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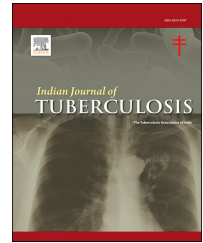
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Editorial

Leveraging the potential of multi-stakeholder engagement for achieving tobacco endgame in India through integrated action on tuberculosis and tobacco use

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The epidemic of tobacco use is a global public health threat killing more than 8 million people annually.¹ There are around 267 million tobacco users in the Indian subcontinent (adults aged 15 years and above).² Tobacco consumption is the single most ubiquitous risk factor to the non-communicable diseases (NCDs) such as cancers, diabetes, cardiovascular diseases, and chronic lung diseases. In addition, it is also a major risk factor for the most insidious infectious diseases like tuberculosis (TB) and lower respiratory tract infections.¹ Further, tobacco smoking may be attributable to more than 20% of the global TB incidence, and 40% in India.³ Smokeless tobacco use causes cancers of the throat and oral cavity, as well as cancers in other parts of the body.⁴ Empirical evidence has suggested that in comparison to nonsmokers, smokers have a twofold increased risk of contracting tuberculosis, proceeding to active disease, developing recurring TB, and dying from TB.⁵ It is clear that several goals, including TB-free India, cannot be achieved without significant and immediate reduction in tobacco use. According to a recent secondary data analysis of the TB & Tobacco trial, TB patients who give up tobacco smoking may have better outcomes in comparison to those who do not quit.⁶

India has consistently worked to lower the double burden of morbidity and mortality caused by the TB and tobacco

epidemics. However, the progress required to achieve TB and Tobacco free India lags behind. As a working solution, leveraging the potential of multi-stakeholder engagement for achieving tobacco endgame in India through integrated action on TB and tobacco could serve as a promising fix. Tobacco control in India is a multi-sectoral issue and hence cannot be dealt in silos. There are around 14 different ministries and departments are involved in tobacco control at various stages; from cultivation to consumption including Ministries of: Health & Family Welfare; Information and Broadcasting; Commerce & Industry; Power; Agriculture and Farmers' Welfare; Environment, Forest and Climate Change; Labour & Employment; Law and Justice; Women & Child Development; Education; Home Affairs; AYUSH; Finance; Personnel, Public Grievances and Pensions; Consumer Affairs, Food and Public Distribution. Tobacco and tuberculosis remain long-standing enemies of humanity and hence integrated action of TB & tobacco through multi-stakeholder engagement could support the movement of achieving tobacco endgame in the country.

Several opportunities exist for multi-stakeholder engagement in the form of collaborative policy planning and development, integrated training sessions, joint monitoring and supervision, partnerships for delivering cessation support to patients suffering from TB, and other diverse multisectoral

approaches at national and sub national levels. These opportunities can be tackled at policy or implementation level.

At policy level, a mutual monitoring and evaluation framework at the national, state, district, and sub-district levels is required. For this, there are several global policies for joint TB-Tobacco activities that show how incorporating tobacco control into TB control at different levels could enhance health benefits and efficiency gains. India too developed a National Framework for joint TB-tobacco collaborative activities.⁷ Furthermore, in order to scale up mutual benefits for TB and tobacco, we need to institute a mutually beneficial coordination network, wherein tobacco users enrolled in the NTCP must undergo active screening for tuberculosis and in similar fashion, the patient enrolled in TB network must be asked about history of tobacco use (in sufficient detail) and referred to tobacco cessation centre, if reported to be consuming tobacco. This will help in facilitating an easy two-way referral mechanism between tobacco cessation centres and TB treatment centres for further management. In addition, there is need for development of collaborative IEC campaigns along with creation of a supportive and enabling environment for the health care professionals in both programs through adequate trainings. Adoption and establishment of smokefree policies and workplaces, integrated capacity building programs, establishment of institutional framework is required to ensure long term viability of the collaborative ventures of the NTCP and RNTCP, building networks & partnerships with other governmental and nongovernmental organisations; and introduction of a coordination pathway with stakeholders from allied departments are other strategies for jointly working in two programs.

Here, emphasis on each clinical encounter as an opportunity to offer cessation support should not be undermined. Thus, it's crucial to undertake "mutual" continuous capacity building of health workers of both national health programmes. Besides, ensuring institutionalisation of such a mechanism is vital for long term sustainability. At the policy level, creation of conjoint laws and measures to combat both epidemics under a larger ambit, such as the Universal Health Coverage could lead to synergistic outcomes. In addition, creation of a collaborative coordinating mechanism for TB control and tobacco control initiatives at varying stages of implementation could ensure coordination between strategy and service delivery. The TB control community could also join hands with tobacco control community to advocate for higher taxation on tobacco products. Nevertheless, the TB control group could also act as vigil monitors in reporting tobacco industry interference and staying compliant to Article 5.3, Code of Conduct.⁸

At the level of implementation, there must be an efficient collaboration for instituting a wide spectrum of support and care for TB patients who want to give up tobacco smoking by offering an empowering and supportive environment, as well as providing brief tailored cessation advice and making sure that healthcare institutions are stringently smoke-free. Increased community penetration should be endorsed via public-private partnerships with active participation of all stakeholders.

However, the "mutual" challenges cannot be left unaddressed while highlighting the potential opportunities. Challenges such as inadequacy of governance, management,

political support, scarcity of resources, weak inter-sectoral synchronisation, community engagement, and insufficient capacity of TB programme staff in offering cessation services limit the opportunities.

Therefore, in order to realise the dream of tobacco endgame in the country, an integrated action of TB & tobacco it's essential to tap existing opportunities that both programs offer inter alia. Collaboration with national health programs and other developmental healthcare programs shall ensure optimal resource utilisation as well as leveraging of frequent stages of intervention at various levels of the existing healthcare system. In India, both the TB and tobacco epidemics have resulted in enormous losses apropos of disability-adjusted life years (DALYs), economic costs, and mortality. An integrative approach may have a synergistic potential to reduce the burden of both epidemics, which in return could serve as best practice to be adopted by other national health programs and departments.⁹ It is also essential to emphasise on 'Tobacco Control in All' policy wherein tobacco control shall be centred in all health & developmental policies and programs so as to fulfil WHO FCTC obligations.¹⁰

Conflicts of interest

The authors have none to declare.

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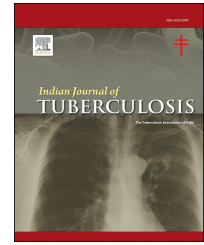
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Editorial

Impact of COVID-19 and tobacco on TB control

The prevalence of TB among COVID-19 patients has been found to be 0.37–4.47% in different studies. There has been an overall decline in TB notification by 26% during January to June 2020 as compared to previous year, due to the COVID-19 pandemic.¹ In nine countries with a high tuberculosis burden, which contribute 60% of the world's tuberculosis cases, its diagnosis and treatment declined by 23%, meaning thereby to 1 million missed cases.² Another high risk factor for TB is smoking. As per studies smoking has been associated with impaired lung function, reduced immunity and making it harder for the body to fight off various diseases. Other tobacco products like e cigarettes, smokeless tobacco etc can increase risk and severity of pulmonary infections because of damage to upper airways and a decrease in pulmonary immune function.³

1. Covid 19 and tobacco use

Worldwide, approximately 1.3 billion people currently smoke cigarettes or use other tobacco products, with more than 900 million tobacco users living in developing countries.⁴ Global prevalence of smoking is 29% (47.5% for men and 10.3% for women over 15 years of age). Tobacco use is the second major cause of death in the world. Available data suggests that smoking kills half of all lifetime users and half of those die in middle age (35–69 years) and is responsible for the death of one in ten adults worldwide. Every 6.5 seconds, one tobacco user dies from a tobacco-related disease somewhere in the world.⁵ If action is not taken to curb the spread of tobacco use, annual deaths are expected to reach 8.3 million by 2030, of which more than 80% will be in developing countries.⁶

Tobacco smokers are vulnerable to contracting COVID-19, as smoking involves contact of fingers with the lips, and this increases possibility of virus transmission from hand to mouth. Smoking water pipes or hookah, involves the sharing of mouth pieces, which may facilitate the transmission of COVID-19 virus.⁴ As per research, smoking may increase the chance of adverse health outcomes for COVID-19 patient when compared with non smokers. Another study concluded that Current smoking status was associated with a lower risk of developing Covid-19 but cannot be considered as an efficient protection against infection.⁷ Alternatively another study concluded that Tobacco use in all forms, whether

(smoking/chewing) is significantly associated with severe COVID-19 outcomes.⁸ Smoking is a known risk-factor for many other respiratory infections, including colds, influenza, pneumonia and tuberculosis. Smoking has been associated with increased development of acute respiratory distress syndrome, a key complication for severe cases of COVID-19, among people with severe respiratory infections. Any kind of tobacco smoking is harmful to bodily systems, including the cardiovascular and respiratory systems and this has been supported by other studies.⁸ COVID-19 can also harm these systems. Data from China shows that people who have cardiovascular and respiratory conditions caused by tobacco use, or otherwise, are at higher risk of developing severe COVID-19 symptom. As per a research report on 55,924 laboratory confirmed cases show fatality rate for COVID-19 patients is much higher among patients with cardiovascular disease, diabetes, hypertension, no pre-existing chronic medical conditions. This concluded that pre-existing conditions may increase the vulnerability of such patients to COVID-19.⁹

Although experience on COVID-19 infection in TB patients is limited, it is presumed that people ill with both TB and COVID-19 may have poorer treatment outcomes,⁵ especially if TB treatment is interrupted. Diabetes, geriatric age group and chronic obstructive pulmonary disease (COPD) have been linked with severe COVID-19. They are also risk factors for poor outcomes in TB. TB patients should take precautions to be protected from COVID-19 and continue their TB treatment as prescribed.

2. Impact of Covid 19 on TB services

Research models suggest⁵ that COVID-19 pandemic has led to a global reduction of 25% in expected TB detection for 3 months, hence a 13% increase in TB deaths are expected. This brings us back to the levels of TB mortality that we had 5 years ago. This may be a conservative estimate as it does take into consideration other possible impacts of the pandemic on TB transmission, treatment interruptions and poorer outcomes in people with TB and COVID-19 infection. The model suggests that during 2020–2025 an additional 1.4 million TB deaths could be registered as a direct consequence of the COVID-19 pandemic (Stop TB Partnership analysis). Hence measures should be taken to ensure that TB services are not interrupted.

Both the diseases (COVID-19 and TB) have the capacity to stress health systems, they are airborne transmissible diseases, can be diagnosed rapidly (although implementation of rapid testing is not yet available in all settings), they cause stigma and need public awareness and cooperation to allow prevention, diagnosis and treatment to be effective. Although surveillance is able to report on TB, in many countries, information on COVID-19 is still incomplete. Information on TB do not contain many clinical parameters, that would help understand the interaction between the two diseases. COVID-19 pandemic has also led to a significant drop in TB notifications.^{10,11}

3. Tobacco, COVID- 19 and TB

Quitting smoking helps lungs and heart to work better from the moment it is stopped. Elevated heart rate and blood pressure drop within 20 minutes of quitting and after 12 hours, carbon monoxide level in the bloodstream drops to normal. In 2–12 weeks, circulation improves and lung function improve. After 1–9 months, coughing and shortness of breath decrease. WHO propagates interventions like toll-free quit lines, mobile text-messaging cessation programmes, and nicotine replacement therapies (NRTs), among others, for quitting tobacco use. Measures must be implemented to limit transmission of TB and COVID-19 Administrative, environmental and personal protection measures must be adopted for both diseases. Provision of TB preventive treatment should be maintained. Tests for TB and COVID-9 are different and both should be made available for individuals with respiratory symptoms, which may be similar for the two diseases. Testing of the same patient for both diseases should generally be indicated for three main reasons, subject to the specific setting in each country: clinical features that are common to both diseases, simultaneous exposure to both diseases and presence of a risk factor.

As the pandemic advances, more people of all ages, including TB patients, will be exposed to COVID-19. Simultaneous testing for the two diseases via cross referral between Covid screening centers and TB screening centers should be encouraged. People-centered outpatient and community-based care should be strongly preferred over hospital treatment for TB patients (unless serious conditions require hospitalization) to reduce opportunities for transmission. Anti-TB treatment must be provided for all TB patients, including those in quarantine and those with confirmed COVID-19 disease. Adequate stocks of TB medicines should be provided to all patients to reduce trips to collect medicines. Use of digital health technologies for patients and programmes should be intensified. Technologies like electronic medication monitors and video-supported therapy can help patients complete their TB treatment.

To conclude, both TB and Covid 19 are respiratory infection with same mode of transmission, similar symptoms and risk factors, although COVID 19 has shorter incubation period.

Tobacco usage, specially smoking is a common risk factor for both diseases. At the same time both diseases causes a significant negative effect on our health system. Quitting smoking not only helps in preventing disease complication but also helps in overall health of community at large.

Conflicts of interest

The authors have none to declare.

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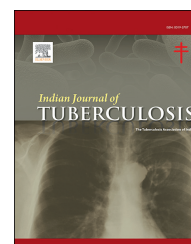
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Original article

Indirect tobacco advertising, promotion and sponsorships in the Indian Premier League 2020: Tobacco Industry's continuous presence in Indian cricket

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ABSTRACT

Background: Indian Premier League (IPL) cricket tournament - a shorter version of the sport which is played between assorted company-owned or individual owner teams - has grown immensely popular over the last decade. There is long history of tobacco advertisement, promotion and sponsorship (TAPS) in cricket. While direct and indirect TAPS is completely prohibited under the Cigarettes and Other Tobacco Products Act (COTPA), 2003 the nexus between tobacco industry and cricket in India continues. We monitored any tobacco product and allied brand or surrogate advertisement, promotion, sponsorship (TAPS) or placement during every match played in the IPL-13 season in the year 2020.

Methods: Using an investigative approach, 60 match highlights during IPL-13 (during September 19 to November 10, 2020) were monitored for TAPS (both on-site i.e. sports-wear and/or in stadia) shown on the official website (www.iplt20.com). All sponsors and advertisers were validated using brand names or logos from their respective official website.

Results: Two IPL teams (Rajasthan Royals and Royal Challengers Bangalore) were sponsored by major tobacco industry owned brands. Violations by a major smokeless tobacco company promoting their brand extension product i.e. Vimal Elaichi, on the official telecast websites (www.espnricinfo.com and www.cricbuzz.com) and television channels (www.Zeenews.india.com/Gujarati) was observed. Tobacco companies i.e. Kamla Pasand and ITC Limited were also listed as associate sponsors for the 2020 championship.

Conclusion: Despite comprehensive ban under India's tobacco control law (COTPA, 2003), sponsorship by tobacco industry was found widespread in IPL-13. Advertisement and logos of tobacco companies are persistent during the telecast and promotion of the IPL events, in clear violation of India's tobacco control legislation and Article 13 of WHO's Framework Convention on Tobacco Control (WHO-FCTC) and its guidelines. Given that India and South Asia comprise the largest audience for televised cricket, strong exclusion criteria is needed by the international cricket authority and national cricket associations to ensure

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compliance with the national law and global good practice, making the cricketing world truly tobacco free.

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1. Introduction

Direct and indirect tobacco advertising is the leading cause of tobacco use and initiation among youth and young adults.¹ Tobacco is a communicated disease.² Globally, no sport has undergone globalisation more than cricket.³ It has a massive audience base in the Indian sub-continent. In India alone, there are an estimated 766 million sports viewers, of whom 93% watch cricket and 35% of youth view live matches at any time.^{4–6} Since 2008, the popularity of cricket in India has boomed with the emergence of the Indian Premier League (IPL), a professional Twenty20 cricket (T20) league established by the Board of Control for Cricket in India (BCCI) in 2008. The shortened version of the game, which has increased the average watch time per viewer, from 28 min in 2016 to 34 min in 2018.^{6,7}

Tobacco companies realise the significance of cricket, and in particular IPL, for the increased brand visibility.⁶ During the IPL-11 season (2018), smokeless tobacco (SLT) and like products such as pan masala, zarda, gutkha were the sixth largest advertisers, contributing 4% share of the total advertising duration of the tournament.⁵ The otherwise unorganised and fragmented SLT industry has bought expensive airtime during prime-time cricket broadcast to target youth and children not only in India but in other countries as well. Vimal, a leading surrogate of SLT brand in India sponsored Pakistan Super League, Season 3 in the year 2018 (incidentally SLT products are banned in Pakistan).⁸ In 2019, Vimal was the umpire and official partner sponsor for Abu Dhabi T10 Super league^{9–13} and a major advertiser in the South Africa's T20 Mzansi Super League.¹⁴

Section 5 of the Cigarettes and Other Tobacco Products Act (COTPA), 2003 prohibits any kind of direct and indirect tobacco advertisement, promotion and sponsorship (TAPS) in the country including a ban on the use of any trademark or brand name of tobacco products.¹⁵ However, tobacco companies continue using the same trademark, logo, tag line and brand colour to advertise their products.^{16–19} To our knowledge, there is no recent published evidence on branding and marketing of tobacco products and/or their brand extensions in Cricket within the low and middle-income countries, specifically India. In view of this gap we attempted reviewing the IPL-13 season for any kind of TAPS to assess the tobacco industry presence in the Indian cricket.

2. Methods

The thirteenth season of the IPL branded as 'Dream11 Indian Premier League 2020' (www.iplt20.com) - originally scheduled to commence on March 29, 2020, was suspended indefinitely by the BCCI due to the COVID-19 pandemic and consequent lockdown in India.²⁰ On August 2, 2020, it was announced that the tournament would be played between 19 September and

10 November 2020 across Dubai, Abu Dhabi and Sharjah in the United Arab Emirates (UAE).²⁰

In September 2020, the researchers (SK, PL, AY) developed a 10-item checklist, followed by face validation through a panel of six experts in the area of tobacco control and related investigative research in India. Information regarding match day/date, match venue (province/state and stadium), IPL Team owners, boards and on-site TAPS i.e. sportswear and/or in stadia were recorded, while viewing the match highlights. Since for the first time in IPL history, mid-season transfer was introduced,²¹ we made sure to record such a unique finding as 'other TAPS' for a particular player. Information regarding all the sponsors and media partners were obtained and categorised into two: 1) championship (such as title sponsor, Official Broadcaster, Official Digital Streaming Partner, Official Partners, Umpire Partner, Official Strategic Timeout Partner); and 2) match sponsors (team sponsors, other local allied or media sponsors for the particular match or side events).

During IPL-13 tournament, we systematically monitored and recorded any tobacco product and allied or surrogate TAPS using an investigative approach. A total of 60 match highlights were viewed by a team of 6 trained observers for an entire period of 53 days on the official website (www.iplt20.com), broadcast available 1–2 days (on an average) post the day of live telecast of a particular match. The observers were the Union South-East Asia regional partners who were extensively experienced in conducting operational research in tobacco control at sub-national level. For this study, virtual training sessions-involving an investigative approach for capturing for all forms of TAPS were carried out using Zoom teleconferencing with WhatsApp as a backup for connectivity between the researchers and observers. The steps taken mirrored the real-time scenario; however, all communication relied on emails before the training sessions and after the data collection. The cross-validation of the observance was done by randomly assessing 10% of the viewed highlights by one of the researchers (SK) and any discrepancy (so found) was amended. The data was manually entered in the form of spreadsheets using Microsoft Excel (version 2010) and descriptive analysis was carried out.

3. Results

The 60 matches were played by 8 IPL teams (Mumbai Indians, Delhi Capitals, Sunrisers Hyderabad, Royal Challengers Bangalore, Kolkata Knight Riders, Kings XI Punjab, Chennai Super Kings and Rajasthan Royals). While viewing the match highlights, no TAPS and 'other TAPS' was observed for in-stadia (Sightscreen, Scorecard, Boundary line/rope, Ground VFX, Seats, Pitch, Drone camera, advertisement balloon, flyer etc.) and the Sports-wear/equipment (uniforms such as Jersey/T-shirt, trousers/lowers, bat, stumps, gloves, helmet, etc.)

We found that two IPL teams were sponsored by major tobacco industry owned brands. Rajasthan Royals by 'Niine Hygiene and Personal Care' from Shudh Plus, a maker of SLT products,^{22,23} and Royal Challengers Bangalore (RCB) by Sunfeast, a confectionary brand owned by India's biggest cigarette maker, ITC Limited²⁴ (Fig. 1). ITC Limited also launched a new advertising blitz of Sunfeast Dark Fantasy as a 'lucky cookie',²⁵ an entertaining spin on a superstition that biting into the cookie while watching a match will lead to a favorable performance. This short commercial film was a part of the larger campaign to attract cricket fans to virtually meet players and win team merchandise (Table 1). In addition, advertisements of Vimal Elaichi (a flavoured Cardamom pouch) were a common sight during the tournament on satellite as well as television channels (Fig. 1). ITC Limited and Kamla Pasand, another leading Pan Masala and SLT brand of India, were also listed as associate sponsors for IPL-13 season.^{26,27}

4. Discussion

With the introduction of a shorter-format, high-value cricket league like IPL, boom in the media platforms, overt glamorisation of communication technology, the shifting global power play and the much-celebrated local culture in the country has led to glocalisation of cricket and widened its viewership in the country and globally as well.²⁸

Amidst the COVID-19 pandemic, the Season 13 of IPL witnessed innovative programming, world-class production - both remote and on-ground. As per the latest data released by the Broadcast Audience Research Council (BARC) India, IPL-13 registered 7 billion viewing minutes (increased by 28% from 2019) and cumulative reach of 108 million (increased by 11% from 2019) for the first 41 matches aired across 21 channels-highest viewership of all seasons.²⁹ Perhaps, the major marketers such as tobacco companies understand the immense influence of this cult of championship and continued to increase their brand visibility, prominence, fame and perceived impact in the minds of millions of fanbase during the IPL-13 season.

History has it when the sponsorship spending has shoot up during major sports events. It is believed that ITC had created the umbrella brand 'Wills Sport' for strong association with cricket. On similar lines, the two famous Indian cigarette brands 'Classic' and 'Gold Flake', owned and produced by ITC were associated with golf and tennis respectively. The Gold Flake sponsoring the 'ATP Tennis championships' in India and signing the then Indian tennis sensation, Leander Paes, for brand endorsement have been etched in the sports history.³⁰ In another survey, Australian Medical Association concluded that 87% of young generation in Western Australia believe that cricketers promote cigarettes.³¹ Our findings found no direct or indirect tobacco brand endorsements by a particular cricketer currently playing the sport at national or international levels.

Previously, the sponsorship of the Australian Cricket Team-in both One Day and Test Matches-by the Benson & Hedges (a British brand of cigarettes owned by American conglomerate Altria) has been the most prominent sponsorship for an Australian sport.³¹ During 1995-96, the BCCI netted

an overall profit worth INR 230 million, mainly due to the Wills World Cup, hosted jointly by India, Pakistan and Sri Lanka – the then main markets for ITC brands. The Wills World Cup, a mammoth-event, had an estimated 300 million TV viewership. The remarkable and unforgettable spend by Wills for branding the event (1996), is estimated to be a whopping 12 million USD. Undeniably, the sponsorship rights to cricket events are not that economical, ITC perhaps had the foresight to sponsor the game as far back as the 1977.³⁰ More than four decades later, ITC seems to have sustained its presence in IPL-13 through its allied brand, ITC Limited's Sunfeast, one of the most preferred biscuits brands in the country. Sunfeast had announced its first-time collaboration with the most promising tournament team - RCB.^{24,26} The exact spending by Sunfeast for sponsorship and promotions during the IPL-13 was beyond the scope of this study.

In the past, ITC has proved its mettle by selling its fast-paced 60-second TV spot that ended with the voiceover: "Just right for India, just right for Wills", one of the smartest ITC's tactic to remain in the young minds via gear endorsements and turf branding. The ad-maker agency justified the commercial as a "tribute to the game of cricket" and denied any intent to "nurture the smoking habit".³⁰ Similar to this, the marketing ploy for RCB during IPL-13 was built around every fan's 'Dark Fantasy' for the respective team's victory this season and a relatable yet entertaining commercial spin 'Lucky Hai'. This spin was a part of a larger media campaign 'Asli Mazaa Andar Se Aayega' (real fun is from inside) which was promoted on Twitter, Facebook and Instagram. The campaign sold the superstition of favorable performance by the viewer's favorite RCB team, in return of munching the cookies and giving them back more prizes and offers.²⁵ We did not assess the impact of this campaign, however future studies are recommended.

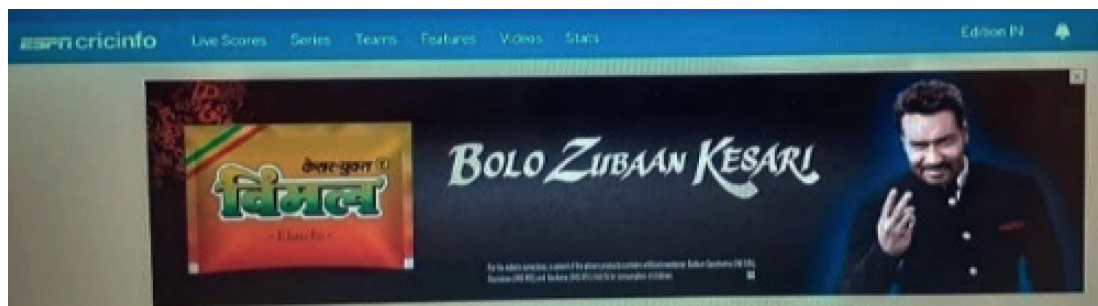
Our findings also highlight the presence of violations by a major SLT company (Vimal) promoting their brand extension product (Vimal Elaichi) on the official telecast websites (www.espncriinfo.com³² and www.cricbuzz.com³³) and television channels (www.Zeenews.india.com/Gujarati).³⁴ In India, Vimal brand has been associated with pan masala and gutkha which continues to be available as 'V1'.^{35,36} This is in line with previous instances wherein Vimal has been associated as the major advertiser and/or sponsors in other International Cricket Leagues such as Pakistan Super League,⁸ Abu Dhabi T10 Super league^{9–13} and South Africa's T20 Mzansi Super League.¹⁴

The reason tobacco companies manage to find their way in the sports is simply because the tobacco industry need popular and commercial sports such as cricket to survive and not the opposite. For instance, the lessons learnt from cricket-the most popular sport in South Africa prove that sports can do without tobacco industry. Although it was totally reliant and funded by the tobacco industry. It, yet, survived and eventually became healthier, after cutting its ties with the industry in the year 1996. On the contrary, there is no evidence that supports otherwise.³¹

The Government of India has recognised that consuming tobacco and spitting smokeless and the like products (e.g. pan masala) can spur transmission of COVID-19 and banned its manufacture, sale and use.³⁷ It is however disappointing to note that tobacco products still find insidious ways to come to



Vimal Elaichi, Pan masala and V1 tobacco pouch



ESPNcricinfo



Cricbuzz



ZeeGujarati

Fig. 1 – Leading advertisement commercial and promotion of brand extension product, Vimal Elaichi (Flavoured Cardamom). Pictures for the Vimal Brand products were taken from the company's official social media pages: <https://www.facebook.com/VimalElaichiOfficial/>³⁵ and <https://www.facebook.com/Vimal-pan-masala-389585321655360/>.³⁶ TAPS for Vimal Elaichi were captured as screenshots by the authors over the official websites satellite (www.espnricinfo.com and www.cricbuzz.com)^{32,33} and television channels e.g. www.Zeenews.india.com/Gujarati³⁴ in October–November 2020. Vimal name was earlier used to sell tobacco product (Vimal Gutkha and the same is currently available as 'V1' tobacco pouch).

Table 1 – Tobacco product and allied brand/surrogate advertisement, sponsorship and placement (TAPS) in IPL-13 season in 2020.

TAPS Violation	Description
Sponsorship from surrogate brand	Niine Hygiene and Personal Care is the principal sponsor for Rajasthan Royals. ²³ (Niine is the sister company of Shudh Plus, ²² a company that manufactures and sells Pan Masala, gutkha and chewing tobacco).
Sponsorship from surrogate brand	ITC Ltd.'s Sunfeast becomes official partner and announced first-time collaboration with team Royal Challengers Bangalore (RCB) at the onset of IPL-13 season. ²⁴ (Sunfeast is a Fast-moving consumer goods (FMCG) brand of one of the biggest cigarette maker in India i.e ITC Limited)
Sponsorship from leading tobacco brands	ITC Ltd. and Kamala Pasand: IPL 2020 sponsorship packages on Star India sold out to 14 associate sponsors. ^{26,27} ITC Ltd. is the biggest cigarette company of India. Kamala Pasand brand has been associated with pan masala and gutkha which continues to be available as 'KP'.
Promotion from Surrogate brand	Sunfeast Dark Fantasy's Facebook promotional page: share the best at-home fun moments and tag the brand #ALotCanHappenInside to win a unique virtual meet-and-greet Royal Challenger Bangalore players. Exclusive goodies and Royal Challengers Bangalore merchandise also to be won. Sunfeast Dark Fantasy Superstition stunt: Associating team's victory by making the RCB fans eat the cookie while watching a match. ^{24,25}
Advertisement and promotion of brand extension product	Vimal Elaichi Commercials (Flavoured Cardamom) on satellite channels i.e. ESPNcrinfo, Cricbuzz or television channel such as Zeegujarati, Vimal brand has been associated with pan masala and gutkha which continues to be available as 'V1'. ^{35,36}
Source: "Niine and Rajasthan Royals join together, for IPL 2020 to make each run count", (2020); Shudh Plus. 8captures, (2016–2020); Brandwagon, (2020); "Sunfeast's Dark Fantasy 'Lucky Hai' for RCB acing it this T20 season", (2020); Dhyani, K., (2020); Gill, P. (2020).	

fore at IPL-13. Globally, the guidelines for implementation of Article 13 of the WHO-Framework Convention on Tobacco Control (WHO-FCTC) highlight the importance of comprehensive restrictions on all forms of TAPS.¹⁹ In line with COTPA Section 5 and Article 13 of WHO-FCTC and its guidelines, enforcement of ban on brand stretching and surrogate tobacco advertising (with no exemption to pan masala and like products) is necessary to mitigate the problem permanently.^{18,38,39} WHO and national governments must engage with sports bodies to advance comprehensive ban on TAPS in sports and ensure harmonisation of global broadcast and electronic transmission policy in line with the Article 13 mandates and ban in-stadia sports and broadcast ban of TAPS globally. Additionally, tobacco control advocates can work with the International Cricket Council, the various Indian and the international country cricket boards and governing bodies to raise the issue and take steps towards an explicit ban on TAPS in cricket and its broadcast not only in India but globally.

In February 2021, the Australian cricket board issued guidelines to the BCCI over using the Australian players in promotion of fast food, betting, alcohol or tobacco brands.⁴⁰ The BCCI shared these guidelines with all franchises of the IPL to comply. However, at its own end, the BCCI was unable to check intrusion of tobacco brands and their surrogates in IPL, in the 2017 edition, and was questioned by the Allahabad High Court for allowing 'Gujarat Lions' jersey to carry the name of 'Shudh Plus'.⁴¹ This happened even when the state health department of Tamil Nadu Government had

instructed the Tamil Nadu Cricket Association and the BCCI to complying with tobacco control laws and not allow the tobacco companies to use their facility to advertise their products.⁴² However, our study suggests that BCCI as the national board of cricket in India has a long walk to make before it fully complies with COTPA and WHO-FCTC obligations.

Unfortunately, all documents governing the BCCI and rules and regulations adopted by the BCCI available at their official website (<https://www.bcci.tv/>) do not indicate to any code for advertising, sponsorships and promotion and linkage with tobacco, alcohol or fast-food industry.⁴³ The BCCI should adopt a code for advertising and allow its ethics committee to monitor compliance with the same as it does for other conflict of interest and to mitigate corruption.

Despite the uniqueness of the investigative approach employed to explore the presence of TAPS in IPL, the present study had certain limitations. First, we did not assess the entire duration of the match innings and decided to view only the highlights since our objective was to investigate the type of TAPS and not the number of instances. Second, the number and duration of in-between commercials over the television and/or other online media platforms such as over-the-top (OTT) channels were not assessed. This would have created a bias, as the advertisers could have been related to the TV/OTT channel and not directly with the cricket. Further studies might be carried out on similar lines. Lastly, we couldn't gather the exact spending by the two tobacco sponsors during

the tournament. Such information might be obtained from the industrial documents or their annual reports.

5. Conclusion

The present study utilizes a unique investigative approach and concludes that sponsorship was the most common form of TAPS in the thirteenth tournament season of IPL. The advertisement and logos of the brand extension products of a famous Indian cigarette and SLT company were persistent during the telecast and promotion of the events. This was in violation of India's tobacco control legislation and Article 13 of the WHO-FCTC and its guidelines, and needs immediate attention of law enforcers. Such evidences urge that tobacco companies simply cannot be trusted to regulate themselves responsibly. The only effective way forward is for governments to legislate to ban tobacco sponsorship of sport and sporting events. Given that India and South-Asia are largest consumers of televised cricket programmes, a strong exclusion criterion developed by the global cricket authority- International Cricket Council (ICC) and national cricket associations (BCCI) will ensure compliance with national law and global good practices, and maintain the reputation of the cricketing bodies and the sport.

Authors' contributions

PL had the original idea for the study. SK and AY contributed to the finalisation of the survey tool. All authors coordinated data collection. SK carried out the data analysis and wrote the first draft of the manuscript. All the authors made substantial contributions to conception, design, and interpretation of data, writing the manuscript and approved its final version.

Conflicts of interest

The authors have none to declare.

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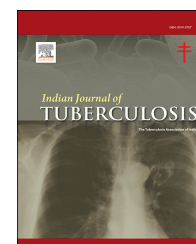
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Original article

Tobacco retailer density and tobacco retailers near schools in two cities of East India, Ranchi and Siliguri

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ABSTRACT

Background: Passive and active exposure to tobacco smoke is associated with tuberculosis infection and tuberculosis disease. Addressing tobacco use is a critical strategy to address tuberculosis (TB). Studies conducted globally demonstrate that the physical presence and density of tobacco vendors can increase tobacco use in both youth and adults. Little is known about the number and density of tobacco vendors in India, where there are approximately 267 million tobacco users. In India, a national tobacco control law (COTPA, 2003) prohibits the sale of tobacco within 100-yards of an educational institution. Little is known about the number of tobacco vendors operating within 100-yards of schools. This study assesses the number and density of tobacco vendors in the cities of Ranchi (Jharkhand) and Siliguri (West Bengal), and the number of retailers selling tobacco near schools. Both of these jurisdictions have passed local tobacco vendor licensing laws.

Methods: Data collectors conducted a census of tobacco vendors within select wards in each city. Each tobacco vendor was classified as either an independent store, permanent kiosk, temporary kiosk, or street vendor. The location of each tobacco vendor was recorded. Data collectors also noted the location of any school/educational institution. Spatial analysis was conducted using GIS software (QGIS 10.5). 100-yard buffers were mapped around school premises. Tobacco vendor density was calculated by area, by road distance, and by population. Tobacco vendors within 100-yards of school properties were counted.

Results: The study identified 559 tobacco vendors in Ranchi, across three wards, and 367 tobacco vendors in Siliguri, across five wards. When considering the three wards in Ranchi,

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tobacco vendor density was 68 vendors/km², 06 vendors/km road, and 08 vendors/1000 population. In Siliguri, the tobacco vendor density was 99 vendors/km², 05 vendors/km road, and 07 vendors/1000 population. The study found that 19% (n = 105) of vendors observed in Ranchi and 23% (n = 84) of vendors in Siliguri were located within 100-yards of one or more schools. The most common vendor-type in Ranchi was an independent store (58%) and in Siliguri was a permanent kiosk (52%).

Conclusion: Tobacco vendor density was remarkably high in each of the surveyed wards. The study identified tobacco vendors operating within 100-yards of schools. Fully implementing COTPA, 2003 could reduce vendor density in Ranchi and Siliguri. Each city's tobacco vendor licensing laws could further reduce tobacco vendor density. Other strategies should be considered to further reduce density, including setting limits on tobacco vendor type, area or population. The data from this study can be used to inform future tobacco control strategies for these cities and others in the region.

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1. Background

Tobacco use is the leading preventable cause of death and disease in the world today.¹ According to the recent Global Adult Tobacco Survey (GATS), there are approximately 267 million tobacco users in India, representing 29% of the adult population.² Tobacco use is estimated to cause more than 1.3 million deaths in India every year; of these, one million are attributed to tobacco smoking and the rest to smokeless tobacco use.^{3,4} Tobacco smoking is a known risk factor for many respiratory infections⁵ and increases the severity of respiratory diseases. It has been determined that smoking tobacco, or exposure to secondhand tobacco smoke is associated with tuberculosis infection and tuberculosis disease. Further, active smoking is associated with recurrent tuberculosis and tuberculosis mortality.^{6,7}

Studies conducted globally demonstrate that the physical presence and density of tobacco vendors can increase tobacco use in both youth and adults.^{8–11} Evidence from multiple jurisdictions also suggests that the density of tobacco vendors in close proximity to educational institutions is directly correlated with increased tobacco use initiation, and the notion that tobacco use is common and acceptable.^{12–15}

In India, the Cigarettes and Other Tobacco Products Act (COTPA, 2003) mandates a range of strategies to reduce tobacco use. For example, COTPA prohibits the sale of tobacco products within 100-yards of any educational institution.¹⁶ Despite this provision, there is evidence that tobacco vendors continue to sell near educational institutions. A 2010 study in Mumbai identified the location of 1741 tobacco vendors, and determined that 13% (n = 221) were operating within 100-meters of a school property.¹⁷ The study also noted that higher tobacco vendor density near schools was associated with current tobacco use and current smokeless tobacco use.¹⁷

There are no accurate estimates on the number of tobacco vendors in India; however, their presence is ubiquitous, with large numbers of tobacco vendors operating in various retail settings including permanent structures (such as brick and mortar shops), as well as temporary structures (such as kiosks, mobile vendors). An overview of the retail environment in India in 2011 estimated that 97% of retailers were “unorganized

retailers” such as corner or family stores.¹⁸ Tobacco is sold in a variety of settings leading to universal easy-access to these products. Consequently, tobacco is readily available at retail outlets where it is sold alongside everyday products such as milk, bread, etc. and in settings freely accessible to children.¹⁹

There are multiple ways by which vendor density can be assessed, including number of tobacco vendors by area (i.e., number of vendors per sq. km),²⁰ number of tobacco vendors by road distance (i.e., number of vendors per km of road),^{21,22} and number of tobacco vendors by population.²³ The location of tobacco vendors can also be measured, for example proximity to schools, residences, or to other tobacco retailers.²⁴ Very little is known about tobacco vendor density in India and there are no published studies detailing tobacco vendor density. Where there are tobacco vendor studies, these pertain to vendor counts near schools¹⁷ and assessment of other issues such as tobacco advertising.²⁵ For instance, a Mumbai school adjacent neighbourhoods study, 2010 reported an average of eight tobacco vendors present within 100m and 60 tobacco vendors within 500m periphery of schools.¹⁷

In India, there is a growing interest in adopting and implementing tobacco vendor licensing systems at the municipal level. In its simplest form, vendor licensing systems establish a list of tobacco retailers. Licensing systems can further support tobacco control strategies. For example, the number of available tobacco licenses for a city could be limited by using quotas based on vendor density. Other strategies include restricting available licenses to specific types of retailer; disallowing retailers based on location, such as near schools; and/or limiting proximity of retailers to each other.^{19,26}

The cities of Ranchi, Jharkhand, and Siliguri, West Bengal, were selected for the study as they are at the forefront of jurisdictions in India to adopt a Tobacco Vendor Licensing Order, aligned with a national advisory issued by the India Health Ministry in September 2017. The advisory recommends the licensing of tobacco vendors through municipal authorities. Further, it stipulates that licensing can be available on the condition that shops permitted to sell tobacco products cannot sell non-tobacco products such as toffees, candies, chips, biscuits, soft drinks, among others, which are meant for the non-users – particularly children.

At the time of the study, Ranchi had adopted and issued a public notice of their Tobacco Vendor Licensing Order²⁷ and Siliguri had adopted their Tobacco Vendor Licensing Order but, not issued a public notice. Neither city had implemented the policy, nor did they have comprehensive lists or records of tobacco vendors. In Ranchi's state of Jharkhand, about one-third (38.9%) of the adult population aged 15 and older use tobacco in some form, while in Siliguri's state of West Bengal 33.5% of adults use tobacco products, both smoked and smokeless. In 2019, the registered population of Ranchi was 1,073,427 and of Siliguri was 513,264.^{28,29}

This study conducted a census of tobacco retailers in select wards. The study also identified any tobacco vendors operating within 100-yards of the perimeter of a school property. Mapping the tobacco vendors' location and then calculating its' density provides helpful information to policymakers that can guide policy responses to reduce overall exposure and access to tobacco across the whole of India.

2. Methods

The study lead was the Institute for Global Tobacco Control (IGTC) at the Johns Hopkins School of Public Health (JHSPH), working in collaboration with the International Union Against Tuberculosis and Lung Disease (The Union). Data collection was conducted by the Postgraduate Institute of Medical Education and Research (PGIMER) Chandigarh.

The study used a cross-sectional observational design.

2.1. Sample

This study conducted a census of all tobacco vendors in select wards in each city. To determine the wards for data collection, PGIMER Chandigarh and The Union compiled details for each of the 53 wards in Ranchi and 47 wards in Siliguri. Each ward was described based on its demographics, and physical assets such as marketplaces/retail areas, educational institutions, public places such as parks, places of worship, and public transportation. To be selected, wards needed to have a retail area and at least one school. Wards were selected that were geographically dispersed from each other, had a range of demographic features, and had diverse public places. The study identified three wards in Ranchi (no.02, 29, 51) and five wards in Siliguri (no.02, 05, 08, 17, 32).

2.2. Training

All data collectors and field co-ordinators attended a three-day training session in December 2019 in Siliguri, West Bengal. Training was provided by staff/faculty from IGTC, staff from The Union, and faculty from PGIMER Chandigarh. Training included practice field work in wards not included in the study sample.

2.3. Data collection procedure

Data collectors were assigned to wards. Data collectors, working in pairs, used a pre-determined walking route to conduct

a census of the tobacco vendors. The assigned routes ensured the data collectors traversed all streets within their assigned wards.

The data collectors identified a tobacco vendor either by observing a tobacco pack and/or advertisements on display, by seeing tobacco products being purchased by consumers, or by asking the vendor directly when neither was observed. Educational institutions were also identified in each ward within both cities.

Two mobile applications were used to support data collection. *Google Maps* was used to affirm data collectors' locations and ensure they were within the boundaries of the ward. *MapMyWalk* was used to help trace the path and ensure that each street was only covered once. Data collectors also used paper maps to support their daily data collection efforts.

2.4. Observations

Once a tobacco vendor was identified, data collectors recorded, using a mobile data collection application (EpiCollect), the vendor name, location, and the type of vendor (see Table 1). Note, the definitions for each of these classifications were developed with the help of local experts.

Similarly, for educational institutions, data collectors recorded the institution's name and geo-coordinates. Photographs of the exteriors of the tobacco vendor and educational institutions were captured using EpiCollect as well.

2.5. Data quality

At the end of each data collection day, identified tobacco vendor geo-coordinates were reviewed for each observation to ensure they were in the correct ward.

2.6. Vendor density calculations

Ward area sizes and lengths of road were determined using GIS software (QGIS 10.5).

Tobacco vendor density by ward area (number of vendors/km²) was calculated by dividing the number of vendors by the area of each selected ward.

Table 1 – Classification of vendor-type.

Vendor-type	Definition
Independent store/supermarket	Establishment that sells a limited variety of goods, including cigarettes, cleaning supplies, and food staples, including grocery/supermarkets
Kiosk, permanent	A small, permanent, enclosed structure, often freestanding, open on one side or with a window, used as a booth to sell cigarettes, bidis, paan products.
Kiosk, temporary	A small, temporary, enclosed structure, often freestanding, open on one side or with a window, used as a booth to sell cigarettes, bidis, paan products
Street vendor	Includes stands, tables, and pushcarts

Tobacco vendor density by road distance (number of vendors/km) was calculated by dividing the number of vendors by the distance covered by road within each selected ward.

Tobacco vendor density by population (number of vendors/1000 population) was calculated by dividing the number of vendors by the total number of registered population^{28,29} (at the time of data collection) within each selected ward.

Presence of tobacco vendors within 100-yards of educational institutions: GIS tools were used to generate 100-yard boundary around educational institutions properties. Property boundaries were identified using Google Maps. In each ward, the number of tobacco vendors within 100-yards of each educational institution was counted; an average number of

vendors per educational institution is reported, as well as the range of tobacco vendors and the type of tobacco vendors.

3. Results

A total of $N = 926$ tobacco vendors were observed, including $n = 559$ in Ranchi (see Fig. 1), and $n = 367$ in Siliguri (see Fig. 2). In Ranchi, the highest number of tobacco vendors was observed in ward no.29 ($n = 327$) and the most common vendor type was an independent store (58%), followed by permanent and temporary kiosk. In Siliguri, the highest number of vendors was observed in ward no.02 ($n = 113$) and

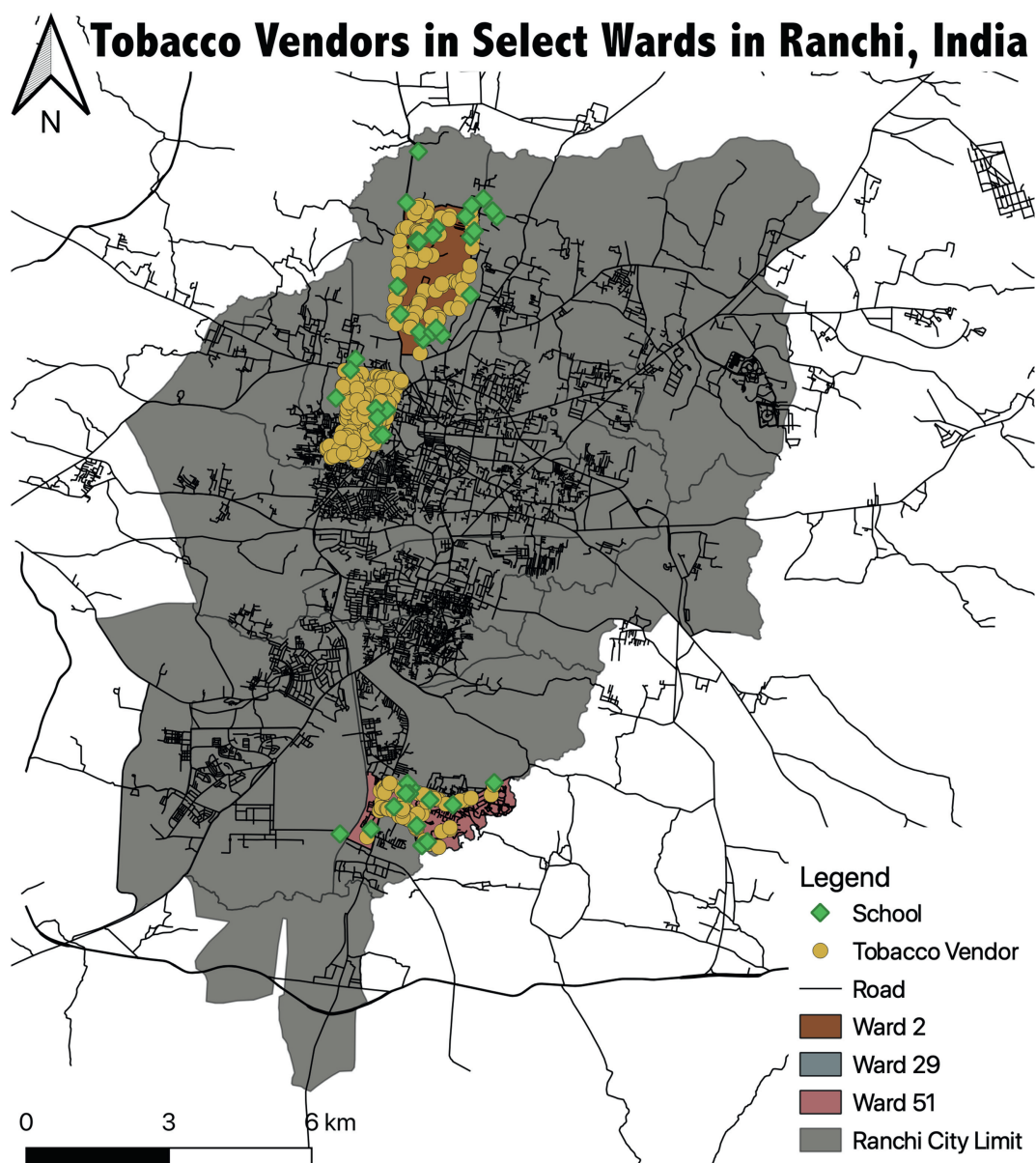


Fig. 1 – Location of tobacco vendors and educational institutions (schools) in three wards in Ranchi.



Fig. 2 – Location of tobacco vendors and educational institutions (schools) in five wards in Siliguri.

the most common vendor type was a permanent kiosk (52%), followed by temporary kiosk and street vendor (Table 2).

3.1. Tobacco vendor density by area

The average tobacco vendor density across three wards in Ranchi was 68 tobacco vendors/km² (range: 34–195). In Siliguri, across the five wards, the tobacco vendor density was determined to be 99 tobacco vendors/km² (range: 43–237) (see Table 3). Of the three wards in Ranchi, the highest tobacco vendor density by area was observed in ward no.29 with 195 tobacco vendors/km²; ward nos.02 and 51 had similar tobacco vendor density, with 37 tobacco vendors/km² and 34 tobacco vendors/km² respectively (see Table 3). In Siliguri, the highest tobacco vendor density was observed in ward no.08 with 237 tobacco vendors/km², while ward no.17 had the second highest tobacco vendor density with 142 tobacco vendors/

km². Tobacco vendor density in ward nos.02 and 05 were found to be similar with 120 tobacco vendors/km²; ward no.13 reported the lowest vendor density amongst all five wards in Siliguri with 43 tobacco vendors/km².

3.2. Tobacco vendor density by road distance and population

Per km of road, this study found an average of 06 tobacco vendors/km in Ranchi and 05 tobacco vendors/km in Siliguri (see Table 3). In Ranchi, there are 08 tobacco vendors/1000 population (range: 4–13), and 07 tobacco vendors/1000 population (range: 04–46) in Siliguri.

When comparing the vendor density by road distance and by population measure within the three wards in Ranchi, the highest tobacco vendor density was found to be in ward no.29, with 11 tobacco vendors/km and 06 tobacco vendors/1000

Table 2 – Number of tobacco vendors in each ward, by vendor-type.

Ward	Independent store/Supermarket % (n)	Permanent Kiosk % (n)	Temporary Kiosk % (n)	Street vendor % (n)	Total
Ranchi					
02	44% (62)	16% (23)	19% (27)	20% (28)	140
29	78% (255)	10% (31)	8% (25)	5% (16)	327
51	9% (08)	73% (67)	12% (11)	7% (06)	92
Total	58% (325)	22% (121)	11% (63)	9% (50)	559
Siliguri					
02	12% (14)	48% (54)	24% (27)	16% (18)	113
05	1% (01)	61% (44)	22% (16)	15% (11)	72
08	0% (0)	64% (39)	26% (16)	10% (06)	61
17	0% (0)	25% (14)	20% (11)	55% (31)	56
32	22% (14)	63% (41)	6% (4)	9% (06)	65
Total	8% (29)	52% (192)	20% (74)	20% (72)	367

population respectively (Table 3). Likewise, in Siliguri, tobacco vendor density by road distance and by population measure within the five surveyed wards was also found to be highest in ward no. 08, with 09 tobacco vendors/km and 46 tobacco vendors/1000 population (see Table 3).

We note that some of the more developed wards were relatively smaller in area but had the highest tobacco vendor densities. For example, ward no. 08 in Siliguri has an area of 0.26 km², with a total population of 5097 people; this ward had a vendor density of 237 tobacco vendors/km² and 46 tobacco vendors/1000 population. Similarly, ward no. 17 in Siliguri has an area of 0.39 km² and a total population of 5029 people, and 142 tobacco vendors/km², 28 tobacco vendors/1000 population (see Table 3).

3.3. Tobacco vendors around educational institutions

In total, there were 36 schools observed in the three wards in Ranchi and 34 schools in the five wards in Siliguri. In Ranchi, n = 105 tobacco vendors were identified operating within 100-yards of a school property. In Siliguri, n = 84 tobacco vendors were identified operating within 100-yards of a school property.

In Ranchi, ward no.29 had the highest number of tobacco vendors near schools with an average of 09 tobacco vendors

per school (range: 0–28). Within the five survey wards in Siliguri, ward no. 02 had the highest number of tobacco vendors with an average of 06 tobacco vendors per school (range: 0–28) (Table 4).

The study reviewed what type of tobacco vendor was operating within 100-yards of a school. In Ranchi, the most common tobacco vendor differed by ward, with wards 02 and 29 having independent shops as the most common type, while ward 51 had more permanent kiosks (see Table 5). In Siliguri, in 04 of the 05 wards, permanent kiosks were the most common tobacco vendor type.

4. Discussion

The results presented in our study indicate that irrespective of methods to calculate the density of tobacco vendors, it is extremely high within both cities. Tobacco vendor density has been studied in other jurisdictions. New York City has approximately 10 tobacco vendors/km²,³⁰ meaning that tobacco vendor density across the three wards in Ranchi is nearly seven times higher and nearly 10 times higher across the five wards in Siliguri. When considering tobacco vendor density by population, Denpasar City in Indonesia has about

Table 3 – Tobacco vendor density measures in Ranchi and Siliguri, by ward.

Ward	Total Number of Tobacco Vendors (n)	Area (km ²)	Density by area (tobacco vendors/km ²)	Road distance (km)	Density by road distance (tobacco vendors/km)	Ward-level population (n)	Density by population (tobacco vendors/1000 population)
Ranchi							
02	140	3.79	37	24.77	06	32,200	04
29	327	1.68	195	29.69	11	31,687	06
51	92	2.68	34	41.48	02	7146	05
Overall	559	8.15	68	24.77	06	71,033	08
Siliguri							
02	113	0.94	120	22.20	05	14,327	08
05	72	0.60	120	11.72	06	16,369	07
08	61	0.26	237	6.57	09	5097	46
17	56	0.39	142	8.71	06	5029	28
32	65	1.50	43	21.72	03	11,334	04
Overall	367	3.69	99	22.20	05	52,156	07

Table 4 – Number and percentage of tobacco vendors near schools by ward.

Ward	Number of schools in each ward	Number of Tobacco vendors within 100-yards of schools (% of all observed tobacco vendors)	Number of Tobacco vendors within 100-yards of each school Mean (range)
Ranchi			
02	18	25 (18%)	02 (0–07)
29	07	54 (17%)	09 (01–28)
51	12	26 (28%)	03 (0–07)
Overall	36	105 (19%)	04 (0–28)
Siliguri			
02	08	34 (30%)	06 (01–15)
05	05	28 (39%)	06 (05–08)
08	03	16 (26%)	05 (01–09)
17	11	05 (9%)	01 (0–04)
32	07	01 (2%)	0 (0–01)
Overall	34	84 (23%)	03 (0–15)

4.6 tobacco vendors per 1000 population³¹ and Scotland about 1.6 tobacco vendors per 1000 population.³² Ranchi and Siliguri have tobacco vendor densities (by population), almost double that of Denpasar and eight times higher than Scotland.

Similarly, when considering the tobacco vendor density measure by road distance, our study reported an average of 06 tobacco vendors/km within the three wards in Ranchi and 05 tobacco vendors/km in the five wards of Siliguri. The vendor density measure by road distance was markedly high compared to a neighbourhood-based study of tobacco retailers in the United States, which reported 0.1 tobacco retailers per km of roadway.³³ The present study's findings suggest that tobacco retailers are ubiquitously located in the cities of Ranchi and Siliguri, and that these two cities have tobacco vendor densities substantially higher than other jurisdictions with published results.

This study adds to the evidence that tobacco vendors are operating within 100-yards of schools, despite the provisions in COTPA (2003). About one-fifth of the tobacco vendors identified in our study across the studied wards were located within 100-yards of one or more educational institution (more than was found in the 2010 Mumbai study). If all tobacco vendors operating within 100-yards of educational

institutions stopped selling tobacco, tobacco vendor density would be reduced.

In other jurisdictions, tobacco vendor licensing strategies have been used to reduce tobacco vendor density by capping the number of vendors in a neighbourhood.^{26,34} Presently, both Ranchi and Siliguri have enacted and started to implement Tobacco Vendor Licensing (TVL), aligned with the national advisory 2017. Licenses can be issued to tobacco vendors by the municipal authorities on the condition that shops provide evidence of a permanent address, and that those permitted to sell tobacco products cannot sell confectionary items such as toffees, candies, chips, biscuits, soft drinks, among others, which are meant for the non-users – particularly children. In addition to fully implementing and enforcing their respective tobacco vendor licensing law, both Ranchi and Siliguri city governments could consider further restrictions including limiting the number of licenses available by area or by population.

Comprehensive tobacco vendor density reduction policies are an excellent potential tool to reduce the public health burden of tobacco use in communities. Embracing tobacco vendor reduction strategies, such as Tobacco Vendor Licensing policy, is also a promising step towards enhancing tobacco control efforts, thereby reducing tuberculosis infection in India.

Table 5 – Type of Tobacco Vendor within 100-yards of school by ward, by vendor-type.

Ward	Independent shop/Supermarket %	Kiosk, permanent %	Kiosk, temporary %	Street vendor %	All Vendor types %
Ranchi					
02	60%	20%	8%	12%	18%
29	81%	11%	3%	3%	17%
51	11%	73%	15%	0%	28%
Total	59%	28%	7%	4%	19%
Siliguri					
02	8%	55%	14%	20%	30%
05	3%	71%	14%	10%	39%
08	0%	75%	25%	0%	26%
17	0%	40%	20%	40%	9%
32	0%	100%	0%	0%	2%
Total	4%	64%	16%	14%	23%

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Data are not available to protect the businesses that were observed.

Not required.

NSP and SS spearheaded the idea for this manuscript. RDK and SS provided substantial contribution to the design of the study in collaboration with RJS, AP, SG and KW. NSP, RDK and SS drafted the manuscript. SS and RDK collated the data. All authors critically reviewed different versions of the manuscript. NSP, RDK, SS and KW contributed to the revisions and all authors gave approval for final manuscript in its present form.

The authors have none to declare.

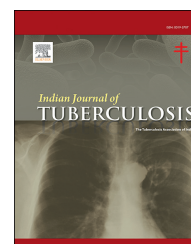
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Original article

Depiction of tobacco in Indian mass media: A content analysis

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ABSTRACT

Background: Although exposure to tobacco content on mass media is a well-grounded source for early initiation, less is known on how tobacco is portrayed in mass media.

Objectives: To determine the proportion of tobacco appearances and the percentage of pro or anti-tobacco messages in the selected print, electronic and internet based Indian mass media.

Methods: The content analysis was conducted among selected categories of: top two daily newspapers in terms of readership, topmost Television channel in terms of viewership and top five trending videos on YouTube. The tobacco appearances in newspaper, television (five minute interval) and YouTube (one minute interval) were recorded and coded as pro or anti-tobacco messages.

Results: Tobacco appearances were present in 0.3% of 9373 [95% CI: 0.2–0.5] advertisements reviewed in Newspapers; all of which were pro-tobacco messages. Among the total 1512 intervals watched on Television, 18.1% [95% CI: 16.2–20.1] had tobacco appearance. There were a total of 289 tobacco incidents in television of which 92.4% were pro-tobacco messages. Out of the total 900 videos watched on YouTube, 11.44% [95% CI: 9.49–13.65] had tobacco appearance. Among the 206 tobacco incidents present in YouTube, 98.5% were pro-tobacco messages.

Conclusions: The study documented considerable extent of pro-tobacco depictions in Indian mass media.

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1. Introduction

Mass media explicitly aims to produce and distribute information. It has linked societies throughout the world and subsequently has evolved to become a part of global virtual society with the discovery of internet. With its extensive coverage, mass media shapes the public perception regarding any issue.¹ The literate population of India spends an average of 36 min per day on print media especially on daily newspaper.² Television penetration in Indian households is 61%.³ There are about 143.2 million internet users in the country; the biggest internet user group being 13–24 years, accounting for 46% of the total base.²

Exposure to tobacco content on mass media is a well-grounded source for early initiation of tobacco use^{4,5} based on the message it conveys.^{6–8} As suggested by Global Adult Tobacco Survey 2, 42.4% of males, 14.2% of females and 28.6% of all individuals above 15 years use smoke, smokeless or both forms of tobacco.⁹ Widespread utilization of mass media, up to 127 min per day especially by the age group of 20–30 years,² renders it an ideal platform for tobacco industry to advertise and promote its products via news, entertainment and advertisements to the general public in order to retain and add to its present consumer base. This is evident from the appreciable presence of tobacco depictions in both Indian and global mass media.^{7–16} A previous study had indicated 22% tobacco depictions among Indian television programmes.¹⁷ Another study from UK demonstrated 12% tobacco use depictions in their television programmes especially in movies and reality TV.¹⁰ There is also evidence suggesting the presence of pro-smokeless tobacco content (74.4%) on YouTube.¹³ Studies have also quantified the presence of tobacco content on video-on-demand (VOD)-eg. Netflix and Amazon Prime¹¹ and Facebook.¹²

The Government of India, recognizing the harmful effects of tobacco¹⁸ and the potential of mass media in the uptake of tobacco use, enacted a comprehensive legislation: Cigarette and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Act (COTPA) in 2003. Additionally, the government regulates tobacco content on cable television via the Cable Television Networks Act (CTNA).¹⁹ Despite the opposition from film industry, India being a signatory of WHO's Framework Convention on Tobacco Control (FCTC), has strived to ban all forms of tobacco advertisements, promotion and sponsorship (TAPS) in mass media including internet videos (Article 13.58).²⁰

While researchers in other countries have quantified the tobacco content in mass media, there is a huge deficit of such evidence in Indian mass media despite its enormous user base. Against this backdrop, the current study was an attempt to document the depiction of tobacco content in Indian newspapers and television channels. For YouTube, the videos trending in India were studied: this being one of the initial studies to use such a search strategy for YouTube videos and therefore a better representative of the content viewed by the general public on this platform in the country.

2. Methods

2.1. Study design

A content analysis was conducted among selected print (Newspaper), electronic (TV channels) and internet (YouTube) based Indian mass media.

2.2. Sampling technique

Among the top three daily newspapers in terms of readership in each category (according to Indian Readership Survey 2017) viz. English, Hindi and Regional language; two were selected purposively. In English language, The Times of India & The Hindu; in Hindi language, Dainik Jagran & Hindustan and in regional language, Daily Thanthi (Tamil) & Malayala Manorama (Malayalam) were selected. The advertisements in each of these newspapers were reviewed. Classified regular advertisements, public notice, tenders, personal advertisements, obituary and recruitment advertisements were not included as they are of least health value.

Indian television channels with highest viewership in various categories were selected based on the data from Broadcast Audience Research Council (BARC- week 13). In General Entertainment category-Dangal; in Hindi movie genre- Sony MAX; in News category- AajTak; in Kids category-Nick and in Regional Category - Sun TV (Tamil) were selected. For representing channel of non-Indian origin HBO (English movie channel) was selected from English movie channels.

The top five trending videos on YouTube were selected in each genre (Music, Gaming, News, Movies [trailers]: default categories of YouTube videos at the time of data collection). Advertisements in between YouTube videos were not included in the study as they are not constant in nature.

2.3. Study tool

Data were collected using three tally sheets developed one each for reviewing newspapers, television channels and YouTube videos from 1st September to 15th October 2019. The tally sheets recorded the date, type of mass media, name of the newspaper, category of the television channel/YouTube video, frequency of tobacco appearances & incidents and characteristics of the tobacco incident like its point of view/slant, type of pro-tobacco message and presence of health warning.

2.4. Study procedure

During the data collection period newspapers in each category was reviewed daily. In newspaper, any advertisement associated with tobacco was defined as a tobacco appearance.

Each of the selected television channels was viewed during the Early Prime Time Band (by BARC) from 6 pm to 9 pm for a period of one week each. These broadcasts were reviewed using five-minute intervals. In television, onscreen presence of any type: item/dialogue/gestures/brand associations/advertisements related to tobacco was defined as a tobacco

incident. If multiple incidents of the same type took place in the same five minute interval, it was considered as a single incident. Incidents of the same type that passed the transition from a five minute interval to the next were recorded as two separate incidents. Incidents of different type taking place in the same interval, were also noted as two separate incidents. Tobacco appearances were calculated as the number of five-minute intervals containing one or more tobacco incident.

The selected trending videos on YouTube were viewed daily. The YouTube videos were reviewed using one-minute intervals. All videos of duration less than twenty minutes were watched completely. If any video extended beyond twenty minutes, systematic random sampling was done to select twenty intervals from the video for feasibility. Among YouTube videos, onscreen presence of any type: item/dialogue/gestures/brand associations/advertisements related to tobacco was defined as a tobacco incident. If multiple incidents of the same type took place in the same one-minute interval, it was considered as single incident. Incidents of the same type that crossed the current interval to the next in the video were noted as two separate incidents. If incidents of different type took place in the same interval, these were recorded as two separate incidents. Tobacco appearances were quantified as the number of videos containing one or more tobacco incident.

The point of view/slant of tobacco incidents were coded as a pro-tobacco or an anti-tobacco message. Pro-tobacco messages included any reference to tobacco, favoring tobacco use or enhancing the general view that smoking and any other form of tobacco use is normal.

Operational definitions for types of pro-tobacco messages included:

Actual tobacco use is the use of tobacco by any character, coded as cigarette, cigar, pipe or other (such as water pipe or chewing tobacco). **Implied tobacco use** refers to any inferred tobacco use occurring without actual use (e.g.: a comment about going for a cigarette), which could be verbal or nonverbal. **Tobacco paraphernalia** is the presence of tobacco or tobacco related materials (including cigarette or other tobacco pack, smoke from mouth, matches, lighter or ashtray). **Tobacco brand appearance/sponsorships** includes the presence of clear and unambiguous tobacco branding, including cigarette or other tobacco packs and corporate social responsibility initiatives of tobacco company. **Brand stretching/brand extension** is the marketing of a different product manufactured by the tobacco company. **Surrogate advertisement** can be defined as an advertisement that duplicates the brand image of one tobacco product to promote another product of the same brand.

Anti-tobacco messages included any reference favoring tobacco control or enhancing the general view that smoking and any other form of tobacco use and those institutions, interests, laws and policies that favor it are unacceptable, or show a critical coverage of tobacco marketing approaches.

2.5. Statistical analysis

Data were entered using EpiData software version 3.1 (The EpiData Association, Odense, Denmark) and data analysis was done using SPSS version 22 (IBM Corp. Armonk, NY, USA). Tobacco incidents in newspaper, tobacco appearances in

television and YouTube were expressed in proportion with 95% CI. Pro and anti-tobacco messages, type of pro-tobacco message and presence of health warning in newspaper, television and YouTube were expressed in proportion. Comparison of tobacco incidents within each of the selected mass media was done using a chi-square test.

3. Results

Out of the total 9373 advertisements reviewed in newspapers, 0.3% [95% CI: 0.2–0.5] had tobacco appearances, all of which were pro-tobacco messages. Among the total 1512 intervals watched in television, 18.1% [95% CI: 16.2–20.1] had tobacco appearance (Table 1). There were a total of 289 (19.1%) tobacco incidents in television of which 92.4% were pro-tobacco messages. Among the total 900 videos watched on YouTube, 11.4% [95% CI: 9.5–13.7] had tobacco appearance (Table 2). A total of 206 (22.9%) tobacco incidents were present in YouTube out of which 98.5% were pro-tobacco messages.

3.1. Newspaper

Among newspapers, Dainik Jagran (0.6%)[95% CI: 0.4–1.1] and Daily Thanthi (0.6%)[95% CI: 0.3–1.1] had the highest proportion of tobacco appearances. The tobacco appearances in regional newspaper category were entirely contributed by Daily Thanthi. Surrogate advertisements comprised the major chunk (64.5%) of pro-tobacco messages (Fig. 1). Such advertisements were more common (70%) in newspapers of Hindi language. Among the total pro-tobacco messages, 54.8% of the messages did not have health warning while the rest 45.2% had a health warning.

It was observed that surrogate advertisements were more common among manufacturers of smokeless form of tobacco while brand stretching was most commonly used by manufacturers of smoke form. Moreover, certain movie posters depicted the characters smoking tobacco.

3.2. Television

Among television channels, Hindi movie category had the highest proportion of tobacco appearances (46%)[95% CI: 40.0–52.2] and tobacco incidents (48%). The second highest proportion of tobacco appearances (19%) [95% CI: 14.6–24.3] and incidents (19.4%) were present in News category. Proportion of tobacco appearances differed significantly between different genres ($\chi^2 = 206.3$, $p < 0.001$) (Table 1). Among the total pro-tobacco messages in television, 28.5% were tobacco paraphernalia, closely followed by actual tobacco use (26.9%) and brand stretching (24%) (Fig. 2). Brand stretching was commonly seen (79.7%) in Kids category. Majority (97.8%) of the surrogate advertisements were present in News category. Among the total pro-tobacco messages, 64.8% did not have a health warning while 35.2% were accompanied with health warning.

Other findings noticed among television channels were that tobacco use was mainly associated with glamour and style in movies. Brand stretching was the common form of advertisement for manufacturers of smoke form of tobacco.

Table 1 – Incidents and appearances related to Tobacco in Television.

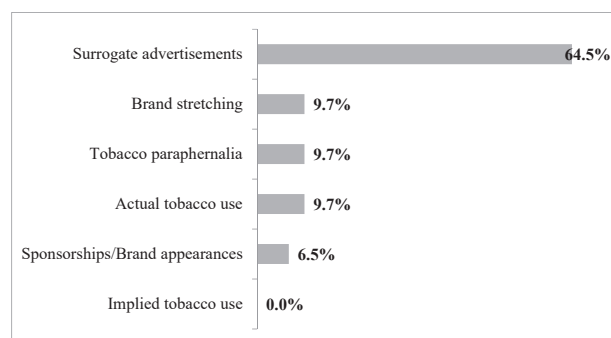
Name of Television channel	Total intervals N	Tobacco incidents* n (%)	Tobacco appearances n (%)	95% CI	p-value
Hindi movie	252	121 (48)	116 (46)	40.0–52.2	<0.001
News	252	49 (19.4)	48 (19)	14.6–24.3	
English movie	252	48 (19)	48 (19)	14.6–24.3	
Kids	252	51 (20.3)	42 (16.7)	12.4–21.7	
Regional	252	20 (7.9)	20 (7.9)	5.1–11.8	
General Entertainment	252	0 (0)	0 (0)	–	
Total	1512	289 (19.1)	274 (18.1)	16.2–20.1	

* An interval may have multiple tobacco incidents.

Table 2 – Incidents and appearances related to Tobacco in YouTube.

Category of YouTube video	Total videos N	Tobacco incidents* n (%)	Tobacco appearances n (%)	95% CI	p-value
Movies (Trailers)	225	96 (42.7)	52 (23.1)	18.0–29.2	<0.001
Gaming	225	66 (29.3)	28 (12.4)	8.6–17.3	
Music	225	41 (18.2)	20 (8.9)	5.7–13.2	
News	225	3 (1.3)	3 (1.3)	0.3–3.6	
Total	900	206 (22.9)	103 (11.4)	9.5–13.7	

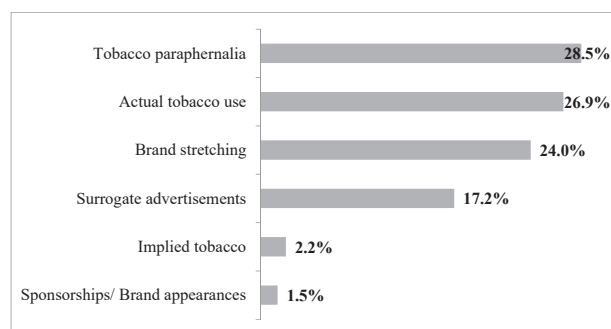
* An interval may have multiple tobacco incidents.

**Fig. 1 – Type of pro-tobacco messages in newspaper (N = 31).**

The products advertised by tobacco company in Kids channel were consumables appealing to kids. Most of the depictions in movies were accompanied with health warning. However, instances of tobacco use and tobacco paraphernalia during the advertisement of movies and video on demand (VOD) platforms did not contain a health warning.

3.3. YouTube

Among YouTube categories, movie (trailers) had the highest proportion of tobacco appearances (23.1%) [95% CI: 18.0–29.2] and incidents (42.7%) followed by gaming category, which had 12.4% [95% CI: 8.6–17.3] tobacco appearances and 29.3% tobacco incidents. Proportion of tobacco appearances differed significantly between different categories ($\chi^2 = 54.59$, $p < 0.001$) (Table 2). Out the total pro-tobacco messages in YouTube, 75.9% were incidents of actual tobacco use followed

**Fig. 2 – Type of Pro-tobacco messages in television (N = 289).**

by tobacco paraphernalia (19.7%) and implied tobacco use (4%). Other types of pro-tobacco messages were absent in YouTube videos. Majority (97.5%) of the tobacco paraphernalia was present in gaming category. None of the pro-tobacco messages on YouTube displayed a health warning. It was found that several games included smoke form varieties of tobacco as accessories for the main character which could be selected by the player.

4. Discussion

4.1. Presence of tobacco depictions in mass media

This study showed that although the overall tobacco appearances in newspapers were few (0.3%) [95% CI: 0.2–0.5], all of them were pro-tobacco messages. Primarily,

manufacturers of smokeless tobacco found a way to bypass the existing laws by means of surrogate advertisements (64.5%). This finding is validated through another study by Panvelkar, conducted among 120 literate respondents, above the age of 16 years in Goa which stated that surrogate advertisements were most commonly used by tobacco and liquor industry. The study also revealed that newspaper (7%) was the most appropriate media for showcasing surrogate advertisements after television ads (69%) and movies (17%).²¹ This draws special attention to the need for regulating surrogate advertisements in newspapers. The present study indicated that brand stretching (9.7%) was mainly employed by cigarette industry. The 2018 judgment by Delhi High Court which directed ITC to remove their campaign “#SayNoTo-Concentrate”, for its packaged juice brand ‘B Natural’, from all hoardings, print and electronic media, is further indicative of brand stretching strategy by the company in newspapers.²² According to this study, certain movie posters in Tamil newspaper depicted the actors holding a cigarette. A similar incident was brought into light when a case was filed against the actor and producers of a movie for depiction of smoking on film's poster in Kerala.²³

In this study, among television channels, Hindi movie channel had the most tobacco incidents (48%). Actors in the movies were shown smoking cigarettes which portrayed tobacco use as a glamorous act. This finding is substantiated by the data from Centers of Disease Control and Prevention which stated that from 2002 to 2018, in U.S, six out of every ten movies (56%) displayed tobacco use. It also revealed that among the 48 youth rated movies of 2018, average occurrence of tobacco incidents per movie reached an all-time high.²⁴ The current study showed that in television, surrogate advertisements (17.2%) were more common in news category (AajTak). This finding is supported by another study conducted by Sushma and Sharang in 2005, which stated that the total annual cost for advertisement for ‘Pan Parag pan masala’, in two news channels, AajTak (Hindi) and Headlines Today (English) was Rs.24.46 crore.²⁵ The present study observed that brand stretching was used by manufacturers of smoke form of tobacco, by means of products attractive to kids especially in Kids channel. A Press Report of Economic Times suggested that ITC product ‘savlon’ owned a place amongst the best advertisements of 2016.²⁶ This is suggestive of the efforts the company puts into creating customized advertisements for the viewers for brand promotion. Hence an immediate need to act on the tobacco industry's tactics is accentuated.

Federal Trade Commission Cigarette Report showed that cigarette advertising and promotional expenditures in internet based media increased from \$1,309,000 in 2012 to \$5,410,000 in 2014.²⁷ The report also presented the data for smokeless tobacco, which was \$931,000 in 2016 for internet based media.²⁸ The results from this study also unveiled the presence of tobacco content in 11.4% of the total 900 YouTube videos. Another study by Cranwell et al among 110 popular contemporary music videos selected from Official Singles Chart UK Top 40 list on YouTube showcased presence of tobacco content in 22% [95% CI:13–27%] of the videos.²⁹ This difference could be attributed to the fact that the current study included videos from several categories

and the music videos watched in this study were different from the later. These findings highlight the fact that internet based media is one of the important and emerging platform for tobacco advertisement. According to this study only 1.5% of the tobacco incidents were anti-tobacco messages. Similar study by Elkin et al, which included a sample of 163 videos, searched using five leading non-Chinese cigarette brands worldwide on YouTube, also revealed that only 3.7% [95% CI: 1.4–7.8] of the videos had anti-tobacco message.³⁰ This study stated that in gaming category 12.4% of the videos had tobacco incident. A study Forsyth et al conducted among 118 video games listed in Entertainment and Software Ratings Board (ESRB), claimed that 30% of the games had verified tobacco content. These findings indicate the need for better implementation of Framework Convention on Tobacco Control laws (Article 13.58) for internet based media.

4.2. Strengths and limitations

This study sample is a good representative of the mass media use in India. The sample size for newspapers accounted for 45% of the total readership in the country. Trending videos are the best way to showcase the current fad on YouTube as they are ranked based on the total number of viewers, how fast the video generates views, where the views are coming from and the age of the video.³¹ Also, the list of trending videos is specific for a country. According to literature, interval coding used in this study is the best method to analyze television broadcasts.

This study had few limitations. The data for this study was collected over a forty-five day period hence the sample might be susceptible to seasonal influences in mass media. Therefore, it would be recommended to conduct the study over a longer time-frame. Further, a single coder was only present for classifying the tobacco depictions as pro and anti-tobacco messages. In future, standardized measures shall be taken to assess the inter-observer reliability of the coding. This being an exploratory study, we further propose a collaborative approach for an optimal countrywide participation including multiple coders to achieve higher robustness to the data collected thereby eliminating any bias.

4.3. Policy implications

Tobacco advertising and promotion is still prevalent in mass media as indicated by the study. Tobacco industry uses promotional platforms like electronic, internet based media and video games to circumvent restricted advertisement bans where possible. Recent data from BARC shows that ITC Ltd. is the third top advertiser in Indian television.³² Brand stretching, surrogate advertisements, sponsorships through corporate social responsibility (CSR) activities, promotion by means of films and internet etc. are some of the indirect form of advertisements that have gained popularity with an increase in pressure on tobacco industry. Hence, there is a necessity for comprehensive TAPS ban that covers all the conventional and emerging channels for marketing and endorsement of tobacco containing products through multi-stakeholder convergence. We also recommend the engagement of the regulatory authority in the governance at the Center and in States for an

effective prohibition of TAPS as it is the key step in achieving the desired goal.

5. Conclusion

This study revealed that in newspaper the tobacco related incidents were very few. There was ample presence of tobacco appearances in television and YouTube. In all the three forms of mass media, majority of the tobacco incidents conveyed a pro-tobacco message. Active collaboration between multiple stakeholders is essential in preventing and controlling tobacco use.

Ethical approval

Jawaharlal Institute of Postgraduate Medical Education and Research Institutional Ethics Committee.

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Conflicts of interest

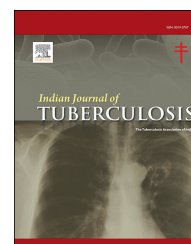
The authors have none to declare.

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Original article

Tobacco consumption trends and correlates of successful cessation in Indian females: Findings of Global Adult Tobacco Surveys

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ABSTRACT

Background: Female gender is being affected disproportionately by tobacco use. The correlates of tobacco use among women are different from men, which has not been studied in India. To develop gender-sensitive interventions and policies in tobacco control, it's essential to ascertain the factors that affect tobacco consumption and successful cessation among Indian women.

Methods: This secondary data analysis was done for females respondents aged >15 years using the data generated from the GATS-1 (2009–2010) and GATS-II (2016–2017). The primary dependent variables included interest in quitting smoking/SLT, attempt to quit smoking/SLT, successful quitting. The independent variables were broadly categorized as a community, household, and individual level. Simple descriptive analysis using % age relative change was used to calculate the change in tobacco consumption between two rounds of GATS, whereas; bivariate and multivariable logistic regression were used to calculate the unadjusted and adjusted odds ratio for cessation related variables (GATS-2). **Results:** There was a 29.5% relative reduction in the prevalence of tobacco use in round-2 among females. A maximum reduction in the prevalence was observed in the 15–29 years (–51.3%), those not exposed the media advertisements (–19.9%). While unadjusted OR depicted that unmarried women, young age, asked by health workers about tobacco use, and advice given by them increased the interest in quitting smoking, none of them emerged to be significant on a multivariable logistic regression except the advice given by the health care provider. Successful cessation (>6 months) of SLT products is possible in urban areas, with decreased exposure to media advertisements.

Conclusion: There is an urgent need for gender-sensitive policies in tobacco control and the integration of these policies with relevant national health programs. This shall help to

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synergize efforts and obtain better outcomes that would support the overarching goal of tobacco-free India.

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1. Background

Tobacco use has been affecting the female gender disproportionately, whereas the emphasis on women tobacco users has received less attention from implementers and policy-makers.¹ Apart from generic health consequences (that both genders face), reproductive health is compromised among female tobacco users to a larger extent in its impact on pregnancy, fertility, and the causation of female-specific cancers.² Further, infants born to smoking mothers have lower birth weights (200–250 grams lower) than those born to non-smoking mothers.³ In addition, stillbirth, neonatal death, and sudden infant death syndrome (SIDS) are all more common in the children of smoker females.^{3–5} Primary and secondary infertility, as well as delays in conception, are more common in smokers than non-smokers. Besides, premature rupture of membranes, premature detachment of the implanted placenta from the uterine wall, partial or total obstruction of the cervical os by the placenta, and pre-term delivery risks pregnant women who smoke.⁵ Further, women are much more sensitive to the effect of nicotine and exhibit higher sensitivity to some of the subjective effects of nicotine which makes them difficult to quit.^{6,7} In addition, tobacco cessation services are hardly being offered as part of reproductive health care programs to females. To add to the brunt, women are the most vulnerable groups of second-hand smoke (SHS), which they are exposed to due to smoker men in the family.^{5,8}

Globally, there are 250 million women daily smokers.⁹ The proportion of female smokers is higher in developing economies (22%) than in developed economies (9%).¹⁰ According to a recent systematic review and meta-analysis, the pooled prevalence of ever and current cigarette smoking among females was 28% and 17%, respectively. In addition, it was consistently higher among subgroups of adolescent girls (23%), adult females (27%), pregnant females (32%), and women with the disease (38%).¹¹ It is estimated that tobacco smoking among females is likely to increase by 20% (532 million) in developed and developing nations without robust and sustainable measures to reduce the uptake of tobacco and initiate quitting.¹⁰ According to the 2nd round of the Global Adult Tobacco Survey (GATS-2) conducted in India (2016–17) has reported that 14.2% of adult females are current tobacco users. Besides, 2.0% of these women currently smoke tobacco, while 12.8% currently use smokeless tobacco. Further, in the previous 12 months, 35.5% of women smokers and 28.4% of women SLT users attempted to quit tobacco use. Interestingly, 46.4% of female smokers and 42.2% of SLT users were

planning to or were thinking about quitting.¹² Besides, an analysis of nationally representative surveys (between years 1993–2009) reported a rising trend of tobacco smoking among Indian females.¹³

Worldwide, the reasons for using tobacco among females have been different in comparison to men. It is perceived among high-income countries that tobacco smoking: is seen as a signifier of women's liberation; suppresses appetite hence keeps them slim and maintains weight; is attributed to peer smoking and exposure to cinema and advertisements.¹³ However, in low-income economies, social norms, family life, local beliefs, and culture are the key determinants influencing females' tobacco use behavior.¹⁴ Some women in India, for example, believe that chewing tobacco can cure tooth-aches or be helpful during labor and delivery.¹⁵ Factors such as poverty, depression, lack of social support, and fear of weight have emerged as the key roadblocks for cessation among women.¹⁶ Furthermore, the inadequate knowledge of the risk and difficulty in cessation, that is influenced by a variety of environmental and psychological factors, as well as nicotine dependence, adds to the concern.⁵ To decrease the catastrophic effects of tobacco use on the health of women and children, tobacco cessation must become an urgent priority worldwide.⁵

India has been a party to WHO-Framework Convention on Tobacco Control. It has been implementing the “O” (Offering help to quit tobacco use) component of MPOWER (it's a package of six measures introduced by WHO to combat the tobacco epidemic where ‘M’: monitoring tobacco use; ‘P’: protecting people from tobacco smoke; ‘O’: offering help to quit tobacco use; ‘W’: warning about the dangers of tobacco; ‘E’: Enforcing bans on tobacco advertising, promotion and sponsorship; ‘R’: raising taxes on tobacco)¹⁷ through the establishment of Tobacco Cessation Centres (TCCs) and introduction of mCessation and quitline.¹⁸ However, women-centric cessation programs, especially with a focus on subgroups of pregnant women, adolescents, disadvantaged groups, are still lacking in India, and uptake of existing services remains suboptimal. In addition, the impact on women's reproductive health due to tobacco use will be treated as new normal in the absence of well instituted gender-based tobacco control policies. Furthermore, it was suggested following the GATS-1 survey that for sampling equivalent participants of both males and females, the reduced prevalence of tobacco use among females might be an underestimate, suggesting a need for larger samples.¹⁹ To develop gender-centric interventions and mainstream gender-sensitive tobacco control policies, it's essential to ascertain the factors that affect tobacco consumption and successful cessation among Indian women.

2. Methodology

2.1. Data source

The current secondary data analysis was carried out using data from the Global Adult Tobacco Survey-India (GATS) rounds 1 (2009–2010) and 2 (2016–2017). It is a nationally representative survey that followed a set protocol for the questionnaire, sample design, data collection, and management processes.

2.2. Sample selection

Our study included female respondents aged >15 years who participated in the two surveys.

2.3. Study variables

The independent variables were broadly classified as follows at the community, household, and individual levels: The variables included in the community category were country regions and residence. India was divided into six regions based on geographical location and cultural factors: North (Jammu and Kashmir, Himachal Pradesh, Punjab, Chandigarh, Uttarakhand, Haryana, and Delhi); Central (Jammu and Kashmir, Himachal Pradesh, Punjab, Chandigarh, Uttarakhand, Haryana, and Delhi); (Rajasthan, Uttar Pradesh, Chhattisgarh, and Madhya Pradesh); East (West Bengal, Jharkhand, Odisha, and Bihar); North-east (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, and Assam); West (Gujarat, Maharashtra, and Goa); and South (Gujarati, Maharashtra, and Goa) (Andhra Pradesh, Telangana, Karnataka, Kerala, Tamil Nadu, and Puducherry). Telangana, a new state formed from Andhra Pradesh in 2014, is included in the GATS-2's southern region. The household category included variables such as wealth index quintiles, caste, and religion. An asset index was used to calculate the household wealth index. The asset index was created using the Principal Component Analysis technique, and it was based on household assets and household consumer items. GATS-2 included 14 household assets based on their time relevance to create the wealth index. Utilizing rank methods, households were classified into five equal wealth quintiles, each representing 20% of the total score, ranging from 1 (poorest) to 5 (richest) (wealthiest).^{20,21}

The variables included under **individual category** were age in completed years, sex, level of education, type of occupation, no. of children, currently pregnant, and awareness among the respondents. The details of the tobacco-related variables like type of tobacco products used, the quantity of tobacco products, age at daily initiation of smoking tobacco, the average number of tobacco consumed per day, time of tobacco usage after waking, observed PHW on tobacco products, exposure to media advertisements, knowledge/awareness regarding the harmful effects of tobacco, belief about serious illness caused due to tobacco use, use of cessation methods, advice given by health care provider, and thinking about quitting tobacco were also included. The primary dependent variables used in our study included interest in quitting smoking/SLT, attempt

to quit smoking/SLT, successful quitting. The operational definitions of the variables used in our analysis were adopted from GATS (Supplementary file 1).

3. Data analysis

In two rounds of GATS, the prevalence of tobacco use among women in various socio-demographic settings was calculated by age and sex. Weighted proportions are presented with their 95 percent confidence intervals (CI) after accounting for sampling, non-response, and post-stratification weights using SPSS version 16.0's complex sample analysis. To depict the changes in tobacco consumption over the two rounds of the GATS, simple descriptive statistics using percent relative change ((final value-initial value)/initial value * 100) were used. Using data from the second round of GATS, bivariate and multivariable logistic regression was used to calculate the unadjusted and adjusted odds ratio with 95 percent CI for deriving the correlates that affected interest in quitting, attempts to quit, and successful quitting.

4. Results

4.1. Trends in tobacco usage

35,529 and 40,265 females who participated in the GATS India rounds I & II were included in the final sample. We observed tobacco use prevalence amongst females aged 15 years & above as 22.4% and 15.8%, with a relative change of 29.5%. Maximum reduction in the prevalence was observed in the youngest age group of 15–29 years (–51.3%), with maximum years of education (–36.5%), from rural areas (–28%), residing in eastern (–51.4%) and southern (–30.3%) region, and belonging to fourth wealth quintile (–41.3%) (Table 1). However, there was an increase in the north (10.9%) and north-eastern (20.1%) regions of the country, among the respondents from the richest quintile (13.4%), and those who were not aware about the ill effects of (8.8%). The prevalence decreased among those not exposed to the media advertisements (–19.9%) compared to the exposed group (–16.8%).

Table 2 depicts tobacco buying preferences, addiction severity, exposure to the PHW labels, media advertisement exposure, and the changes observed over the two rounds of GATS separately for smoked and SLT products. In women who smoked tobacco, there was a 129% relative increase in usage of cigarettes compared to merely an 11% increase when the age of initiation was between 19 and 21 years. However, the prevalence of bidi and other smoked products decreased in round II by –9.5% and –18.9%. Addiction severity increased in the category who consumed <5 units per day, bought packet smoke, or consumed smoking product within 31–60 minutes upon waking. The proportion of women who ever observed any PHW increased by nearly 300%. Among women respondents, who primarily consumed SLT, there was a relative increase in loose SLT (136%). The proportion of women who started daily initiation of SLT at younger ages decreased by –35.4% and –9.3%, while the proportion of older women increased by 14.2% and 23.2%. The proportion of women

Table 1 – Socio-demographic variations in tobacco usage among the women respondents of GATS-India round I and II.

Variable	Non-Users			Tobacco Users		
	GATS I	GATS II	% Relative change	GATS I	GATS II	% Relative change
Female	27,464 (77.6)	33,374 (84.2)	8.5	8065 (22.4)	6891 (15.8)	–29.5
Age group (years)						
15–29	10,742 (88.3)	11,244 (94.3)	6.8	1855 (11.7)	1180 (5.7)	–51.3
30–44	9974 (76.7)	11,928 (85.2)	11.1	2992 (23.3)	2348 (14.8)	–36.5
45–59	4468 (67.6)	6464 (75.8)	12.1	1855 (32.4)	1868 (24.2)	–25.3
≥60	2280 (56.3)	3738 (66.0)	17.2	1363 (43.7)	1495 (34.0)	–22.2
Marital status						
Unmarried	–	4572 (96.9)	–	–	355 (3.1)	–
Married	–	25,793 (84.3)	–	–	5201 (15.7)	–
Separated/divorced/widowed	–	3006 (65.4)	–	–	1334 (34.6)	–
Level of education						
No formal school	8409 (64.4)	9499 (71.3)	10.7	4300 (35.6)	3632 (28.7)	–19.4
Up to primary school	5886 (78.9)	6599 (84.0)	6.5	1998 (21.1)	1701 (16.0)	–24.2
Up to secondary school	7845 (91.4)	9766 (92.7)	1.4	1339 (8.6)	1196 (7.3)	–15.1
Higher secondary and above	5269 (96.5)	7477 (97.8)	1.3	390 (3.5)	356 (2.2)	–37.1
Residence						
Urban	11,822 (86.8)	13,100 (89.8)	3.5	2080 (13.2)	1575 (10.2)	–22.7
Rural	15,642 (73.9)	20,274 (81.2)	9.9	5985 (26.1)	5316 (18.8)	–28.0
Region						
North	6776 (95.4)	9860 (94.9)	–0.5	434 (4.6)	461 (5.1)	10.9
Central	3886 (77.3)	4605 (81.0)	4.8	1301 (22.7)	1235 (19.0)	–16.3
East	3212 (63.6)	4102 (82.3)	29.4	1796 (36.4)	1011 (17.7)	–51.4
North-East	4725 (67.7)	3931 (61.2)	–9.6	3104 (32.3)	2932 (38.8)	20.1
West	3846 (82.7)	3768 (84.1)	1.7	717 (17.3)	513 (15.9)	–8.1
South	5019 (85.5)	7108 (89.9)	5.1	713 (14.5)	739 (10.1)	–30.3
Wealth-index Quintiles						
First	4779 (74.5)	4772 (82.0)	10.1	1847 (25.5)	1263 (18.0)	–29.4
Second	5557 (74.0)	6256 (83.3)	12.6	2145 (26.0)	1521 (16.7)	–35.8
Third	3687 (78.6)	6483 (84.1)	7.0	1197 (21.4)	1336 (15.9)	–25.7
Fourth	4195 (70.0)	6600 (82.4)	17.7	1850 (30.0)	1535 (17.6)	–41.3
Fifth	9099 (91.8)	8812 (90.7)	–1.2	983 (8.2)	1054 (9.3)	13.4
Exposed to media advertisements						
Yes	17,161 (82.7)	5265 (85.6)	3.5	4139 (17.3)	926 (14.4)	–16.8
No	3178 (80.4)	21,775 (84.3)	4.9	864 (19.6)	4608 (15.7)	–19.9
Awareness regarding harmful effects of tobacco						
Unaware	13,442 (81.9)	14,613 (80.3)	–2.0	3049 (18.1)	3789 (19.7)	8.8
Aware	13,979 (74.5)	18,761 (87.9)	18.0	4988 (25.5)	3102 (12.1)	–52.5

consuming 5–20 cigarettes per day increased by 12.8%, 19.4%, and 25.2%. There was a 136.8% increase in buying preference for loose tobacco (+136.8%). More women have started consuming SLT with 31–60 minutes upon waking up (52.7%). However, there was a decrease in the proportion of women who ever observed a PHW on SLT packages (–15.2%). Overall, there was a 23% and 34% decrease in exposure to media advertisements among females who were smokers or SLT users.

4.2. Correlates of willingness to quit and successful quitting

While unadjusted OR depicted that unmarried women, young age, concerns of health workers, and advice given by them increased the interest in quitting smoking, none of them emerged to be significant on a multivariable logistic regression except the advice given by the health care practitioner (Table 3). Further, higher social status, advice from a health care practitioner (HCP), positive thinking about quitting smoking depicted higher chances of attempting to quit smoking. Similarly, Table 4 depicts the significant factors associated

with interest in quitting and attempts to quit SLT. Interest in quitting was more among unmarried young, educated women from urban areas, and belonging highest wealth quintiles, those who ever used cessation methods, and received advice from HCP. Chances to quit SLT increased in young age, urban areas, and if women received advice from HCP. Successful cessation (>6 months) of SLT products is possible in urban areas, with decreased exposure to media advertisements (Table 5).

5. Discussion

This study was undertaken to ascertain tobacco consumption trends and correlates of successful cessation in Indian females as per the GATS Round I and II. Specific vital findings have emerged from our analysis. There was a decline in tobacco use amongst women of India over the two rounds (relative change of about 30%). A decomposition analysis of the GATS survey conducted by Lahoti et al also reported similar findings.²² However, this trend was not uniform, and

Table 2 – Pattern of tobacco usage per different socio-demographic variables among the women in GATS-India round I and II.

Variable	Smoked tobacco			Smokeless tobacco		
	GATS I	GATS II	% Relative change	GATS I	GATS II	% Relative change
Type of smoking						
Cigarette	139 (9.4)	267 (21.6)	129.5	—	—	—
Bidi	536 (52.1)	369 (47.2)	–9.5	—	—	—
Other smoked products	517 (38.4)	425 (31.2)	–18.9	—	—	—
Single-use Pouches	—	—	—	3657 (57.0)	2423 (43.2)	–24.2
Cans	—	—	—	1434 (27.7)	843 (20.5)	–26.0
Loose SLT products	—	—	—	1058 (15.3)	2198 (36.3)	136.8
Age at daily initiation						
Less than 15	190 (25.1)	160 (18.4)	–26.7	1299 (31.3)	897 (20.3)	–35.4
15–18 years	90 (9.9)	99 (6.1)	–37.8	589 (11.4)	656 (10.4)	–9.3
19–21 years	150 (13.3)	135 (14.8)	11.3	707 (12.3)	784 (14.1)	14.2
22 years old or older	461 (51.8)	425 (60.7)	17.2	2044 (44.9)	2311 (55.3)	23.2
The average number of tobaccos consumed per day						
Less than 5 Units/day	315 (46.5)	317 (55.3)	18.9	2476 (61.5)	2367 (57.1)	–7.1
5–9 Units/day	287 (22.8)	202 (22.8)	0.1	1504 (25.4)	1529 (28.6)	12.8
10–14 Units/day	141 (15.9)	85 (12.3)	–22.3	527 (7.7)	513 (9.2)	19.4
15–20 Units/day	89 (10.9)	45 (5.5)	–49.4	261 (3.1)	233 (3.8)	25.2
25+ Units/day	35 (4.0)	45 (4.1)	2.5	115 (2.3)	63 (1.2)	–49.5
How do you buy tobacco						
Loose	303 (53.0)	128 (18.5)	–65.0	1058 (15.3)	2198 (36.3)	136.8
Packets	478 (47.0)	492 (81.5)	73.3	5091 (84.7)	3266 (63.7)	–24.8
Believes that tobacco causes serious illness						
No	289 (18.5)	209 (13.7)	–25.8	1164 (17.6)	504 (9.5)	–46.1
Yes	1300 (81.5)	1122 (86.3)	5.9	5976 (82.4)	5562 (90.5)	9.9
Time of tobacco usage upon waking (Minutes)						
Within 5	230 (21.5)	203 (22.1)	3.0	911 (20.5)	786 (18.8)	–8.1
Within 6–30	395 (38.1)	296 (32.3)	–15.4	1735 (33.8)	1730 (38.4)	13.7
Within 31–60	183 (14.4)	153 (21.1)	46.3	841 (12.7)	933 (19.3)	52.1
More than 60	243 (25.9)	172 (24.5)	–5.6	1552 (33.1)	1282 (23.5)	–28.9
Ever observed a PHW on tobacco products						
No	1166 (89.8)	645 (57.4)	–34.0	1315 (41.7)	1817 (50.5)	21.3
Yes	420 (10.2)	687 (42.6)	299.1	1844 (58.3)	1508 (49.5)	–15.2
Exposed to any of the media advertisements						
Yes	696 (55.3)	697 (44.8)	–19.0	2691 (64.0)	2712 (51.7)	–19.2
No	345 (44.7)	508 (55.2)	23.5	1642 (36.0)	2645 (48.3)	34.2

there were significant socio-demographic variations with an increase in north and northeast respondents from the richest quintile. This could be attributed to the fact that health being a state subject, various states have implemented state-specific measures with reference to their respective socio-cultural-political dynamics. Besides, the states also differ in the levels of tobacco control implementation measures.²³

There has been a decrease in women's awareness about the detrimental effects of tobacco use. There has been a decrease in awareness regarding the harmful effects of tobacco among women. Nevertheless, more women now believe that tobacco causes serious illness. Further, there is an increasing prevalence of tobacco use in 19–21 years, the most vulnerable age to initiate tobacco. Similar has been reported by global (Cantrell et al) and Indian studies (Sharma et al), suggesting higher tobacco use among the younger age group.^{24,25} This could be attributed to poor academic performance in this age group, peer influence, tobacco use in the family, etc.²⁵

The positive trend of decline in overall tobacco use is encouraging to meet the target of 30% reduction by 2025 and realize the Sustainable Development Goals.²⁶ Furthermore,

tobacco use is a preventable & modifiable behavioral risk factor for major non-communicable diseases. A decline in its use would impact the overall health outcomes and prevent consequences on fertility and pregnancy.²⁶

The Indian sub-continent has diverse ethnic and regional variations, and as a result, tobacco use practices and perceptions about its use also differ. This calls for undertaking region-specific research studies to gain deeper insights into such heterogeneous outcomes. Besides, development and testing of tailor-made interventions as per socio-demographic gradients, dynamics, & needs of the user and integrating such interventions into routine services could be undertaken.

A decline in awareness regarding the hazardous effects of tobacco use among women users is a matter of concern. Evidence states that awareness is generally associated with a desire to quit, and intentions consistently predict future quitting attempts. Nonsmokers are less likely to start smoking if they are aware of the harmful effects of tobacco. Furthermore, it is critical because awareness helps tobacco smokers become aware of the impact of their smoking on others and thus are motivated to quit.^{27,28} This, in return, could prevent inequalities resulting from tobacco use along with morbidity

Table 3 – Factors associated with willingness to quit among ever-smoker women as per the GATS India round II (2016–17).

	Interest in quitting		Attempted to quit	
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
Marital status				
Unmarried	(Ref.)	(Ref.)	(Ref.)	–
Married	0.31 (0.08–1.14)	0.37 (0.09–1.48)	3.61 (0.81–16.19)	–
Separated/divorced/widowed	0.25 (0.07–0.93)	0.36 (0.09–1.49)	3.54 (0.77–16.20)	–
Age group (years)				
15–29	(Ref.)	(Ref.)	(Ref.)	–
30–44	0.78 (0.41–1.48)	0.94 (0.47–1.86)	1.38 (0.72–2.68)	–
45–59	0.61 (0.33–1.15)	0.70 (0.36–1.38)	1.23 (0.64–2.36)	–
≥60	0.47 (0.25–0.88)	0.54 (0.27–1.07)	1.24 (0.65–2.35)	–
Level of education				
No formal school	0.74 (0.24–2.23)	–	1.26 (0.43–3.67)	–
Up to primary school	1.20 (0.38–3.81)	–	1.10 (0.36–3.41)	–
Up to secondary school	1.71 (0.51–5.78)	–	0.92 (0.28–3.03)	–
Higher secondary and above	(Ref.)	–	(Ref.)	–
Residence				
Urban	(Ref.)	–	(Ref.)	–
Rural	0.85 (0.56–1.30)	–	0.71 (0.47–1.08)	–
Wealth-index Quintiles				
First	1.08 (0.62–1.87)	–	1.01 (0.59–1.74)	1.06 (0.58–1.94)
Second	0.69 (0.41–1.16)	–	0.72 (0.43–1.21)	0.82 (0.46–1.45)
Third	1.03 (0.60–1.74)	–	0.51 (0.30–0.89)	0.47 (0.26–0.87)
Fourth	1.16 (0.70–1.93)	–	0.55 (0.33–0.91)	0.50 (0.28–0.89)
Fifth	(Ref.)	–	(Ref.)	(Ref.)
Occupation				
Govt./Non-Government employee	(Ref.)	–	(Ref.)	–
Self Employed/Retired	0.62 (0.22–1.72)	–	1.75 (0.52–5.87)	–
Student/Homemaker	0.89 (0.36–2.24)	–	2.30 (0.76–6.99)	–
Unemployed	0.56 (0.19–1.70)	–	1.38 (0.37–5.11)	–
Ever used				
Used cessation methods.	(Ref.)	–	–	–
Without assistance	0.46 (0.18–1.13)	–	–	–
Did the health worker ask about your tobacco habits?				
No	(Ref.)	–	(Ref.)	–
Yes	1.49 (1.04–2.13)	0.91 (0.37–2.25)	1.81 (1.27–2.58)	1.71 (1.11–2.37)
Received any advice from health care practitioner				
No	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Yes	1.65 (1.13–2.41)	1.99 (1.07–5.12)	2.04 (1.41–2.96)	2.40 (0.78–7.37)
Thinking about quitting tobacco				
Quit within the next month	–	–	(Ref.)	(Ref.)
Thinking within the next 12 months	–	–	2.60 (1.24–5.45)	2.77 (1.27–6.05)
Quit Someday	–	–	0.86 (0.46–1.61)	0.81 (0.42–1.56)
Not interested	–	–	0.35 (0.19–0.65)	0.38 (0.20–0.74)
Don't Know	–	–	0.49 (0.15–1.58)	0.61 (0.18–2.08)

& mortality. Increasing awareness about the detrimental impact of tobacco consumption on women's health should be incorporated into tobacco cessation campaigns and programs. Besides that, policymakers and organizations undertaking anti-tobacco interventions could be encouraged to increase a population's awareness of tobacco-related risk and willingness to quit smoking, particularly among vulnerable and disadvantaged groups. The increase in the consumption of cigarettes could be attributed to the aggressive advertisements of tobacco products undertaken by the tobacco industry, change in socio-economic dynamics of women, symbolizes liberation, maintains body weight, etc.²⁹ The increase in loose tobacco in the SLT category could be due to the easy availability and affordability of the product, with its use being reinforced by cultural beliefs and local practices.³⁰ Such

factors continue to heavily influence tobacco use initiation and cessation among the females.

Observation of pack health warning (PHW) by a higher proportion of female smokers in round 2 in comparison to round 1 indicates the aggressive implementation of these warnings over tobacco products (85%).³¹ Contrastingly, this number decreased for SLT users as the results reported that loose tobacco use increased. Therefore, there was the absence of PHW (which violates the legislation) and wasn't observed by users. These variations between smoked and SLT can be attributed to a variety of factors, such as the less widespread use of WHO FCTC articles on SLT products.³² Also, these differences stress placing stringent monitoring & evaluation measures and a check on the sale of loose tobacco. There is no national-level ban over the sale of loose tobacco in India,

Table 4 – Factors associated with willingness to quit among women who ever-consumed SLT as per the GATS India round II (2016–17).

	Interest in quitting		Attempted to quit	
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
Marital status				
Unmarried	(Ref.)	(Ref.)	(Ref.)	–
Married	0.42 (0.32–0.55)	0.63 (0.46–0.87)	0.84 (0.65–1.09)	–
Separated/divorced/widowed	0.25 (0.18–0.33)	0.51 (0.35–0.74)	0.79 (0.60–1.05)	–
Age group (years)				
15–29	(Ref.)	(Ref.)	(Ref.)	(Ref.)
30–44	0.80 (0.68–0.94)	0.96 (0.79–1.17)	0.93 (0.78–1.10)	0.99 (0.81–1.20)
45–59	0.62 (0.53–0.74)	0.78 (0.63–0.97)	0.89 (0.74–1.06)	0.84 (0.68–1.05)
≥60	0.33 (0.28–0.40)	0.50 (0.39–0.64)	0.67 (0.54–0.82)	0.66 (0.51–0.84)
Level of education				
No formal school	0.28 (0.21–0.36)	0.47 (0.34–0.65)	0.62 (0.48–0.81)	0.81 (0.59–1.10)
Up to primary school	0.46 (0.35–0.61)	0.77 (0.55–1.06)	0.85 (0.65–1.11)	1.05 (0.77–1.44)
Up to secondary school	0.68 (0.51–0.91)	0.93 (0.67–1.28)	0.90 (0.68–1.19)	1.01 (0.74–1.37)
Higher secondary and above	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Residence				
Urban	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Rural	0.66 (0.58–0.76)	0.80 (0.69–0.94)	0.61 (0.53–0.70)	0.64 (0.54–0.75)
Wealth-index Quintiles				
First	0.53 (0.44–0.65)	0.57 (0.45–0.72)	0.78 (0.64–0.97)	0.87 (0.68–1.11)
Second	0.63 (0.52–0.75)	0.65 (0.52–0.82)	0.74 (0.60–0.90)	0.81 (0.64–1.03)
Third	0.63 (0.52–0.76)	0.67 (0.53–0.84)	1.07 (0.87–1.31)	1.17 (0.92–1.48)
Fourth	0.72 (0.60–0.87)	0.74 (0.59–0.93)	0.85 (0.69–1.04)	0.88 (0.70–1.12)
Fifth	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Occupation				
Govt./Non-Government employee	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Self employed/Retired	0.58 (0.44–0.78)	0.86 (0.63–1.17)	0.72 (0.53–0.98)	0.92 (0.66–1.28)
Student/Homemaker	0.67 (0.52–0.87)	1.05 (0.79–1.39)	0.82 (0.63–1.08)	1.02 (0.76–1.36)
Unemployed	0.59 (0.41–0.85)	1.23 (0.82–1.84)	0.92 (0.63–1.33)	1.26 (0.84–1.90)
Ever used				
Used cessation methods.	(Ref.)	(Ref.)	–	–
Without assistance	0.48 (0.30–0.78)	0.48 (0.27–0.84)	–	–
Did the health worker ask about your tobacco habits?				
Yes	1.33 (1.15–1.54)	0.89 (0.58–1.37)	2.09 (1.80–2.43)	1.38 (0.89–2.14)
No	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Received any advice from health care practitioner				
Yes	1.40 (1.19–1.64)	1.82 (1.15–2.88)	2.23 (1.90–2.61)	1.76 (1.11–2.81)
No	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Thinking about quitting tobacco				
Quit within the next month	–	–	(Ref.)	–
Thinking within the next 12 months	–	–	0.82 (0.62–1.09)	–
Quit someday	–	–	0.44 (0.34–0.56)	–
Not interested	–	–	0.11 (0.09–0.14)	–
Don't Know	–	–	0.18 (0.12–0.28)	–

though state-specific policies exist, such as in Punjab, Uttarakhand, Haryana, Karnataka, and Maharashtra.

Advice from HCPs regarding the harmful effect of tobacco and less exposure to media advertisements emerged to be drivers for successful tobacco cessation among women users. Health care providers have a professional responsibility to advise and promote tobacco cessation while being aware of all the risks associated with its use. They are critical in the identification, assessment, and treatment of users. Individuals regard health care providers as the most trustworthy source of health-related information and advice. In order to strengthen cessation services, there is a need to undertake capacity building of HCPs about cessation so that it facilitates the identification of tobacco users. Further, it would also assist HCPs in facilitating referral to a specialist for

further management as and when required. Besides, there is a need to empower tobacco users with essential skills to quit tobacco use and overcome barriers in their settings (social, cultural, environmental, and personal factors).^{33–35}

5.1. Strengths & limitations

The study is based on a secondary data analysis of a nationally representative survey that was conducted using standardised methodology. Hence, the results are representative and generalizable to the adult population (15 years and above). The current analysis highlights the factors among a very vital group that is vulnerable: women tobacco users. There is an inherent limitation of cross-sectional surveys, which limits the establishment of a causal relationship. The study also has

Table 5 – Factors affecting successful tobacco cessation (> 6 months) among women tobacco users as per the GATS India round II (2016–17).

	Ever smoker with Successful cessation		Ever smokeless with Successful cessation	
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
Marital status				
Unmarried	Ref.	–	Ref.	–
Married	0.47 (0.17–1.34)	–	0.95 (0.58–1.55)	–
Separated/divorced/widowed	0.54 (0.18–1.59)	–	1.33 (0.78–2.26)	–
Age group (years)				
15–29	Ref.	–	Ref.	Ref.
30–44	0.56 (0.26–1.21)	–	1.06 (0.75–1.49)	1.00 (0.70–1.43)
45–59	0.72 (0.35–1.48)	–	1.08 (0.75–1.54)	1.03 (0.70–1.50)
≥60	0.90 (0.45–1.79)	–	1.55 (1.09–2.22)*	1.34 (0.90–1.98)
Level of education				
No formal school	0.69 (0.22–2.10)	–	0.70 (0.45–1.09)	–
Up to primary school	0.59 (0.17–1.98)	–	0.71 (0.44–1.14)	–
Up to secondary school	0.59 (0.16–2.17)	–	0.87 (0.54–1.41)	–
Higher secondary and above	Ref.	–	Ref.	–
Residence				
Urban	Ref.	Ref.	Ref.	Ref.
Rural	0.57 (0.36–0.91)*	0.61 (0.37–1.00)	0.66 (0.52–0.84) *	0.74 (0.57–0.98)*
Wealth-index Quintiles				
First	0.58 (0.31–1.09)	–	0.80 (0.54–1.18)	–
Second	0.56 (0.31–1.00)	–	0.71 (0.48–1.04)	–
Third	0.40 (0.21–0.78)	–	1.15 (0.81–1.65)	–
Fourth	0.42 (0.23–0.77)	–	0.84 (0.58–1.22)	–
Fifth	Ref.	–	Ref.	–
Occupation				
Govt./Non-Government employee	Ref.	–	Ref.	–
Self employed/Retired	0.91 (0.23–3.68)	–	0.67 (0.39–1.14)	–
Student/Homemaker	1.26 (0.37–4.33)	–	0.81 (0.51–1.29)	–
Unemployed	1.62 (0.39–6.62)	–	1.05 (0.56–1.96)	–
Believes smoking causes serious illness.				
No	Ref.	–	Ref.	–
Yes	1.20 (0.63–2.27)	–	1.50 (0.98–2.30)	–
Exposure to media				
Yes	Ref.	Ref.	Ref.	Ref.
No	1.82 (1.17–2.84)	1.65 (1.04–2.61)	1.49 (1.16–1.91)	1.44 (1.11–1.86)

*p-value <0.05.

a limitation of lack of inclusion of institutionalized population during the sample selection.

5.2. Recommendations

To generate awareness and increase the outreach of cessation support to women at this point in time, it's essential to rope in all possible avenues currently available under the national health policies and programs. This includes Health & Wellness Centres under the Ayushman Bharat scheme, non-communicable disease clinics under the National Programme for Prevention & Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS) program, National Oral Health Programme (NOHP), Revised National TB Control Programme (RNTCP), National Mental Health Program (NMHP), and Reproductive, Maternal, New-born, Child, and Adolescent Health (RMNCH+A) strategy. It's critical for the health care providers to use each encounter with a woman as an opportunity to enhance her awareness about the harms of tobacco use and motivate her to quit if she is a tobacco user. Community empowerment and its active involvement would

support any such program and aid in reducing tobacco use. Adopting a standard core curriculum containing comprehensive tobacco prevention and control among women at the school and college level could be beneficial in the longer run. Moreover, to reduce tobacco use and its health inequalities among women, the role of academic institutions and achievements should be investigated in future studies. This may include women-focused educational -campaigns, programs & messages, inclusion in educational curricula & training, and representation of women role models.

6. Conclusion

Gender is a crucial determinant of health inequalities and has obvious relevance for tobacco control. Tobacco exposure is linked to health system responses (access to care; quality of care received) and is influenced by gender. Also, the tobacco research predominantly measures impact with no associated gender analysis; evaluation of interventions provides sex-disaggregated data, and delivery of policies and programs

remain mostly gender-unresponsive. Although the number of female smokers is less than the males as per our analysis, there is an increase in the consumption of cigarettes and SLT, which urges an urgent need for gender-sensitive policies in tobacco control. There is a need to strengthen the capacity for gender analysis of policies, programs, and data for monitoring and evaluation. We have observed that anti-tobacco policies, that may have been effective in combating the smoking epidemic in women, may not be effective in combating SLT prevalence, and thus more advocacy is required to combat the emerging threat of SLT usage among women. In addition, the policies should be integrated with relevant national health programs. Furthermore, forming vertical public-private partnerships (PPPs), alliances with health professional organisations, and civil society groups will help to synergize efforts and achieve better results, all of which will contribute to the overarching goal of a tobacco-free India.

Conflicts of interest

The authors have none to declare.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijtb.2021.08.037>.

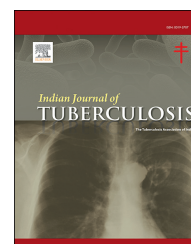
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Original article

Prevalence and factors associated with the sale of loose cigarettes at Point of Sale: A cross-sectional analytical study from four Indian states

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ABSTRACT

Background: The Framework Convention on Tobacco Control (FCTC) has established that sale of loose cigarettes increases the affordability and accessibility of tobacco for minors. Acknowledging this threat to public health, the Department of Consumer Affairs, Government of India amended the Legal Metrology Act to prohibit sale of loose cigarettes. Regardless, over 70% of the total cigarette sale in the country is in the form of loose cigarettes majority of which is being sold at unrecognized, unrecorded and unregulated informal sector of economy. However, there is a paucity of studies examining the factors associated with sale of loose cigarettes and further research is warranted in the country to know the dynamics of this issue.

Objective: To determine the prevalence and the factors associated with the sale of loose cigarettes at Point of Sale (PoS) in the selected four Indian states.

Methods: A community based cross-sectional analytical study was conducted among a total of 2044 PoS in the project states of Meghalaya, Odisha, Puducherry and Telangana using purposive sampling technique. The characteristics of tobacco vendors and the status of loose cigarettes sale were collected using a structured and pre-tested checklist. Proportion for prevalence estimate, bivariate and multivariable log binomial regression analysis were done. **Results:** The prevalence of loose cigarette sale was 93.05% [95% CI: 91.89–94.1]. Sale of loose cigarette showed a significant association with area (aPR 1.03; 95% CI: 1–1.06; $p = 0.025$), sale of tobacco products to minors (aPR 1.07; 95% CI: 1.04–1.11; $p < 0.001$), sale of smoking aids to customers (aPR 1.05; 95% CI: 1.01–1.09; $p = 0.02$), sale of flavored chewable tobacco (aPR 1.08; 95% CI: 1.03–1.12; $p = 0.001$) and presence of pack warning (aPR 1.18; 95% CI: 1.11–1.25; $p < 0.001$).

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Conclusion: Our findings infer an open disregard for the laws specific to sale of loose cigarettes at PoS. The factors associated with the sale of loose cigarette needs to be addressed through prompt implementation of the tobacco control laws and suitable policy formulation.

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1. Introduction

Despite the existence of a wide variety of laws designed to prevent and reduce the use of tobacco products among youth, the powerful lobby of tobacco industry continues to resist the tobacco control measures in India.¹ One such industry tactic is the sale of loose cigarettes. Loose cigarettes are individually sold/purchased cigarettes which have been taken out from their pack. On one hand the industry challenges the validity of pack warning through litigations² while on the other, evades the Section 7 of Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Act which states “no person shall directly or indirectly produce, supply, distribute cigarettes or any other tobacco products, unless every package of cigarettes or any other tobacco products produced, supplied or distributed bears on its label the specified health warning” by means of loose cigarette sale.³

The Framework Convention on Tobacco Control (FCTC) has established that sale of loose cigarettes increases the affordability and accessibility of tobacco for minors.⁴ A qualitative study among 28 young adults attending employment training and educational programs in Baltimore revealed that about 77% of the participants had bought loose cigarettes the previous month, among which 66% of the participants stated ‘convenience’ as the most common reason for the purchase of single cigarettes which was closely followed by ‘less expensive’ response.⁵ Whilst the immediate cost for buying single cigarette appears to be lower, the actual cost per cigarette is higher, as in the cost of single cigarette purchase is higher as compared to the unit cost of cigarette when bought in a pack.⁶

There are several public health concerns associated with loose cigarette sales. The easy availability and affordable nature of loose cigarettes can initiate smoking habit among children and also nurture this habit among minors who smoke.^{7,8} Likewise, a 2006 survey among four different cities in Mexico reported that even among adult smokers, sight of single cigarette sales is a cue to smoke.⁴ Purchase of loose cigarette can also help conceal the smoking behavior among people who find it socially unacceptable to carry cigarette packs in their pockets.⁹ Although purchasing single cigarettes has been reported as harm reduction strategy by some smokers, the evidence is inconclusive.¹⁰

As per the GATS survey, majority of the cigarettes purchased in Bangladesh, India and Philippines are in the form of singles.¹¹ In India, over 70% of the total cigarette sale is in the form of loose cigarettes.¹ Globally, sale of loose cigarettes have been observed in both formal and informal sectors of economy.⁶ However, in India majority of such sale and purchase is

restricted to the unrecognized, unrecorded and unregulated informal sector.³ Prevalence of loose cigarette sale at stores has been found to be significantly associated with sale of tobacco to minors.¹²

Acknowledging this threat to public health, Article 16 of World Health Organization-FCTC recommended formulation of comprehensive policies and effective enforcement strategies to tackle the issue of loose cigarette sale.¹³ In 2015, Department of Consumer Affairs, Government of India amended the Legal Metrology Act to prohibit sale of loose cigarettes following which several Indian States banned the sale of loose cigarettes.^{14–17} Government has also proposed to ban the sale of loose cigarettes in the COTPA amendment bill 2020 by inserting a proviso in Section 7 which says “provided that trade and commerce in cigarette or any other tobacco product shall be in sealed, intact and original packing” (see Fig. 1).¹⁸

Several studies have investigated the purchase pattern and access to loose cigarette by youth,^{4–6,8,10,19} and few countries have studied the prevalence of loose cigarette sale and characteristics of the individuals purchasing single cigarettes from tobacco vendors.^{7,12,20} No additional study except a cross-sectional survey conducted among the tobacco vendors in Karnataka suggesting that loose cigarettes were being sold by 95% of the vendors has been reported from India till date.³ Along with the buyer's standpoint, delving deeper into the tobacco vendor's perspective of loose cigarette sale is equally important to understand the dynamics of this issue-‘who are purchasing and from where?’. However, there is a paucity of studies examining the factors associated with the sale of loose cigarettes at Point of Sale (PoS). Hence, this multi centric study aims to determine the prevalence and factors associated with the sale of loose cigarettes at PoS by tobacco vendors which would aid in providing a better understanding of loose cigarette sale in the country.

2. Methods and materials

2.1. Study design & settings

This community based cross-sectional analytical study was conducted among 2044 PoS as a part of the ongoing project “Advancing tobacco control at national and sub-national level through Capacity building, MPOWER implementation and support to National Tobacco Control Programme (NTCP)” in the project states of Meghalaya, Odisha, Puducherry and Telangana focusing selected districts of each State in November, 2020 (see Fig. 2). The project is a Bloomberg Initiative managed by International Union Against Tuberculosis And Lung Disease (The Union) aiming

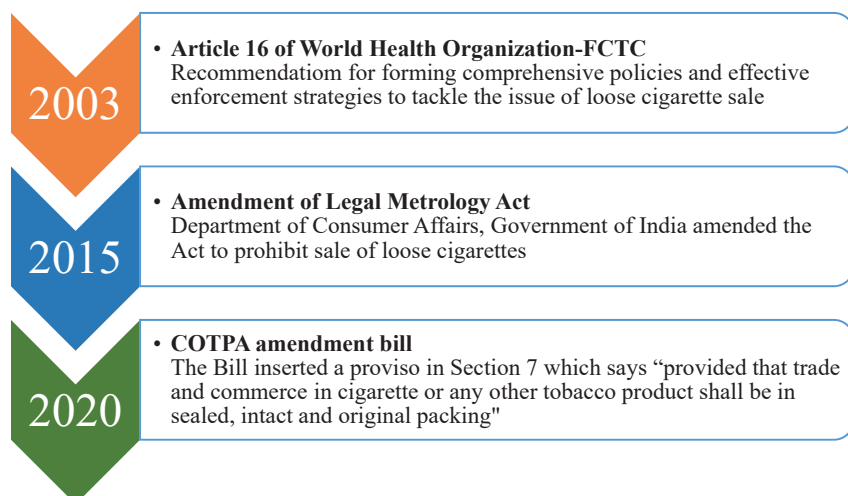


Fig. 1 – Flowchart illustrating the laws pertaining to Sale of loose cigarettes.

to establish an institutional framework for tobacco control, building capacity on technical and operational aspects of tobacco control and effective implementation of tobacco control policies under Cigarettes and Other Tobacco Products Act (COTPA) in four project states.

The states of Meghalaya, Odisha, Puducherry and Telangana representing diverse parts of India, have low-to-moderate politico-administrative commitment for tobacco control. Hence, the proposed project aims to provide technical support to NTCP in these four states.

2.2. Sample size

Assuming an alpha error of 3%, confidence level of 99% and the prevalence of loose cigarette sale as 50%, the maximum sample size was calculated to be 1840 using OpenEpi version 3.01. Presuming a non-response rate of 10%, the final sample size of 2044 was considered for the study. The total sample size was divided between the selected districts of four project states. The PoS for the study were selected from five districts each of Odisha (N = 829) and Telangana (N = 613) and two

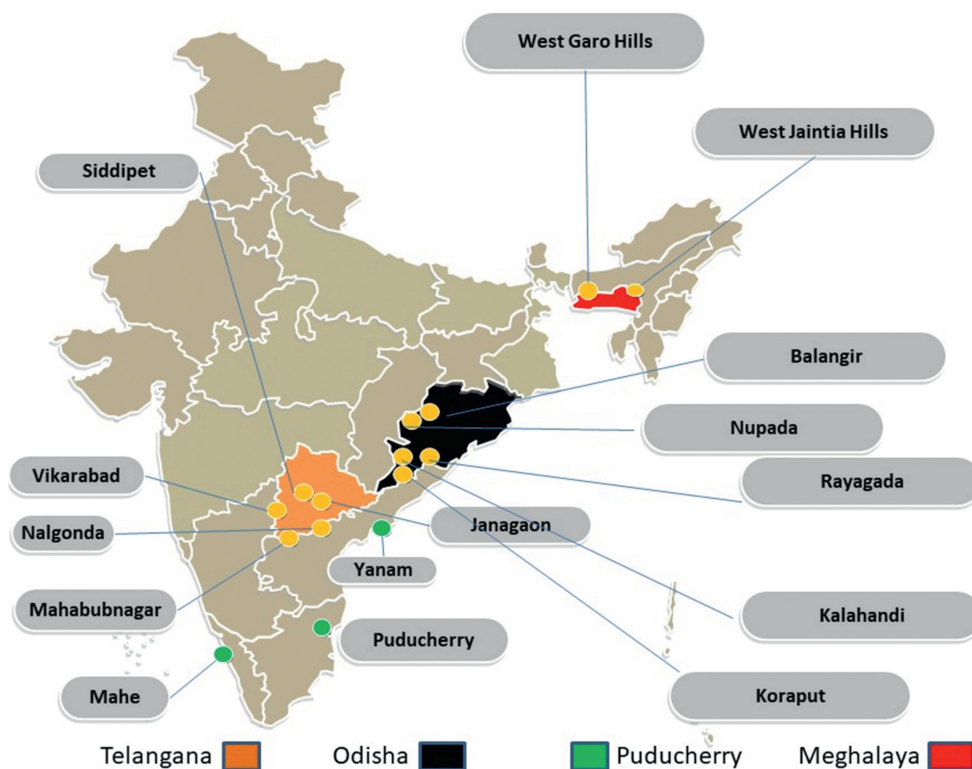


Fig. 2 – Overview of project states and districts.

districts each from Meghalaya (N = 300) and Puducherry (N = 302) using purposive sampling technique.

2.3. Study procedure

Data were collected from the PoS of each district by field investigators using a structured and pre-tested checklist. An hour long virtual training session was organized by the principal investigator for the field investigators to educate them on COTPA sections, contents of the checklist and the tools for data collection. The checklist was filled based on the observations made by the field investigator, followed by a brief interview with the tobacco vendors at PoS. The data collection continued for a period of two weeks during which any queries by the investigators were addressed on a real time basis by the program officer of respective states.

2.4. Study variables

The independent variables included the PoS characteristics like state, area, type of vendor, items being sold, presence of advertisement outside the shop, display of tobacco products, display of section 6a signage, sale of tobacco products to minors, sale of tobacco products by minors, sale of smoking aids to customers, sale of flavored chewable tobacco, enquiry of age proof by vendors and presence of pack warning on the tobacco products sold. Sale of loose cigarette at PoS was taken as the outcome variable.

2.5. Operational definitions

Point of Sale (PoS)- PoS is being defined in this study, as any store, be it a part of formal or informal sector of economy, from which tobacco products can be purchased.

Loose cigarettes- Loose cigarettes are individually sold/purchased cigarettes which have been taken out from their pack.

Smoking aids- Smoking aids refers to the smoking accessories that can be used for other purposes, such as matches and lighters or presence of ashtrays.

2.6. Statistical analysis

The data were collected and entered using Epicollect 5 v4.1.5. Data analysis was done using STATA version 14 (Statacorp., Texas, USA). During data analysis the categorical variables were expressed as proportion. Prevalence of loose cigarette sale was expressed as proportion with 95% CI. To express the association between characteristics of PoS and the prevalence of loose cigarette sale, bivariate and multivariable log binomial regression analysis were done and prevalence ratio with 95% CI was used. P value less than 0.05 was considered significant.

3. Results

A total of 2044 PoS were included in this study. More than half (58.4%) of the PoS were present in the urban areas as compared to 41.6% in the rural area. Kiosks-permanent type of

vendor comprised the larger part (32.4%) of the study participants, closely followed by street/mobile vendors (29.5%) and kiosks-temporary type of vendors (28.2%). Enquiry of age by the tobacco vendors (0.8%) and display of section 6a signage (7.2%) were the least compliant among the COPTA laws pertinent to PoS. Moreover, flavored chewable tobacco was being sold at 66.1% of the PoS (Table 1).

3.1. Prevalence of the sale of loose cigarettes

Loose cigarette sale was present at 1902 (93.1%) [95% CI: 91.9–94.1] of the total 2044 PoS studied. Nearly 60% of the PoS selling loose cigarettes were located in urban areas, whereas 34.2% were permanent kiosks type of establishments. In approximately 57% of the PoS, observed to be selling loose cigarettes, food items were also being sold. Among PoS selling loose cigarettes, 31% had presence of advertisement outside the shop, 58.6% had display of tobacco products, 94.9% had no

Table 1 – Characteristics of Point of Sale in four Indian states (N = 2044).

Variables	Frequency	Percentage
State		
Odisha	829	40.6
Telangana	613	30
Puducherry	302	14.8
Meghalaya	300	14.7
Area		
Urban	1194	58.4
Rural	850	41.6
Type of vendor		
Street/mobile vendor	603	29.5
Kiosks-permanent	663	32.4
Kiosks- temporary	576	28.2
Independent shop/supermarkets	202	9.9
Items being sold along with tobacco		
Stationary/school supplies	72	3.5
Food items	1132	55.4
Services	32	1.6
Combination of items	808	39.5
Presence of advertisement outside the shop (Yes)	613	30
Display of tobacco products (Yes)	1119	45.3
^a Display of section 6a signage (No)	1897	92.8
Sale of Tobacco products to minors (Yes)	140	6.9
Sale of tobacco products by minors (Yes)	48	2.4
Sale of smoking aids to customers (Yes)	688	33.7
Sale of flavored chewable tobacco (Yes)	1350	66.1
Vendors enquired age proof (No)	2027	99.2
Presence of statutory health warning (No)	317	15.5

^a Section 6a signage refers to the prohibition of the sale of tobacco products to minors.

display of Section 6a signage, 35.3% sold smoking aids to customers, 67.8% were selling flavored chewable tobacco and 99.2% of the tobacco vendors did not enquire for age proof. While 2.5% of the PoS selling loose cigarettes had tobacco products being sold by minors, about 7.3% were found to be selling tobacco products to minors. More than three-quarters (81%) of the PoS selling loose cigarettes exhibited health warning on the cigarette packets being sold.

3.2. Factors associated with sale of loose cigarettes

Table 2 displays the association between characteristics of PoS with sale of loose cigarettes. The variables with P value ≤ 0.2 after binary regression were included in the multivariate regression model. The multivariate regression model revealed that prevalence for sale of loose cigarettes was higher among

PoS in urban area (aPR 1.03; 95% CI: 1–1.06; $p = 0.025$), selling tobacco products to minors (aPR 1.07; 95% CI: 1.04–1.11; $p < 0.001$), selling smoking aids to customers (aPR 1.05; 95% CI: 1.01–1.09; $p = 0.02$), selling flavored chewable tobacco (aPR 1.08; 95% CI: 1.03–1.12; $p = 0.001$) and with presence of pack warning on cigarette packets (aPR 1.18; 95% CI: 1.11–1.25; $p < 0.001$).

3.3. Comparison of the PoS selling loose cigarettes in urban and rural areas

Table 3 states that as compared to rural PoS, the urban PoS selling loose cigarettes were twice (PR = 2.36; 95% CI: 1.96–2.84; $p < 0.001$) and six times (PR = 6.11; 95% CI: 1.86–20.06; $p < 0.001$) more likely to be street/mobile vendors and service providers respectively. A significantly higher

Table 2 – Factors associated with the sale of loose cigarettes at Point of Sale in four Indian states (N = 2044).

Variables	Sale of loose cigarettes		PR (CI)	P value	Adjusted PR (CI)	Adjusted P value
	Yes (N = 1902) (93%)	No (N = 142) (7%)				
Area						
Rural	769 (90.5)	81 (9.5)	R	–	–	–
Urban	1133 (94.9)	61 (5.1)	1.05 (1.02–1.08)	<0.001	1.03 (1–1.06)	0.025
Type of vendor						
Street/mobile vendor	524 (86.9)	79 (13.1)	1.08 (1.01–1.17)	0.037	1.14 (1.07–1.22)	<0.001
Kiosks-permanent	651 (98.2)	12 (1.8)	1.22 (1.14–1.31)	<0.001	1.07 (1.02–1.12)	0.002
Kiosks- temporary	565 (98.1)	11 (1.9)	1.22 (1.14–1.31)	<0.001	1.04 (0.99–1.08)	0.056
Independent shop/supermarkets	162 (80.2)	40 (19.8)	R	–	–	–
Items being sold along with tobacco						
Stationary/school supplies	59 (81.9)	13 (18.1)	R	–	–	–
Food items	1092 (96.5)	40 (3.5)	1.18 (1.06–1.31)	0.003	1.04 (0.94–1.15)	0.463
Services	30 (93.8)	2 (6.3)	1.14 (0.99–1.32)	0.061	0.99 (0.9–1.08)	0.790
Combination of items	721 (89.2)	87 (10.8)	1.1 (0.97–1.22)	0.133	1.01 (0.92–1.12)	0.818
Presence of advertisement outside the shop						
Yes	590 (96.3)	23 (3.8)	1.05 (1.03–1.07)	<0.001	1.01 (0.93–1.09)	0.854
No	1312 (91.7)	119 (8.3)	R	–	–	–
Display of tobacco products						
Yes	1114 (99.6)	5 (0.5)	1.21 (1.17–1.24)	<0.001	0.98 (0.95–1.01)	0.111
No	788 (85.2)	13 (14.8)	R	–	–	–
Display of section 6a signage						
Yes	97 (66)	50 (34)	R	–	–	–
No	1805 (95.2)	92 (4.9)	1.44 (1.28–1.62)	<0.001	1.02 (0.9–1.15)	0.777
Sale of tobacco products to minors						
Yes	138 (98.6)	2 (1.4)	1.06 (1.04–1.09)	<0.001	1.07 (1.04–1.11)	<0.001
No	1764 (92.7)	140 (7.4)	R	–	–	–
Sale of tobacco products by minors						
Yes	47 (97.9)	1 (2.1)	1.05 (1.01–1.1)	0.017	1.03 (0.97–1.1)	0.316
No	1855 (92.9)	141 (7.1)	R	–	–	–
Sale of smoking aids to customers						
Yes	671 (97.5)	17 (2.5)	1.07 (1.05–1.1)	<0.001	1.05 (1.01–1.09)	0.02
No	1231 (90.78)	125 (9.2)	R	–	–	–
Sale of flavored chewable tobacco						
Yes	1289 (95.5)	61 (4.5)	1.08 (1.05–1.11)	<0.001	1.08 (1.03–1.12)	0.001
No	613 (88.3)	81 (11.7)	R	–	–	–
Vendors enquired age proof						
Yes	16 (94.1)	1 (5.9)	1.01 (0.9–1.14)	0.851	0.92 (0.82–1.04)	0.171
No	1886 (93)	141 (7)	R	–	–	–
Presence of statutory health warning						
Yes	1651 (95.6)	76 (4.4)	1.21 (1.14–1.28)	<0.001	1.18 (1.11–1.25)	<0.001
No	251 (79.2)	66 (20.8)	R	–	–	–

Bold values indicate the significant p values

Table 3 – Comparison of the Point of Sale selling loose cigarettes in urban and rural areas of four Indian states (N = 1902).

Variables	Urban (n = 1133)	^a Rural (n = 769)	PR (CI)	P value
Type of vendor				
Street/mobile vendor	407 (77.7)	117 (22.3)	2.36 (1.96–2.84)	<0.001
Kiosks-permanent	405 (62.2)	246 (37.8)	1.12 (0.98–1.27)	0.09
Kiosks- temporary	232 (41.1)	333 (58.9)	0.47 (0.41–0.54)	<0.001
Independent shop/supermarkets	89 (54.9)	73 (45.1)	0.82 (0.62–1.11)	0.211
Items being sold along with tobacco				
Stationary/school supplies	44 (74.6)	15 (25.4)	1.99 (1.12–3.55)	0.015
Food items	618 (56.6)	474 (43.4)	0.88 (0.82–0.96)	0.002
Services	27 (90)	3 (10)	6.11 (1.86–20.06)	<0.001
Combination of items	444 (61.6)	277 (38.4)	1.09 (0.97–1.23)	0.163
Presence of advertisement outside the shop				
Yes	387 (65.6)	203 (34.4)	1.29 (1.12–1.49)	<0.001
No	746 (56.9)	566 (43.1)	–	–
Display of tobacco products				
Yes	795 (71.4)	319 (28.6)	1.69 (1.54–1.86)	<0.001
No	338 (42.9)	450 (57.1)	–	–
Display of section 6a signage				
Yes	67 (69.1)	30 (30.9)	–	–
No	1066 (59.1)	739 (40.9)	0.98 (0.96–0.99)	0.048
Sale of tobacco products to minors				
Yes	53 (38.4)	85 (61.6)	0.42 (0.3–0.59)	<0.001
No	1080 (61.2)	684 (38.8)	–	–
Sale of tobacco products by minors				
Yes	12 (25.5)	35 (74.5)	0.23 (0.12–0.45)	<0.001
No	1121 (60.4)	734 (39.6)	–	–
Sale of smoking aids to customers				
Yes	405 (60.4)	266 (39.6)	1.03 (0.91–1.17)	0.605
No	728 (59.1)	503 (40.9)	–	–
Sale of flavored chewable tobacco				
Yes	646 (50.1)	643 (49.9)	0.69 (0.64–0.72)	<0.001
No	487 (79.5)	126 (20.6)	–	–
Vendors enquired age proof				
Yes	4 (25)	12 (75)	–	–
No	1129 (59.9)	757 (40.1)	1.01 (1.003–1.02)	0.006
Presence of statutory health warning				
Yes	1033 (62.6)	618 (37.4)	–	–
No	100 (39.8)	151 (60.2)	0.45 (0.36–0.57)	<0.001

^a Rural PoS selling loose cigarettes was taken as the reference group.

Bold values indicate the significant p values

proportion of urban PoS selling loose cigarettes had advertisement outside the shop (PR = 1.29; 95% CI: 1.12–1.49; $p < 0.001$) and display of tobacco products (PR = 1.69; 95% CI: 1.54–1.86; $p < 0.001$) as compared to such rural PoS. However, the urban PoS selling loose cigarettes had 58% lower sale to minors, 77% lower sale of tobacco products by minors, 31% less likely to sell flavored chewable tobacco and 55% less non-compliant to pack warning as compared to their rural counterparts. The non-compliance to enquiry of age by tobacco vendors was significantly higher among urban PoS as compared to rural PoS selling loose cigarettes.

3.4. Comparison of various types of vendors selling loose cigarettes

Except for the non-compliance to enquiry of age by tobacco vendors all the other PoS characteristics are significantly different between the four types of tobacco vendors selling loose cigarettes (Table 4).

4. Discussion

This cross-sectional analytical study among 2044 PoS examined the prevalence and factors associated with sale of loose cigarettes by tobacco vendors. Our study results suggests an overall high prevalence (93.05%) of loose cigarette sale among PoS. The highest prevalence of loose cigarette sale was observed in Odisha (99.88%) and Telangana (99.02%) followed by Meghalaya (87.67%) and Puducherry (67.55%). De Ojeda et al in a similar study investigated the availability of single cigarettes in Guatemala. The results of the study, similar to ours, reflected 91% prevalence of loose cigarette sale among stores and street vendors that sold cigarettes.⁷ Another study conducted among 206 retail outlets in middle and lower-middle class metropolitan areas of San Bernardino and Riverside counties, California by Klonoff et al stated that 49.1% of the stores sold loose cigarettes.²⁰ This disparity between the prevalence of single cigarette sale in California and our study

Table 4 – Comparison of various types of vendors selling loose cigarettes of four Indian states (N = 1902).

Variables	Street/mobile vendor (n = 524)	Kiosks-permanent (n = 651)	Kiosks- temporary (n = 565)	Independent shop/supermarkets (n = 162)	P value
Presence of advertisement outside the shop					
Yes	284 (48.2)	156 (26.4)	137 (23.2)	13 (2.2)	<0.001
No	240 (18.3)	495 (37.7)	428 (32.6)	149 (11.4)	–
Display of tobacco products					
Yes	263 (23.6)	416 (37.3)	392 (35.2)	43 (3.9)	<0.001
No	261 (33.1)	235 (29.8)	173 (21.9)	119 (15.1)	–
Display of section 6a signage					
Yes	75 (77.3)	21 (21.7)	1 (1)	0 (0)	–
No	449 (24.9)	630 (34.9)	564 (31.3)	162 (9)	<0.001
Sale of tobacco products to minors					
Yes	32 (23.2)	88 (63.8)	16 (11.6)	2 (1.5)	<0.001
No	492 (27.9)	563 (31.9)	549 (31.1)	160 (9.1)	–
Sale of tobacco products by minors					
Yes	13 (27.7)	28 (59.6)	4 (8.5)	2 (4.3)	<0.001
No	511 (27.6)	623 (33.6)	561 (30.2)	160 (8.6)	–
Sale of smoking aids to customers					
Yes	300 (44.7)	215 (32)	144 (21.5)	12 (1.8)	<0.001
No	224 (18.2)	436 (35.4)	421 (34.2)	150 (12.2)	–
Sale of flavored chewable tobacco					
Yes	165 (12.8)	520 (40.3)	548 (42.5)	56 (4.3)	<0.001
No	359 (58.6)	131 (21.4)	17 (2.8)	106 (17.3)	–
Vendors enquired age proof					
Yes	6 (37.5)	9 (56.2)	1 (6.3)	0 (0)	–
No	518 (27.5)	642 (34)	564 (29.9)	162 (8.6)	0.06
Presence of statutory health warning					
Yes	445 (27)	525 (31.8)	529 (32)	152 (9.2)	–
No	79 (31.5)	126 (50.2)	36 (14.3)	10 (4)	<0.001

Bold values indicate the significant p values

is probably due to the fact that a ban on loose cigarette sale has been in-force in California since 1991 while there is no such legislation in place among the study states in India.^{20,21} Another study by Kuri-Morales et al in Mexico City indicated that loose cigarette sale was present at 58% of the 577 stores studied.¹² The Mexican legal framework having included a ban of single cigarettes since 1999 and the enactment of General Law of Tobacco Control in 2008- Article 16, Section 1 outlaws distribution and sale of cigarettes in packages of fewer than 14 units, play a crucial role in the low prevalence of loose cigarette sale as compared to our study.¹⁹ Also both the studies from California and Mexico City were conducted to assess cigarette sales to minors, the actual prevalence of loose cigarette sale might have been under reported. A similar study conducted by Eshawri et al in Karnataka produced similar results, showcasing 95.5% prevalence of loose cigarette sale among 155 tobacco vendors included in the study.³

Our study also documented higher prevalence of loose cigarettes at PoS in urban areas (60%) similar to another study conducted in Boston by Laws et al which stated that single and mentholated cigarettes were sold more often in urban communities.²² Most of the PoS selling loose cigarettes in our study were permanent kiosks (34.23%), temporary kiosks (29.71%) or street vendor (27.55%) type of establishments, all part of informal economic sector. Our study results also stated that sale of loose cigarettes at permanent shops/supermarkets was almost 10% lower as compared to mobile vendors, further supporting the evidence by Kulkarni et al

conducted in Karnataka that majority of loose cigarette sale in India is by the informal economic sector.³ The informal/unorganized sector comprising majority of the Indian economy; along with the non-availability of administrative data and employment details from such sectors, pose a serious challenge to tobacco control initiatives in the country. Specific laws need to be formulated for the legal recognition of such enterprises thereby regulating the sale of loose cigarettes in such set-ups.

In our study we found a significantly higher prevalence of loose cigarette sale among PoS selling tobacco products to minors (aPR = 1.07). Similar results were found in a study by Klonoff et al where it was found that singles were sold significantly more often to minors than to adults. Among the stores selling loose cigarettes 52.5% sold to both adult and minors while 40.6% sold only to the minors.²⁰ We also found a higher sale of loose cigarettes among PoS which sold cigarette packs with presence of health warning (aPR = 1.07). This finding is substantiated by the fact that vendors admit to interception of the exposure of buyers to health warning on cigarette packs, as a reason to sell loose cigarettes.³ Our study also established significantly higher prevalence of loose cigarette sale among PoS selling smoking aids and flavored chewable tobacco. This finding implies that the PoS facilitating the uptake of smoking through sale of loose cigarettes and smoking aids, are also promoting smokeless tobacco use among youth by selling flavored chewable tobacco as evidenced by Kostygina et al.²³

While comparing the characteristics of urban and rural PoS selling loose cigarettes we found that street/mobile vendors and service providers were more likely to sell loose cigarettes in urban as compared to rural area. Various types of PoS selling loose cigarettes also presented significant difference in their characteristics. These findings have several practical applications—one of the most important being the identification of PoS selling loose cigarettes during enforcement drives in the urban and rural areas of project states. With the anti-tobacco forces devoting majority of their time for enacting new legislation and fighting tobacco industry attempts to weaken existing laws, there is a need to reinstate significant amount of attention to implementation and enforcement activities. Despite the presence of monitoring and enforcement committee comprising a Special Task Force and/or the Police Department in the project states, the high prevalence of loose cigarette sale among the project states is undoubtedly an indicative of the need to enact a strict ban on such sales. Our study findings would serve as a guide to identify the focus areas of loose cigarettes sales and effectively implement tobacco control legislations in the four states.

The major strength of this study was that the multi-centric investigation did not rely on the responses of tobacco vendors alone but also included observation of the PoS by the field investigator to fill the pre-tested checklist. The study included a sufficient sample size to determine the factors associated with sale of loose cigarettes at PoS. However, there are few limitations to our study. Firstly, we used a purposive sampling technique that limits the generalizability of the results. Secondly, none of the States included in the study had a ban on loose cigarette sale in place. Therefore, we may have overestimated the prevalence of loose cigarette sale in India as there was no representation of States with an effective ban on loose cigarette sale.

5. Conclusion

The study estimated a high prevalence (93.05%) of loose cigarette sale at PoS in the study States. Our study also pinpoints the factors (PoS characteristics) that predicts loose cigarette sale by tobacco vendors. Several studies have highlighted the outcome of high prevalence, and therefore increased accessibility, of loose cigarette sale on addiction among adults and youth. The high prevalence of sale also indicates that purchasing prevalence may be high in the country.⁷ This accentuates the need for studies to determine trends of loose cigarette consumption in the country. Despite the limitations of our study, the data provided by us have clear policy implications. We recommend an immediate enforcement of country wide ban on the sale of loose cigarettes as a segment of the ongoing multipronged approach to tobacco control in the country. Implementation of vendor licensing would also be beneficial for the surveillance, monitoring and enforcement mechanism of the ban. Educating the tobacco vendors on the public health implications of loose cigarette sale is also of utmost importance.

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Conflicts of interest

The authors have none to declare.

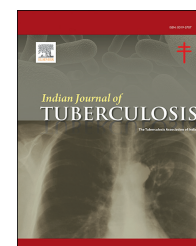
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Original article

Communicating risk: Status of health warning labels on various tobacco products in Indian market

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ABSTRACT

Background: Owing to the role of tobacco packaging as a strong medium of communication, display of health warnings on tobacco packs effectively impart health risks of tobacco consumption to those currently using or contemplating the use of tobacco.

Methods: This community based cross-sectional analytical study was conducted among 2044 tobacco product packs, each collected from a different PoS, to estimate the non-compliance of section 7, 8 & 9 of COTPA among various tobacco products and its association with the PoS characteristics. Data were collected by observation of PoS by field investigators and then purchase of a unique product from each vendor followed by a brief interview of the tobacco vendor.

Results: The study documented an absence of health warning label on 15.51% [95% CI: 13.99–17.13] of the total 2044 tobacco products collected. The non-compliance to 'quality of health warning picture' was lowest 5.96% [95% CI: 4.91–7.16] among the tobacco products with a health warning label. The multivariate regression model revealed that absence of health warning on tobacco product packs were higher among the PoS in rural area (aPR 1.38; 95% CI: 1.16–1.65; $p < 0.001$) and among street/mobile vendors (aPR 1.65; 95% CI: 1.22–2.24; $p = 0.001$). The PoS not displaying tobacco products (aPR 1.36; 95% CI: 1.08–1.72; $p = 0.01$), selling flavored chewable tobacco (aPR 1.67; 95% CI: 1.24–2.27; $p = 0.001$), not selling loose cigarettes (aPR 2.93; 95% CI: 1.94–4.43; $p < 0.001$) and with vendors not enquiring age proof (aPR 10.69; 95% CI: 1.59–72.09; $p < 0.001$) had higher proportion of tobacco products without health warning labels. A greater proportion of smokeless/local variety tobacco products (aPR 18.06; 95% CI: 12.31–26.51; $p < 0.001$) had absence of health warning label.

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Conclusion: The data provided by us have clear policy implications. We recommend regular enforcement activities to monitor the presence of health warning labels on tobacco product packs along and accurate printing of the same with adherence to the Ministry of Health and Family Welfare templates.

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1. Introduction

Tobacco packaging is a powerful platform for communication.¹ A cigarette pack is exposed not only when a person purchases cigarettes but also each time the smoker retrieves one from the pack which can account to over 7000 exposures in a year, especially among those smoking up to one pack a day.^{2,3} The tobacco packaging is also at frequent display among the non-users of tobacco, whether it be at Point of Sale (PoS), during interaction with a tobacco user or in the form of discarded tobacco packs.⁴ In the past, the industry has utilized tobacco packaging as a crucial marketing strategy primarily due to the stringent restrictions placed on conventional forms of marketing. Tobacco industry uses tobacco packaging as a vehicle for promoting their brand image as well as a means to increase appeal among women and the youth, thus influencing the purchase patterns in their favor.⁵

Tobacco use being a risk factor for six of the eight leading causes of mortality⁶ and the only legal product killing over eight million people in a year worldwide, it is essential to remove even the tiniest detail contributing glamour and attraction to the tobacco packs.⁷ Simultaneously, the health risks of tobacco use must be effectively imparted to those currently using or contemplating the use of tobacco. Owing to the role of tobacco packaging as a strong medium of communication, introduction of plain packaging (8) and display of health warnings can help us achieve the aforementioned goals.^{1,2,9}

The Article 11 of WHO Framework Convention on Tobacco Control (FCTC), a global treaty recommends its 182 signatories to display pre-approved clear visible and legible health warning-both textual and pictorial, on the tobacco product packs covering not less than 30% of the principal display area.^{1,2,9–11} Going a step further, the guidelines on Article 11 (packaging and labelling), and Article 13 (tobacco advertising, promotion and sponsorship), adopted by the Conference of the Parties in 2010 also proposes that parties should consider adopting plain packaging.⁸ In 2003, Government of India through section 7, 8 & 9 of the comprehensive legislation- Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Act [COTPA], prohibits the sale, supply or distribution of tobacco without appropriate warning labels on the package.^{11–13} Subsequently the Cigarettes and Other Tobacco Products (Packaging and Labelling) Amendment Rules in 2014 mandated a larger health warning label, occupying 85% of the principal display area of the tobacco package.¹⁴ Despite such efforts the industry continues to manipulate the health warning labels especially on smokeless tobacco products and bidis sold in the country.^{15,16} There is also global evidence on the

delay of the implementation of health warning policies due to industry interference.^{8,9}

There is ample evidence throughout the world suggesting the effectiveness of health warning on tobacco product packs.^{1,2,5,17,18} A systematic review including studies from 14 different countries on the display of health warning labels as per the requirements, states that overall compliance to the four indicators of location, size, label elements and text size of health warning was 80% in India.³ Several Indian studies have assessed the compliance of Section 7, 8 & 9 of COTPA among various tobacco products.^{11–14,17,19} Studies suggest that although the compliance to presence of health warning is good among Indian made cigarettes (96%), it is comparatively lower among bidi (60%) and smokeless tobacco (78.9%).¹⁹ However, there is a dearth of studies determining the predictors for the non-compliance to presence of health warning among tobacco products sold in India. Hence, this study aims to estimate the non-compliance of section 7, 8 & 9 of COTPA among various tobacco products and its association with the PoS characteristics.

2. Methods and materials

2.1. Study design

This community based cross-sectional analytical study was conducted among 2044 tobacco product packs, each collected from a different PoS in November, 2020. The study was a part of the ongoing project “Advancing tobacco control at national and sub-national level through Capacity building, MPOWER implementation and support to National Tobacco Control Programme (NTCP)”, a Bloomberg Initiative managed by The Union, in the project states of Meghalaya, Odisha, Puducherry and Telangana.

2.2. Study setting

Global Adult Tobacco Survey-2 (GATS 2) revealed that 28.6% of all adults (≥ 15 years) in India are currently using tobacco in any form. The prevalence of tobacco use in the project states of Meghalaya, Odisha, Puducherry and Telangana are 45.6%, 17.8%, 47% and 11.2% respectively. To address the tobacco menace, Indian government launched the National Tobacco Control Programme (NTCP) during the 11th Five-Year-Plan in the year 2007–08. The workforce for NTCP in each state comprises State Nodal Officer (SNO) at the Head; assisted by the State Consultant and District Nodal Officers (DNOs). Odisha, Puducherry and Telangana having five, seven and three Tobacco Cessation Centers respectively at District level;

facilitates for effective tobacco control in the states. No cessation centers are however functional in Meghalaya.

The states of Meghalaya, Odisha, Puducherry and Telangana are in the initial stages of implementing National Tobacco Control Programme, WHO MPOWER policies and other tobacco control measures. The project states are diverse with respect to their location, tobacco use prevalence and in the implementation of tobacco control measures. The proposed project is aimed to provide technical support to NTCP in the selected states and has been actively engaging in the same.

2.3. Sample size

Assuming an alpha error of 3%, confidence level of 99% and the non-compliance to health warning labels on tobacco product packs as 50%, the maximum sample size was calculated to be 1840 using OpenEpi version 3.01. Presuming a non-response rate of 10% among tobacco vendors, the final sample size of 2044 was considered for the study. The total sample size was divided between the selected districts of four project states. The PoS for the study were selected from two each districts of Meghalaya and Puducherry and five each districts of Odisha and Telangana using purposive sampling technique.

2.4. Study procedure

Data on state, area, type of vendor, items being sold along with tobacco, display of tobacco products, sale of tobacco products to minors, sale of tobacco products by minors, sale of flavored chewable tobacco, enquiry of age proof by vendors, sale of loose cigarette, status of health warning label, promotional inserts, 85% warning coverage, warning in white font on black background, quality of warning picture, warning in proper position and warning in local language on tobacco product packs were collected from the PoS of each district by field investigators using a structured and pre-tested checklist. PoS being defined in this study, as any store, be it a part of formal or informal sector of economy, from which tobacco products can be purchased.

Prior to data collection, a training session was organized for the field investigators to educate them on COTPA sections and the contents of the checklist. The field investigator first observed the PoS from a distance and then went on to purchase a unique tobacco product from each of the vendor. This was followed by a brief interview of the tobacco vendor at PoS. The width/length/circumference/diameter of the pictorial and text warnings were measured in centimeters with the help of a calibrated scale/measuring tape. Non-compliance to Section 7,8 &9 were assessed based on various indicators and criteria (Table 1). The data collection continued for a period of two week during which any queries by the investigators were addressed on a real time basis by the program officer of respective states.

2.5. Statistical analysis

The data were collected and entered using Epicollect 5 v4.1.5. Data analysis was done using STATA version 14 (Statacorp., Texas, USA). P value less than 0.05 was considered significant. During data analysis the independent categorical variables were expressed as proportion. The outcome variables like

status of health warning label, promotional inserts, 85% warning coverage, warning in white font on black background, quality of warning picture, warning in proper position and warning in local language on tobacco product packs was expressed as proportion with 95% CI. To express the association between characteristics of PoS and the absence of health warning label on tobacco product packs, bivariate and multi-variable log binomial regression analysis were done and prevalence ratio with 95% CI was used.

3. Results

A total of 2044 tobacco product packs were collected from different PoS for this study. Among the total tobacco products collected, 73.53% (1503) were Indian cigarettes/cigars; 13.94% (285) were smokeless/local varieties of tobacco products; 10.18% (208) were bidis and the rest 2.35% (48) were foreign made cigarettes/cigars. More than half (58.41%) of the tobacco products were collected from the urban area as compared to 41.59% in rural area. Nearly 32.44% of the tobacco products were collected from permanent kiosks. Among the total 2044 PoS from which tobacco products were collected 93.05% sold loose cigarettes and 66.05% sold flavored chewable tobacco. Age proof was enquired by the vendor, before selling tobacco products in only 0.83% of the shops (Table 2).

3.1. Non-compliance of health warning on tobacco product packs

The study documented an absence of health warning label on 15.51% [95% CI: 13.99–17.13] and presence of promotional inserts in 32.39% [95% CI: 30.38–34.44] of the total 2044 tobacco products collected (Table 3). The non-compliance to health warning label was least (1.93%) among Indian cigarettes/cigars and the highest (69.82%) among smokeless/local varieties of tobacco products. However, the presence of promotional inserts were highest (38.12%) among Indian cigarettes/cigars. Among the 1727 tobacco products with the presence of health warning on the tobacco pack, 12.04% [95% CI: 10.57–13.64] did not have 85% warning coverage, 33.87% [95% CI: 31.67–36.13] did not have warning in white font on black background, 56.98% [95% CI: 54.63–59.3] did not have warning in the local language and 54.66% [95% CI: 52.31–57] did not have the warning label in the proper position. The non-compliance to 'quality of health warning picture' was lowest 5.96% [95% CI: 4.91–7.16] among the tobacco products with a health warning label. Except for the 'absence of warning in proper position' all the other compliance indicators of pack warning status showed a significant difference between the smoked-form and smokeless form of tobacco products. The absence of health warning [PR = 10.41; 95% CI: 8.61–12.59], absence of 85% warning coverage [PR = 2.37; 95% CI: 1.63–3.45], absence of warning in white font on black background [PR = 2.72; 95% CI: 2.43–3.05], presence of poor quality picture [PR = 9.6; 95% CI: 7.98–11.56] and absence of warning in local language [PR = 1.78; 95% CI: 1.69–1.88] were significantly higher among smokeless tobacco products as compared to smoked forms. However, presence of promotional inserts [PR = 0.44; 95% CI: 0.33–0.58] was significantly higher among smoked tobacco products.

Table 1 – Indicators and criteria for assessment of non-compliance to Section 7, 8 & 9 of COTPA.

COTPA sections	Indicators	Criteria
Section 7	Health warning label 85% warning coverage	Absence of either text or picture was considered as non-compliance Health warning composed of 60% picture and 25% text was considered as compliance. Absence of either was considered non-compliance
Section 8	Warning in white font on black background Quality of warning picture Warning in proper position	Absence of warning text in white color on a black background was considered as compliance. A picture of least 4 cm length and 3.5 cm width and distinguishable from the background was considered compliant. Absence of either was considered non-compliance. Position of warning in such a way that none of its elements are damaged on opening was considered as compliance and otherwise as non-compliance.
Section 9	Warning in local language Promotional inserts	Absence of warning text in either English or local language was considered as non-compliance. Presence of any matter or statement that is inconsistent with, or detracts from the specified warning.

Table 2 – Characteristics of Point of Sale from which tobacco products were collected (N = 2044).

Variables	Frequency (n)	Percentage (%)
State		
Odisha	829	40.56
Telangana	613	30
Puducherry	302	14.77
Meghalaya	300	14.68
Area		
Urban	1194	58.41
Rural	850	41.59
Type of vendor		
Street/mobile vendor	663	32.44
Kiosks-permanent	603	29.5
Kiosks- temporary	576	28.18
Independent shop/supermarkets	202	9.88
Items being sold with tobacco products		
Food items	1132	55.38
Stationary/school supplies	72	3.52
Services	32	1.57
Combination of items	808	39.53
Display of tobacco products (Yes)	1119	54.75
Sale of Tobacco products to minors (Yes)	140	6.85
Sale of tobacco products by minors (Yes)	48	2.35
Sale of flavored chewable tobacco (Yes)	1350	66.05
Enquiry of age proof by vendors (No)	2027	99.17
Sale of loose cigarettes (Yes)	1902	93.05

3.2. Association of PoS characteristics with absence of health warning on tobacco product packs

Table 4 displays the association between characteristics of PoS with absence of health warning labels on tobacco packs. The sale of tobacco to minors (PR = 1.05; 95% CI: 0.78–1.41) and by minors (PR = 1.21; 95% CI: 0.96–1.53) were initially found to be associated with absence of health warning labels on tobacco packs but after adjusting for confounding factors the results were not statistically significant.

The variables with P value ≤ 0.2 after binary regression were included in the multivariate regression model. The multivariate regression model revealed that absence of health warning on tobacco product packs were higher among the PoS in rural area (aPR 1.38; 95% CI: 1.16–1.65; $p < 0.001$) and among street/mobile vendors (aPR 1.65; 95% CI: 1.22–2.24; $p = 0.001$). The PoS not displaying tobacco products (aPR 1.36; 95% CI: 1.08–1.72; $p = 0.01$), selling flavored chewable tobacco (aPR 1.67; 95% CI: 1.24–2.27; $p = 0.001$), not selling loose cigarettes (aPR 2.93; 95% CI: 1.94–4.43; $p < 0.001$) and with vendors not enquiring age proof (aPR 10.69; 95% CI: 1.59–72.09; $p < 0.001$) had higher proportion of tobacco products without health warning labels. A greater proportion of smokeless/local variety tobacco products (aPR 18.06; 95% CI: 12.31–26.51; $p < 0.001$) had absence of health warning label as compared to Indian cigarettes/cigars followed by foreign cigarettes/cigars (aPR 14.23; 95% CI: 8.35–24.24; $p < 0.001$) and bidis (aPR 10.7; 95% CI: 7.15–16; $p < 0.001$).

4. Discussion

Our study aimed to determine the non-compliance of Section 7, 8 & 9 of COTPA among various tobacco products. A low proportion of independent shops/supermarkets were enrolled in our study as compared to other type of vendors since we have defined PoS as any form of formal/informal sector of economy from which tobacco products can be bought and independent shops/supermarkets had much lower sale of tobacco products as compared to other vendor types. The study results indicate absence of health warning among 15.51% of the total 2044 tobacco products included in the study. Similar study by Chahar et al suggested that 25.6% of the total 98 tobacco products assessed in their study did not contain health warning on both sides of the pack.¹⁴ This difference between the studies can be attributed to the difference in study setting-the latter was restricted to a UT in northern part of India whereas our study included four states located in various parts of India. However, our study findings were reciprocated in the study by Goel et al which suggested 19.2% non-compliance to presence of health warning.¹⁹

Table 3 – Status of Section 7, 8 & 9 of COTPA on various tobacco products in selected Indian States.

Indicators	Type of tobacco product					P value ^a
	Total	Smoked			Smokeless tobacco/local varieties n (%)	
		Indian cigarettes/cigars n (%)	Foreign cigarettes/cigars n (%)	Bidi n (%)		
Absence of health warning label	317 (15.51)	29 (1.93)	19 (39.58)	70 (33.65)	199 (69.82)	<0.001
Presence of promotional inserts	662 (32.39)	573 (38.12)	5 (10.42)	40 (19.23)	44 (15.44)	<0.001
Tobacco products with presence of health warning label	N=1727	n= 1474	n= 29	n= 138	n= 86	
Absence of 85% warning coverage	208 (12.04)	125 (8.48))	11 (37.93)	49 (35.5)	23 (26.74)	<0.001
Absence of warning in white font on black background	585 (33.87)	412 (27.95)	14 (48.28)	86 (62.32)	73 (84.88)	<0.001
Poor quality of warning picture	103 (5.96)	31 (2.1)	15 (51.72)	95 (68.84)	71 (82.56)	<0.001
Absence of warning in proper position	944 (54.66)	806 (54.68)	14 (48.28)	83 (60.14)	41 (47.67)	0.185
Absence of warning in local language	984 (56.98)	743 (50.41)	29 (100)	128 (92.75)	84 (97.67)	<0.001
Significant p values were written in bold.						
^a Comparison of specific indicator between smoke and smokeless form of tobacco.						

Significant p values were written in bold.

^a Comparison of specific indicator between smoke and smokeless form of tobacco.

Although Indian cigarettes/cigars had good compliance for presence of health warning (98.07%) in our study, the compliance among other types of tobacco products was low especially among smokeless/local varieties of tobacco (30.8%). These findings in our study is substantiated by results of another study by Goel et al conducted among 78 tobacco product packs wherein 100% of the Indian cigars and 96% of the Indian cigarettes contained health warning on the tobacco package.¹⁹ The findings from the study by Chahar et al also indicated the presence of health warning among 96.67% of the cigarettes, similar to our study.¹⁴ The compliance for presence of health warning among bidi packets was 66.35% in the current study. Almost similar results were obtained in the study by Goel et al which suggested 60% compliance.¹⁹ Another study by Chahar et al showed 55.55% compliance among the 18 beedi packets included in their study.¹⁴ The difference in results can be explained by the larger sample size included in our study. The compliance to smokeless tobacco products were found to be 78.04% and 78.9% in the study by Chahar et al and Goel et al respectively.^{14,19} These findings varied from our study results due to the fact that we included the local varieties of tobacco products indigenous to the study states along with SLTs during our analysis for compliance assessment. The compliance among such local products were very poor bringing down the overall compliance among SLT in our study.

We found that 45.4% of the tobacco products in our study displayed warning in proper position while 43.02% of the packs had health warning printed in local language. Similar findings were reflected in the study by Ganganahalli et al conducted in Vijayapura district of North Karnataka which revealed that among 45% of the tobacco products, health warning was retained without any damage on opening the pack.¹² The findings on 'health warning in local language' in our study were held up by the findings from a cross-sectional study conducted in Odisha by Panda et al which stated 37.1% compliance to health warning in local language.¹¹ The least non-compliance in our study was documented for 'quality of

pictorial warning' indicator (5.96%) and these results are supported by another study conducted in a North Indian city, stating 7.7% non-compliance for picture quality.¹⁹

This was one of the initial studies assessing the PoS predictors of non-compliance to presence of health warning on tobacco product packs. Our study found that absence of health warning on tobacco product packs was higher among the PoS in rural areas and street/mobile vendors which forms the part of unregulated informal sector of economy and therefore is a cause for concern.²⁰ The concentration of bidi and SLT users in rural areas can result in a higher sale of such products at rural PoS. There is an evidence suggesting lower compliance and manipulation of health warning among SLT products in rural India.¹⁵ The other striking observation from our study was that those PoS which did not display tobacco products i.e. compliant to Section 5 of COTPA, had more sale of tobacco product packs without health warning. This could be one of the strategy to avoid attention during enforcement drives by authorities. Another noteworthy finding was the higher non-compliance to presence of health warning among PoS not selling loose cigarettes which further supports the argument that interception of the exposure of buyers to health warning on cigarette pack is the major reason to sell loose cigarettes.²⁰ As tobacco packs are being sold without pack warning the need for sale of loose cigarette decreases considerably.

The other major strength of the study was that this multi-centric investigation did not rely on the response of tobacco vendors alone but also included observations from the PoS by the field investigator to fill the pre-tested checklist. Specific indicators were used and criterion was set to check the compliance status of Sections 7, 8 & 9 of COTPA. The study included a sufficient sample size to determine association between PoS characteristics and the absence of health warning on tobacco packs. However, the limitation to our study was that we used a purposive sampling technique due to which more cigarettes were included

Table 4 – Factors associated with the absence of health warning label on tobacco product packs in selected Indian States.

Variables	Total tobacco products collected N = 2044	Absence of health warning n = 317 n (%)	PR (CI)	P value	Adjusted PR (CI)	Adjusted P value
Area						
Rural	850	198 (23.29)	2.34 (1.9–2.88)	<0.001	1.38 (1.16–1.65)	<0.001
Urban	1194	119 (9.97)	R ^a	–	–	–
Type of vendor						
Street/mobile vendor	603	102 (16.92)	2.38 (1.68–3.35)	<0.001	1.65 (1.22–2.24)	0.001
Kiosks-permanent	663	136 (20.51)	2.88 (2.07–4.01)	<0.001	1.36 (1.05–1.7)	0.019
Kiosks- temporary	576	41 (7.12)	R ^a	–	–	–
Independent shops	202	38 (18.81)	2.64 (1.75–3.99)	<0.001	1.6 (1.15–2.24)	0.006
Type of tobacco products						
Indian cigarettes/cigars	1503	29 (1.93)	R ^a	–	–	–
Foreign cigarettes/cigars	48	19 (39.58)	20.52 (12.42–33.89)	<0.001	14.23 (8.35–24.24)	<0.001
Bidi	208	70 (33.65)	17.44 (11.6–26.22)	<0.001	10.7 (7.15–16)	<0.001
Smokeless tobacco/local varieties	285	199 (69.82)	36.19 (25.04–52.31)	<0.001	18.06 (12.31–26.51)	<0.001
Items being sold along with tobacco						
Stationary/school supplies	72	5 (6.94)	R ^a	–	–	–
Food items	1132	179 (15.81)	2.28 (0.97–5.36)	0.06	0.89 (0.4–2)	0.783
Services	32	0 (0)	–	–	–	–
Combination of items	808	133 (16.46)	2.37 (1–5.6)	0.049	1.07 (0.48–2.38)	0.867
Display of tobacco products						
Yes	1119	87 (7.77)	R ^a	–	–	–
No	925	230 (24.86)	3.2 (2.54–4.03)	<0.001	1.36 (1.08–1.72)	0.01
Sale of Tobacco products to minors						
Yes	140	84 (60)	4.9 (4.09–5.88)	<0.001	1.05 (0.78–1.41)	0.765
No	1904	233 (12.24)	R ^a	–	–	–
Sale of tobacco products by minors						
Yes	48	24 (50)	3.4 (2.52–4.6)	<0.001	1.21 (0.96–1.53)	0.112
No	1996	293 (14.68)	R ^a	–	–	–
Sale of flavored chewable tobacco						
Yes	1350	244 (18.07)	1.72 (1.35–2.2)	<0.001	1.67 (1.24–2.27)	0.001
No	694	73 (10.52)	R ^a	–	–	–
Enquiry of age proof by vendors						
Yes	17	1 (5.88)	R ^a	–	–	–
No	2027	316 (15.59)	2.65 (0.39–17.79)	0.316	10.69 (1.59–72.09)	0.015
Sale of loose cigarettes						
Yes	1902	251 (13.2)	R ^a	–	–	–
No	142	66 (46.48)	3.52 (2.85–4.35)	<0.001	2.93 (1.94–4.43)	<0.001

^a Reference group.

Significant p values were written in bold.

in the study sample as compared to bidis and smokeless forms and hence limits the generalizability of the results.

5. Conclusion

Despite the plethora of evidence stating the effectiveness of health warning on tobacco product package in communicating adverse effects of tobacco (1,2,5,17,18), our study indicated an inadequate compliance to indicators for Section 7, 8 & 9 of COTPA especially among smokeless form of tobacco (30.18%). The study also identified the PoS characteristics that predicts the sale of products with absence of health warning on the tobacco product pack. Even with the limitations of our study, the data provided by us have clear policy implications. We recommend regular enforcement activities to monitor the presence of health warning labels on tobacco product packs along and accurate printing of the same with adherence to the Ministry of Health and Family Welfare templates.

Conflicts of interest

The authors have none to declare.

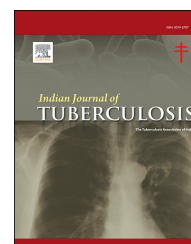
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Original article

An analysis of affordability of cigarettes and bidis in India

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ABSTRACT

Background: Easy affordability of tobacco products is one of the reasons for increased tobacco consumption. The study attempts to project the affordability of cigarettes and bidis from 2017 to 2025 in India.

Methods: The affordability was measured in terms of Relative Income Price (RIP) and the price of smoked tobacco products. RIP depends upon per capita gross domestic production (GDP) required to purchase 100 packets of cigarettes. The GDP per capita was calculated using data from National Accounts Division, Central Statistics Office, 2017. The price of cigarettes and bidis was calculated using data from WHO global report on tobacco epidemics, 2017. The projections were done from 2017 to 2025 assuming constant rise of per capita GDP as in the year 2017 (7%) and price rise of cigarette and bidis due to inflation (4%). Four and Six scenarios for cigarettes and bidis respectively, of different tax rises (0%–200%) in the years 2017–2025 were taken.

Results: Bidis were more affordable at lower increments in tax as compared to cigarettes. Affordability for cigarettes decreased to - 9.9% after a 100% increase in tax whereas affordability of bidi decreased to - 8.61% after a 200% increase in tax by the end of 2025.

Conclusion: Since bidis are more easily affordable than cigarettes, an adequate increase in taxes of bidi should be made to make it less affordable.

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1. Introduction

The consumption and affordability of cigarettes and bidis have a direct relationship with their prices. Affordability usually refers to the ability of an individual to purchase a product. The affordability of tobacco products is measured by Gross domestic products (GDP) per capita income and the

price of the tobacco product to be purchased.¹ Though cigarettes in developed countries are more expensive than in developing countries in terms of absolute prices but on average they are more affordable than the developing countries when we take per capita GDP as a measure of income.² Affordability can also be measured as the minute of labour or percentage of daily income required to purchase a pack of cigarette.^{3,4}

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India is home to 10% of the world's total smokers with bidi (85%) and cigarette (15%) as the two most widely used smoked tobacco products.⁵ The bidis are usually smoked by the people of lower socioeconomic status and cigarettes are smoked by the higher socioeconomic status.⁶ Sometimes smokers switch from cigarette smoking to bidi smoking when they are incapable of purchasing cigarettes because of their high price.

To reduce the consumption of tobacco, the WHO's Framework Convention for Tobacco Control in the year 2003 have called for increasing the taxes on tobacco products (Article 6).⁷ The WHO FCTC article 6 is implemented by guiding principles which are: the parties have sovereignty to establish their taxation policies; effectively raising tobacco taxes (inflation-adjusted) to lower tobacco consumption and prevalence; tobacco tax to be a source of revenue for government; taxation system and administration should be efficient and effective; economically efficient and reduce health inequalities; and protected from the commercial and vested interest. MPOWER strategy was introduced to assist in the country-level implementation of effective interventions to reduce the demand for tobacco, contained in WHO FCTC. The strategy measures are Monitor tobacco use and preventive policies, Protecting people from tobacco use, Offer help to quit tobacco use, Warning about the dangers of tobacco, Enforcing tobacco advertisement, promotion and advertisement bans, Raising taxes on tobacco. Further, the last component of the MPOWER strategy i.e. Raising taxes on tobacco products has been cited as the most important component for reducing the prevalence of tobacco use due to decreased affordability.⁸ Moving forward the tobacco taxation agenda globally the World Bank Group put forward strategies like attacking affordability to reduce tobacco consumption, raising the tax by quantity and not the price of cigarettes, building broad alliances and regional collaboration to boost results.⁹ Also there is consensus among tobacco control economists that increasing tax is an extremely effective way of reducing tobacco consumption.^{10,11} The Cigarette and Other Tobacco Product Act, 2003 and National Tobacco Control Program also aimed at reducing the prevalence of tobacco use in India.^{12,13}

A study by Blecher EH et al has found that a 1% increase in the relative income price (cigarette affordability) is expected to decrease cigarette consumption by 0.49–0.57%.² Guindon et al in their study concluded that the failure of countries to increase the price of cigarettes with the general price level of goods and services made cigarettes more affordable.⁴ He Y et al in his study suggested that the rate of price increase should exceed the rate of economic growth (in low and lower-income countries) which should outpace the inflation rate to make cigarettes less affordable thereby reducing tobacco use.¹⁴ However, there is little literature in India on the affordability of tobacco products. A study by Kostova D et al has found that the affordability of bidis in India is relatively high as compared to cigarettes.¹⁵ Another study by Goodchild M et al found that India has to significantly increase taxes on all forms of tobacco products to reduce the affordability of these tobacco products.¹

Till now various studies has calculated the affordability by taking data from past years. The current study tried to project the affordability of cigarettes and bidis in India by

extrapolating the GDP per capita and price of cigarettes and bidi till the year 2025. The results of this study can guide the decision-makers in deciding the rate of increase in taxes of cigarettes and bidis to reduce its affordability in future years.

2. Methodology

2.1. Calculating affordability of smoked tobacco products

The study measured the affordability of two commonly used smoked tobacco products (cigarette and bidi) using Relative Income Price (RIP) and the price of tobacco products adjusted for inflation. RIP is the percentage of per capita GDP required to purchase 100 packs of cigarettes.² Per capita GDP is an important factor, which enables a person to purchase things of his/her choice. The data for per capita GDP in this study is taken from the National Accounts Division, Central Statistics Office, 2017.¹⁶ The per capita GDP of the year 2016–17 was taken as the base year and we calculated it further till 2025 assuming it to increase at a constant rate (7%) from the year 2017.

The price of cigarettes and bidis is another factor that decided the affordability of cigarettes and bidis. The price data for cigarettes and bidis in this study is taken from the WHO global report on tobacco epidemics, 2017.⁹ We took the prices (in local currencies) of the most sold brand of cigarette and bidi from the report which are represented for 20 cigarette pack.¹² The price of cigarettes and bidis was segregated into the actual value of the product and the tax levied on that product. While projecting the prices till 2025, we considered the price elasticity (prevalence) as –0.2 and –0.45 respectively for cigarette and bidis.¹⁷ We also assumed percentage change in the cost of production (inflation) as 4% based on previous data.¹⁸

2.2. Development of scenarios

The current study increased the tax of cigarettes and bidis in four and six scenarios respectively based on an incremental increase in tax between 2016 and 17. The increments assumed for taxes in different scenarios were: scenario 1 (0%) scenario 2 (25%), scenario 3 (50%) and scenario 4 (100%) for cigarette whereas scenario 1 (0%) scenario 2 (25%), scenario 3 (50%), scenario 4 (100%), scenario 5 (150%) and scenario 6 (200%) for bidis. These were projected from 2017 to 2025. For calculation, the increase in per capita GDP was kept constant at 7%.¹⁶

2.3. Statistics

The data was entered and analyzed in Microsoft Excel 2019. The per capita GDP and price of cigarettes and bidis for the base year (2016–2017) were extrapolated till 2025 using constant GDP per capita growth rate of 7% and an inflation rate of 4% for change in the price of cigarettes and bidis. Relative income price was calculated separately for cigarette and bidi for each year from 2017 to 2025 in different scenarios. Absolute percentage reduction in affordability of smoking cigarettes and bidis was calculated year-wise till target year (2025).

Relative affordability for cigarettes and bidis were calculated from the base year 2017 till 2025.

3. Results

Table 1 shows the affordability of cigarettes and bidi in different scenarios assumed respectively from 2017 to 2025. With no change in tax of cigarettes and bidis but extrapolated per capita GDP, the RIP started decreasing from 0.174 to 0.149 for cigarettes and 0.011 to 0.009 for bidis with each passing year making affordability of these products easy. With a 100% increase in base tax, the RIP for cigarettes changed from 0.174 to 0.193 and for bidis, no visible change was noticed. With a further increase in tax (200%) for bidis, the RIP changed from 0.011 to 0.012, depicting a tax increase that started making affordability of bidis difficult.

Table 2 predicts the percentage change in affordability with increment in tax in different scenarios for the target year (2025). For cigarettes, a fall in affordability (negative percentage) can be seen in scenario 4 (100% tax), whereas for bidis, a fall in affordability can be seen in scenario 5 (150% increase in tax) and scenario 6 (200% increase in tax).

The relative affordability (the base year 2017, affordability = 1) of cigarette and bidi with each year till 2025 is depicted in Figs. 1 and 2.

4. Discussion

The current study attempted to project the affordability of smoked tobacco products from the years 2017–2025. The study considered four and six scenarios for the incremental increase in tax for cigarettes and bidis respectively and a

Table 1 – Projected Relative Income Price of cigarettes and bidis in different scenarios from 2017 to 2025 in India.

Year	Scenario 1		Scenario 2		Scenario 3		Scenario 4		Scenario 5		Scenario 6	
	cigarette	bidi	cigarette	bidi	cigarette	bidi	cigarette	bidi	cigarette	bidi	cigarette	bidi
2017	0.174	0.011	0.174	0.011	0.174	0.011	0.174	0.011	–	0.011	–	0.011
2018	0.170	0.011	0.172	0.011	0.173	0.011	0.176	0.011	–	0.011	–	0.011
2019	0.167	0.010	0.170	0.011	0.172	0.011	0.177	0.011	–	0.011	–	0.011
2020	0.164	0.010	0.168	0.011	0.171	0.011	0.179	0.011	–	0.011	–	0.011
2021	0.161	0.010	0.166	0.010	0.171	0.011	0.181	0.011	–	0.011	–	0.012
2022	0.158	0.010	0.164	0.010	0.170	0.010	0.184	0.011	–	0.011	–	0.012
2023	0.155	0.009	0.162	0.010	0.170	0.010	0.187	0.011	–	0.011	–	0.012
2024	0.152	0.009	0.160	0.010	0.169	0.010	0.190	0.011	–	0.011	–	0.012
2025	0.149	0.009	0.159	0.010	0.169	0.010	0.193	0.011	–	0.011	–	0.012

Table 2 – Percentage change in affordability of cigarettes and bidis in different scenarios in 2025 (compared to base year 2017) in India.

	Percentage Change in affordability					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Cigarettes	16.5%	9.6%	2.9%	–9.9%	–	–
Bidis	21.9%	18.4%	14.8%	7.3%	–0.56%	–8.61%

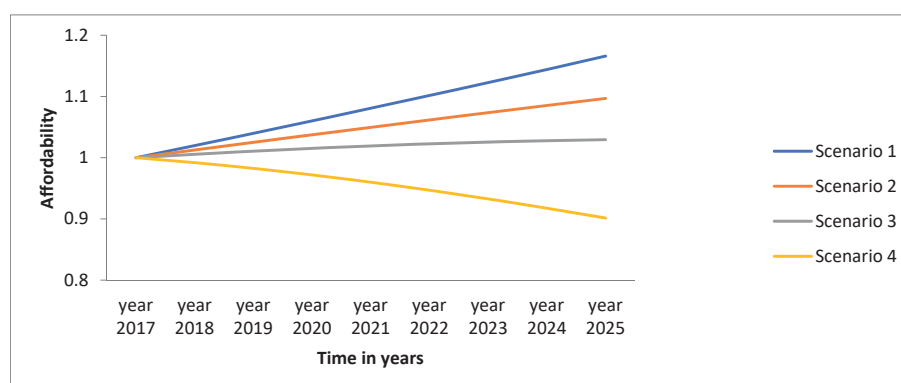


Fig. 1 – Projected relative affordability of cigarettes in different scenarios from 2017 to 2025 in India.

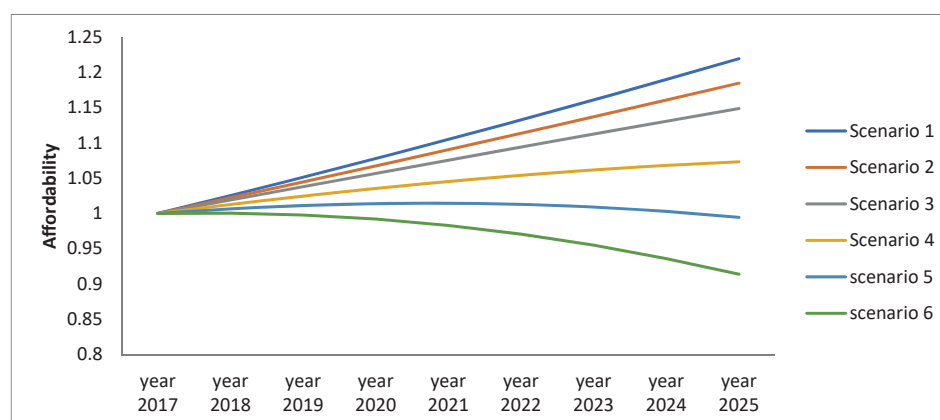


Fig. 2 – Projected relative affordability of bidis in different scenarios from 2017 to 2025 in India.

constant rise in inflation rate and per annum increase in per capita GDP for the study period. Our study found that affordability has a direct relationship with the tax on smoked tobacco products. The cigarettes become less affordable at a lower increase in tax as compared to bidi which needs a higher rise in tax to make them less affordable.

The affordability of tobacco products reflects the purchasing capacity of the person which in turn depends upon the price of the product and the per capita GDP. Our study found that with no change or a little increase in the tax on these products, doesn't decrease their affordability. A substantial change of at least 100% increase in the tax for cigarettes and a 200% increase for the bidis is the need of the hour to make these products less affordable in coming years. A study by He Y et al found the per capita consumption of cigarettes falls by 10% if RIP for cigarettes increases by 10% in High-income countries but less than 2% in lower-middle-income countries.¹⁴ A study by Jha P et al has also found that from 1990 to 2011, the affordability of cigarettes and bidis has increased by 175% and 300% respectively in India.⁵

Our study also found that the tax increase for cigarettes and bidis should be substantial as compared to an increase in the per capita GDP to overcome the effect of income growth on affordability. A study by Guindon G et al found that during the period from the years 2000–2018 the price of cigarettes and bidis didn't increase much as compared to the increase in income which made a real increase in prices of these products relatively flat, thus making cigarettes and bidi 40% and 20% more affordable than they were in 2000.¹⁹ A study by John et al, calculated that the affordability of purchasing cigarette and bidi is increasing owing to less percentage of per capita GDP required to purchase them.²⁰ A study by Nargis et al found RIP of bidi and cigarette higher in 2009 as compared to 2015 which was attributed to faster growth in an average price increase in cigarettes as compared to per capita GDP.²¹

One biggest challenge to be faced while controlling the affordability of cigarettes and bidi in India is that the people in India use a wide range of cigarette and bidi price categories. This wide range in price of these products can undermine the impact of an increase in tax as people will switch over to the

cheaper forms of cigarettes and smaller cigarettes (small in length) of the same brand to overcome the price rise. Further, a gross difference between the RIP of bidi and cigarettes in India can make a scope for the smokers to shift from cigarette smoking to bidi smoking. A study by Kostova D et al has found that the increased price of tobacco products alone is of no value in decreasing the affordability of tobacco products especially in the countries like Poland that had relatively affordable cigarettes owing to the country's high income despite having the highest price for the cigarettes.¹⁵

The main implication of this study is for the existing tobacco taxation policy to increase the tax considerably by at least 100% for cigarettes and 200% for the bidis to overcome the impact of rising per capita GDP in coming years on the affordability of these products. The study recommends making the taxation system uniform for all types of tobacco products with a higher tax levied on bidi to make them less affordable.

There are few limitations of the study. It forecasted the affordability based on the most common sold single brand of cigarette and bidi consumed in India. Further, the projections are also based on constant rates of inflation and per capita GDP increase till 2025.

5. Conclusion

The study supports the fact that a tax increase is undoubtedly the most effective measure to reduce the affordability of cigarettes and bidi in India. The affordability of cigarettes and bidis is to be considered while increasing the incremental increase in tax each year. More tax on bidis need to be considered as its affordability is more as compared to cigarettes else the cigarette consumers will shift to bidi and the change in the situation of tobacco use in the country will be negligible.

Conflicts of interest

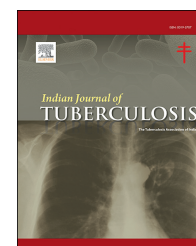
The authors have none to declare.

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Original article

Quality of life of tobacco users- A correlation with duration of use and nicotine dependence

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ABSTRACT

Background: Few studies have investigated the relationship between health-related quality of life and nicotine dependence, while none are from India. This study aims to explore the quality of life among patients with nicotine dependence and examine the clinical and demographic correlates of quality of life.

Method: This was a cross-sectional study in which 130 active nicotine dependence individuals were interviewed. Participants were selected using random sampling from the various clinical department of a tertiary health care setting of Northern India. Information about the quality of life and severity of nicotine dependence was assessed using SF-12 and Fagerstrom test for Nicotine Dependence questionnaire. One way ANOVA test compared the means among different tobacco users, while Pearson or Spearman tests assessed the correlation between the quality of life and nicotine dependence.

Results: The mean age of the respondents in the study was 42.72 (SD = 15.68); with 66% using smoking tobacco, 53.07% had a high dependence towards tobacco. We observed a negative correlation between the physical health component and years of regular use ($r = -0.503$, $p < .001$). There was also a negative correlation between FTND score and physical health component ($r = -.180$, $p = .049$).

Conclusion: Duration of tobacco use and the severity of nicotine dependence negatively influence health-related quality of life in treatment-naïve individuals.

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1. Introduction

Tobacco consumption poses several health hazards and is one of the causes of preventable deaths.¹ With over 80% of the 1.3 billion tobacco users worldwide living in LMICs accounts for

the heaviest burden of tobacco-related illness and death.² As per the Global Adult Tobacco Survey 2016–17, nearly 1.35 million deaths per year occur due to tobacco use. Tobacco contains thousands of harmful chemicals such as nicotine, tar, carbon monoxide, etc. As emphasized in previous studies, these toxic substances pose a risk for many conditions, including coronary artery disease, peripheral vascular disease, respiratory myocardial infarction, cancer, and stroke, which

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affect health and impede quality of life (QOL).^{3–5} The impaired activities of daily living, declined physical function, physical and cognitive impairment, and diminished overall health resulting from tobacco consumption directly impede quality of life.⁶ A negative impact of tobacco use, including death, the longer length of hospital stay (LHS), and costs of hospitalization, is though well documented in previous studies.^{7–10}

Reliable health-related quality of life measure thus becomes crucial to assess tobacco users' well-being and quantify the efficacy of interventions. Though evidence exists comparing and evaluating tobacco dependence with the quality of life in different parts of the world,^{11–17} very few could be reported from the low-middle-income countries.¹⁸ As far as India is concerned, no such research could be found.

The study thus aims to generate evidence for the correlation of tobacco dependence with quality of life among the Indian population to motivate them to change their attitude towards tobacco use for overall improvement in health. It will also promote tobacco users and practitioners to become more sensitive to the sub-clinical adverse effects of tobacco, thereby will improve the motivation to quit, cessation rates, and treatment outcomes.

2. Methodology

2.1. Study settings and population

This was a cross-sectional study, which included one hundred and thirty participants from a tertiary care hospital in Northern India from December 2020 to March 2021. The participants were selected by random sampling from, i.e., Cardiology, Neurology, Pulmonary Medicine, Drug de-addiction, and Otolaryngology department of tertiary health care setting of northern India.

The criteria for the selection of sample participants were:

2.1.1. Inclusion criteria

1. Participants with active nicotine dependence
2. Participants with any medical comorbidity
3. Age more than 18 years and either sex
4. Participants consented to the study

2.1.2. Exclusion criteria

Participants who require urgent attention for the medical problems.

2.2. Data collection

The researcher collected the data through individual interview of the respondents using a self-administrated questionnaire. It consisted of the following sections:

The first part of the tool included socio-demographic characteristics (age, education, address, employment,

locality), socio-economic, and comorbidity status. Participants with cardiac-related problems, diabetes, stroke, or cancer were included in the group with physical disorders in the study. While participants with depression, stress, etc., were included in the group with mental disorder.

The second part included tobacco use characteristics (type of tobacco use, age of initiation, years of regular use, and nicotine dependence). The Fagerstrom test for Nicotine Dependence (FTND) was used to assess the intensity of physical addiction to nicotine.^{19,20} Thus, participants were divided into three groups based on the FTND scores (a) highly dependent group (7–10), (b) Moderately dependent group (5–7), (c) minimally dependent group (1–4).

The last section of the tool included the SF-12 instrument to assess the quality of life.²¹ Although several validated questionnaires are available for evaluation covering various quality of life domains, we used the SF-12 questionnaire, formed from the Medical Outcomes Study (MOS) 36-item Short-Form Health Survey SF-36.

The SF-12 covers eight health domains as the SF-36 with fewer questions, making it a more practical research tool. The eight domains include 1) Physical functioning (PF), 2) Role-physical (RP), 3) Bodily pain (BP), 4) General health perceptions (GH), 5) Vitality (V), 6) Social functioning (SF), 7) Role-emotional, and 8) Mental Health.

Scores range from 0 to 100, with higher scores indicating better physical and mental health functioning. A score of 50 or less for PCS-12 determines a physical condition, while a score of 42 or less for MCS-12 indicated clinical depression. For the generation of physical and mental health composite scores, an algorithm was used to compare with normative data where:

1. The mean score was 50
2. Score >50 indicate better physical or mental health than the mean
3. Score <50 indicates worse physical or mental health than the mean.

2.3. Statistical analysis

The data obtained were analyzed using the Statistical Package for the Social Sciences, Version 25 (IBM Corp., SPSS statistics for windows, Armonk, NY, USA) for Windows (version 21) and Microsoft Excel 2010. The comparison between means among different types of tobacco users was calculated by One way ANOVA test. While Tukey HSD, Post Hoc test compared the means among different groups. The normality of the data was analyzed using the Shapiro Wilk test. The Pearson or Spearman tests analyzed the correlation between the quality of life and nicotine dependence. The correlation between demographic variables (income, education, locality, type of diagnosis, gender) and both components of SF-12 quality of life score was assessed using point biserial correlation test. The Stata version 25 was used for analysis, and the *p*-value less than 0.05 was considered statistically significant.

2.4. Ethical statement

The study protocol was approved by the Research Ethics Committee, PGIMER Chandigarh. The consent was obtained from the participants after briefing in detail about the nature and purpose of the study. The data was collected and analyzed anonymously, and confidentiality was assured.

3. Results

The study initially comprised 140 individuals using tobacco in any form. Ten subjects were excluded because of missing data and other reasons, and thus the study included 130 subjects in total. The mean age of the study population was 42.7 years, and 98.5% were male. Table 1 presents the scores for a physical and mental component summary of eight domains of the SF-12 Quality of Life Questionnaire expressed in mean and standard deviation. The mean score for physical and mental components were 40.81 ± 10.28 and 35.51 ± 10.95 , respectively, indicating the poor physical quality of life of included participants and suffering from clinical depression.

Table 2 present the comparison of means where significant difference among the three groups of tobacco users was observed for the physical component of quality of life. Besides, while assessing the difference within and between groups, the results were statistically significant between dual users and

smokers, whereas no such comparison could be found in other comparison groups.

Table 3 represents the correlates of quality of life (both PCS and MCS) with clinical and demographic characteristics such as age, gender, locality, diagnosis (i.e., the physical or mental comorbidity), socio-economic status, and nicotine dependence of the participants.

A statistically significant correlation between physical health component and age ($r = -.605$, $p < .001$) indicates a decline in the physical health of tobacco users with an increase in age. With improvement in knowledge with education, the population presented improved physical quality of life, whereas employed participants had improved mental quality of life. The correlation between the quality of life for (PCS and MCS) and disease was statistically significant in the study, and the participants with physical comorbidity presented to have impaired quality of life. At the same time, the study could not found any such correlation for gender and locality, income, and age of initiation.

Additionally, to address how the population dependent on tobacco have impacted their quality of life, it was important to address this relationship. After the assessment, a negative correlation was observed between the physical health component and tobacco dependence variables such as years of regular use ($r = -.503$, $p < .001$) and nicotine dependence score ($r = -.180$, $p = .049$) respectively. Further, the physical health of tobacco users was found to be affected with more years of regular use and nicotine dependence.

Table 1 – Characteristics of participants in the study (N = 130).

Characteristics	Mean \pm SD/n (%)
Age (years)	42.72 \pm 15.68
Years of tobacco use	19.65 \pm 14.014
Age at initiation	22.38 \pm 8.53
FTND Score	6.5 \pm 1.59
High Dependence	98 (75.38)
Low Dependence	32 (24.61)
Gender	
Male	128 (98.46)
Female	2 (1.54)
SES	
Above 15kpm	65 (50)
Below 15kpm	65 (50)
Locality	
Urban	66 (50.77)
Rural	64 (49.23)
Comorbidity	
Physical Disorder	70 (53.84)
Mental Disorder	60 (46.15)
Employed	
Yes	119 (91.54)
No	11 (8.46)
Education Level	
Literate	113 (86.92)
Illiterate	17 (13.08)
Physical Component	40.81 \pm 10.28 (22.72–60.59)
Summary (PCS)	
Mental Component	35.51 \pm 10.95 (17.71–60.09)
Summary (MCS)	

FTND-Fagerstrom Test for nicotine Dependence, kpm-thousand per month, SES-Socio-economic status.

4. Discussion

The physical and mental health component score assessed using the SF-12 questionnaire indicated that tobacco users had a poor overall quality of life and were suffering from clinical depression. Besides, the study suggests that the increase in age, years of tobacco use, and a higher level of nicotine dependence were directly correlated with the physical health component of quality of life.

World Health Organization (WHO) defines Quality of Life as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns.²² Therefore, the health status of the individuals, including physical and mental components of quality of life, becomes even more important from the patient's perspective. It is also necessary to assess the impact of harmful lifestyles such as nicotine dependence on tobacco user's life. Thus the current study attempted to address such a relationship, and as expected from previous literature on the direct impact of nicotine dependence on the quality of life,^{23–25} the results were below mean health score for both the components of quality of life (physical and mental) among tobacco users.

As evident from the literature on the influence of various socio-demographic characteristics on quality of life,^{26–32} the current study also found poor quality of life among individuals with low education and similarly tobacco dependence variables such as high nicotine dependence and more years of tobacco use were associated with lower quality of life.

Table 2 – Differences of means among different form of tobacco users.

Quality of Life	Smokers (1) n = 86	SLT users (2) n = 29	Dual Users (3) n = 15	F (p)	Post hoc analysis
PCS	38.71 ± 9.6	42.51 ± 9.87	49.55 ± 9.98	8.493 (<.001)	3>1 > 2
MCS	36.68 ± 11.12	32.65 ± 9.58	34.34 ± 12.03	1.578 (.210)	–
PCS-Physical Component Score, MCS-Medical Component Score.					

Table 3 – Correlation of SF-12 Quality of life components summary score with demographic and nicotine dependence variables.

	PCS		MCS	
	r	p	r	p
Age	-.605	<.001	.198	.024
Gender	.020	.824	-.086	.333
Locality	.048	.591	.122	.166
Diagnosis	-.527	<.001	.306	<.001
Education	.242	.005	-.080	.368
Income	-.129	.144	.119	.177
Occupation	-.096	.277	.177	.031
Age of Initiation	-.209	.017	.170	.053
Years of tobacco use	-.503	<.001	.004	.966
FTND	-.180	.049	-.147	.108
PCS-Physical Component Score, MCS-Medical Component Score.				

A significant effect on the physical health component was found on assessing the relationship with other demographic variables such as age. That is individuals who were older presented reduced scores on this domain. It was similar to findings in an earlier study³³ where the scores for quality of life domains declined as the age increased. Therefore, preventing the initiation of tobacco use at an earlier age is the most effective way of dealing with tobacco burden and complications later.³⁴ There is a need to increase awareness of the ill effects of tobacco and other interventions among the young population to keep them away from its use.

Another significant finding of our study was that individuals with higher FTND scores presented poor physical health scores. The impaired physical health may be related to diseases developing in these individuals with continuous regular intake of tobacco and other factors like no commitment towards cessation and, lack of awareness hindering the cessation process. Thus it becomes more important to change the behavior of tobacco users with motivation, education, awareness, counselling, and other sources to reduce the development of nicotine dependence. Besides, the need is also to strengthen all initiatives like programs, laws on tobacco cessation for overall improvement in health-related quality of life.

5. Conclusion

A positive association between health-related quality of life and tobacco dependence was observed in the study, which underscored the need for strengthening tobacco cessation services, especially for younger age groups. The policymakers, implementers, and educators should design effective need-

based cessation programs which can be easily imparted in contextual settings of limited resources.

5.1. Limitations and future perspective

As the participants were selected from a tertiary care setting where the presence of comorbidities could not be controlled, the physical and mental comorbidities of the selected participants were confounding factors affecting the assessment of correlation between nicotine dependence and quality of life. Secondly, the study was single centric, which compromise the generalization of study results. We recommend conducting similar research in other settings and using a control group to reduce the confounding bias.

Authors' contributions

PD was responsible for data collection, data analysis, preparation of preliminary drafts, and final manuscript. AG, SG was involved in the refinement of study tool and manuscript drafts. All authors read and approved the final manuscript.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

This study was granted ethical approval from the Institutional Research and Ethics Committee of the Post Graduate Institute of Medical Education and Research.

Confidentiality and anonymity of the participants were assured and maintained as their personal information like name, and contact number was not recorded.

Conflicts of interest

The authors have none to declare.

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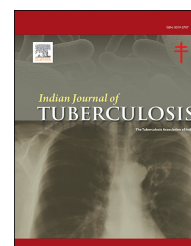
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Original article

Raising the legal age for purchase and use of tobacco to 21 years: A step towards tobacco endgame in India

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ABSTRACT

Background: Globally, policies to counter targeting of young people by the tobacco industry have proven to be effective and a key determinant of reducing the magnitude of tobacco epidemic. This paper presents a case for increasing the minimum legal age to access tobacco to 21 years in India.

Method: We analysed the two rounds of nationally representative Global Adult Tobacco Survey (GATS) data: GATS-1 (2009–10) and GATS-2 (2016–17). We segregated data for two categories of tobacco consumption (smokers and smokeless tobacco users) at the age of initiation (<18, 18–21 and >21 years) and analysed for their consumption patterns found during the time of the survey (current daily, current less than daily, former and ever users) from GATS-2 (2016–17). Further, we compared the projections from the sub-national level analysis for youth initiating tobacco use before 21 years and change in the prevalence of overall underage tobacco users between the two survey rounds.

Result: Nearly 77% of smokers and 75% smokeless tobacco users in India initiate tobacco use before or until the age of 21 years. Many large, most populous and high tobacco prevalence states had higher than national mean (14.1%) of youth initiating into tobacco use before 21 years. Overall, as compared to GATS-1, there is a perceptible increase in the prevalence of underage tobacco use in most states.

Conclusion: Global best practices and the significant number of young tobacco users in India call for increasing the age of access to tobacco from the current 18 years to 21 years. This will help in reducing the overall adult tobacco use prevalence in the longer run in India.

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1. Introduction

There is growing evidence that shows that increasing the age of sale, purchase and use of tobacco products to 21 years will help to prevent underage populations from ever starting to consume tobacco and overall in the long-run reduce the deaths, disease and health care costs induced by tobacco use. Increasingly many jurisdictions have policies that strengthen protecting youth from early initiation and denormalise tobacco use. Tobacco companies, whether domestic or international, actively seek to promote the use of their products market to youth, and recruit “replacement” users to protect and increase their profits. Globally addiction studies have proven that the younger a person starts to use tobacco regularly, stronger is their addiction and giving it up becomes more difficult.¹

Increasing the minimum legal age to access tobacco to 21 years will help counter the efforts of the tobacco companies to target young people at a critical time when many move from experimenting with tobacco to regular use. By delaying initiation to tobacco use completely reduces the intensity of addiction and prevents lifetime addiction to nicotine among youth and promote smoking cessation.²

Nearly all tobacco users start as adolescents or young adults, and these age groups are heavily targeted by the tobacco industry. Research shows that youth obtain their tobacco products from individuals that are under the age of 21 years.³ One of the most noticeable benefits observed from age restriction policies that have already passed is that it places legal purchasers beyond the social groups and peers. This significantly reduces the transfer to tobacco from one underage user to another which leads to a disruption of transmission.

To counter this perverse industry tactic, several countries and jurisdictions have since progressed towards adopting a higher age limit to sale, purchase and use. Singapore raised the minimum legal age from 20 to 21 years for the purchase, use, possession, sale and supply of tobacco products on January 1, 2020.⁴ Guam, Honduras, Kuwait, Samoa, Sri Lanka, Uganda have set the minimum legal age of sale and purchase (not use) at 21. Most countries in the world have the minimum purchase age set at 18. But, the age limit for most does not cover the use and possession of tobacco products which include countries like Australia, Malaysia and Indonesia.⁵

Among these United States is a major producer of cigarettes and beneficiary from global tobacco trade begun the process of increasing the minimum purchase age to 21 years at federal and country level, and few other jurisdictions have made modest increase from 18 and 19 years. A March 2015 report by the Institute of Medicine (IoM) (renamed National Academy of Medicine in 2018) strongly recommended that raising the tobacco age to 21 will have a substantial positive impact on public health and save lives.⁶ The IoM study found that increasing the tobacco age will significantly reduce the number of youth who start to tobacco use; reduce future health burden and disease; and immediately improve the health among underage tobacco users and deter their peers. Using the IoM report as evidence, the USA adopted federal legislation on 20

December 2019 which effectively raised the age of tobacco use, purchase and sale to 21.⁷ The legislation (known as “Tobacco 21” or “T21”) became effective immediately, and put a responsibility on all retailers to not sell any tobacco product to anyone under 21.^{6,7}

India's massive tobacco industry - the two leading cigarette companies, the highly unregulated bidi trade and a massive underground SLT sector, continue to count on the aspirations of millions of youth who would like to graduate to more attractive tobacco products brands. While India has made significant strides in reducing the impact of tobacco use on youth, emerging trends like electronic cigarettes and “vaping” represent a new frontier for the tobacco industry to gain a foothold and secure its next generation of nicotine addicts.^{8,9} The several industry malpractices that are unique to India threaten to overturn conventional tobacco control strategies, which include: industry's pressure to deter adoption of a rational tax strategy; absence of vendor licensing; sale of single stick and a large variety of kiddy packs for cigarettes; weak packaging regulations for bidis and SLT products^{10,11}; contradictory legislations that permit trademark migration across products by tobacco brands which leads to extensive surrogate advertisement and promotion; and absence of effective cessation services.¹² With this background, this paper presents a case for increasing the legal age for sale for the access of tobacco to 21 years in India.

2. Methods

This study employed analysed the two rounds of nationally representative Global Adult Tobacco Survey (GATS) household surveys: GATS-1 (2009–10) and GATS-2 (2016–17). The details of methodology for GATS-1 and 2 are discussed in detail elsewhere.^{9,13}

From GATS-2 (2016–17), prevalence of tobacco users was calculated for the two categories (smokers and smokeless users) at the age of initiation (<18, 18–21 and >21 years) and gender-wise analysis was carried out for their consumption patterns (current daily, current less than daily, former and ever users) for 20–34 years' population found during the time of the survey. In the present analysis, ‘age of initiation’ of tobacco consumption (in any form) was expressed in terms of the age at which the survey respondent started consuming tobacco. Only those cases were included, for which responses to the question enquiring age of initiation were given. Moreover, those consuming before or until the age of 18 years during the survey were categorized as ‘underage users’. Further, the sub-national level analysis was carried out for calculating the mean age of youth initiating into tobacco use before 21 years and compared with the national average. Another aspect that was explored was change in the prevalence of overall underage tobacco users at the sub-national level from GATS-1 to GATS-2.

The weighted GATS data was extracted for GATS-1 and 2, India, which is available for public use from the Global Tobacco Surveillance System.¹⁴ Statistical Package for the Social Sciences (IBM SPSS Statistics for Windows, Version 21.0; Armonk, NY: IBM Corp., USA) was used to carry out data analysis.

Age of initiation in years	Total current daily smokers %, (n)		Total current less than daily smokers %, (n)		Total former smokers %, (n)		Total ever smokers %, (n)	
	M	F	M	F	M	F	M	F
<18	33.34% (52,85,622)	21.27% (1,13,821)	30.86% (3,42,997)	19.69% 9,692	46.26% (8,12,699)	26.31% (39,127)	34.41% (64,41,318)	22.19% (1,62,640)
18–21	45.27% (71,73,352)	45.86% (2,45,408)	33.97% (3,77,560)	15.08% 7,420	34.37% (6,03,728)	34.82% (51,789)	43.56% (81,54,640)	41.56% (3,04,617)
>21	21.39% (33,91,444)	32.87% (1,75,872)	35.16% (3,90,860)	65.23% (32,100)	36.44% (4,22,960)	20.89% (3,40,303)	22.02% (41,22,607)	36.26% (2,65,783)
Total	100% (158,50,418)	100% (5,35,101)	100% (11,11,417)	100% (49,212)	100% (17,56,730)	100% (1,48,727)	100% (187,18,565)	100% (7,33,040)
M-Males. F-Females. T-Total.								

Table 2 – Percent distribution of smokeless users aged 20–34 years at tobacco use initiation according to use pattern, GATS 2 India, 2016–17.

Age of initiation in years	Total current daily smokeless users (n)			Total current less than daily smokeless users (n)			Total former smokeless users (n)			Total ever smokeless users (n)		
	M	F	T	M	F	T	M	F	T	M	F	T
<18	36.99% (149,83,418)	34.99% (31,29,651)	36.77% (181,13,069)	31.13% (6,08,562)	53.59% (1,79,458)	36.66% (7,88,020)	30.11% (6,00,294)	53.79% (3,51,786)	35.96% (9,52,080)	37.00% (161,92,274)	38.00% (36,60,895)	36.73% (198,53,169)
18–21	40.03% (162,14,570)	29.24% (25,57,471)	38.11% (187,72,041)	35.33% (6,41,043)	30.24% (1,01,255)	34.53% (7,42,298)	36.86% (7,34,978)	30.82% (2,01,580)	35.37% (9,36,558)	39.69% (175,90,591)	29.38% (28,60,306)	37.84% (204,50,897)
>21	22.98% (93,09,217)	34.99% (30,60,544)	25.11% (123,69,761)	31.13% (5,64,925)	16.17% (54,165)	28.80% (6,19,090)	33.03% (6,58,626)	15.39% (1,00,620)	28.67% (7,59,246)	23.77% (105,32,768)	33.02% (32,15,329)	25.43% (137,48,097)
Total	100% (405,07,205)	100% (87,47,666)	100% (492,54,871)	100% (18,14,530)	100% (3,34,878)	100% (21,49,408)	100% (19,93,898)	100% (6,53,986)	100% (26,47,884)	100% (443,15,633)	100% (97,36,530)	100% (540,52,163)
M-Males, F-Females, T-Total.												

between the survey periods were generally too meagre to show an overall reduction in the tobacco use prevalence in India. An increase in the prevalence of tobacco use between the two GATS surveys (2009 and 2016) of up to 25% is seen in Mizoram, West Bengal, Jharkhand, and Odisha; 25–50% in Rajasthan, Nagaland, Tripura, Madhya Pradesh, and Karnataka; 50–100% in Delhi, Gujarat, Maharashtra and Puducherry; and >100% in Jammu and Kashmir, Uttarakhand, Uttar Pradesh, Arunachal Pradesh, Manipur, Meghalaya, Assam, Goa, and Tamil Nadu.

4. Discussion

Based on our assessment and in line with India's commitment to international recommendations of the WHO's Framework Convention to Tobacco Control (WHO-FCTC),¹⁷ raising the age to 21 years for tobacco sale, purchase and use will impact the prevalence of tobacco use among underage and young people by making its use less visible, acceptable, accessible, and eventually less affordable in society. Given the described diffusion of tobacco use patterns (eg: from parents to children, and between peers and cohorts of children and adolescents) decreases in the tobacco use prevalence among adults might be the prelude to similar decrease in young people and other vulnerable populations. Public health advocates cannot take for granted that policies will have similar effects on tobacco use in young people as they have had on adult users. For example, while tobacco taxation is a globally accepted best policy buy, in India taxing tobacco has historically been at a suboptimum level, which has given negligible revenue and health gains. While assessments of tobacco taxation policies have mostly confirmed the expected effect: higher prices lead to lower rates of tobacco use initiation, this may not be a political or practical reality for India, given the massive local production of tobacco products. While other policies that influence and deter tobacco use and initiation among youth are less studied, social denormalisation and barriers to access may be additional strategies that need to be added to the public health arsenal.⁶ Underage users and youth circumvent conventional measures to access tobacco products (peer to peer exchange). To effectively reduce early initiation and use India would need more non-tax tobacco control measures e.g. vendor licensing besides raising the age to 21 years, that will lower initiation rates and eventually lead to a decline in overall adult prevalence and produce substantial long-term health and economic benefits.¹⁵ Future evaluation of policies must specifically focus on data of tobacco use collected from children and youth which goes beyond the current tobacco prevalence-specific (GATS, GYTS) and health surveys (NFHS, AHS) and provides focussed district-specific data, which can help design strategic grassroot-specific interventions, programmes and policies.

Although India's national and state legislations have a deep history of protecting underage users from tobacco use,¹⁵ and yet the age of initiation and the numbers of underage tobacco users is comparable to the most poorly performing nations.¹⁸ Only Goa has raised its legal age of purchase to 21 years and has the lowest adult tobacco use in India with only 3.1% of its population starting tobacco use before the age of 21 years.¹⁵

Raising the legal purchase age of tobacco to 21 years old has shown some promising effects on the reduction of smoking in the places that have implemented it so far and have also garnered greater public support as well.¹⁹

Our comprehensive analysis of tobacco use in India's youth mirrors the annual 1.3 million deaths.⁹ We find in our counterfactual analysis that had India adopted a comprehensive legislation to raise age of sale, purchase and use to 21 years in 2012, along with sustaining implementation of existing policies (public smoking and tobacco-free institution bans, strong health warnings and advertising bans in traditionally popular and new forms of media at the strictest level), a significant reduction would have been achieved. These estimates highlight the urgent need for India to move toward an accelerated adoption of raising the age to 21 years along with new complementary policies like vendor licensing introduced by some states and jurisdictions, and tobacco-free recruitment (like the one initiated by the state of Jharkhand on April 1, 2021)²⁰ which will not only stop the roll back on gains made thus far but significantly reduce underage prevalence of tobacco products in the country. There is urgent need for additional efforts to meet the legal mandate of protecting minors from exposure to tobacco (section 6 of Cigarette and Other Tobacco Products Act, 2003 prohibits sale of tobacco products to minors)²¹ and reach the ambitious target of a tobacco-free society.

Increasing the minimum sale age for tobacco products to 21 is an important strategy in reducing tobacco use among youth. Such a policy is an important signal for changing social norms and denormalise tobacco use and tobacco products. Raising the tobacco age to 21 can become part of a comprehensive strategy alongside other measures, including tobacco-free educational institutions, tobacco-free media, smoke-free public places, sustained higher prices of tobacco products, and well-funded mass media campaign backed by cessation programmes.

5. Conclusion

India has a significant number of young tobacco users in spite of the unambiguous ban on sale of tobacco products to minors in the country. Global evidence and experts suggest that increasing age of access to 21 years shall reduce adult smoking prevalence in the long term by having a larger drop in youth smoking prevalence. Besides full compliance with WHO-FCTC and COTPA, 2003 which cover the best buys in tobacco control, Government of India should consider increasing the age of sale, purchase and use of tobacco to 21 years.

Authors' contributions

PL had the original idea and wrote the first draft of the study. SK and AD contributed to the data analysis and interpretation. AY and SK contributed significantly to the subsequent drafts of the study. All authors approved the final draft of the paper for submission.

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Conflicts of interest

The authors have none to declare.

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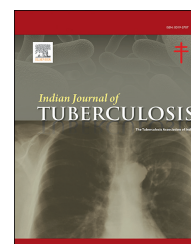
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Original article

Systematic content analysis of online information on herbal smoking products

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ABSTRACT

Background: Herbal smoking products (HSPs) are marketed as a safer alternative to tobacco. These are easily available at affordable prices in the online retail websites. This study aimed to analyze the HSP-related informational content available in the most popular online platforms.

Methods: Google, Yahoo, Bing and YouTube online platforms were searched for HSP related content using appropriate keywords. First 50 search results were retrieved and screened for potential eligibility. The included web-pages were categorized as video and still records. From each included record, information regarding source, primary theme, health benefits/hazards and tone was abstracted. Additionally, video production quality, like ratio and video power index was also computed for each video record. All included records were subjected to descriptive statistics and Chi-square test, as appropriate. Level of significance was set at <0.05. **Results:** 174 still and 94 video records were included. 35.6% of the included still records were sourced by manufacturers/suppliers while that of scientific origin was 12.1%. 83% of the video-records were posted by general public. About 90% of the included records had not mentioned anything regarding age restrictions. 67.8% of the still records and 87.2% of the video records promoted the use of HSPs.

Conclusions: The informational content presented online is huge, mostly posted by the general public without any scientific rationale and exclusively favors the use of HSPs. There is no age restriction as to who can access the information, making this content easily accessible to people of all ages. Such spread of information may mislead the public in adopting the smoking of these herbal products. Since HSPs may act as a potential gateway to tobacco smoking, there is an urgent need to regulate the content available online.

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1. Introduction

The use of herbs in various forms like tea, syrup, essential oils and tablets has been suggested in ancient Indian, Chinese and Greek medicinal practices.¹ However, smoking these herbs in the form of cigarettes, bidis or hookahs is believed to result in deleterious health outcomes.^{2–4} The nicotine-free content of herbal smoking products (HSPs) is used to propagate the sale of these products as safer alternatives to conventional smoking products.⁵ But apart from nicotine, other chemicals like carbon monoxide, nitrosamines, polyaromatic hydrocarbons etc., are reported to have health hazards, making HSPs as harmful as tobacco.^{6,7} Moreover, the DNA damage response caused by smoking herbal products was similar to that of conventional smoking products, indicating their hazardous carcinogenic potential.⁸ Besides, HSPs closely mimic conventional smoking products in the way they are smoked, which potentiates the use of HSPs as a probable precursor/gateway to the habit of smoking tobacco products.

In the past few decades, internet use has been instrumental in bridging the gap between the known and the unknown. Individuals worldwide are exposed to various online platforms (like Google, Yahoo and Bing) where information can be easily searched and accessed. YouTube is another popular online platform wherein one can post/share/view videos on any topic of interest.⁹ Besides, the easy availability and increased affordability of smartphones and enhanced accessibility of internet services have allowed consumers to easily access digital content.¹⁰

A recent content analysis of the retail web pages has reported that HSPs are readily available online at affordable prices and attractive variants.⁵ Since the way information is framed and reported to its users significantly affects health-related knowledge, attitudes and practices,¹¹ it becomes necessary to assess and analyse the available online information regarding HSPs. Thus, this study was planned to systematically analyse the web-based informational content available on Google, Yahoo, Bing and YouTube regarding HSPs.

2. Methodology

2.1. Conceptual framework

The objective of this content analysis was to systematically assess the online information in terms of who (source – Manufacturer/Mass media – General public or journalist/Scientific Community/Public Records – patents/Govt. orders) is presenting what (overall tone – Discourage use/promote use/neutral) about HSPs, to whom (mention of age restrictions/verification), why (primary theme – to present facts/promote use/review a product/social networking/discourage use) and how (health impact-benefits/hazards, headline characteristic and photo/video characteristic) (Fig. 1). The overall tone implies the apparent inclination of the content available on the internet. It may be positive or negative if the information presents an overall inclination towards discouraging or promoting the use of HSPs respectively. The main aim of the informational content web page was termed as the 'Primary

theme' and was categorised as promoting use of HSPs, discouraging its use, social networking, legal/patent registration or neutral for static records. For video records, Primary theme was categorised as promote use, discourage use, product review or neutral.

2.2. Search strategy

Google, Yahoo, Bing and YouTube were searched in February 2021 using the following keywords: 'herbal cigarettes', 'non-tobacco cigarettes', 'non-nicotine cigarettes', 'organic cigarettes', 'no tar cigarettes', 'herbal bidi' and 'herbal hookah'. To nullify any effect of past searches made, cookies/cache were deleted before the commencement of every search. For each of the seven keywords, the first 50 search results were retrieved from the four online platforms. From the list thus obtained, duplicates were removed, and remaining records were screened for possible inclusion based on the eligibility criteria by two authors ('SS' and 'PY'). Discrepancies, if any, were discussed with the third author ('AG1') and a consensus was sought.

2.3. Eligibility criteria

All scientific articles/reports, news, expert opinions, blogs, product reviews, videos and public records (government orders/rulings/patents) on herbal smoking products available in English, Hindi, Kannada, Telugu, Punjabi, Tamil and Malayalam languages were included. Marketing/e-retail websites, scientific papers etc., based on E-cigarettes, other tobacco/nicotine-containing smoking/smokeless products, smokeless herbal products as well as websites related to substance-abuse were excluded.

2.4. Data extraction

The retrievals from the four online platforms searched were analysed as per the search engine results page (SERP) analysis. Any web page returned by the online platforms in response to a keyword entered is regarded as a SERP.¹² Each of the web page included were categorised as either 'static' or 'video'. Two separate data extraction forms for static web pages and videos were designed based on similar studies.^{13–17} The forms were pilot tested using three keywords 'organic cigarettes', 'herbal bidi' and 'herbal hookah' in Google and YouTube. The first ten retrievals were listed, and information was extracted by two trained and calibrated authors ('SS' and 'PY') using the data extraction forms from the selected records. Difficulties were discussed with authors ('AG1' and 'AG2'), and appropriate changes were made in the data extraction forms with consensus.

Data on the source of information, year, primary theme, health impact and rationale, headline characteristic, photo/video characteristic, and overall tone were extracted from both the still and video records. Additionally, the number of views, likes and dislikes were recorded from each included video record and video power index as well as the like ratio were computed from the same to assess the audience engagement. Moreover, for all the video records, the length of the video, production quality, and the gender and age group of the person uploading the video was also recorded. The

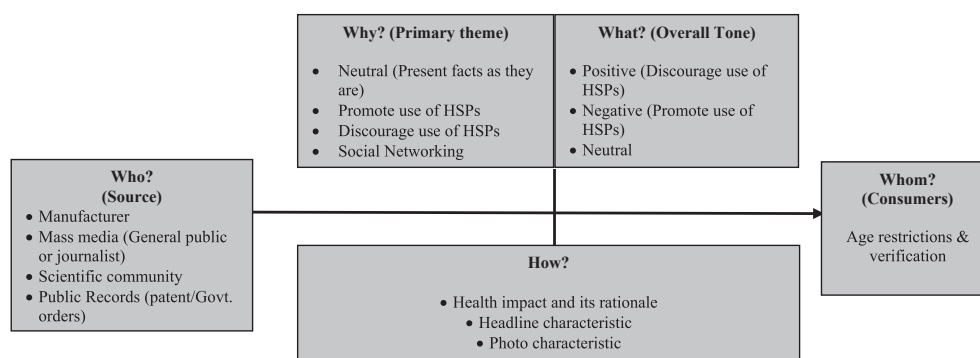


Fig. 1 – The conceptual framework for the assessment of the online content present on Herbal Smoking Products.

comments received for each included video were also analysed to assess the public perception regarding the video content. The comments were grouped into one of the following categories: favours smoking, discourages smoking, doubts related to HSPs, neutral to the use of HSPs or irrelevant.

2.5. Statistical analysis

Following data extraction, codes were entered into SPSS (version 24, SPSS Inc, USA). For analysing the audience engagement, the like ratio was calculated by $[\text{likes} \times 100 / (\text{likes} + \text{dislikes})]$ and video power index by $[\text{like ratio} \times (\text{number of views/days}) / 100]$. Descriptive statistics were used to summarise the data for both the still records and the video records. Differences in the reporting of categorical variables across the three sources (manufacturers/Mass media/scientific community/Public records) were assessed using the Chi-square test (χ^2). Statistical significance was set at p value < 0.05 .

3. Results

Google, Yahoo, Bing and YouTube provided a total of 1400 retrievals. After removing 415 duplicates, the remaining 985 weblinks were categorised as either 'Still' or 'Video'. One hundred seventy-four still web pages and 94 video records met inclusion based on the set eligibility criteria (Fig. 2).

Inter-rater kappa values ranged from 0.8 to 1 between the two authors ('PY' and 'SS') involved in data extraction. The majority of the included still records and videos hailed from India (44.8% and 56.4% respectively), followed by the United States (22.4% and 17% respectively).

35.6% of the included still records were sourced by manufacturers/suppliers, while 12.1% had a scientific basis. About 30% of the included informational web-pages were updated/posted only recently (since 2019). More than half (67.8%) of the information 'promoted the use of HSPs'. 90.8% of the still records made no mention of any age restrictions.

Out of the 94 video records included, the general public posted 83% of the content. HSPs are available in a wide range of flavours, as mentioned by 71% of the video records. Alarmingly, 90% of the included video records promoted HSPs, while only 6.4% discouraged their use. Only 3 (3.2%) video records displayed 'smoking is injurious to health' and 5 (5.3%) records

mentioned 'The information provided should not be considered as professional advice'. Moreover, merely 7.4% of the included video records required login for viewing while 4.2% of the YouTube videos mentioned age restriction, but no verification was needed to watch it. In more than half of the video records (62.8%), the presenter belonged to the young-adult age group. The majority of the viewer's comments (58.9%) were not related to smoking of herbal or conventional products and were regarded as irrelevant. Out of the remaining 1901 comments relevant to smoking, 95.6% of the comments were seen to favour the use of HSPs by appreciating the flavour, easy access, claimed health benefits etc., of the respective product being described in the video. The category-wise distribution of the still and video records are presented in Table 1.

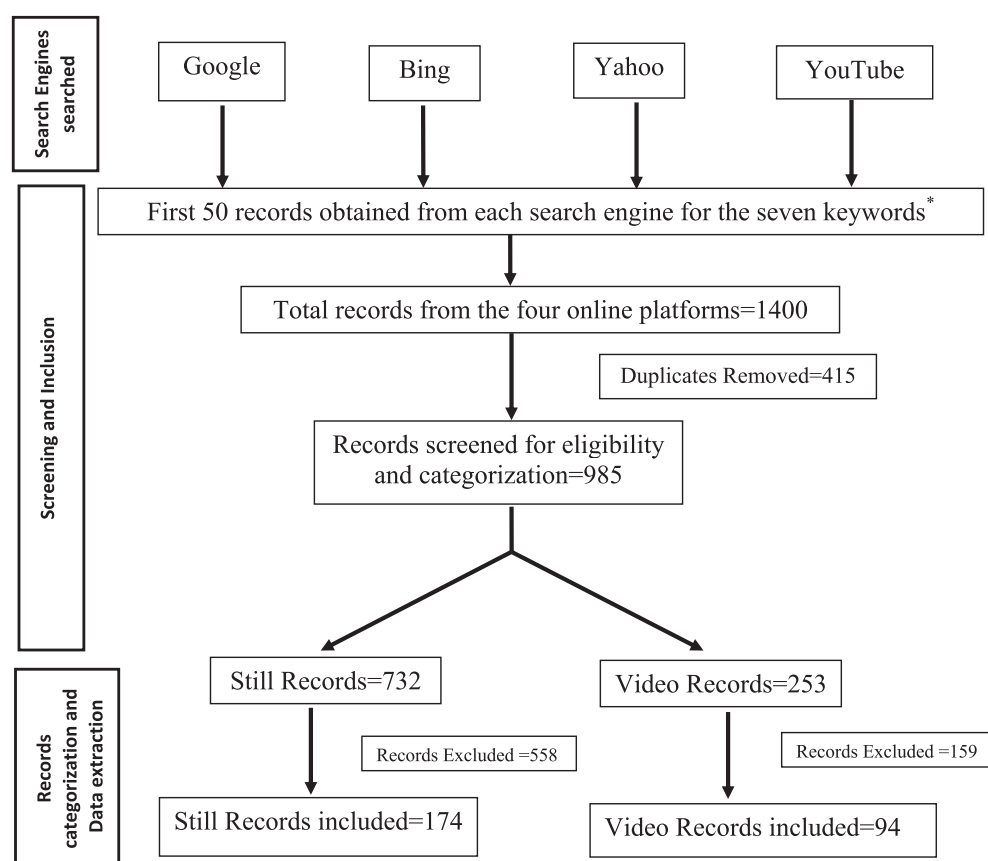
The 94 selected videos presented with about 673 minutes of audio-visual content on HSPs with an average of 7.16 minutes per video. The videos were posted by 71 channels having a total of 72.7 lakh subscribers. The mean like ratio was found to be 87.8, and the video power index was 77.6, both of which signifies the acceptability and popularity of the HSPs related content available online. Additional description about video statistics is given in Table 2.

Of all the still records included, 64.4% mentioned the possible health benefits compared to 36.2% that stated the potential health hazards of HSPs. The health benefits were primarily self-acclaimed by the general public/manufacturers (75.6%). Likewise, of all the video records included, 69.1% mentioned the health benefits in contrast to the mere 6.4% which stated the potential health hazards. Details regarding the health impact of HSPs available online are shown in Fig. 3.

All the manufacturers presented information to advertise and support herbal smoking products with an overall negative tone. Among the still records, 27.4% of the general public/journalists (mass media) and 85.7% of the scientific community had a positive tone exhibiting a strong disagreement regarding the use of such products. Similarly, all the video records presented by the manufactures promoted the use of HSPs. Category-wise distribution of the included audio and video records with respect to the source is shown in Table 3.

4. Discussion

Internet use for health information has significantly influenced the general public decision-making and autonomy.



*Keywords: 'herbal cigarettes'; 'non-tobacco cigarettes'; 'Non-nicotine cigarettes'; 'organic cigarettes'; 'no tar cigarettes'; 'herbal bidi'; 'herbal hookah'

Fig. 2 – Search strategy and data extraction process.

Over 60–80% of the population is reported to use the internet for health-related information in some urban parts of India.^{18–20} These numbers are expected to be increasing in rural parts of the country as well. This is a matter of grave concern as the information presented online has very little regulation on its content, as the web-pages are rarely verified for accuracy unlike the scientific articles/journals.²¹ Stringent laws and policies have been adopted by countries worldwide regarding the display of information and the marketing strategies of tobacco-containing products. However, HSPs (cigarettes/bidis/hookah) are tobacco-free and do not fall under the domain of such laws, and thereby the information presented about HSPs is unregulated. This study analysed the information available regarding HSPs on the most popular online platforms (Google, Yahoo, Bing & YouTube) and found it to be abundant and extensively promoting their use.

Most of the informational web pages hail from the Indian sub-continent, which may be attributed to the well-established traditional medicinal system guided by various herbs.¹ However, smoking of even the medicinal herbs cannot be recommended as it has profound health implications and is also strongly associated with fire-related and trauma-related injuries.²² Majority of the online content about HSPs was regarding the use of herbal hookah. The primary reason for this can be the misperception of a hookah being less harmful

than a cigarette, which has resulted in its growing popularity among youth.²³ The availability of various flavours further attracts the adolescents and adults who perceive this to be a safer form of smoking.⁵ Latent class analysis in the United States has shown that 37% smoke herbal hookah.²⁴ An increase in awareness regarding the adverse health effects of smoking tobacco and nicotine, coupled with the rising number of hookah lounge and bars, is anticipated to promote the concept of herbal hookah attracting people of all ages.^{25,26}

The vast popularity of HSPs is well indicated by the high number of views, and the high like-ratio as well as the video-power index of the included video records. Like ratio gives information on the likability of a particular video, whereas video power index determines the popularity by analysing the number of likes compared to number of views for each video. In pursuit of a greater audience engagement, the videos were made more appealing by use of enthralling music, background and lights thus ensuring high production quality. Also, the queries regarding the availability and price of the HSPs in the comment section of the videos indicate towards the increased demand for these products. YouTube has a regulation policy to restrain the youth from accessing violent/sexually explicit/profanity videos that are considered inappropriate to that age.²⁷ Age verification by account information of the users to access such information could further regulate the reach of

Table 1 – Category-wise distribution of still and video records.

Still Records		
Category	N = 174	%
Source		
Blogs/Social Networking	51	29.3
News	37	21.3
Scientific	21	12.1
Manufacturers/suppliers	62	35.6
Public records (Complaints/Patents/Rulings)	3	1.7
Year		
Before 2000	5	2.9
2000–2010	8	4.6
2010–2015	14	8
2016–2018	20	11.5
2019 to Present	52	29.9
Not mentioned	75	43.1
Primary Theme		
Neutral - Present facts as they are	66	37.9
Promote the use of HSPs	80	46
Discourage use of HSPs	17	9.8
Social Networking (LinkedIn, Facebook etc.)	9	5.2
Legal/Patent Registration	2	1.1
Overall Tone		
Negative (Promote use)	118	67.8
Neutral	10	5.8
Positive (Discourage use)	46	26.4
Mention of age restrictions		
Mentioned	16	9.2
Not mentioned	158	90.8
Video Records		
Category	N = 94	%
Source		
General public	78	83
Manufacturing companies	10	10.6
Scientific community	2	2.1
News	4	4.3
Primary theme		
Neutral - Present facts as they are	8	8.5
Promote the use of HSPs	47	50
Discourage use of HSPs	1	1.1
Product review	38	40.4
Flavour variants		
Mentioned	67	71.3
Not mentioned	27	28.7
Mention of age restrictions		
Mentioned but not verified	4	4.3
Login required	7	7.4
Not mentioned	83	88.3
Other discussed products		
None	82	87.2
Conventional smoking products	5	5.3
Smokers lip cream	7	7.5
Tone		
Negative (Promoting use of HSPs)	82	87.2
Neutral	6	6.4
Positive (Discourage use of HSPs)	6	6.4
Production Quality		
Poor	15	16
Moderate	35	37.2
Professional	44	46.8

(continued on next page)

Table 1 – (continued)

Video Records		
Category	N = 94	%
Gender of the speaker		
Male	49	52.1
Female	28	29.8
Could not be determined	17	18.1
Age group of the speaker		
Young adults	59	62.8
Adults	10	10.6
Not Visible	25	26.6
External links mentioned		
No link mentioned	45	47.9
Links mentioned	49	52.1
Comments (Total No. of comments = 4625)		
Favoring use of HSPs	1818	39.3
Favoring use of Conventional Smoking	4	0.09
Discouraging use of HSPs	47	1.02
Discouraging the use of conventional smoking	1	0.02
Neutral to smoking	8	0.17
Doubts related to HSPs	23	0.5
Irrelevant	2724	58.9

this content. This content analysis did not involve logging in to the YouTube browser that enabled us to assess how many of the videos had age restrictions. Surprisingly, very few mandated logging-in at the browser to be able to watch the video, indicating that the online content on HSPs is easily accessible to all including the underage youth (<18 years). Most of the videos on HSPs were presented mainly by young adults, further promoting its safe use even at a minor age.

A serious finding of the present study is the vast number of SERPs that have mentioned the health benefits of HSPs. The benefits stated mainly were based on the manufacturer's claims, while a scientific rationale supported the adverse health effects. One of the health benefits stated by one-fourth of the static and video web pages is the efficacy of HSPs in treating respiratory disorders, including conditions like COVID-19. Although mild bronchodilator activity is noticed in atropine alkaloid containing herbal cigarettes²⁸ yet, the increasing evidence of their abuse is a good enough reason to restrict the availability of these products and choose better alternatives for the treatment of asthma and other conditions.^{28,29} Surprisingly, another commonly reported health benefit of HSPs is its use as a tobacco-cessation aid or a safer and healthier alternative to tobacco smoking products, both of which are not supported by any scientific evidence. However, something which closely mimics conventional cigarettes and is consumed similarly cannot be regarded as any safer. It is important to note that although HSPs are nicotine-free, other chemicals like carbon monoxide, polyaromatic hydrocarbons, etc., are equally harmful to the consumer and the people in proximity.^{23,30,31} The likelihood of subsequent tobacco use among non-smokers is expected to increase manifold owing to the large variety of flavours available that makes the smoking products endearing and addictive.³²

International organizations and national government agencies, health professionals and researchers have implemented various education campaigns combined with multiple

Table 2 – Video statistics of the included records.

Video statistics variable	Total (n = 94)	Mean	SD	Min	Max
Views	69,00,746	73,412.19	2,84,954.51	137	26,26,686
Likes	2,23,901	2,381.93	9,888.41	0	89,000
Dislikes	8,734	92.91	316.54	0	2,400
Like ratio	8256.69	87.84	18.7	0	100
Video power index	7,289.67	77.55	214.33	0	1567.39
Length of videos (in minutes)	673.02	7.16	5.56	0.65	27.82

policies that have generated significant awareness about tobacco abuse. Such awareness campaigns have made smokers think a great deal about discontinuing smoking, with the rate for quitting estimated to be around 0.82 attempts per individual.³⁰ However, the massive amount of promotional content on HSPs available online may cause the recipients to seek out more similar content, further reinforcing their beliefs on the claimed safe use of these products.³³ Many of the YouTube videos demonstrated *how to roll* herbal cigarette/bidi while other videos presented mesmerising product reviews of the available brands, attracting the viewers to try smoking of HSPs. Such videos have tremendous potential to attract even the *never smokers* to initiate smoking of HSPs, which may gradually proceed to the use of conventional tobacco products. Therefore, there seems to be an urgent need to strictly scrutinise the online information on HSPs as it has the potential to misguide the ignorant people who may fall prey to this probable abuse. Also, future studies should focus on the possible health as well as economic impact of smoking herbal products to generate reliable scientific evidence to educate the public regarding the ill-effects of HSPs.

The large number of web pages screened in the four most commonly used online platforms constitute a significant strength of this content analysis. As there are no guidelines

for assessing the information available on the internet, the authors have tried to categorise the online content and systematically extract as much information as possible to present a comprehensive picture of the web-based information on HSPs. However, this study has several limitations. Firstly, within the language constraints of the authors, the inclusion of web pages was restricted to English, Hindi, Kannada, Telugu, Punjabi, Tamil and Malayalam languages. Secondly, the keywords selected might not show a complete picture. There might be a considerable amount of content available, which might be visible only by some other terminology/brand name. Moreover, the optimisation of the search engines is location-oriented, attributing to possible variation in results in other countries. Also, as the online content is dynamic and is updated rapidly, results may vary at any given time. Herbal (smoke and smokeless) products known for substance abuse were kept out of the scope of this study.

5. Recommendations

This study necessitates the urgent need for policies on the sale, promotion and marketing of HSPs. In this regard, here are a few suggestions that can be adopted:

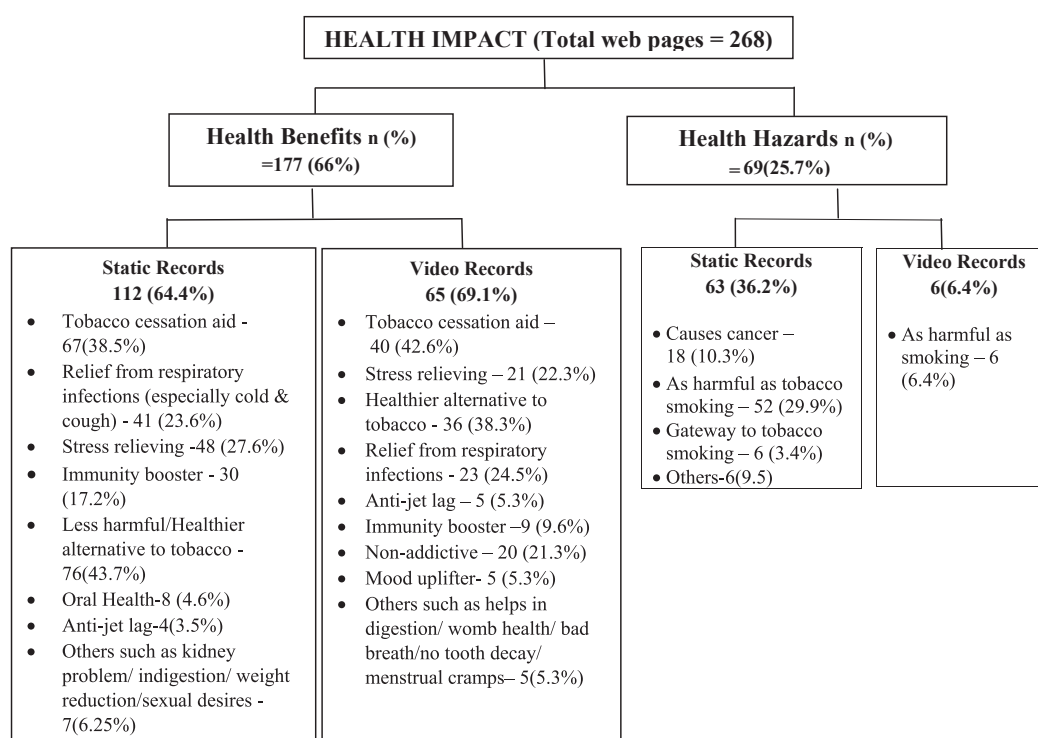
**Fig. 3 – The health impact of herbal smoking products reported online.**

Table 3 – Category-wise distribution of still and video records with respect to the source.

Table 3 – Category-wise distribution of still and video records with respect to the source.													
Category	Source of the Still records						p Value	Source of the Video records					
	Mass Media (N = 51)	Manufacturers (N = 62)	Scientific community (N = 21)	News (N = 37)	Public Records (N = 3)	Total (N = 174)		Mass Media (N = 78)	Manufacturers (N = 10)	Scientific community (N = 2)	News (N = 4)	Total (N = 94)	
Headline Characteristic	Discountage use	2	2	8	6	0	18	<0.001*	Video title Characteristic				<0.001*
	Promote use	20	13	2	12	1	48		Promote use				
	Interrogative/Neutral	29	47	11	19	2	108		Interrogative/Neutral				
	Photo Characteristic	24	48	3	5	1	81	<0.001*	Video Characteristic				<0.001*
Photo Characteristic	Discountage Use								Discountage use				
	Promote use	0	1	1	1	0	3		Promote use				
	Neutral	11	7	2	17	1	38		Neutral				
	No photo	16	6	15	14	1	52		Health Benefits				
Health Benefits	Mentioned	30	55	5	21	1	112	<0.001*	Mentioned				
	Not mentioned	21	7	16	16	2	62		Not mentioned				
	Adverse Health Effects								Adverse Health Effects				
	Mentioned	28	1	18	16	0	63	<0.001*	Mentioned				
Adverse Health Effects	Not mentioned	23	61	3	21	3	111		Not mentioned				
	Overall Tone								Overall Tone				
	Negative	34	62	2	17	3	118	<0.001*	Negative				
	Neutral	3	0	1	6	0	10		Neutral				
Positive	14	0	18	14	0	46		Positive					
	* Statistically significant.												

* Statistically significant.

1. Any pro-smoking video should be age-restricted with mandatory age-verification.
2. The content presented online needs to be regulated to ensure no misleading information is out in the public domain.
3. Display of health warnings pertaining to smoking should be presented even on HSPs packages to allow the consumer to take a well-informed decision regarding their use.

6. Conclusion

The informational content regarding HSPs on the internet is enormous and mostly favours their use based on manufacturers claims. The lucrative online video content on HSPs attracts the ignorant public of all ages who may succumb to its use. This must be regarded as a threat as HSPs is a potential gateway/precursor to tobacco smoking. Moreover, owing to the unregulated ingredients of HSPs, their safety cannot be established. Thus, there is a dire need to regulate the content available on the internet regarding such potential hazardous substances to ensure that only reliable and scientifically validated information reaches the public to enable them to make well-informed choices.

Conflicts of interest

The authors have none to declare.

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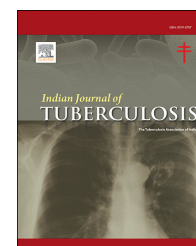
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Review article

Tobacco cessation in India—Current status, challenges, barriers and solutions

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ABSTRACT

The attention to tobacco cessation (TCs) has increased globally by WHO through the Framework Convention on Tobacco Control (FCTC) and MPOWER. In India, NTCP (National Tobacco Control Program), the National and three Regional Quitlines and mCessation, some apex national institutes, and professional dental bodies and others have eased an access to quit, the proportion of the former users has been dismally low—below 2% at population level. The challenges of not having: (1) TCCs at secondary and tertiary care as well as in the larger private healthcare setups; (2) participatory health system and healthcare professionals; (3) motivated tobacco users to quit even in short-term; (4) focused NTCP due to convergent NHM (National Health Mission); and, (5) optimal coverage to the health-insured “need a priority attention”. Also, there is need to eliminate the barriers existing: (a) at all levels in the governance, health system and other stake-holding sectors; and, (b) due to the interference of the tobacco industry. Overall, (i) setting the norm of quitting since all tobacco users are actually patients; (ii) increasing the awareness of benefits of quitting and incentivizing it; (iii) establishing a systems approach in all health facilities of screening, treatment and follow-up of the treated tobacco users besides coding them; plus (iv) amending COTPA (the Cigarettes and Other Tobacco Products Act of 2003) can increase the quit rates in India and LMICs.

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1. The global provision

Article 14 of the Framework Convention on Tobacco Control (FCTC)—one of the largest global treaty of the WHO between

182 member countries [also referred as “parties”] refers to tobacco cessation (TCs) as one of the key demand reduction measures.^{1,2} While, currently, the progress of its implementation is categorized as “intermediate (i.e., slow and often partial)”, the guidelines include:

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1. Provision of an infrastructure that supports TCs and treatment for tobacco dependence.
2. In addition to the use of population-level approaches, the use of systems approach which enables all health facilities and health care workers deliver TCs to the individuals in a stepwise manner.
3. Robust monitoring and evaluation of the processes of the cessation and their outcomes through clearly defined indicators. And, lastly,
4. An international collaboration so that the most effective cessation measures get implemented.

Cessation is also promoted as one of the key components of the WHO devised MPOWER strategy³ under the acronym by “O”, i.e., Offer help to quit tobacco. According to the WHO report on global tobacco epidemic 2019,⁴ while its coverage has increased from 5% world population to in 2007 to 31% in 2018- an increase by 26%, between 2016 and 2018 this coverage reduced by 1%! This report also recognized India as one of the 23 countries to have achieved the status of comprehensive cessation support at the best-practice level to the tobacco users seeking help to quit.

2. The current status of TCs in India

India began its efforts way back in 2002 when the WHO India and MOHFW collaborative established a network of 19 Tobacco Cessation Centers (TCCs) countrywide in some apex tertiary care institutions of the country.⁵ It was done to assess the feasibility of TCs services in India. In a report published in 2012 on its 5 years outcomes out of managing 34,741 patients, out of 23,320 evaluable patients (67.12%) with majority of married males over 20 years of age, in a follow-up over six weeks, 3255 (14%) had quit and another 5187 (22%) had reduced tobacco use. Opining a feasibility of setting up TCCs in India, it observed then that “its integration into the healthcare system remains a challenge”. In the preceding twelve years, the country also had publication of some more TCs specific studies. These reported a quit rate which varied from 12.5% at 2 months follow-up to 42% at 42 months (Table 1):

But, the burden of tobacco in India is ever increasing; and, this will predictably increase in longer term despite a significant decrease of its current users by 6% reported by GATS 2¹⁵ (vs. GATS 1¹⁶) in the view of the dismally low and rather stagnant rate of quitting tobacco (1.8% for former smokers and 1.2% for the former users of smokeless tobacco¹⁵) vs. sheer annual increase ~1.0% in size of the population (i.e., ~54.8 million [5.48 crores]¹⁷) which obviously will add to a significant number of new users every year considering the fact that every day ~5500 children initiate into tobacco use, i.e. ~2 million every year (20 lacs annually).¹⁸ It is also evident by the average increase in annual deaths by 5.87%^{17,19} due to tobacco-related diseases-from ~0.7 million in 2003 to 1.35 million in 2018.^{1,20}

With the acquisition of unique and laudable distinction from WHO⁴ of providing comprehensive cessation services countrywide, India currently provides TCs “at no cost” the following:

1. The TCCs at primary healthcare level. These are ~500 countrywide under the National Tobacco Control Program (NTCP)^{21,22}; now converged under National Health Mission [NHM]²⁴ along with other national health program.²³ In addition, India also has cessation delivery facility through the deaddiction services provided by the psychiatry departments/units of the medical, ~1120 clinics run by the dentists trained under the TII of the IDA²⁴ and the specific TCCs run by a few private and corporate health facilities. Also, Dental Council of India is in process to empower 321 dental institutes under the National Oral Health Program (NOHP) to establish and run the TCCs^{25,26};
2. Nicotine Replacement Therapy (NRT) as provision of pharmacological treatment facilities at the district level under NTCP²¹;
3. Cessation counselling for the registered users through the National Quitline¹² based out of Delhi plus 3 Regional quitlines based out of Bengaluru, Guwahati and Mumbai through a single toll-free number 1800-11-2356; and,
4. The mCessation^{4,13} program that delivers messages to quit tobacco to the users who register on toll-free number 011-22902702.

Last year, MoHFW publishing a note “Corona-19 Pandemic and Tobacco Use in India” to brief on “Tobacco and nicotine use, NCDs and COVID-19” elaborating on the higher risks of incurring the infection associated with smoking, use of smokeless tobacco and NCDs²⁷ had advised tobacco users to call the *national quitline* or register and avail benefit of its messaging service through *mCessation*.

3. The challenges

So, what are the challenges in the cessation delivery? These are following:

1. Besides its rather sketchy delivery even by the tertiary care government health sector, i.e., the medical colleges, almost an absolute lack of the TCCs even under the secondary- and tertiary-levels of the private healthcare sector that now spans over 70% of the country's entire health system. This stark lacuna can be attributed to an absolute indifference instead of an inability of the Ministry of the Health and Family Welfare, the State Medical and Health Departments as well the management in the private health facilities to establish a Systems Approach²⁸ that will facilitate a process of “screen, treat and follow-up” to all the tobacco using patients despite its existing epidemic;
2. A suboptimal participation of the healthcare professionals (HCPs)²⁹ as neither the subject is taught to them nor there is a mandate that (a) they all be trained compulsorily in TCs delivery through an in-service program, (b) they deliver it whenever and everytime there is a clinical encounter with a tobacco using patient or (c) refer these promptly in view of their genuine inability due to either ignorance or being busy concurrently in other professional undertakings to either the National Quitline, mCessation or a TCC in-house or nearby; in addition, their respective academic associations and councils too have stayed indifferent to the issue

Table 1 – Reported quit rates for tobacco cessation in Indian studies (2009–2020).

	CVDs Work place Study (2009) ⁶	The Kerala Study (2009) ⁷	TCC Project of India (2012) ⁵	Tamil Nadu Study (2012) ⁸	Diabetes clinic-Kerala (2013) ⁹	Bihar Teachers study (2013) ¹⁰	Bangalore study (2014) ¹¹	National Quitline Study (2018) ¹²	mCessation (2018) ¹³	SDMH (2020) ¹⁴
Post-study	38.8									
1 mos						50		38.1	19	
6 wks			14							
2 mos				12.5						
3 mos		16								
6 mos					51.8	20				58
12 mos					45.8					49
42 mos							5			42

Abbreviations used in the table above-wks- weeks; mos-months; SDMH- Santokba Durlabhji Memorial Hospital, Jaipur.

or to empower them appropriately and optimally despite its evidence-based utility and knowing tobacco use as a major risk factor for ever mounting burden of the non-communicable diseases (NCDs);

3. A lack of intent on part of the tobacco users to quit or to defer it “now or for the next 12 months” despite their higher awareness of its harmful effects¹⁵ either due to the established socio-cultural norms, addiction to nicotine, “no one told them to quit” or just being careless;
4. Lack of messaging through IEC or mass media campaigns under tobacco control efforts of either government or the civil societies that only convey harmful effects of tobacco but do not deliver benefits of quitting tobacco “at an earliest” and “forever (total abstinence lifelong)”;
5. The national health programs have been converged under National Health Mission, but these do not have a specific mandate on the targets to be achieved under TCs delivery through their outpatient services or field activity (e.g. NPCDCS,²³ NTEP,³⁰ etc.) as it exists under National framework for Joint TB-Tobacco Collaborative Activities³⁰; and, lastly,
6. Inability of the medical insurance sector to integrate use of tobacco for a higher premium and/or reimbursement of the entire cost of tobacco dependence treatment including consultation to the insured.

4. The barriers

The barriers can be categorized into:

1. Lack of KAP (knowledge, attitude and/or practices) to quit at an earliest at all levels ubiquitously, be it political, administrative, media, health system, healthcare workers, patients and their care givers or the communities in which they live to thrive¹⁵;
2. An inability of the governance to not only stop tobacco cultivation and its sale eventually by every type of tobacco industry, formal or/and informal despite knowing that it is losing significantly more on account of management of the tobacco-related illnesses vs. the revenue earned through taxes on tobacco products³¹ or its exports,³² but, also

making a tardy progress in popularizing quitting and stopping effectively a ready access of the highly addictive tobacco products, even to the minors unlike other addictive products; in addition, the presence of the Tobacco Board is indirectly in conflict with the efforts the Ministry of Health and Family Welfare is making to control tobacco; and,

3. An adverse and antagonistic influence of the tobacco industry, often interfering, threatening, blackmailing or bribing the governments or its constituents-the politicians and/or political parties; and, which is in direct conflict with the public health (health of the people) despite knowing that tobacco is addictive and kills half of its consumers due to tobacco-related illnesses³³; the facade of this infamous industry is so very evident when it resists any effort of the governments to minimize the promotion and access of its products, especially to the uninitiated youth while it is offering to manage the sick by offering to the governance to assist in improving the delivery of healthcare or provide the wellness simply under public-private partnership³⁴!

5. The solutions

So, how can the existing scenario be altered!? Following proposals may be useful:

1. The countries, communities, health and insurance sectors introduce and eventually establishes a norm that “Tobacco use is A Disease and, thus, Every Tobacco User is A Patient”,¹⁴ so that all current users get motivated optimally to quit at an earliest and the former users (the successful quitters) do not relapse;
2. The government must go all out to promote and incentivize quitting of tobacco through mass media, health management and insurance portals/facilities while disincentivizing those who do not quit in a given timeline;
3. Strengthening of existing cessation services by mandating its delivery at all levels of health care through the Systems Approach of screening, treatment and follow-up.²⁷ It will mean (1) establishing suitable infrastructure that identifies and records tobacco use among all new and follow-up

patients attending any health facility through WHO ICD- 11 coding³⁵ and links it to their health/insurance id for any reference in future through a real-time national dashboard; (2) capacity building among all cadres of in-service healthcare workers, especially doctors, nurses, counselors and pharmacists along with regular CMEs (continued medical education) both in the government and/or private health sector to treat a tobacco using patient optimally and promptly along with his/her primary ailment^{27,28}; (3) following them up on a regular basis for 6 months to a year to support their effort and to ensure their staying totally abstinent; at least in the very first month¹⁴ if the resources do not permit a longer follow-up.

4. Recently, the Ministry of Health and Family Welfare, Government of India (MoHFW), has put proposed amendments to COTPA (the Cigarette and Other Tobacco Products Act of 2003) for the Public for its views and comments.³⁶ While this much-awaited step of the MOHFW does not address TCs directly, if the amendments get approval of both houses of the Parliament, will hopefully motivate a higher number of tobacco users to quit as these will eliminate (1) the “designated smoking areas” and their unauthorized presence in the workplaces, (2) surrogate advertisements, (3) increase the age of minors from 18 years to 21 years, (4) increase the distance of tobacco vending retailers from 100 yards to 100 meters and (5) sale of loose tobacco products, especially cigarettes that initiate smoking among the youth. The biggest threat to have achieved the proposed amendments is likely to come from the tobacco industry that has already lobbied not to go for these and is likely to strengthen its anti-amendment drive through both-the political lobbyists in form of parliamentarians and the front groups it has in form of farmers, traders, retailers, social media, etc.

If these solutions can be implemented, the delivery of the TCs can be a win–win situation for all the stakeholders:

1. The *governments* in the Center and the States will have to spend lesser³⁷ on managing tobacco-related illnesses vs. their gain on account of earning revenue through taxation on tobacco products; and, saving on loss of the productivity due to premature loss of lives of its citizens;
2. The *health management* in the private health sector while assisting duly the country to reduce burden of tobacco-related morbidities and mortality rates and adding to the quit rate in the country, shall also profit on account of patients' consultation and profit on the sale of NRT and cessation medications which in terms of large number of tobacco using patients²⁹ can be substantial (plus their additional profit from the sale of the rest of therapy prescribed to treat three primary ailment/s); by maintain their facilities “tobacco-free”, they will promote quitting through a higher motivation of their tobacco-using patients;
3. The *healthcare workers* shall succeed more by empowering their patients to eliminate a major risk factor,³⁸ especially those suffering from either tobacco-related NCDs, tuberculosis or alcohol (an additional risk factor in NCDs and some gastrointestinal disorders such as cirrhosis liver);

also, quitting assists them to manage the current clinical ailment more effectively and with lesser complications and recurrence/relapse; and,

4. The tobacco-using *patients and their families* on account of (a) lesser spending on tobacco use and seeking treatment, (b) elimination of the probability of the loss of productivity due to a premature loss of 6–10 years of life^{39,40} as well as (c) saving on daily spending on tobacco products plus (d) the cost of management incurred for any tobacco-related illness/es.

6. Conclusion

Populous countries like India can ill-afford the current burden of tobacco in view of its easy access, high use and significant morbidity and mortality. India despite its WHO categorized status of comprehensive provider of TCs has huge burden of tobacco users due to dismally low rates of former daily smokers and users of SLT. It will be served the best if quitting tobacco becomes a norm instead of an exception as is the situation currently. Accordingly, India will fulfill its responsibility accepted internationally through ratification of the WHO FCTC. Also, it will set an example to the low- and middle-income countries towards this demand-reduction measure.

Although India has TCCs under NTCP plus other portals, a national quitline with three regional units, mCessation program and availability of first-line pharmacotherapy, a multi-sectoral approach can overcome the existing challenges and barriers. Adopting solutions proposed herein can realize the hypothesis on the TCs as a win–win situation and a useful case for business for all its stakeholders-policy planners, health management, HCPs and tobacco users and their care givers. India must not hesitate to set targets for all tobacco users quit within a given timeline and itself becoming tobacco-free by the end of the year 2030.

Authors contributions

RG has conceptualized, researched and written the manuscript. Both MSP, RC and SG have reviewed it.

Conflicts of interest

The authors have none to declare

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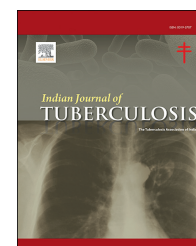
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Viewpoint

Tobacco use, tuberculosis and Covid-19: A lethal triad

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ABSTRACT

Smoking, TB and Covid-19 are high prevalence entities with public health consequences. All three of them have a possible complex interaction at cellular level. Smoking behavior makes it difficult to maintain infection control measures. Smoking is known to increase TB infection and also adversely affect treatment outcomes in TB. There is also upcoming evidence which suggests that smoking and TB increase the risk of severe Covid-19 symptoms. Simple infection control measures like, social distancing, cough etiquette, isolation, hand hygiene, quarantine, use of masks etc. play a pivotal role in prevention of these diseases. There is need of strengthening of the public health policies and incorporation of the Covid-19 safety awareness measures into the various national programmes.

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The habit of smoking is centuries old and tobacco addiction is no less than an epidemic. The epidemiological data of 2019 by World Health Organization (WHO) reported that tobacco was responsible for 8 million deaths worldwide.¹ WHO factsheet 2018 of India reported more than 1 million deaths which was about 9.5% of all the deaths.¹ Tuberculosis (TB) as a disease also has a very high burden. An estimated 10 million people developed TB in 2019 with 1.2 million TB deaths. India alone reported 2.64 million cases in 2019.² The Coronavirus disease (Covid-19) caused by severe acute respiratory syndrome

corona virus 2 (SARS-CoV-2) has spread throughout the world. Globally, by 28th July 2021, there have been 195,992,087 confirmed cases of Covid-19, including 4,193,169 deaths indicating a very high burden of infection. In India alone there has been 31,484,605 cases with 422,054 deaths.³ The association between the three entities is presently undefined and studies are needed to establish a clear association. The epidemiological picture however undoubtedly clarifies that smoking, TB and Covid-19, all three have a high burden with public health concerns.

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1. Possible etio-pathogenetic link of smoking, TB and Covid-19 infection

Smoking, TB and Covid-19 have complex interaction at cellular level. Smoking has a damaging effect on lungs. It alters the immune response by hindering the functioning of immune cells like macrophages, monocytes and CD4 lymphocytes and affects the ciliary function.⁴ These factors are responsible for increased susceptibility of smokers to TB. Smoking is known to increase the risk of various other infections. Risk for pneumococcal, legionella, and mycoplasma pneumonia infection is about 3–5-times higher in smokers than non-smokers. Studies though scarce have shown increased risk of mortality and increased disease severity in smokers with Middle Eastern respiratory syndrome coronavirus.⁵ It also hinders the cytokine release and results in upregulation of the angiotensin converting enzyme 2 (ACE-2) receptor, which is the main receptor used by SARS-CoV-2 for entry to the mucosa.⁵ SARS-CoV-2 infection has been implicated in the reactivation of dormant TB by activating the cell mediated defense mechanism and its role in predisposing for TB is also proposed in view of its ability to initiate inflammation by increasing cytokine release. Moreover, the virus affects the host immunity because of mutations in Interferon- γ and Interleukin-12 signaling pathways.⁶

2. Clinical convergence and possible interactions

Smoking is a known risk factor for getting infected with *Mycobacterium tuberculosis* and developing a severe form of the disease. It has also been linked to poor TB treatment outcomes.⁴ Smokers have been found to be more likely to contract the flu and smoking has been found to be consistently associated with a higher risk of hospital admissions after influenza infection. Smoking is also primary etiological factor behind chronic obstructive pulmonary diseases (COPD) and exacerbations of COPD are strongly linked to respiratory viruses.⁵ Some studies have shown smoking to be associated with severe Covid-19.⁷ While one meta-analysis did not associate smoking with severity of coronavirus disease.⁸

Smoking is not yet established as a risk factor for acquiring SARS-CoV-2 infection, but it might increase the disease severity. Also, smoking is an established causative factor for many chronic diseases which are themselves a risk factor for increased disease severity in Covid-19.⁹

The co-existence of Covid-19 and TB pandemic had given rise to various concerns. Firstly, as both primarily affect lungs leading to overlapping symptoms, there were concerns about a diagnostic difficulty. Secondly, there was worry regarding delay in TB diagnosis and treatment because of Covid-19 restrictions and lockdown. Number of patients registered for TB treatment and notification of cases declined. To combat the effects of the pandemic on tuberculosis services in India National TB Elimination Program (NTEP) announced a rapid

response plan and a plan for bi-directional screening. Under this all diagnosed patients with TB are to be screened for Covid-19, and all Covid-19-positive patients are to be screened for TB.⁹ Thirdly, there was apprehension regarding increased disease severity and mortality. The frequent use of drugs like Tocilizumab further complicated the situation as it reduces the macrophage and cytotoxic cell differentiation thus leading to decreased anti-mycobacterial activity.⁶ Currently available evidence is insufficient to support that TB increases the susceptibility to Covid-19 but evidence support that TB may lead to increased risk of complications from Covid-19.⁶

3. Preventive strategies and suggestions

Both TB and Covid-19 are known to spread to contacts through droplet nuclei of aerosols. Thus, simple infection control measures like, social distancing, cough etiquette, isolation, hand hygiene, quarantine, use of masks etc. play a pivotal role in prevention of these diseases.⁶ Strict implication of the infection control measures to prevent Covid-19 has certainly increased the awareness of the infection control measures among the general population.

Smoking behavior makes it difficult to maintain infection control measures. Smokers tend to gather in closed environments and smoking can make the user cough/sneeze thus releasing large number of aerosols. Even smokeless tobacco can contribute in the spread of the diseases as it is finally spit out with saliva and might carry the pathogen. Home isolation policies to curtail the spread of the disease led to increase in symptoms of panic and anxiety urging smokers to use tobacco.¹⁰ There is a need to identify the importance of tobacco control, particularly during the Covid-19 epidemic. Public awareness campaigns about the risks of tobacco use and the benefits of quitting should be encouraged and also incorporated into Covid-19 prevention strategies.

Also, there is a need to strengthen telemedicine services in India. The ministry of health and family welfare, Government of India, runs the National Tobacco Quit Line services to provide telephone-based tobacco cessation counseling.¹¹ Such already established platforms can be used to spread awareness of the infection control measures among smokers.

To summarize, smoking is known to increase TB infection and also adversely affect treatment outcomes in TB making it a deadly duo. Growing evidence suggest that smoking and TB increase the risk of severe Covid-19 symptoms. Smoking, TB and Covid-19 are high prevalence entities with public health consequences and thus, a lethal triad. There is a need for strengthening of the public health policies and incorporation of the Covid-19 safety awareness measures into the various national programmes.

Conflicts of interest

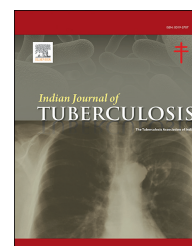
The authors have none to declare.

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Perspective

Supporting tobacco cessation in tuberculosis patients

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ABSTRACT

Tobacco is a key determinant of health inequalities, both across and within countries. 80% of tobacco users live in economically developing countries, which also face a huge tuberculosis (TB) burden. TB being an archetypal disease, affects low income groups, and has a higher proportion of smokers than the general population. The sub-group of TB patients who smoke disproportionately suffer from poorer outcomes, despite treatment. Behavioural interventions aimed at helping smokers quit by modifying their health beliefs and attitudes are highly successful in TB patients. However, integrating them in routine TB care is challenging, and requires a cultural shift at several levels, including individual, structural and organisational. We offer recommendations for policy, practice and research to address the dual burden of tobacco use and TB. Acting on these are vital towards achieving the United Nations (UN) Sustainable Development Goal (SDG) target of ending the TB epidemic by 2030.

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1. Introduction

Tobacco claims more than 7 million lives each year and about \$2 trillion in healthcare costs and lost productivity.¹ Over 80% of the world's 1.3 billion tobacco users live in low- and middle-income countries (LMICs), where the TB burden is also substantial.² A recent study in South Asian countries estimated that smoked tobacco rates are higher among TB patients than the general population.³ Despite treatment with anti-TB medication, patients who smoke face poorer outcomes, including delays in sputum conversion, treatment failure, risk of recurrence/relapse, developing multidrug resistance and dying from TB.⁴

2. Significance of tobacco cessation in TB patients

Diagnosis of TB can be a strong predictor of tobacco quitting behaviour, as it provides a teachable moment when patients are most receptive to advice on lifestyle modification.⁵ TB

patients who use tobacco come into frequent contact with healthcare systems, creating strong opportunities to assist their quitting. TB care settings must therefore actively address tobacco use, particularly by encouraging and supporting patients to quit.

The majority of TB patients who smoke want to quit (98%),³ but find it hard to do so on their own as smoking is extremely addictive. Unaided quit rates are generally low – about 5% over a year, while even simple cessation support can increase this to 10–20%.⁶ Affordable and effective interventions for smoking cessation in healthcare settings include brief advice from health workers, telephone helplines, automated text messaging, printed self-help materials, and pharmacotherapies such as Cytisine and Nortriptyline.⁶ Some of these have also been evaluated in TB contexts and found to be highly successful. For example, behavioural support aimed at helping TB patients in LMICs change unhealthy habits by modifying their health beliefs and attitudes, have demonstrated quit rates as high as 40%.^{7,8} Pharmacotherapies such as Bupropion and Cytisine when added to behavioural support, did not show a significant effect in this patient group and needs further evaluation.^{7,8}

3. Integration of tobacco cessation in routine TB care – challenges and opportunities

In general, the large majority of evidence points towards the feasibility of delivering tobacco cessation in routine TB care, but barriers at various levels hinder their optimal implementation. TB patients who visit treatment facilities may face stigma in society, and not want to engage in cessation activities that increase their time in hospital.⁹ Without adequate infection control measures in TB treatment facilities, there may also be concerns regarding the risk to healthcare personnel of contracting infection during the delivery of cessation interventions.¹⁰ At the systems level, lack of cultural norms such as ‘patient-centred approach’ or ‘shared-decision making’ can deter providers from engaging in conversations about changing patients’ smoking behaviours.¹¹ But implementing personnel themselves may not have a large influence on cessation results, so TB programmes may be able to customise cessation services according to their needs and limitations.¹² The need for contextual adaptation of interventions including cultural/language tailoring, fostering environments conducive to tobacco cessation, and securing mandates from higher authorities remain important considerations for successful integration of tobacco cessation in routine TB care.¹¹

Specific challenges noted by cessation service providers relate to the complexity of behavioural interventions (e.g. ‘length’- duration and number of sessions, and ‘breadth’- number of behaviour change elements offered), as well as low levels of provider motivation and support.¹¹ Using a patient-facing chart for communicating key messages was considered a straight-forward and intuitive approach, but interpersonal interaction techniques, such as emphasising patient choice, reflective listening, and tailoring individual advice, were found to be much harder to adopt.^{11,13,14} Therefore, in training healthcare personnel on delivering tobacco cessation interventions, moving away from didactic, classroom style sessions to more interactive approaches, whereby providers can act out interpersonal communications and information exchange techniques (through roleplay, etc.), can prove useful in building provider self-efficacy.¹¹ In addition, better alignment of cessation support activities with various providers’ roles and receptivity, may be key to overcoming the systemic barriers for successful planning and integration of tobacco cessation services in routine TB care.

4. Policy environment for tobacco cessation in LMICs

From a policy angle, the World Health Organisation (WHO) Framework Convention on Tobacco Control (FCTC) provides a comprehensive range of supply and demand reduction measures for global tobacco control. Article 14 of the FCTC requires countries that are party to the convention to provide evidence-based tobacco cessation treatments.¹⁵ However, progress in implementation has been particularly slow on this aspect, with several countries not even having an official national strategy for treating tobacco dependence.¹⁶

Additionally, there exists a significant gradient in implementation across different countries by their income levels, with far fewer provisions for tobacco cessation in LMIC contexts. Further, partial or non-adherence to other tobacco control policies such as smoke-free policies in these countries, allow the visibility of smoking inside healthcare facilities, and can present major barriers to fostering environments that are conducive to the delivery of smoking cessation services.¹¹

Comprehensive policy and practice guidelines for tobacco cessation have been developed specifically for TB programmes in LMICs.¹⁷ But for the effective implementation of these policies and to avoid wider inequalities in accessing tobacco cessation services across countries, greater support from policymakers and national TB programmes in LMICs are urgently needed.

5. Way forward

In summary, we know that effective interventions exist to help smokers quit, and that some of these are also highly successful in TB patients. However, implementation needs to be improved, with an emphasis on overcoming the identified challenges and integrating affordable, broad-reaching, tobacco cessation interventions into existing healthcare systems,¹⁸ including TB treatment settings. Cessation provisions may be further extended to TB patients within community settings, but this will require collaborations beyond health workers to treatment supporters, peers and the media.¹⁹ We offer the following as recommendations for policy, practice and future research in this area –

5.1. Policy recommendations

With regard to FCTC Article 14, building tobacco control capacity, including for research and advocacy, is a major priority for health in LMICs. More countries should start with conducting a national situation analysis, and also develop and implement evidence-based tobacco cessation strategies to suit their specific contexts.¹⁸ Governments around the world could and should do more to take advantage of the WHO FCTC as a tool to advance globally agreed health, development and human rights objectives.²⁰ Further, policy makers should facilitate greater collaboration between tobacco and TB initiatives to maximise results in low-resource settings.

5.2. Practice and research recommendations

Integrating tobacco cessation within TB programmes offers a viable solution to reduce the TB and tobacco related disease burden. To this effect, we make the following recommendations:²¹

- Mandate the recording and reporting of tobacco use status for all TB patients
- Train TB workers to provide brief cessation advice, including for patients who may face stigma
- Support healthcare workers in quitting tobacco use themselves

Specific areas of research to promote the integration of behavioural interventions for tobacco cessation within health systems in LMICs include:²²

- Simplifying content of behavioural interventions for tobacco cessation
- Developing core competency training in treatment delivery approaches for providers, and
- Promoting approaches that enhance patient communication

We additionally suggest research to assess the effects of tobacco cessation on TB treatment outcomes, as this could inform the revision of treatment guidelines.²³ Besides smoking, being cognisant of smokeless tobacco use is equally important, given their disproportionately high prevalence in LMIC contexts. But the association between other forms of tobacco and TB disease and treatment outcomes needs further study.

Ending the TB epidemic by 2030 is among the key targets of the United Nations (UN) Sustainable Development Goals (SDGs). This would not be possible without effectively tackling tobacco use in TB patients.

Author contributions

All authors have accepted responsibility for the entire content of this submitted manuscript and approved submission.

Ethics statement

Primary data for humans or animals were not collected for this report.

Conflicts of interest

The authors have none to declare.

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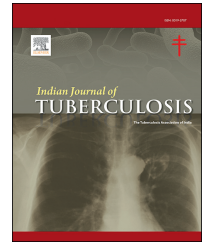
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Perspective

Why tobacco control should be a priority agenda item of Joint External Monitoring Missions for TB control?

Keywords:
Tuberculosis
Tobacco
Smoking
Monitoring

ABSTRACT

Introduction: Tobacco smoking is a significant risk factor for developing tuberculosis (TB), contributing to diagnostic delays, poor treatment outcomes and an increased risk of death and relapse. The World Health Organization (WHO) has reported that TB rates could decline by as much as 20% if smoking were eliminated. Tobacco smoking was a risk factor in at least 860,000 TB cases in 2018, and has been documented as one of the leading contributors to TB in India, Indonesia, Myanmar, Nepal and Philippines.

Methods: Joint External Monitoring Missions (JEMM) are arranged by WHO to review the progress, challenges and plans for national TB control programs and provide guidance for improvement of policies, planning and implementation. During May and June 2021, JEMM reports from five South-East Asian countries that had a JEMM in 2019 and early 2020 were reviewed. Reports reviewed from India, Indonesia, Myanmar, Nepal and the Philippines. Any mention of the association of TB and smoking, TB and tobacco use, impact of tobacco use/smoking on TB outcomes, current practices and challenges of TB and tobacco in the TB control program and proposed actions were documented.

Results: Of the five country JEMM, Myanmar's did not recognise the impact of smoking tobacco on TB at all, and only one of the five countries, India, identified a very limited number of current TB-Tobacco practises including that a collaborative framework for TB/tobacco was in place. Nepal's 2019 JEMM acknowledged that there was no smoking cessation within the TB Control program and health providers were not aware about the brief advice and smoking cessation program. The Philippines and Myanmar reported neither current practices nor challenges in implementing tobacco intervention in TB control programs.

Conclusion: Given the importance of tobacco smoking as a key risk factor for TB, assessing its burden on the national TB epidemic should be included as one of the key indicators in the JEMM framework. Key interventions include brief cessation support through regular TB services and the use of Nicotine Replacement Therapy (NRT) and other medications as part of a comprehensive package of care for people with TB to improve the quality of the services they receive. Multisectoral efforts to stop smoking also contribute the non-communicable disease agenda as well as protecting against poor outcomes for COVID-19. The support of TB programs to integrate tobacco control is critical and will contribute to national TB control program targets that support WHO's End TB Strategy.

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1. Introduction

An estimated ten million people fell ill with tuberculosis (TB) with approximately 1.4 million deaths in 2019, making TB the leading infectious disease killer.¹ The tobacco epidemic is one of the biggest public health threats, with the World Health Organization (WHO) estimating that in 2019 tobacco killed more than eight million people a year globally. More than seven million of those deaths are the result of direct tobacco use, while approximately 1.2 million are the result of non-smokers being exposed to second-hand smoke. Over 80% of the world's 1.3 billion tobacco users live in low- and middle-income countries,² many of which also have a high TB burden. Integrating tobacco control into the TB control strategy is a key intervention to address tobacco smoking's influence on TB epidemics.

In 2007, WHO and the International Union Against Tuberculosis and Lung Disease (The Union) published a joint monograph showing that people who use tobacco products are at significant risk for negative TB-related consequences, with an increased likelihood of infection, longer delays in TB diagnosis and treatment, greater clinical severity, relapse after treatment, and death.³ WHO reported that TB rates could decline by as much as 20% if smoking were eliminated. As per WHO, among the five most significant risk factors (undernutrition, smoking, alcohol abuse, HIV infection, diabetes), smoking stood as the second biggest risk factor attributable to TB, causing 860,000 TB cases in 2018.⁴ Research has shown that 50% of deaths from TB among Indian men have been attributed to smoking,⁵ with smokers in South Korea having a 40% increased risk of incident TB and 55% being more likely to die of TB than non-smokers.⁶ For smokers in Nepal, there was a longer delay in accessing treatment for TB (adjusted odds ratio 2.03, 95% confidence interval 1.24–3.31).⁷ In Indonesia, smoking is the main contributor to TB burden.⁴ Smoking is the leading contributor to TB in many South-East Asian countries including India, Indonesia, Myanmar, Nepal and Philippines.⁴

Joint External Monitoring Missions (JEMM) are arranged by WHO at the request of government, and include technical, developmental and implementing partners. JEMMs review the progress, challenges and plans for national TB Control and provide the guidance for improvement of policies, planning and implementation. Given the importance of smoking as a preventable risk factor for poor TB outcomes, National TB programs should be ensuring that measures are being taken to address it. This article reviews the JEMM reports from the five missions undertaken in 2019 and early 2020 in South-East Asian countries and identifies how these reports position the need of smoking intervention in their national TB response.

2. Methods

During May and June 2021, JEMM reports from five South-East Asian countries that had a JEMM in 2019 and early 2020 were reviewed. These countries were purposely selected as the reports were available in the public domain and accessed from WHO. Reports reviewed from India,⁸ Indonesia,⁹ Myanmar,¹⁰

Nepal¹¹ and the Philippines.¹² Full text of the reports including the executive summary and annexes were reviewed by the authors. We identified whether the JEMM reported any association of TB and smoking, TB and tobacco use, impact of tobacco use/smoking on TB outcomes, current practices and challenges of TB and tobacco in the TB control program and proposed actions. A further search was conducted for each report using the key words “smoking”, “smoker”, “tobacco use”, “users”, “smoking cessation”, “smoking counselling”, “nicotine replacement therapy”, “TB and comorbidities”, “TB risk factors”, “determinants of TB”, “behavioural counselling”, “medication” to ensure that all appropriate text was identified related to TB and smoking and tobacco use.

2.1. Setting

Of the five countries in the region chosen, all except Nepal are among the WHO top 30 high burden TB countries.¹ Table 1 presents the respective burdens of TB and tobacco use in India,¹³ Indonesia,¹⁴ Myanmar,¹⁵ Nepal¹⁶ and Philippines.¹⁷

2.2. Analysis

We summarised the review under three broad headings: i) recognition of the burden of smoking in TB control; ii) identification of current practice and challenges of smoking intervention in TB control; iii) actions recommended from the JEMM with regards to TB and tobacco activities. Exact wording from the JEMM text was included for review.

2.3. Ethical review

Institutional review board (IRB) approval was not required for this review.

3. Results

3.1. Recognition of burden of smoking in TB control by JEMM

Of the five countries, India recognised Tobacco smoking as one of the main risk factors for TB and noted the rising trend in people with TB using tobacco with an estimated 4% of the national TB burden attributable to it. The JEMM report for Nepal also additionally reported that tobacco smoking was a significant risk factor for TB, with the prevalence of smoking higher in people with TB than the general population. The

Table 1 – Burden of TB and Tobacco use in 5 countries.

Country	TB incidence (rate per 100,000/per year)	Cases of TB attributable to smoking	Tobacco Use-smoked and/or smokeless tobacco (million)
India	193	143,000	266.8
Indonesia	312	104,000	61.4
Myanmar	322	14,000	13.3
Nepal	238	6500	6.0
Philippines	554	63,000	16.6

Philippines JEMM reported about 20 million adult people who regularly smoked tobacco and that they were particularly vulnerable to TB. There was no information about tobacco smoking mentioned in the Myanmar JEMM report (Table 2).

3.2. Identification of current practices and challenges of tobacco intervention in TB control by JEMM

JEMM reports also identified the current practices and challenges to address tobacco smoking in TB control in the selected countries. India's JEMM report stated that some States and Districts documented smoking status and tobacco use in TB cards; however, the JEMM noted low reporting and high drop-off rates of smoking cessation and the suboptimal integration of tobacco cessation into TB control throughout the country due to inadequate training and documentation and lack of regular coordination and supervision. Indonesia's JEMM did not mention smoking in the operational component and noted the multi-sectoral element of the plan missed the possible synergy of collaboration with smoking cessation programs to take advantage of the techniques available to assist TB patients who smoked tobacco to stop. Challenges identified were lack of intensified TB case finding among high-risk group including smokers and no provision of smoking cessation through routine TB services. Nepal's JEMM acknowledged that there was no smoking cessation within the TB Control program and health providers were not aware about the brief advice and smoking cessation program.

The remaining countries (The Philippines and Myanmar) reported neither current practices nor challenges in implementing tobacco intervention in TB control programs (Table 2).

3.3. Actions recommended by JEMM

JEMM conducted in each country presented actions to implement, including in some cases tobacco control interventions in the TB control program. Table 2 highlights the key points recommended by the JEMM reports including recommendations like bi-directional screening for TB and tobacco, investment in training for local government officials, scale up tobacco cessation across all states and districts, coordinated supervision and policy to screen risk factors including tobacco in TB patients notified by the private sector, including considering smokers for active case finding. Nepal's JEMM was the only report to recommend specifically that tobacco cessation should be integrated into the TB control program by training health/DOT providers to i) Ask patients/visitors if they smoke, or are exposed to second-hand smoke, ii) give Brief advice to stop tobacco use, and iii) offer Cessation support with regular monitoring. There was no any recommendation included to address tobacco in Myanmar's JEMM (Table 2).

4. Discussion

Global targets and milestones for reductions in TB incidence and TB deaths have been set as part of the Sustainable Development Goals (SDGs) and WHO's End TB Strategy has

targets to end the global TB epidemic by 2030.¹ The End TB Strategy includes targets of a 90% reduction in TB deaths and an 80% reduction in the TB incidence rate (new and relapse cases per 100,000 population per year) between 2015 and 2030.¹ As highlighted in the 2020 WHO Global TB report, the world as a whole, and particularly many high TB burden countries, is not on track to reach the milestones of the End TB Strategy.¹ The progress prior to 2020 was already slow and the impact of COVID-19 has been significant with an estimated 1.4 million fewer people receiving care for TB in 2020 than in 2019, with a potential extra 0.5 million TB deaths.¹⁸ The key risk factors for poor or negative TB outcomes are well documented and include malnutrition, smoking, diabetes, alcohol use disorder and HIV, all of which need to be addressed comprehensively in the TB response.^{1,4}

The aim of reviewing the most recent JEMM reports from missions to five South-East Asian countries, India (2019), Indonesia (2020), Myanmar (2019), Nepal (2019) and Philippines (2019) was to determine if smoking was recognized as one of the TB risks factors in the country, whether or not the country practiced any tobacco control intervention in TB control, and whether JEMM recommended any actions to address tobacco smoking in people with TB. Of the five countries, only one country, Myanmar, did not recognise the impact of smoking tobacco on TB and only one of the five countries, India, had current TB-Tobacco practises, albeit limited. Possible reasons for this omission in Myanmar might include; absence of smoking related indicators in JEMM framework; poor understanding or program overlooking the association of tobacco smoking and TB; and lack of local knowledge about the full range of risk factors for TB. Thus, it is critical to integrate TB and tobacco indicators in the JEMM terms of reference.

India's JEMM recognized the burden of tobacco use in TB, where over 266 million of all adults use tobacco¹³ are also vulnerable to TB. It was estimated that over 2.6 million people fell ill with TB in 2019 in India.¹ The JEMM report for India highlighted the current services, including their challenges with regards to coverage and reporting as well as recommending further strengthening of the services. Of the estimated nearly 1 million people with TB reported in Indonesia,¹ its JEMM reported about 300,000 of them were attributable to tobacco smoking. Indonesia is the home of over 61.4 million smokers, where smoking prevalence is exceptionally high at 67.4% among adult men.¹⁴ The prevalence of smoking in new smear positive pulmonary people with TB was reported 77.6%.¹⁹ Despite this, there are no TB-Tobacco collaborative activities referred to the JEMM. In the Philippines, the JEMM recognized that smoking and smokers were particularly at risk of TB, where 33.9% of the adult population (29 million people) regularly smoke tobacco and nearly 600,000 people fell ill with TB in Philippines in 2019.¹ There was no activity currently looking at TB and tobacco. In Nepal, the JEMM identified tobacco smoking as one of the major risk factors for TB morbidity, mortality, treatment failure and delay in TB diagnosis and treatment. Its National Tuberculosis Prevalence Survey (TBPS) 2018-19 found that an estimated 117,000 TB cases with TB incidence was increased by 1.6 times in the general population.²⁰ The 2019, WHO's STEPwise Approach to NCD Risk Factor Surveillance (STEPS) Survey in Nepal found that 28.9% percent of adults aged 15–69 years (48.3 percent of

Table 2 – Addressing tuberculosis and tobacco use/smoking as presented in the reports of Joint Monitoring Mission for TB Control in India, Indonesia, Myanmar, Nepal and the Philippines.

Country	Recognition of burden of tobacco in TB control	Identification of current practices and challenges of tobacco intervention in TB control	General/specific recommendations;
India	<ul style="list-style-type: none"> India is simultaneously burdened by multiple health conditions that have been associated with TB, including tobacco smoking. Global Burden of Disease Study 2010 which determined 4% of India's TB burden is attributable to tobacco smoking. In 2018, tobacco smoking remained as one of the major attributable risk factors for TB in India. Known tobacco use status among TB patients was reported with increased trend from 19% in 2017 to 46% in 2019. 	<ul style="list-style-type: none"> Collaborative framework for TB/tobacco is in place. Some States and Districts document a status of smoking and tobacco use in TB cards. Low coverage and/or reporting of screening with high drop-off rates for referral or co-management of the comorbidities including tobacco cessation in all persons reported as having TB. There are various health system-level integration programs, but some, including smoking cessation, have yet to be addressed. However, there is an overall upward trend in TB-HIV activities, and great collaborative action on TB, diabetes, and smoking. Paper-based and digital recording systems for TB and HIV which has resulted in an administrative burden for health workers and comorbidities such as DM, smoking, and alcohol being recorded only on HIV cards but not on TB treatment cards of the same individual. Suboptimal implementation of tobacco cessation into TB control throughout the country. Professional psychological counselling is available at the primary public health center, and is used for TB treatment adherence, treatment for substance use such as tobacco, excessive alcohol use, and other psychiatric illness. Some cross referrals were observed between the recently established tobacco cessation program and Revised National Tuberculosis Control Program (RNTCP); however, this area needs further promotion and strengthening with enhanced training, documentation and more regular coordination and supervision. 	<ul style="list-style-type: none"> Strengthen health system to address vulnerabilities focusing on NCDs, including tobacco cessation clinics; Plans to establish linkages between call centres, tobacco cessation clinics and TB programs to enable counselling support for TB patients; RNCTP and National Tobacco Control Program (NTCP) to put in place mechanisms that facilitate the implementation and recording and reporting of screening and co-management of risk factors including tobacco in TB patients, notified by private providers. Investment in training and capacity building for the leaders and officials of Local Self-Government to respond to social determinants like smoking; Coordination and joint supervision mechanisms need to be established or strengthened for tobacco interventions across all States and Districts; Mechanism to ensure a bi-directional screening for TB and tobacco needs to be improved; and status of smoking or tobacco use should be documented in TB Cards and they should be reviewed periodically.
Indonesia	<ul style="list-style-type: none"> About 300,000 TB cases in Indonesia are attributable to tobacco smoking. It also highlights smokers are particularly vulnerable to TB. 	<ul style="list-style-type: none"> With respect to the drivers of the TB epidemic, smoking is not mentioned in the operational component. The multi-sectoral element of the plan misses the possible synergy of collaboration with smoking cessation programs to take advantage of the techniques available now to assist smoking TB patients to stop their habit. There is no component that collaborates with wider efforts of smoking cessation to reduce tobacco smoking in the general population, and cut down on the TB epidemic attributable to tobacco smoking. Challenges identified were lack of intensified TB case finding among high-risk group including smokers and no provision of smoking cessation through routine TB services. 	<ul style="list-style-type: none"> TB-Tobacco program should coordinate with Tobacco cessation counselling and support for people with TB patients who smoke. Patients within the health system suffering from comorbidities such as diabetes mellitus, mental health, and who smoke, or those who are simply old, should be considered for active case finding.

Table 2 – (continued)

Country	Recognition of burden of tobacco in TB control	Identification of current practices and challenges of tobacco intervention in TB control	General/specific recommendations;
Myanmar	None	<ul style="list-style-type: none"> JEMM 2019 mandates included to assess the feasibility of service integration of general health care including comorbidities such as non-communicable diseases (NCDs) and propose ways for efficient integration (health system – integrated patient-centred care). Acknowledged that there was no smoking cessation within the TB control program and health providers were not aware about the brief advice and smoking cessation program. 	None
Nepal	<ul style="list-style-type: none"> Tobacco smoking is a significant risk factor for TB, leading to greater clinical severity and longer delays in TB diagnosis and treatment, with an increased likelihood of infection, relapse, and death. Longer delays in getting treatment were significantly associated with current smoking in Nepal WHO has asserted that TB rates could decline as much as 20% if smoking were eliminated. In Nepal, smoking was significantly more frequent in males with TB as compared to men in the general population (77% vs. 52%) and similarly, although with lower rates, among females with TB and women in the general population (23% vs. 8%). Health seeking was often delayed in persons with TB who smoke. People initially believed their cough was due to smoking and did not require further intervention. It was estimated that approximately 33.9% of the adult population (or about 20 million people) in the Philippines regularly smoke tobacco. This population was identified to have an increased risk of TB disease. Smoking for more than five years in men (3.3 times) and or 1–5 “pack years” in females (1.9 times) were more likely to get TB 	<ul style="list-style-type: none"> Tobacco cessation should be integrated into the NTP by training health/DOT providers to i) Ask persons with TB/visitors if they smoke, or are exposed to second-hand smoke, ii) give Brief advice to stop tobacco use, and iii) offer Cessation support with regular monitoring. 	<ul style="list-style-type: none"> PLHIV should continue to be systematically screened, as well as other groups with a very high risk of TB, including people with diabetes mellitus, people with alcohol use disorder, smokers and those who are undernourished. National TB Control Program has expanded eligibility for TB preventive treatment (TPT) which also include smokers.
Philippines	<ul style="list-style-type: none"> It was estimated that approximately 33.9% of the adult population (or about 20 million people) in the Philippines regularly smoke tobacco. This population was identified to have an increased risk of TB disease. Smoking for more than five years in men (3.3 times) and or 1–5 “pack years” in females (1.9 times) were more likely to get TB 	None	<ul style="list-style-type: none"> PLHIV should continue to be systematically screened, as well as other groups with a very high risk of TB, including people with diabetes mellitus, people with alcohol use disorder, smokers and those who are undernourished. National TB Control Program has expanded eligibility for TB preventive treatment (TPT) which also include smokers.

men, 11.6 percent of women) used tobacco in the country.²¹ JEMM also reported that smoking prevalence among male TB patients was found to be 77%, with approximately 12% of TB deaths accountable to tobacco use.²¹ Again, despite these data, no TB/tobacco activities were implemented. In Myanmar, it was found that addressing tobacco use as one of the determinants of TB was not considered by the JEMM, despite the fact that 54.4% of adults used some form of tobacco; 26.1% of adults were current tobacco smokers and 43.2% of adults currently used smokeless tobacco,²² and about 174,000 fell ill with TB in 2019, with 22,000 people dying from TB.¹ WHO reports smoking was the second largest risk factor attributable to TB disease in Myanmar^{1,4} with nearly 10% of TB deaths attributable to tobacco use.²²

Early diagnosis and early treatment are the key elements of TB control to break the chain of mycobacterial transmission. In 2007, WHO and The Union published a joint monograph with emphasis on the need for action-oriented collaboration between TB and tobacco control programs.³ Despite this emphasis being in place for nearly 15 years, it is evident in this cohort of countries, there remain considerable gaps in addressing tobacco smoking to reduce people's vulnerability to TB infection and disease. Some efforts have been made by India as reported in the JEMM report, which included development of a collaborative framework for TB-tobacco, establishment of smoking cessation programs in some districts and availability of professional psychological counselling in primary health centres. The JEMM also identified challenges such as high drop-off rates of smoking cessation, inadequate training and coordination, recording and reporting, and supervision. Such challenges are common in TB programs as well. In Indonesia, Myanmar and the Philippines, interventions to address the tobacco epidemic in relation to TB were completely missed in national TB control operational plans, whereas in Nepal there were some efforts in policy development but a lack of implementation of smoking cessation within the TB control program.

Studies conducted in many high burden countries for TB and tobacco suggest that brief advice to promote smoking cessation in TB patients is effective and has resulted high quit rates. In Bangladesh, 82% smoking quit rates were found with the intervention of brief advice at month zero by a health worker and biweekly follow-up visits at a person with TB's home by community health volunteers.²³ In Indonesia, quit rates of nearly 67% were found among persons with TB as brief advice was given by health workers at each monthly visit and family members were encouraged to support persons with TB to quit smoking¹⁹; in India and China, some 67% quit rates were observed with brief advice given by health worker at month zero and follow-up visits at months 2, 5 and 6 of TB treatment.^{24,25} JEMM reports from India recommended smoking cessation to all notified persons with TB by trained health workers, bi-directional screening for TB and tobacco and coordinated supervision. In addition to smoking cessation, the JEMM in Indonesia suggested smokers should be considered for active case finding that would contribute to identifying additional people with TB and cut the chain of community transmission of TB. The Philippines JEMM suggested smokers should be included in regular TB screening and TB preventive treatment (TPT) but the reports missed

recommending smoking cessation as a key intervention in TB services. Nepal's JEMM identified a key recommendation to integrate The Union ABC²⁶ (Ask, Brief advice, Cessation support) approach for smoking cessation in TB control, that is doable in the busiest primary health care services. In Myanmar, JEMM completely failed to include any recommendation related to tobacco intervention in TB control.

The United States Centers for Disease Control and Prevention (CDC) reports that along with brief advice, Nicotine Replacement Therapy (NRT) is the one of the most helpful tools smokers can use to quit. Many people use NRT and medications to help reduce withdrawal feelings and nicotine cravings. Quit smoking medications, including NRT, can double the chances of stopping using tobacco products for good.²⁷ However, none of the JEMM carried out in those five countries recommended NRT or quit smoking medications as one of the options to be offered to the smokers with TB.

Reducing the number of people developing TB infection, disease and deaths is only possible through multisectoral actions to address TB determinants such as smoking. As reported by WHO, the COVID-19 pandemic has led to approximately 750 million tobacco users saying they want to quit, but only 30% of them have access to the tools that can help them do so. The Union's ABC approach, which includes offering brief smoking cessation through TB clinics to all people with TB, creating smoke-free health care and smoke-free home environments¹⁹ and inclusion of NRT along with brief advice in regular TB services are necessary to significantly curb the TB and tobacco epidemics; such interventions should be an integral part of TB control programs in all countries. These interventions have population level effects to cut the chain of TB transmission, improving TB outcomes, and reducing out-of-pocket expenditure and health costs in general. In December 2020, WHO launched a year-long global campaign for World No Tobacco Day 2021 with the theme of "Commit to Quit". The campaign targets to reach at least 100 million tobacco users to make them commit to quit, which needs a holistic-health system population level approach.²⁸

Possible limitations of this study include: the JEMM reports from India, Indonesia, Myanmar, Nepal and Philippines were either accessed from WHO or from the country's TB Control Programs. We were not able to capture any discussions or feedback that may have occurred during the JEMM. The results presented here were largely desk reviews of the JEMM reports. There is the possibility that a country was implementing some sort of tobacco cessation activity in the TB program, but this information was missed in the JEMM reports. The results of this review could be added to with a more detailed survey specifically focused on TB and Tobacco activities in these countries to capture data on activities focused on TB and Tobacco cessation activities.

5. Conclusion

Smoking is a key risk factor for the development of TB. As with other major risk factors for TB, such as HIV, it is important that the extent of the "co-morbidity" be defined so that appropriate interventions and collaborative activities can be planned and implemented to address it. Given the role of

JEMM to improve and develop TB programs to address the specifics of national TB responses, the burden of smoking on the TB epidemic should be included as one of the key indicators in the JEMM framework with multisectoral actions to address TB-tobacco use evaluated and recommended. In addition to brief cessation support through regular TB services, NRT and other medications can be included in the comprehensive package care for people with TB to improve quality of the services they receive. Stopping smoking or tobacco use has benefits at the individual and population level and go beyond just TB. Multisectoral efforts to stop tobacco use also support the non-communicable disease agenda as well as protecting against poor outcomes for COVID-19. The support of TB programs to strengthen the implementation of the WHO Framework Convention on Tobacco Control is critical and will support the national TB programs targets to END TB in line with the END TB Strategy and ultimately the SDGs.

Conflicts of interest

All the authors have no conflicts to declare with regards to the content of this article.

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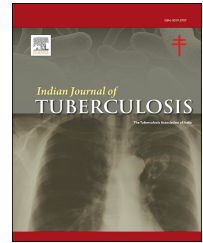
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Short communication

Pricing of tobacco products: Pre and post GST implementation

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ABSTRACT

There is ample evidence stating that any taxation policy that effectively increases the real price of tobacco products reduces its use. In the past, several countries have documented instances; wherein the intended effects of tobacco taxation were undermined by aggressive pricing strategies of the industry. However, there is a dearth of such evidence in Indian context. Hence, the current study was conducted to ascertain the changes in the retail price of locally available tobacco products during pre and post GST period in India. This cross-sectional analytical study was conducted among all available tobacco products in the states of Meghalaya, Odisha, Puducherry and Telangana. The information on maximum retail price (MRP) pre and post GST implementation on tobacco products was gathered from the owners of Point of Sale (PoS), vendors and retailers of various tobacco products. The results showed that of the total 154 brands observed pre and post GST implementation, 33.12% [95%CI 25.75–41.15] did not exhibit any increase in their price. The proportion of tobacco product brands with decrease/no change in price was a higher in Meghalaya (PR = 44; 95%CI: 6.32–306.3), Odisha (PR = 23; 95%CI: 3.25–162.7) and Puducherry (PR = 1.48; 95%CI: 0.1–22.84) as compared to Telangana. As compared to cigarettes, smokeless tobacco (PR = 1.84; 95%CI 1.16–2.89) and bidi (PR = 1.74; 95%CI: 0.78–3.9) had more number of brands with a decrease/no change in price post GST implementation. Moreover, four new brands of smokeless tobacco were introduced into the market following GST implementation. The study clearly suggests a departure from the outcomes envisaged by taxation policy on tobacco products in the country. Given the

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importance of price as a determinant in tobacco use especially among youth, there is an urgent need for strengthening our tax regime for tobacco products.

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1. Background

Ramping up the price of tobacco products through taxation is one of the most effective and a well-grounded measure for mitigating tobacco burden. There is ample evidence stating that any taxation policy that effectively increases the real price of tobacco products reduces its use. A price increase of 10% for *bidi*: locally made smoking tobacco and cigarette can reduce their consumption by 9.2% and 3.4% respectively.^{1–4} The World Health Organization, through the Article 6 of Framework Convention on Tobacco Control (FCTC), acknowledges tobacco taxation as ‘effective means’ for reduction in the demand for tobacco.⁵ In 2008, WHO packaged and promoted six proven measures, known as MPOWER to control tobacco use worldwide. The ‘R’ of the measures denotes ‘raising tobacco taxes’ which aims at scaling up of the provisions in Article 6 of the WHO FCTC on the ground.⁶

Tobacco products are subject to a myriad of taxation policies in India-both at the Central and the State level. The pre-GST (Goods and Service Tax) excise imposed by the Centre on all products of tobacco included the Basic Excise Duty (BED), National Calamity Contingent Duty (NCCD), Health Cess (HC) and the Special Excise Duty (SED). The excise tax on most smoked tobacco products were levied as rupee amounts per thousand sticks-nonetheless liable to variations according to product category and tier. In contrast, most of the smokeless products were subject to *ad valorem* excise taxes, levied as a percent of the retail price. At the state level, a value added tax (VAT) was imposed on the price inclusive of excise.²

The implementation of GST by the Indian Government on July 2017 substantially reformed the indirect taxation system by shifting the paradigm from an origin based system (benefitting manufacturing states) to benefitting the consumer states. A statutory *ad-valorem* GST rate of 28%-encompassing national excise duties, state-level VAT and several other duties-with an additional compensation cess on smokeless tobacco and cigarettes has been fixed for all tobacco products. The NCCD (10%) was retained for all the tobacco products; both smoke and smokeless form.⁷

In the past, several countries have documented instances; wherein the intended effects of tobacco taxation were

undermined by aggressive pricing strategies of the industry.^{3,4} Tobacco companies vary in their response to increased taxes. One of their several tactics employed is to undercut any increase in the price of their products due to increase in taxation; thus impairing the taxation policy. For example: The wholesale prices of tobacco products were cut down so that the total retail price increased by less than the amount of tax to cushion the effect of tax increase on consumers.³ However, there is dearth of any such evidence in Indian context. Hence, the current study was conducted to ascertain the changes in the retail price of locally available tobacco products during pre and post GST period in India.

2. Methodology

This cross-sectional analytical study was undertaken as a part of the ongoing project “Advancing tobacco control at national and sub-national level through Capacity building, MPOWER implementation, and support to National Tobacco Control Programme (NTCP)” in the project states of Meghalaya, Odisha, Puducherry and Telangana.

A list of all available tobacco products were obtained by trained field staff. The retail price, brand name and weight of all locally available tobacco products were assessed in the project states/UT using convenient sampling technique. The assessment was done at field sites by using the Epicollect 5 application. The information on maximum retail price (MRP) prior to GST implementation on tobacco products was gathered from the owners of Point of Sale (PoS), vendors and retailers of various tobacco products. The post GST MRP of the same tobacco product brands were collected in 2019 from the sellers.

3. Results

A total of 158 brands of various tobacco products were collected from the four project states, of which four were new brands of smokeless tobacco: ‘Baahubali pan masala’, ‘Google’, ‘Sweet Supari’ and ‘Nandini Supari’, introduced into the market following GST implementation. Out of the total 154 brands

Table 1 – Price change of tobacco products post GST implementation in the four project States.

State	Total brands observed n	Price n (%)		PR (CI)	P value
		Decrease/No change	Increase		
Meghalaya	23	22 (95.65)	1 (4.5)	44 (6.32–306.3)	<0.001
Odisha	54	27 (50)	27 (50)	23 (3.25–162.7)	<0.001
Puducherry	31	1 (3.23)	30 (96.77)	1.48 (0.1–22.84)	>0.99
Telangana	46	1 (2.17)	45 (97.83)	1	–
Total	154	51 (33.12)	103 (66.88)	15.23 (2.16–107.2)	<0.001

observed pre and post GST implementation, 33.12% [95%CI 25.75–41.15] did not exhibit any increase in their price. The proportion of tobacco product brands with decrease/no change in price was higher in Meghalaya (PR = 44; 95%CI: 6.32–306.3), Odisha (PR = 23; 95%CI: 3.25–162.7) and Puducherry (PR = 1.48; 95%CI: 0.1–22.84) as compared to Telangana (Table 1).

Except for a 5.88% increase in the price of '555': cigarette-Indian brand, there is no change in price of the tobacco products in Meghalaya. Out of the total 54 brands of locally available tobacco products, 50% did not reflect any increase in pack price post GST implementation in Odisha. Of the total 27 brands that did not exhibit any price hike in Odisha, 11 (40.74%) were smokeless tobacco products, 10 (37.04%) were Indian cigarette brands and the rest comprised Indian cigars (3.7%), foreign cigarettes (11.11%) and bidi (7.41%). Among the 31 locally available tobacco products in Puducherry all except 'Kings' cigarette brand: which saw a 37.5% decline in prices; all others recorded an increase in price post GST implementation. In Telangana, of the 46 locally available tobacco products, 45 (97.83%) witnessed an increase in pack price post GST implementation.

As compared to cigarettes, smokeless tobacco (PR = 1.84; 95%CI: 1.16–2.89) and bidi (PR = 1.74; 95%CI: 0.78–3.9) had more number of brands with a decrease/no change in price post GST implementation.

4. Discussion

Despite the implementation of GST, the study revealed an absence of any increase in the retail price of 33.12% of the total 154 tobacco brands studied. The study clearly suggests a departure from the outcomes envisaged by taxation policy on tobacco products in the country.

There is enough evidence from around the world; of tobacco industry acknowledging the threat posed by propositions for raising the tax structures for tobacco products. Tobacco industries have always considered tax increase as a critical threat to their business and seek to overcome it by adopting numerous strategies.³ After experimenting with several such marketing strategies for eg: raising the manufacturing price of cigarettes when an increase in tax was introduced and posing in front of the tobacco users that the increase being solely the fault of the government which in turn would prompt the tobacco users to stock up the product-the industry realised that an increase in price of the product would only result in lowering the uptake as young adults are highly sensitive to price changes. Reduction in youth tobacco users would significantly lower their profits in the long run.⁴

In the current study, the data collectors observed that one of the major step adopted by industry to undercut the price was to decrease the size/quantity of the product proportional to the tax increase. Such resized packets were sold at a lower price-thereby under shifting the tax increase. The other marketing measures taken up by the industry specifically for smokeless tobacco was to tactfully separate the tobacco pouches-Gutka from the *pan masala* packets. This in turn

helped them achieve three objectives. Firstly, they evaded the ban imposed under COTPA regulations as the product no longer contains tobacco: simultaneously the tobacco pouch was sold illegally in the shop without any display of the product. Secondly, the GST was not calculated for the separated tobacco pouch: it only covered the chewing *pan masala* packet. Thirdly, the *pan masala* packet was exempt from GST rates for tobacco which are higher as compared to the rates of food products. Most dangerously, statutory pictorial health warnings was missed on most such tobacco pouches, as those were sold illegally, and hence manufacturers did not feel to have it on those pouches. This way the purpose of putting health warning on such tobacco products for visual impact on users was diluted. Policy may be reframed adequately or have interim amendment to remove such porous way used by manufacturers for higher benefit blended with extensive promotion of their products.

5. Conclusion

Given the importance of price as a determinant in tobacco use especially among youth, there is an urgent need for strengthening our tax regime for tobacco products; making it less affordable for the younger generation. The tobacco manufacturers have adopted various ways and means to accommodate the enhanced price of tobacco products after implementation of GST. These practices by the Tobacco Industry have adverse impact on tobacco control efforts that require action at various level and may, inter alia, include:

6. Recommendations

- The need for substantial increase in the taxation of smokeless tobacco products. Strong enforcement drives to prevent the illegal sale of tobacco pouches in shops selling *pan masala*.
- Simplification of existing tax system for tobacco products.
- Taxes should be revised regularly to adjust for inflation to reduce the affordability of tobacco products in the country especially by the youth.

Conflicts of interest

The authors have none to declare.

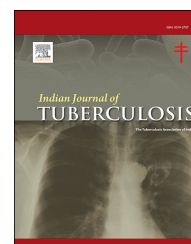
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Short communication

Increasing use of flavoured tobacco products amongst youth

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ABSTRACT

Adolescence and early adulthood are the most susceptible phase of life for tobacco initiation and its use during this period can have profound public health implications. Anti-smoking campaigns have helped in reducing the social acceptability of smoking; however, newer nicotine products are becoming increasingly popular, globally. Evidence suggests that flavours play a key role in youth initiation of tobacco use. Flavoured Tobacco Products (FTP) are disproportionately used by the youth and young adults due to their high palatability and misperceptions regarding reduced ill effects of their constituents. Early use of a flavoured tobacco product puts youth and young adults at risk of continued tobacco use and other substance use. The prevalence of FTP use (72.7%) is much higher in young adults as compared to non-flavoured tobacco products.

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1. Introduction

With the growing regulatory pressure ban on public smoking, major tobacco companies are adopting deceptive and aggressive marketing techniques to lure the young population by introducing newer flavoured tobacco products (FTP).¹ These nicotine-containing products include flavoured smokeless tobacco (snus, chewing tobacco, dry snuff), electronic cigarettes (E-cigs), heat-not-burn devices, nicotine pouches, cigars, cigarillos, hookah and many more. Largely unregulated, most FTPs have ease of use and are easily available in the market with a substantial sale on the internet.² E-cigs, cigars, hookah and snus are the most

common products used in the United States. There were about 7765 flavours and 466 brands of E-cigs available in the US market in 2014, and since then its popularity has increased consistently among U.S. youths.³ The sale of flavoured cigars has also increased by nearly 50% in the US from 2008 to 2015. While cigarette sale in the US seems to decline, the sale of flavoured moist snuff increased 69% between 2002 and 2016 with expenditures for moist snuff rising from \$209.3 million in 2002 to \$678.7 million in 2016.⁴ Flavoured smokeless tobacco (ST) constitutes 70–98% of all ST products in SEAR and the most popular ones are Khaini (tobacco and lime), Zarda and Gutka (mixture of tobacco, areca nut and lime), the latter being now banned in India.

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To improve the aroma and taste and to reduce the harshness, bitterness, and astringency, FTPs are supplemented with additives like sugars, salts, humectants, and artificial flavourings like fruit, candy, and peppermint. This increases the product's palatability and enhances its appeal to the youth. According to data from Wave 1 of the Population Assessment of Tobacco and Health (PATH) Study, 81% of youth and 86% of young adults using tobacco, reported that the first tobacco product they used was flavoured. According to a large longitudinal cohort study in the US, flavours in tobacco products were associated with youth and young adult tobacco experimentation.⁵ US National Youth Tobacco Survey, 2020 showed that currently, 23.6% high school and 6.7% middle school students are reported to be using any tobacco product.

Nicotine is a highly addictive chemical that can harm the developing adolescent brain, and increase the risk for future addiction to other drugs. It adversely affects nearly all organ systems of the body especially the heart, lung, kidney etc. Nicotine is also known to impair macrophage killing of *Mycobacterium Tuberculosis* (MTB). Cigarette smoking is a well-recognised risk factor for tubercular infection for a long, but recent studies have shown that E-cigs too may stimulate a pro-inflammatory cytokine response to MTB by impairing the phagocytic function.⁶ However, the long-term health effects of new and emerging flavoured nicotine products are relatively unknown and yet to be analysed. While the research based on E-cigs is still underway, a number of studies have found that the flavouring used in E-cigs and E-liquids have been linked to serious health problems, including toxic effects on the lungs and negative effects on the immune system.

Data analysis 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 showed that in 8 out of 11 countries, more than 10% of 13 to 15-year-old adolescent students, reported tobacco use.⁷ Tobacco use onset in adolescents is seen to cause an 'accelerated dependency' within a short period from first exposure.⁸ Patterns of FTP use varied by age group with young adults aged 18 to 29 reported a higher prevalence of FTP use (72.7%) as compared with those using non-flavoured tobacco products. This could be the reason that the prevalence of Smokeless Tobacco (ST) is seen to exceed that of cigarettes in many countries. In most of the SEAR countries, tobacco use among adolescents and youth (15–24 years) is high with early age of initiation with no consistent signs of decline over the last decade.⁹

Anti-smoking campaigns have seen some success in changing attitudes and reducing the social acceptability of smoking, however, these strategies are causing a switch to other flavoured nicotine products in an attempt to quit smoking. The ban was also associated with an increase of 45% increase in the use of menthol cigarettes, a 34% increase in the use of cigars, and a 55% increase in the use of pipes, indicating that youth are switching to other FTPs in place of cigarettes. Very recently, US FDA has announced to ban menthol flavour in cigarettes and all flavours in cigars to help save lives and to significantly reduce youth initiation and increase the chances

of smoking cessation among current smokers. According to the Youth Risk Behaviour Surveillance System, between 2007 and 2013, the cigarette smoking rate among high school students in the US, dropped by 22%, whereas ST use rose by 11% in 2017. The Centre for Disease Control and Prevention's (CDC) Morbidity and Mortality Weekly Report, 2015 showed that 70% of middle or high school students who use tobacco reported using a flavoured product within the past 30 days. More recent data from the 2020 National Youth Tobacco Survey (NYTS) continues to evidence this trend and states that among all current E-cigs users, 82.9% used flavoured E-cigs, including 84.7% of high school users (2.53 million) and 73.9% of middle school users (400,000).

According to CDC, tobacco surveillance summaries report, in 2019 more than half of young tobacco product users are reported seriously thinking about quitting all tobacco products. However, pleasurable taste, easy availability, surrogate tobacco product marketing, ease of use, and ignorance about harmful effects from tobacco use were the most prevalent factors that promote flavoured tobacco product use among the youth.¹⁰

2. Conclusion

The availability of a variety of additives and flavours, exposure to tobacco product marketing, curiosity, susceptibility, and misperception about their reduced harm are the prime factors that promote tobacco product use especially among youths. Added fragrance and fruit flavourings in tobacco products is highly appreciated by adolescents which not only promotes tobacco use but aid tobacco initiation and nicotine addiction at an early age. As the youth find flavours appealing, data supports a ban on all characterising flavours in tobacco products to reduce the palatability and addictiveness of tobacco products. This will eventually curtail their uptake, increase cessation and can help to reduce relapse. Proper communication about specific toxicants could discourage FTP use.

The current COVID-19 pandemic is the right time to focus on our efforts to strengthen FCTC and non-FCTC policy measures for effective control over flavoured tobacco products as people should now be more receptive to tobacco control measures.

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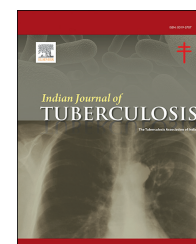
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Short communication

Determinants of drug resistant & drug sensitive tuberculosis patients from North India-a case control study

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ABSTRACT

Background and objective: The burden of drug resistant tuberculosis (DRTB) has posed a huge challenge to for the governments, throughout the world. India has 27% of the global DRTB burden with incidence of 130,000 cases. India has kept an ambitious target of elimination of tuberculosis by 2025 which requires understanding and mitigating various determinants of DRTB.

Methods: The retrospective case control study was undertaken from May to September 2019 among drugresistant (cases) and drug sensitive (controls) tuberculosis patients from two districts of Himachal Pradesh, India. A total of 211 participants were recruited in the study, which includes all 102 cases and randomly selected, age and sex matched 109 controls. A semi structured questionnaire, adapted from a study by Lobo et al, was used for assessing the determinants of DRTB and DSTB. The data collection was undertaken from district and block level health care facilities followed by home visits to patients. Multivariate logistic regression was used to determine risk factors associated with DRTB.

Results: Diagnostic delay (aOR-7.72, p value 0.000), history of treatment default (aOR-2.97, self history of tuberculosis (aOR 1.42, p value 0.01), migration (aOR-4.84, p value 0.000), smoking (aOR-2.70, p value 0.014), and belonging to rural area (aOR-2.62, p value- 0.013) were found as independent risk factors for the occurrence of DRTB.

Conclusion: The risk factors identified in the study should be prioritized by the policy makers, implementators and educators for framing appropriate policies in TB control programme in India. The diagnostic delay as a risk factor merits active case finding of TB patients and educating health care staff and community.

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1. Introduction

Tuberculosis has emerged as a major cause of morbidity and mortality across the world with 10 million incident cases and 1.41 million deaths in 2019 worldwide.¹ In India, approximately 2.64 million TB cases and 0.45 million deaths were notified in 2019; which constitute around one third of the global tuberculosis burden.¹ Further, Drug resistant tuberculosis (DRTB) has been an increasing challenge for the public health as it is increasing at an annual rate of over 20%.² In 2018, 484,000 people developed rifampicin resistance TB (RR-TB) out of which India contributed a total of 130,000 MDR/RR cases.¹ The first national drug resistance survey in India showed that the rates of MDR among newly diagnosed TB patients was 2.8% and those in previously treated to be 11.6% respectively.³ A study by Sharma et al has forecasted that percentage of MDRTB among incident TB patients is likely to reach 12.4% in India, by 2040. This study also predicted the percentage of XDR TB among incident MDRTB to reach at 8.9% in 2040.⁴

United Nation led 'Sustainable Development Goals' (SDG) and World Health Organization supported 'End TB Strategy' are providing framework for control of TB, across the world. SDGs (2016–2030) aims at ending of tuberculosis by 2030, where as the 'End TB Strategy' envisions 95% reduction in TB deaths and 90% TB incidence by 2035 in comparison to levels of TB in 2015.⁵ India's National Health Policy 2015 led National Strategic Plan (NSP) 2017–25, is providing framework for the tuberculosis control in India which envisions 'TB free India by 2025 with zero deaths, disease and poverty due to TB' by adopting four strategic pillars "Detect-Treat-Prevent-Build".⁶ Engagement of private sector, door to door active case finding, Nikshay nutritional support, robust surveillance system, DRTB management, community engagement and multi-sectoral approach are among various strategies adopted under NSP.⁶ 'Programmatic management of drug resistant tuberculosis guidelines' (PMDT), adopted in 2007 details the comprehensive strategy for the control of DRTB.⁷

The existing research from developed^{8,9} & developing countries^{10–12} have highlighted multiple determinants associated with DRTB. Younger age, contact with MDRTB patient and male gender bear more risk of primary infection with X/MDRTB.¹⁰ Previous TB treatment, low education, unemployment, smoking, social stigma, underweight, adverse drug effects, inadequate initial treatment regimen, history of TB treatment, infection with human immune-deficiency virus and being far from health facility also increase the risk for MDR-TB.^{11,12} Most of the evidence on predictors of DRTB is from developed nations. Further, the factors were not extensively studied in previously treated TB patients. The national drug resistance survey has also concluded the state wide variations in drug resistance among TB patients in India. The national level estimates masks the local level of epidemics which are required to be addressed with specific interventions.³ The hilly state of Himachal Pradesh bears different geographical and cultural settings, in comparison to the other states in the country. Understanding of risk factors associated with X/MDRTB will bring out intervention opportunities for the effective management of DRTB. Hence, in the

current study, we aim at determining the factors associated with drug sensitive and drug resistant TB patients in Himachal Pradesh.

2. Methods

2.1. Study design and setting

The retrospective case control quantitative study was carried out between May and September 2019 in the two districts namely Mandi and Solan, of the state Himachal Pradesh. The study districts were purposively chosen as these were main districts in the state in terms of number of DRTB, DSTB patients; along with the fact that these both districts represents the whole state in socio-cultural as well as geographical context. The state with a population 6,864,602 and area 55673 Km² extends from the latitudes 30°22'40" (N) to 33°12'40"(N) and longitudes 75°45' 55" (E) to 79°04' 20"(E) in the northern part of India.¹³ It has 12 districts, 78 administrative blocks and 3226 village panchayats (Fig. 1).

It is the least urbanized state of the country, with only 10% of the people living in urban areas of the state. In the year 2018, 16416 tuberculosis patients which includes 294 MDR/RR and 108 Mono H resistant TB cases were notified, both in public as well as in private sector.⁶ The annual tuberculosis notification rate in the state is 224/lakh/year.⁶ All the health blocks of these two districts were involved in the study to maintain the heterogeneity of the data. Total notified TB cases for the districts of Mandi and Solan were 2375 and 2233 (in the year 2018); which included 21 and 67 DRTB cases respectively. The TB notification rate of District Mandi was 201/lakh/year whereas for District Solan it was 279/lakh/year.

2.2. Study population

All cases/DRTB patients from the two selected districts were enrolled from TB notification register at the district level, where as randomly selected age and sex matched controls/DSTB patients were enrolled from TB notification register at the block level. The register of the DRTB patients is only maintained at the district level with the District TB Officer whereas DSTB patients records are available at block level with Medical Officer (Tuberculosis) as per the current system of record keeping under National Tuberculosis Elimination Program.

2.3. Sampling technique & sample size calculation

All the DRTB patients (cases) from the two districts were enrolled in the study, whereas 'controls' were purposively chosen in the way that they belong to the jurisdiction of 'cases' and matched for age and gender. A total 102 cases and 109 controls were recruited in order to achieve 80% power (α) and detect an odd ratio of 2.35 at 5% significance level.¹⁴

2.4. Inclusion criteria

All current DRTB patients, who had completed their treatments up to one year before the data collection and available

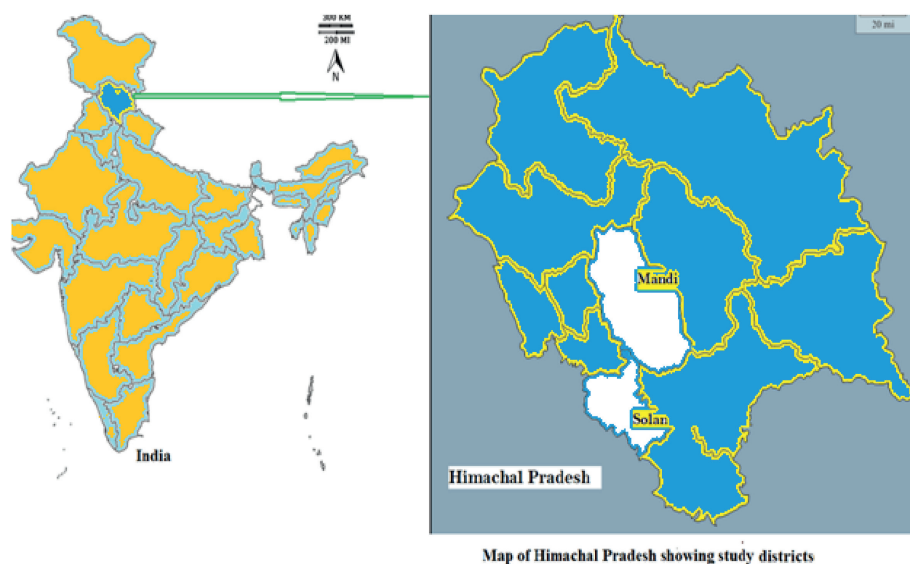


Fig. 1 – Map showing location of jurisdiction of the study.

at the time of data collection were included as cases in the study. For the controls, patients who have recovered from TB after having successfully completed their treatment without having turned drug resistant were included in the study.

2.5. Exclusion criteria

Severely ill and debilitated patients and those refused to give consent were excluded from interview. The migrant patients and others who were not available at the time of interview were also excluded from the study.

2.6. Study tool

A semi-structured questionnaire for assessing determinants in DRTB/DSTB was adapted from a study by Lobo et al, which has also been used in similar settings of Patna, Bihar.¹⁵ It contained dependent variables as occurrence or non occurrence of drug resistance towards treatment of tuberculosis whereas the independent variable includes socio-demographic variables of the study participants, diagnostic and treatment delays, default to treatment, substance addiction, TB treatment history etc.

2.7. Data collection

Data collection from the study participants was done by conducting home visits in every health block of the two districts. These visits were made with the help of District TB coordinators, Senior treatment supervisors, Senior TB Laboratory supervisors, Multi-purpose health workers, and ASHA workers. Participants were contacted on mobiles one day prior of the home visit to ensure their availability at homes. Besides this, the DRTB patients visiting DRTB Centre Mandi, TB Sanatorium Dharmpur, at various tuberculosis Units (TUs), CHCs

or PHCs were also interviewed. IDIs were conducted in the preferred language (*Hindi or Pahari*) of the participant. Each interview extended approximately for 40–45 min.

Participants' data was cross examined with the prescriptions, laboratory reports, treatment cards available with them and from the records available at the various level of the Department of Health & Family Welfare, Himachal Pradesh like TB notification register, treatment register, DRTB registers laboratory register and Nikshay platform.

2.8. Ethical issues

Ethical approval from the intramural ethics committee of PGIMER Chandigarh was obtained prior to the study. Approval for data collection for the study along with examination of patients' records was taken from the State Tuberculosis Officer (STO), Himachal Pradesh. Participants were provided 'Participant Information sheets' prior to the study and its purpose was explained to every participant aloud. Informed consent was obtained from every study participant along with ensuring their anonymity and confidentiality.

2.9. Data analysis

Data entry was conducted using Microsoft Excel while the Stata version 13.1 software was used for further analysis. The completeness of the data was checked for each variable by running frequencies of each variable. For the data analysis, descriptive statistics were derived followed by multivariate logistic regression analysis to control the confounding effects of different variables. Odd ratios and 95% confidence intervals were used to examine the strength of association between potentials determinants and DRTB. The p-value of 0.05 was used as threshold for ascertaining the variables statistical significance.

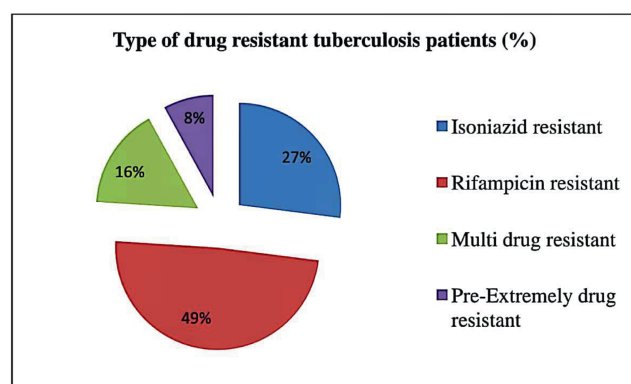


Fig. 2

3. Results

A total of 102 drug resistant tuberculosis patients participated in the study. (Fig. 2) The majority 50 (49%) were resistant to rifampicin(R) followed by resistance to isoniazid (H) 28 (27.45%). The Multi drug resistant (MDR) patients constituted 16 (15.7%) of the participants while 8 patients (7.8%) were of 'Pre-Extensively drug resistant' (Pre XDR) category. Table 1 represents the socio demographic characteristics of the study participants.

3.1. Risk factors associated with drug resistant tuberculosis

The socio-demographic and treatment related determinants of drug resistant and drug sensitive TB patients is shown in

Table 1 – Socio-demographic characteristics of the study participants.

Variables		Tuberculosis patients		
		Drug Resistant (DR)	Drug sensitive (DS)	Total
		n (%) N = 102	n (%) N = 109	n (%) N = 211
Age (years)	<30	41 (40.2)	35 (32.1)	76 (36.0)
	31–60	54 (52.9)	63 (57.8)	117 (55.5)
	>61	7 (6.9)	11 (10.1)	18 (8.5)
Gender	Male	64 (62.8)	63 (57.8)	127 (39.8)
	Female	38 (37.3)	46 (42.2)	84 (60.2)
Caste	SC	24 (22.2)	29 (28.7)	53 (25.2)
	General	78 (71.6)	68 (67.3)	146 (69.5)
	OBC	6 (5.5)	4 (3.7)	10 (4.8)
	ST	1 (0.9)	0 (0.0)	2 (0.9)
Education	Up to primary level	32 (31.4)	36 (33.0)	68 (32.2)
	Above primary level	70 (68.6)	73 (66.9)	143 (67.7)
Marital status	Single & others	34 (33.3)	28 (25.7)	62 (29.4)
	Married	68 (66.7)	81 (74.3)	149 (70.6)
Religion	Hindu	99 (98.0)	105 (96.3)	205 (97.2)
	Non-Hindu	2 (1.9)	4 (3.7)	6 (2.8)
Area	Rural	87 (85.3)	78 (71.6)	165 (78.2)
	Urban	15 (14.7)	31 (28.4)	46 (21.8)
Occupation	Salaried/Pension	24 (23.5)	28 (25.7)	52 (24.6)
	Self employed	12 (11.8)	21 (19.3)	33 (15.6)
	Students	21 (20.7)	15 (13.8)	36 (17.1)
	Housewife	23 (22.6)	15 (13.8)	38 (18.0)
	Unemployed	22 (21.6)	30 (27.5)	52 (24.6)
	Kutch	29 (28.4)	37 (33.9)	66 (31.3)
Kind of house	Mix	18 (17.6)	11 (10.1)	29 (13.7)
	Pucca	55 (53.9)	61 (55.9)	116 (55.0)
Wood as cooking fuel	Yes	85 (83.3)	76 (69.7)	161 (76.3)
	No	17 (16.7)	33 (30.3)	50 (23.7)
Addiction of substances	Yes	51 (50.0)	48 (44.1)	99 (46.9)
	No	51 (50.0)	61 (55.9)	112 (53.1)
History of current smoking	Yes	49 (48.0)	36 (33.0)	85 (40.3)
	No	53 (51.9)	73 (66.9)	126 (59.7)
History of cattle rearing	Yes	51 (50.0)	64 (58.7)	115 (54.5)
	No	51 (50.0)	45 (41.3)	96 (45.5)
Status of migration	Yes	40 (39.2)	15 (13.8)	55 (26.1)
	No	62 (60.8)	94 (86.2)	156 (76.9)

Table 2 – Socio-demographic and treatment related determinants of drug resistant and drug sensitive TB patients.

Variables		Tuberculosis patients		
		Drug Resistant (DR)	Drug sensitive (DS)	OR (95%CI), p value
		n (%) N = 102	n (%) N = 109	n (%) N = 211
Age	<30	41 (40.2)	35 (32.1)	1.841 (0.64–5.26), 0.254
	31–60	54 (52.9)	63 (57.8)	1.35 (0.57–3.72), 0.565
	>61	7 (6.9)	11 (10.1)	Reference
Gender	Male	64 (62.8)	63 (57.8)	1.23 (0.61–2.14), 0.464
	Female	38 (37.3)	46 (42.2)	Reference
Caste	SC	24 (22.2)	29 (28.7)	1.22 (0.07–2055), 0.891
	General	78 (71.6)	68 (67.3)	0.89 (0.05–14.4), 0.931
	OBC	6 (5.5)	4 (3.7)	0.42 (0.02–9.36), 0.59
	ST	1 (0.9)	0 (0.0)	Reference
Education	Up to primary level	32 (31.4)	36 (33.0)	0.93 (0.52–1.66), 0.798
	Above primary level	70 (68.6)	73 (66.9)	Reference
Marital status	Single & others	34 (33.3)	28 (25.7)	1.45 (0.80–2.62), 0.224
	Married	68 (66.7)	81 (74.3)	Reference
Religion	Hindu	99 (98.0)	105 (96.3)	1.89 (0.34–10.59), 0.470
	Non-Hindu	2 (1.9)	4 (3.7)	Reference
Area	Rural	87 (85.3)	78 (71.6)	2.305 (1.15–4.46), 0.016
	Urban	15 (14.7)	31 (28.4)	Reference
Occupation	Salaried/Pension	24 (23.5)	28 (25.7)	1.169 (0.54–2.54), 0.693
	Self employed	12 (11.8)	21 (19.3)	0.780 (0.32–1.91), 0.586
	Students	21 (20.7)	15 (13.8)	1.910 (0.81–4.52), 0.141
	Housewife	23 (22.6)	15 (13.8)	2.09 (0.89–4.90), 0.09
	Unemployed	22 (21.6)	30 (27.5)	Reference
Type of house	Kutcha	29 (28.4)	37 (33.9)	0.87 (0.47–1.60)
	Mix	18 (17.6)	11 (10.1)	1.82 (0.79–4.18), 0.161
	Pucca	55 (53.9)	61 (55.9)	Reference
Wood as cooking fuel	Yes	85 (83.3)	76 (69.7)	2.171 (1.11–4.25), 0.021
	No	17 (16.7)	33 (30.3)	Reference
Nutrition	Poorly nourished	39 (38.2)	22 (20.2)	2.45 (1.31–4.59), 0.004
	Well nourished	63 (61.8)	87 (79.8)	Reference
History of cattle rearing	Yes	51 (50.0)	64 (58.7)	1.42 (0.82–2.46), 0.205
	No	51 (50.0)	45 (41.3)	Reference
Addiction of substances	Yes	51 (50.0)	48 (44.1)	1.271 (0.74–2.19), 0.387
	No	51 (50.0)	61 (55.9)	Reference
Smoking	Yes	49 (48.0)	36 (33.0)	1.875 (1.07–3.30), 0.027
	No	53 (51.9)	73 (66.9)	Reference
Alcohol use	Yes	33 (32.4)	39 (35.8)	0.858 (0.48–1.52), 0.601
	No	69 (67.6)	70 (64.2)	Reference
Tobacco use	Yes	14 (13.7)	18 (16.5)	0.804 (0.38–1.72), 0.574
	No	88 (86.2)	91 (83.3)	Reference
Status of migration	Yes	40 (39.2)	15 (13.8)	4.04 (2.06–7.94), 0.000
	No	62 (60.8)	94 (86.2)	Reference
History of tuberculosis	Yes	51 (50.0)	64 (58.7)	1.42 (0.82–2.46), 0.205
	No	59 (57.8)	89 (81.6)	Reference
Contact history	Yes	58 (56.9)	46 (42.2)	1.805 (1.05–3.12), 0.034
	No	44 (43.1)	63 (57.3)	Reference
Diagnostic delay	≥15 days	76 (74.5)	38 (34.9)	5.46 (2.85–10.46), 0.00
	<15days	26 (25.5)	71 (65.1)	Reference
Default of treatment	Yes	32 (31.4)	11 (10.1)	4.07 (1.87–8.89), 0.000
	No	70 (68.6)	98 (89.9)	Reference
First point of care (gov)	PHC or below	11 (32.4)	6 (13.3)	3.11 (1.01–9.53), 0.043
	CHC or above	23 (67.7)	39 (86.7)	Reference

Table 2. The history of migration (COR-4.04, p value 0.00), past history of contact with TB patient in family, friends or colleagues at work place (COR-1.805, p value-0.034), self history of tuberculosis (COR-3.243, p value-0.000), usage of the wood as cooking fuel for longer duration (COR-2.171, p value 0.02), poor or moderate level of nutrition across their life (COR-2.45, p value-0.004), smoking (COR-1.875,

p value-0.027), default to TB treatment (at least once during the course of their TB medication) (COR-4.073, p value-0.000), diagnostic delay (≥15 days) (COR-5.461, p Value-0.000), start of the treatment at or below the level of PHC among government HCPs (COR-3.109, p value 0.04) were the various variable found significant in the bivariate analysis (Table 2).

Table 3 – Predictors of drug resistance among study participants.

Factors	COR	aOR	S.E	95% CI	P value
Diagnostic delay	5.46	7.72	2.95	3.65–16.33	0.00
Default of treatment	4.07	2.97	1.35	1.21–7.24	0.01
History of tuberculosis	1.42	2.70	1.07	1.24–5.89	0.01
Smoking	1.86	2.7	0.88	1.15–4.90	0.01
Area	2.31	2.62	1.26	1.02–6.71	0.01
Migration	4.04	4.84	2.16	2.02–11.60	0.00
Constant		0.05	0.03	0.02–0.17	0.00

On undertaking multivariable logistic analysis (of the significant variables in the bivariate analysis) after adjusting for the other variables, the five variables which includes diagnostic delay (aOR-7.72, p value 0.000), treatment default history (aOR-2.97, self history of tuberculosis (aOR 1.42, p value 0.01), p value-0.01), migration (aOR-4.84, p value 0.000), smoking (aOR-2.70, p value 0.014), and belonging to rural area (aOR-2.62, p value- 0.013) were found as independent risk factors for the occurrence of DRTB (see Table 3).

4. Discussion

This is the first study from the North India, which comprehensively analyzed various determinants for DRTB. The study finds its strength in the fact the all the current DRTB patients of the two districts available during the study were enrolled. Further, the patient's records were corroborated with personal interviews of patient/care givers, which provided validation to the data collected in the study. In addition this study provides a comprehensive understanding of the interplay of various risk factors associated with DRTB.

Mycobacterium tuberculosis, the causative bacteria of TB, develops resistance to various antibiotics due to various factors, and the default to anti TB treatment has been one of them. Similar to the results of current study, various studies looking for the risk factors of DRTB have reported that having undergone TB treatment in the past, as a consistent predictor of DRTB.^{8,11,14,18–21} Patients with the past history of TB treatment comprise of those patients who are re-initiating their treatments after having defaulted first line anti-TB drugs for DSTB and those who relapsed after having successfully completed their DSTB treatments. In coherence with these earlier studies our study also found history of anti TB treatment as a significant risk factor for DRTB. This result emphasizes the importance of the quality of TB treatment needed at the drug sensitive stage to avoid development of drug resistance in the later stage. Other studies conducted across the world has found default to anti tuberculosis drugs as risk factor for DRTB^{12,16–19} which confirms results of our study.

In the current study we found that 'Diagnostic delay' as a risk factor for the DRTB. Diagnostic delay is period from the point of first care by the chest symptomatics, at the level of any health care provider till the diagnosis of TB.²² Long delay in diagnosis has been claimed as predictor pre-treatment attrition of TB/DRTB patients in various studies across the globe.^{23,24}

Belonging to rural areas emerged as an independent risk factor in our study. It has been associated with diagnostic delay, treatment initiation delay, lack of easily accessible laboratory facilities and the low level of awareness. The study result is further confirmed through various studies, looking for the predictors of DRTB predictors.^{21,25}

Various studies across the world suggests smoking behaviour as a risk factor for the DRTB.^{11,25–27} In our study also, being addicted to smoking (cigarette, Bidi) was found significant as a risk factor to DRTB in the final multivariable analysis.

History of migration was another variable which emerged significant in the multivariate analysis. Migratory TB patients in the study area keep on shifting their accommodation in search of livelihood which makes it difficult for the health care providers to locate them easily which further leads to difficulty in provision of the continuum of needed health care services. This leads to development of resistance towards anti TB drugs. A Gujarat based study has also concluded that the history of migration is a significant risk factor for DRTB (OR 1.86).

There were few variables which were found statistically significant in the bivariate analysis but were not found significant in the multivariate logistic regression. These variables include poor nutritional history (p value 0.004)²⁸; using wood as fuels; and having contact history with TB/MDRTB patients. Further studies on these variables with more statistical power may be conducted to confirm statistically significant associations.

4.1. Limitation

The study has few limitations. The study comprises of both pulmonary as extra-pulmonary patients as study participants. Further research may look for separate examination of both these categories with enrolment of large numbers, for dis-aggregated analysis. Recall bias from the patients could be there as most of the DRTB participants were currently under treatment while all the DSTB patients were cured recently.

5. Conclusion

The study concludes that diagnostic delay, default to the TB treatment, having history of tuberculosis, current smoking status, belonging to rural area and history of migration are independent factors for the DRTB. The risk factors identified in the study should be prioritized by the policy

makers, implementators and educators for framing appropriate policies in TB control programme in India. The diagnostic delay as a risk factor merits active case finding of TB patients while treatment defaulters needs to be addressed through counselling and educating health care staff and community.

Conflicts of interest

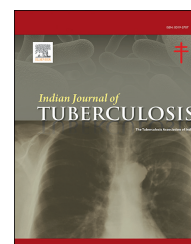
The authors have none to declare.

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Short communication

National level E-Resource Centre for Tobacco Control (E-RCTC): One stop solution to information on tobacco control in India

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ABSTRACT

The existing information on tobacco control, though highly valuable, is lying scattered at different sources. Post Graduate Institute of Medical Education and Research (PGIMER) Chandigarh in collaboration and technical support of International Union against TB and Lung Diseases (The Union) undertook an initiative to start a national level E-Resource Centre for Tobacco Control (E-RCTC) with an aim to provide relevant information on tobacco control under one roof thereby countering the misleading facts on tobacco control which exist on various web engines. The national level E-Resource Centre for Tobacco Control was developed in three stages. In the span of less than 3 years, the portal is open in public domain with over 2,36,019 visitors from around 80+ countries (as on 23rd July 2020), and growing. The portal showcases an array of valuable and vital information related to tobacco control initiatives under various heads like: Policies and Legislations, Circulars and Orders, National Tobacco Control Programme (NTCP), Publications and IEC Materials. India's first national level Resource Centre for Tobacco Control has proved to be a much-needed step in the country for facilitating speedy implementation of World Health Organization- Framework Convention on Tobacco Control (WHO-FCTC), MPOWER and other tobacco control interventions. Even with its limitations like absence of an interactive mechanism among a few others, the Resource Centre is nothing less than a storehouse of knowledge as it showcases content that are immensely helpful for the tobacco control community. Constant efforts are being made to improve the national level E-Resource Centre for Tobacco Control website and minimize the drawbacks.

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1. Introduction

The existing information on tobacco control, though highly valuable, is lying scattered at different sources. Certain best practices and innovations in the area of tobacco control go unnoticed as they do not get featured on state and national level portals. In addition to this, there are a number of orders and notifications that need to be organised at different administrative levels. There is a need for channelizing and arranging information on tobacco control in a systematic manner at a particular place. This move will greatly help the programme managers who presently face challenges in accessing orders and notifications to facilitate tobacco control programmes in their respective states. It can also be used by budding aspirants (researchers and academicians) who do not find a stage to orient themselves in tobacco control.

In the past several Indian organizations^{1–4} have attempted to collate the information on the country wide tobacco control activities through various web portals. Though these portals showcase various components of tobacco control in the country, they are not without limitations. The State-wise circulars/orders/notifications regarding tobacco control displayed on few of these portals are not updated regularly. Various manuals which have been developed at regular intervals according to the latest guidelines are not displayed on these portals. Moreover, there is a lack of regular streamlining of the IEC materials viz. signages, posters, awareness audios and videos. Additionally, global and national level policies and legislations on tobacco control are not accurately displayed on many of the portals. Structural and functional components of National Tobacco Control Programme (NTCP) which is a pre-eminent essence of tobacco control is also not exhibited by them.

With this background, the Post Graduate Institute of Medical Education and Research (PGIMER) Chandigarh in collaboration and technical support of International Union against TB and Lung Diseases (The Union) undertook an initiative to start a national level E-Resource Centre for Tobacco Control (E-RCTC).⁵ This virtual centre aims to provide relevant information on tobacco control under one roof thereby countering the misleading facts on tobacco control which exist on various web engines.

2. Methods

2.1. Developmental framework

Development of the national level E-Resource Centre for Tobacco Control was done in three stages.

Step-1. Development of national level E-Resource Centre for Tobacco Control framework through national-level-need assessment

The Bloomberg Initiative project partners, employees, and resource persons, who attended the induction training at PGIMER Chandigarh on 19th to 21st June, 2018 provided their feedback, which helped in making draft framework of Resource Centre.

Step-2. Mapping and reaching out to potential partners/stakeholders

The mapping activity of potential partners/stakeholders at national and sub-national level was done. They were invited

to act as ‘collaborating partners’ of national level E-Resource Centre for Tobacco Control at PGIMER Chandigarh for providing specific information related to their specialized area in tobacco control. Around 25 high level personnel from various organisations provided letter of consent to PGIMER, Chandigarh and agreed to provide their constant support towards setting up and maintaining virtual Resource Centre.

Step-3. Round table consultation of coalition partners

A high-level round table consultation meeting of coalition partners under the chairmanship of Union Secretary, Ministry of Health & Family Welfare, Government of India (GOI) was held on 27th July 2018 to discuss and finalize the draft framework for the Resource Centre. The meeting was attended by around 45 participants ranging from international bodies like World Health Organization-South East Asia Regional Office⁶ to central government bodies like Ministry of Health and Family Welfare (MoHFW),⁷ National Institute of Cancer Prevention and Research (NICPR) and government medical institutes viz. All India Institute of Medical Sciences (AIIMS), Delhi⁸; Jawaharlal Institute of Post-graduate Medical Education and Research (JIPMER), Puducherry⁹; Maulana Azad Medical College¹⁰; Vardhman Mahavir Medical College.¹¹ Major non-governmental organisations both at international and national level namely, The Union,¹² Sambandh Health Foundation,⁴ Socio-Economic and Educational Development Society (SEEDS),¹³ Voluntary Health Association of India,¹⁴ Vital Strategies,¹⁵ Campaign for Tobacco-Free Kids¹⁶ and Manbhumi Ananda Nityananda Trust¹⁷ were also part of this consultation. The meeting also brought together various public-private initiatives like Public Health Foundation of India,¹⁸ private research universities like Indian Institute of Health Management and Research (IIHMR)¹⁹ and State Government officials from New Delhi and Punjab.

Step-4. Set up communication/networking channels

The list of stakeholders/coalition partners along with their communication details in various states of India was compiled. Various communication channels (e-mail groups, WhatsApp groups etc.) were established to finalize, regularly update and maintain the content of the resource centre.

Step-5. The launch of national level E-Resource Centre for Tobacco Control for Tobacco Control

The grand launch of virtual national level E-Resource Centre for Tobacco Control - www.rctcpgi.org took place in the presence of the Director of Healis Institute for Public Health; the Deputy Regional Director of Asia Pacific Region, The Union; the Regional Adviser (Tobacco Free Initiative)-WHO SEARO and a Behavioural Scientist and Communication Expert at The Asia Pacific Conference on Tobacco or Health (APACT) at The Hilton Resort, Bali Indonesia on 14th September 2018.²⁰

3. Results

The national level E-Resource Centre for Tobacco Control has emerged as one-point reference system for varied tobacco control information and activities. In a span of less than three years, the portal has over 2,36,019 visitors from around 90

countries (as on 7th July 2021), and growing. Moreover, the centre drives collaborations between tobacco control organizations and foster tobacco control partnerships. The portal showcases an array of valuable and vital information related to tobacco control initiatives under various heads like: Policies and Legislations, Circulars and Orders, National Tobacco Control Programme (NTCP), Publication and IEC Material.⁵ The structuring of the content on the Resource Centre is such that the visitors, who are from different backgrounds, can access the required information within no time.

3.1. *An initiative to support NTCP and MPOWER implementation in India*

The portal serves as a one-point platform for various circulars/orders (1000+ from 36 states), policies and legislations, IEC materials, multidisciplinary publications covering all aspects of health impacts attributed to tobacco use and smoking cessation and much more. Thus the Resource Centre functions as an awareness podium for policy makers, implementers and other stakeholders for various tobacco control updates. The national level E-Resource Centre for Tobacco Control also explores emerging issues involved in various domains of tobacco control along with discussion on key policies and regulatory implications which are beneficial for tobacco control. Several round-table consultations, seminars and induction trainings are held from time to time under the Resource Centre.

3.2. *Tobacco-Free Times-A theme based bi-monthly newsletter of Resource Centre for Tobacco Control*

The Tobacco Free Times (TFT) focuses on different themes in every edition. A total of 14 editions of the newsletter have been released till date.⁵ The various topics covered in these editions were myths related to ENDS, countering Tobacco Industry Interference, implementation of Tobacco Control Policy in India, progress made by India in implementing WHO MPOWER package, E-cigarettes and its consequences, the use of Smokeless Tobacco in India and the association between Tobacco and Covid-19. This initiative has been immensely useful for researchers, implementers and policy makers to access reliable and compiled information easily for overall strengthening National Control Tobacco Programme (NTCP) in the country.²¹

3.3. *Capacity building of stakeholder across country*

The national level E-Resource Centre for Tobacco Control, has made its stride among a cross section of policy makers, implementers, academician and other stakeholders for its diverse and informative content catering to people from varied backgrounds. Additionally, the portal has conducted 30+ workshops and webinars for the capacity building of around 15+ program managers and academicians per event (Table 1). There are many takers for the information available on E-RCTC. It has been capacitating the grassroots workforce involved in tobacco related programmes. The officials at administrative levels have been approaching the Resource Centre for accessing latest advisories and notifications to counter tobacco use. Researchers and academicians are seeking this platform to acquire knowledge related to best

practices and innovations in tobacco control will get enough information from portal.

4. Discussion

The official portal of national level E-Resource Centre for Tobacco Control has attracted traffic from across the length and breadth of India and other countries of Europe, Indonesia, Africa and Asia. The national level E-Resource Centre for Tobacco Control aimed at the protection of people's health and the environment. It is also paving the way forward for scientific research and action to overcome emerging challenges that are slowing down the target reduction of tobacco use. It is helping the public, health professionals, and other people working on, or interested in areas of tobacco control in providing variety of authentic information regarding tobacco control activities.

India's first national level E-Resource Centre for Tobacco Control has proved to be a much-needed step in the country for facilitating speedy implementation of WHO-FCTC, MPOWER and other tobacco control interventions.²² This resource centre provides a one-stop solution to all the existing challenges of information gap and misleading information in tobacco control. Unlike its predecessors, the national level E-Resource Centre for Tobacco Control regularly updates the evidence and facts and facilitate program managers in seeking correct, reliable, updated and contextual data and statistics in tobacco control. Further, the resource centre is effectively utilized by program implementers, academicians, researchers and other stakeholders for capacity building. In addition to this, the portal helps in catalysing the chain of TC activities along with providing momentum to the establishment of country coordination mechanisms and collaborations for strengthening tobacco control partnerships.

However, the national level E-Resource Centre for Tobacco Control is not without limitations. The IEC material displayed on the portal only covers the Cigarettes and other Tobacco Products Act (COTPA) sections. The portal does not keep count of current tobacco users, illness due to tobacco use and causalities. The portal does not have a portion for feedback from the viewers. There is no provision for direct communication on the portal where people can share their queries related to any tobacco related issues.

Constant efforts are being made to improve the national level E-Resource Centre for Tobacco Control website. A formal network of experts of tobacco control is being established which shall guide Government of India (GOI) in framing or updating legislations. A database on contextual tobacco control research will be published. IEC/BCC material on various sections of COTPA and other tobacco relates issues are being designed at regular intervals. Operational research workshops for implementers and academicians for advancing tobacco control in the country will also be conducted. This will provide momentum to the establishment of country coordination mechanisms and collaborations for strengthening tobacco control partnerships. The portal will cater a feedback portion for the viewers so that improvement can be done with on community perspective. The tobacco related issues of the viewers will be addressed directly through the portal by live chats.

Table 1 – Description of capacity building activities conducted under E-RCTC (2020–21).

Sl. No.	Month, Year	Type of activity	Topic	Organizations involved	Outcomes
1	May, 2021	National Summit on World No Tobacco Day	Protecting youth from industry manipulation and preventing them from tobacco and nicotine use	<ul style="list-style-type: none"> • Strategic Institute for Public Health Education and Research (SIPHER), Chandigarh • International Union against Tuberculosis and Lung Disease (The Union) • International College of Dentists, Section VI (India, Sri Lanka & Nepal) • Indian Dental Association, Mumbai • Govt. of Jharkhand • Healis Sekhsaria Institute for Public Health, Mumbai • Govt. of Bangladesh • SEEDS, India • University of Colombo, Sri Lanka • IPH, Bengaluru • GSA, Mohali • SIPHER, Chandigarh • Healis Sekhsaria Institute for Public Health, Mumbai • The Union 	<ul style="list-style-type: none"> • Education of youth to abstain from the usage of tobacco and related products, understand tobacco industry tactics, in addition to the strengthening of the National Tobacco Control Programme implementation in the country.
2	April, 2020	Webinar	Tobacco-Nicotine use and Corona virus disease (COVID-19)	<ul style="list-style-type: none"> • SIPHER, Chandigarh • Healis Sekhsaria Institute for Public Health, Mumbai • The Union 	<ul style="list-style-type: none"> • Evaluation of new research that examines the link between tobacco use, nicotine use, and COVID-19. • Awareness about tobacco as one of the risk factors for COVID 19. • Capacity building for tobacco cessation during COVID19 pandemic by utilization of existing opportunities
3	May, 2020	Webinar	Tobacco Cessation during Covid Pandemic and Beyond, A need and an Opportunity	<ul style="list-style-type: none"> • Maulana Azad Institute of Dental Sciences, New Delhi • Ministry of Health and Family Welfare, GOI • SIPHER, Chandigarh • Rajasthan Cancer Foundation • Gandhi Medical College, Hyderabad • The Union South-East Asia • SCERT, Telangana • SIPHER, Chandigarh • North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGRIHMS), Shillong • Department of Health and Family Welfare, Meghalaya • The Union • JIPMER, Puducherry • Department of Health & Family Welfare, Puducherry • The Union 	<ul style="list-style-type: none"> • Sensitization of local authorities for the implementation of TOFEI guidelines. • Strict implementation of TOFEI guidelines in various districts of the state. • Sensitization of local authorities for the implementation of TOFEI guidelines. • Strict implementation of TOFEI guidelines in various districts of the state. • Sensitize principals, teachers and other staff about the impact of tobacco on children and orient them on Tobacco -Free Institution Policy and to make Puducherry Schools as "Tobacco Free Schools". • Sensitization of the participants about potential toxicity of Tobacco Product Waste. • Sent policy recommendations to Ministry.
4	July, 2020	Webinar	Tobacco-Free Generation - Role of Educational Institutions: Telangana	<ul style="list-style-type: none"> • SIPHER, Chandigarh • Healis Sekhsaria Institute for Public Health, Mumbai • The Union 	<ul style="list-style-type: none"> • Evaluation of new research that examines the link between tobacco use, nicotine use, and COVID-19. • Awareness about tobacco as one of the risk factors for COVID 19. • Capacity building for tobacco cessation during COVID19 pandemic by utilization of existing opportunities
5	August, 2020	Webinar	Tobacco Free Educational Institution: Meghalaya	<ul style="list-style-type: none"> • SIPHER, Chandigarh • Healis Sekhsaria Institute for Public Health, Mumbai • The Union 	<ul style="list-style-type: none"> • Evaluation of new research that examines the link between tobacco use, nicotine use, and COVID-19. • Awareness about tobacco as one of the risk factors for COVID 19. • Capacity building for tobacco cessation during COVID19 pandemic by utilization of existing opportunities
6	October, 2020	Webinar	Tobacco Free Schools– A Way Forward to Smoke Free Education: Puducherry	<ul style="list-style-type: none"> • SIPHER, Chandigarh • Healis Sekhsaria Institute for Public Health, Mumbai • The Union 	<ul style="list-style-type: none"> • Evaluation of new research that examines the link between tobacco use, nicotine use, and COVID-19. • Awareness about tobacco as one of the risk factors for COVID 19. • Capacity building for tobacco cessation during COVID19 pandemic by utilization of existing opportunities
7	November, 2020	National Consultation	Tobacco Product Waste (TPW), its Health and Environmental impact conducted by E-Resource Centre for Tobacco Control	<ul style="list-style-type: none"> • SIPHER, Chandigarh • The Union • Forest Department, Chandigarh • Ministry of Environment, Chandigarh • Tata Memorial Hospital, Maharashtra 	<ul style="list-style-type: none"> • Sensitization of the participants about potential toxicity of Tobacco Product Waste. • Sent policy recommendations to Ministry.

8	December, 2020	National Consultation	Human Rights Dimension of Tobacco Control	<ul style="list-style-type: none"> Department of Community Medicine & School of Public Health, PGIMER Chandigarh SIPHER, Chandigarh The Union Tata Memorial Hospital, Maharashtra HRIDAY, New Delhi 	<ul style="list-style-type: none"> Sensitization on the human rights aspect of tobacco control. Listed ways to protect present and future generations from the devastating health, social, environmental and economic consequences of tobacco consumption. Sent policy recommendations to Ministry.
9	November, 2020	Webinar	Tobacco Free Educational Institutions: Odisha	<ul style="list-style-type: none"> AIIMS Bhubaneswar Department of Health & Family Welfare and Higher Education Department, Government of Odisha The Union Cancer Care & NOHP, Health & Family Welfare Department, Govt. of Odisha Higher Education Department, Government of Odisha 	<ul style="list-style-type: none"> Sensitization on the Implementation modalities of tobacco free educational institutions; roles and responsibilities of education department in tobacco control and guidelines for tobacco free educational institutes.
10	January, 2021	Webinar	Virtual Dialogue in Support of amendments in COTPA Act 2003: Need of the hour	<ul style="list-style-type: none"> Department of Community Medicine & School of Public Health, PGIMER Chandigarh The Union SIPHER Association of Professional Social Workers & Developtment Practitioners (APSWDP) Integrated Association of Medical, Basic and Social Scientists (IAMBSS) Healis Sekhsaria Institute for Public Health, Mumbai Ministry of Health and Family Welfare, GOI Indian Council of Medical Research Department of Community Medicine & School of Public Health, PGIMER Chandigarh The Union Indian Council of Medical Research WHO-SEARO Govt. of Punjab SEEDS India, New Delhi 	<ul style="list-style-type: none"> Sensitized the participants on the amendments to COTPA, 2003 that have been proposed to improve public health, reduce prevalence of tobacco use and address tobacco use. Built support for the COTPA amendment bill.
11	February, 2021	National Consultation	Smokeless Tobacco Use, attributed to 90% Oral Cancers: Challenges in Implementation of COTPA and the ban under provisions of FSSAI	<ul style="list-style-type: none"> Department of Community Medicine & School of Public Health, PGIMER Chandigarh The Union Indian Council of Medical Research WHO-SEARO Govt. of Punjab SEEDS India, New Delhi 	<ul style="list-style-type: none"> Capacity building of the authorities for stricter implementation of smokeless tobacco. Formulation of stricter policies for smokeless tobacco. Sent policy recommendations to Ministry.
12	February, 2021	National Consultation	Tobacco Vendor Licensing (TVL) in India	<ul style="list-style-type: none"> Department of Community Medicine & School of Public Health, PGIMER Chandigarh SIPHER, Chandigarh The Union Rajasthan Cancer Foundation MANT, Kolkata 	<ul style="list-style-type: none"> Sensitization of the participants on tobacco vendor licencing rules. Capacity building of the authorities for the strict implementation of TVL rules in their respective regions. Sent policy recommendations to Ministry.

(continued on next page)

Table 1 – (continued)

Sl. No.	Month, Year	Type of activity	Topic	Organizations involved	Outcomes
13	April, 2021	Regional level capacity building workshop	Orientation and sensitization on NTCP implementation and effective enforcement of tobacco control policies	<ul style="list-style-type: none"> Community Medicine & School of Public Health, PGIMER Chandigarh SIPHER The Union Ministry of Health and Family Welfare, GOI Gandhi Medical College, Hyderabad JIPMER, Puducherry AIIMS, Bhubaneswar NEIGRIHMS, Shillong Indian association of Preventive and Social Medicine The Union Ministry of Health and Family Welfare, GOI Maulana Azad Institute of Dental Science, New Delhi National Institute of Health and family Welfare, New Delhi Healis Sekhsaria Institute for Public Health, Mumbai SIPHER, Chandigarh The Union Generation Saviour Association, Mohali HRIDAY, New Delhi Public Health Foundation of India, New Delhi Maulana Azad Institute of Dental Sciences, New Delhi Department of Community Medicine and School of Public Health, PGIMER, Chandigarh The Union National Resource Centre for Oral Health Care of Children and Elderly OHSC, PGIMER Chandigarh SIPHER WHO-SEARO Healis Sekhsaria Institute for Public Health, Mumbai The presidents and secretaries of 50+ national level organizations from country participated in the consultation. 	<ul style="list-style-type: none"> Orientation and sensitization on NTCP implementation and effective enforcement of tobacco control policies
14	March, 2021	Bonus workshop on online course	Basics of Tobacco Control	<ul style="list-style-type: none"> Indian association of Preventive and Social Medicine The Union Ministry of Health and Family Welfare, GOI Maulana Azad Institute of Dental Science, New Delhi National Institute of Health and family Welfare, New Delhi Healis Sekhsaria Institute for Public Health, Mumbai SIPHER, Chandigarh The Union Generation Saviour Association, Mohali HRIDAY, New Delhi Public Health Foundation of India, New Delhi Maulana Azad Institute of Dental Sciences, New Delhi Department of Community Medicine and School of Public Health, PGIMER, Chandigarh The Union National Resource Centre for Oral Health Care of Children and Elderly OHSC, PGIMER Chandigarh SIPHER WHO-SEARO Healis Sekhsaria Institute for Public Health, Mumbai The presidents and secretaries of 50+ national level organizations from country participated in the consultation. 	<ul style="list-style-type: none"> Launch of Basic Course on Tobacco Control that has been run successfully from May–July 2021. 50+ participants from 25 countries completed the course.
15	March, 2021	National Consultation	Women and Tobacco: issues, gaps, challenges and way forward	<ul style="list-style-type: none"> SIPHER, Chandigarh The Union Generation Saviour Association, Mohali HRIDAY, New Delhi Public Health Foundation of India, New Delhi Maulana Azad Institute of Dental Sciences, New Delhi Department of Community Medicine and School of Public Health, PGIMER, Chandigarh The Union National Resource Centre for Oral Health Care of Children and Elderly OHSC, PGIMER Chandigarh SIPHER WHO-SEARO Healis Sekhsaria Institute for Public Health, Mumbai The presidents and secretaries of 50+ national level organizations from country participated in the consultation. 	<ul style="list-style-type: none"> Capacity building of the participants to form such policies that will focus the problem of women and tobacco. Formation of strategies to deal with the relationship between smokeless tobacco and women. Sent policy recommendations to Ministry.
16	May, 2021	National Consultation	Commit to Quit- A Road Towards Tobacco Endgame in India	<ul style="list-style-type: none"> SIPHER, Chandigarh The Union Generation Saviour Association, Mohali HRIDAY, New Delhi Public Health Foundation of India, New Delhi Maulana Azad Institute of Dental Sciences, New Delhi Department of Community Medicine and School of Public Health, PGIMER, Chandigarh The Union National Resource Centre for Oral Health Care of Children and Elderly OHSC, PGIMER Chandigarh SIPHER WHO-SEARO Healis Sekhsaria Institute for Public Health, Mumbai The presidents and secretaries of 50+ national level organizations from country participated in the consultation. 	<ul style="list-style-type: none"> Formation of Alliance for Tobacco Control in India (ATCI). Sent policy recommendations to Ministry.

17	March, 2021	Official Launch	3-month Online Course on the “Basics of Tobacco Control”	<ul style="list-style-type: none"> Indian Council of Medical Research Rajasthan Cancer Foundation SIPHER WHO-SEARO Healis Sekhsaria Institute for Public Health, Mumbai The Union SIPHER, Chandigarh The Union National Law School of India University, Karnataka Police Department, Punjab Tata Memorial Hospital, Maharashtra WHO-SEARO SIPHER, Chandigarh Govt. Medical College, Sector 16 Chandigarh Govt. Medical College, Sector 32 Chandigarh DHS Punjab Department of Community Medicine and School of Public Health, PGIMER Chandigarh Ministry of Health and Family welfare (MoHFW), Government of India The Union Tata Memorial Hospital, Maharashtra WHO-SEARO Indian Council of Medical Research Rajasthan Cancer Foundation Healis Sekhsaria Institute for Public Health, Mumbai Maulana Azad Institute of Dental Sciences, New Delhi National Institute of Health and family Welfare, New Delhi Department of Community Medicine and School of Public Health, PGIMER Chandigarh The Union Gandhi Medical College, Telangana Police Department, Hyderabad Department of Community Medicine and School of Public Health, PGIMER Chandigarh The Union Gandhi Medical College, Telangana Toxin Taxation, VHAI Food and Safety Department, Telangana 	<ul style="list-style-type: none"> Sensitization of the participants on various modalities of tobacco control. Training of the participants by giving them a project activity. Capacity building of enforcement officers for strict implementation of the ban on ENDS Sent policy recommendations to Ministry. Honoured the Covid heroes who turned tragedy into triumph during the pandemic. Shared contextual experiences and best practices in tobacco control in order to advance tobacco control in the country. Sensitization and capacity building of the authorities about the guidelines for implementation of FCTC 5.3. Sensitization of Policy Makers, officials of different stakeholder departments and other key stakeholders about tobacco control.
18	June, 2021	National Consultation	Enforcement of ENDS ban in India		
19	July, 2021	Webinar	Celebration of National Doctor's Day 2021		
20	September, 2020	Virtual curtain raiser	5th National Conference on Tobacco or Health		
21.	July, 2021	E-workshop: Telangana	Framing the guidelines for implementation of FCTC 5.3: Telangana		
22.	May, 2021	State Level Sensitization Workshop: Telangana	State Level Sensitization Workshop for Policy Makers		

(continued on next page)

Table 1 – (continued)

Sl. No.	Month, Year	Type of activity	Topic	Organizations involved	Outcomes
23.	August, 2021	Webinar	Sustainable Development Goals and Tobacco Control	<ul style="list-style-type: none"> Department of Community Medicine and School of Public Health, PGIMER Chandigarh The Union Healis - Sekhsaria Institute of Public Health, Mumbai Maulana Azad Medical College, New Delhi WHO-SEARO HRIDAY, New Delhi Public Health Foundation of India, New Delhi Rajasthan Cancer Foundation 	<ul style="list-style-type: none"> Strengthen the means of implementation and revitalize the global partnership for sustainable development. Facilitated an intensive global engagement in support of implementation of all the Goals and targets, bringing together Governments, the private sector, civil society, and other actors and mobilizing all available resources.

5. Conclusion

Indisputably, the national level E-Resource Centre for Tobacco Control has strengthened tobacco control in India. In a span of three years the resource centre has conducted more than 30 webinars/consultations/training programmes, released 14 editions of Tobacco Free Times newsletter focussing multiple aspects of tobacco control in the country and continues to provide unwavering support to NTCP in all states of India.

The portal aims to enable environment for stakeholders by providing a platform for universal access to information on various tobacco control issues and committed to disseminate reliable and relevant information for “Tobacco Free India”. The national level E-Resource Centre for Tobacco Control is nothing less than a storehouse of knowledge as it showcases contents that are immensely helpful for the tobacco control community.

Conflicts of interest

The authors have none to declare.

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