an association of raised urinary cotinine due to exposure to SLT (SHS in the present study) and PID.

**Financial support and sponsorship**
Nil.

**Conflicts of interest**
There are no conflicts of interest.

**REFERENCES**


**Table 2: Categorized urinary cotinine and gynecological presentations**

<table>
<thead>
<tr>
<th>Gynecological complaints (n = 192)</th>
<th>Urinary cotinine (ng/ml)</th>
<th>&lt;10 (n=23; 12%), n (%)</th>
<th>10-40 (n=148; 77%), n (%)</th>
<th>≥40 (n=21; 11%), n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PID</td>
<td>16 (70)</td>
<td>104 (71)</td>
<td>19 (91)</td>
<td></td>
</tr>
<tr>
<td>Infertility</td>
<td>3 (13)</td>
<td>12 (12)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Menstrual abnormality</td>
<td>4 (17)</td>
<td>32 (17)</td>
<td>2 (9)</td>
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</tbody>
</table>

PID: Pelvic inflammatory disease


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