Impact of tobacco price and taxation on affordability and consumption of tobacco products in the Southeast Asia Region

BACKGROUND

Tobacco taxes influence the price, affordability and demand of tobacco products.[1,2] Raising taxes on tobacco products is one of the most cost-effective measures for reducing the consumption of tobacco.[3–5] However, to be effective in reducing tobacco consumption, the tax increases need to result in increases in tobacco product prices that are sufficient to outweigh the effect of real income growth.[6] The change in affordability of tobacco products is an important determinant of the prevalence of use, especially in countries with rapid economic growth .[1,2] In addition, change in affordability of a specific tobacco product can affect the consumption of other tobacco products.[6] Hence, while the price elasticity of demand estimates are often used to represent the relative price response for the demand of tobacco products *ceteris paribus*,[7] affordability (i.e. the percentage of income required to buy specific units of a tobacco product) has been proposed as an alternative for evaluating the impact of tobacco-control fiscal policies.[8] The affordability of tobacco products adjusts for the consumer's purchasing power and is dependent on the income of consumers and price of tobacco products. A higher affordability index relative to a reference point indicates that tobacco products have become more expensive (i.e., less affordable) in relation to the income of consumers. As a result of the decrease in affordability, their consumption, in turn, is expected to decrease.[12, 9]

The price response of the consumption of tobacco products can be even more complicated in the World Health Organization defined Southeast Asia Region (WHO-SEAR, hereafter referred to only as SEAR), which has a myriad of challenges related to the tobacco fiscal policies. The SEAR countries like India, Bangladesh, and Indonesia comprises of the top twenty global tobacco producers.[10] The wide variety of tobacco products including smokeless tobacco and indigenous products pose a significant challenge to levying and administering optimal levels of taxes on these products.[11] In addition, there are also wide socio-economic disparities within this region in terms of tobacco use and income/earnings.[12–16] Only one (Thailand) out of the 11 SEAR countries has achieved the World Health Organization (WHO) best-practice recommendation that a minimum of 75% of the retail price of a pack of cigarettes.[17] However, in some SEAR countries, the percentage of the retail price of a pack of cigarettes that is excise tax is very low, for example 19% in Timor-Leste .[17]

In 2003, Guindon et al. provided a summary of nine studies that reported data on the impact of tobacco price or per capita income on tobacco consumption across six SEAR countries.[18] They reported an overall reduction in tobacco consumption in response to its price increase and estimated the price elasticities of -0.50 in the short- and -0.70 in the long-run for tobacco products in this region.[18] The study also projected an increase in tobacco consumption due to an increase in income.[18] However, the study did not explore the price response of tobacco products on their consumption by socioeconomic status (SES) groups and cross-price elasticities. A recent study, using global data from 169 countries estimated the price elasticity and affordability exclusively for cigarettes, by their income stratification (low- and middle-income country (LMIC) and high-income country (HIC)).[1] There are studies that have illustrated the impact of taxation on consumer behaviour in general, in other regions as well.[4,19,20]

Currently available reviews that are specific to the SEAR region are old, [18] and need to be updated to incorporate more recent studies. Monitoring the affordability of cigarettes over time is important, and considered 'the optimal nominal anchor for tobacco tax policy'.[28] Currently existing reviews that are specific to the SEAR region also do not encompass the implications of change in price and consumption of tobacco products by SES.[18,30] In addition, studies that investigate the impact of price/or tax on affordability of tobacco products in SEAR countries [2,22–24] are yet to be reviewed. Hence, the aim of this study was to comprehensively investigate the impact of tobacco taxes/prices on the consumption (primary outcome) or affordability (secondary outcome) of tobacco products in SEAR countries. We also investigated the change in affordability or consumption of tobacco products in response to price/tax change by SES; and the change in consumption of one tobacco product for a given change in price or tax on other tobacco product (cross-price elasticity).

METHODS

The systematic review followed the Cochrane guidelines[25] and was reported as per the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines.[26] The systematic review protocol was published in the International Prospective Register of Systematic Reviews (PROSPERO 2020, CRD42020133082).[27]

Eligibility criteria

Studies specific to SEAR countries, illustrating the actual impact of prices/taxes on consumption/affordability of tobacco products were eligible for inclusion. Narrative/systematic reviews and studies 'predicting' the impact of price change on the affordability/consumption of tobacco products were excluded from the review. We restricted eligible studies to those whose full articles were available in English. Multi-country studies, containing clear findings specific to SEAR countries were also included in the review. A detailed description of the eligibility criteria is provided in Table 1**.**

Search strategy

The searches were run in April 2020 on five electronic databases- Medline, Cinahl, Econlit, Embase, and Tobacconomics, using keywords for names of different tobacco products, SEAR countries, tax and price. We did not impose any limitations on the time period. The search strategy used for each database is provided in Supplementary Tables S1-S5. We also checked the reference lists of studies that met the eligibility criteria; ran a search on the google search engine from which the first 100 articles were screened for inclusion in the review; and searched relevant websites such as WHO, Southeast Asia Tobacco Control Alliance (SEATCA), International Agency for Research on Cancer (IARC) and other United Nations (UN) organizations.

Study selection

The studies retrieved from searches were de-duplicated using Mendeley reference management software.[28] Each study was independently screened by two reviewers in two phases using a standardized study selection form, as per the pre-specified inclusion and exclusion criteria (Table 1 and Supplementary Table S6). The form was piloted on 10 studies before it was used for study selection. The first phase involved title and abstract screening. Studies that were judged to be potentially eligible from their title and abstracts, or for which there was inadequate information to make inclusion decisions during the first screening phase had their full texts screened in the second phase. Any disagreements were resolved through consensus and discussion with a third reviewer when required.

Data extraction

The included studies were imported to an open access, free web-based tool for systematic reviews, CADIMA (https://www.cadima.info/). An electronic data extraction form was used to extract data including study title, author, year of publication, population/dataset characteristics, outcome and measures of effect (Supplementary Table S7). For those studies reporting both the impact of 'predicted' price/tax rise on consumption/ or affordability of tobacco products, and the impact of 'actual' price/tax changes, only the parts reporting the impact of actual price/tax changes on consumption/ or affordability was included in the data extraction and synthesis (Table 1). The data extraction form was an adaptation of the Cochrane Collaboration's data extraction form for intervention reviews,[29] and it was pre-tested on three studies before use. Data extraction from each article was conducted independently by two reviewers on CADIMA.

Study quality assessment

The Crombie's I tool was modified and used for quality assessment of included studies.[30] The tool was pilot tested on three studies and minor adaptations made before use. The tool comprised of nine items including whether the study objectives were clearly stated, the sample size calculation was clear and representative of the population, and validated method/models for evaluating the outcomes had been used. The detailed Crombie's item list used in the review is given in Supplementary Table S8. The maximum score was 9 and the minimum was 0. Studies with a score of 0-3 were marked as 'low quality', 4-6 as 'moderate quality' and 7-9 as 'high quality'.[31] The quality assessment of each article was also conducted independently by two reviewers. Any disagreements were resolved through discussion or consultation with a third reviewer.

Data synthesis

Data from the included studies was narratively synthesised[32] under the following three main themes: 1)The impact of tobacco tax/price on the consumption/affordability of tobacco products ; 2) The impact of tobacco tax/price on the consumption/affordability of tobacco products by SES and 3) Cross price elasticity and consumption. Within these main themes, studies were further grouped according to the direction of the association between tax/price and

affordability/consumption as follows: 1) Inverse association between tax/price and consumption/ affordability (i.e., where tax/price increases were associated with reductions in tobacco product consumption, or with the products becoming less affordable); 2) Positive or no association between tax/price and consumption/ affordability of tobacco products (i.e., where tax/price increases were associated with increases/no change in consumption of tobacco products, or increases/no change in the affordability of tobacco products); and 3) Unclear association (i.e., if the impact of taxes/prices on consumption/affordability of tobacco products was not clearly drawn from the study or the authors gave contradictory interpretations in the same study). We were expecting heterogeneity across the studies in terms of their methodology, population, settings and other geographical factors. Hence, we did not plan or conduct a meta-analysis as per our protocol.[27]

RESULTS

The literature searches resulted in 880 studies in total (Figure 1). Of these 880 studies, 132 were duplicates, and therefore were removed. After title and abstract screening of remaining 748 articles, 74 studies were included for full-text screening. Among 74 studies, 46 were excluded because of the following reasons: other (non-SEAR) regions (n=9), duplicates (n=5), study design (n=10), did not report any of the outcomes of interest (n=11) and multiple reasons (i.e., not meeting more than one eligibility criteria) (n=6). Five studies were also excluded due to the unavailability of full texts even after contacting the authors. Twenty-eight studies were included in our review**.** The detailed characteristics of the included studies such as the title, author information, tobacco products, intervention and outcomes are provided in the Supplementary Tables S9-S11. None of the included studies were funded by tobacco industry.

Overview of the studies

The highest number of included studies were from India (n=9), followed by Bangladesh (n=5), Indonesia (n=3), Thailand (n=3), Myanmar (n=2), Sri Lanka (n=2) and Nepal (n=1) (Table 2). The remaining three studies covered more than one SEAR country (Table 2). The majority of studies (n=25) involved quantitative secondary data analysis and the remaining (n=3) were primary cross-sectional studies. Most studies used national-level surveys such as the Global Adult Tobacco Survey (GATS), Tobacco Control Policy Survey (TCP), International Tobacco

Control South-east Asia Survey (ITC), or government/international agency reports for consumption and pricing data, to calculate the affordability or price elasticity of tobacco products. Thirteen studies evaluated cigarettes or different variants and brands (including cheroots, hand-rolled cigarettes), two studies exclusively evaluated smokeless tobacco products and 13 studies evaluated multiple tobacco product types (e.g., bidis and cigarettes or smoked products with smokeless products). Out of the 28 studies, 18 studies included information on our secondary outcomes. Around twenty studies reported the change in consumption of tobacco products, while six studies reported the change in affordability of tobacco products and two studies reported both change in consumption and affordability of tobacco products (Table 2). Majority of the studies reporting inverse association between price and consumption/and affordability of tobacco products have used adjusted odds ratio or marginal coefficient as measures of association between price and outcome variables. Whereas, the majority of studies reporting positive or no association between price and consumption/ and affordability of tobacco products had merely measured the change in frequency of the outcome measure in response to price change (details in supplementary table S 10). Additionally, the majority of the studies with inverse association had comprehensively adjusted the socio-economic variables or adjusted for the cross price elasticity in their analysis. Contrastingly, only a few studies (n=5) reporting positive or no association had adjusted for socio-economic or cross price elasticity in their results (Table S 11).

1. The impact of tobacco tax/price on the consumption/affordability of tobacco products

Among twenty studies reporting the outcome in terms of consumption, the majority, i.e., 12 studies, reported an inverse, whilst three reported positive, and two reported no association between price and consumption of tobacco products. The remaining three studies reported unclear interpretations on the price response of tobacco products on their consumption. Out of the six studies reporting the outcome in terms of affordability of tobacco products, two reported positive association, three reported no association, and one reported unclear interpretations on the association, between price and affordability of tobacco products. (Table 3 and supplementary table S10). The price-elasticity estimates of smokeless tobacco were reported as -0.59,[33] -0.87,[34] -0.9[35] in India and; -0.64 to -0.39 in Bangladesh.[36] The price elasticity estimates for cigarettes were reported as -0.059 to 0.104[37] in Thailand; -0.38 to -0.19[34] in India, -0.49[38 in

Bangladesh, -0.02[39] in Indonesia, and -0.36[40] in Myanmar. A detailed account of the findings is given below.

a) Studies reporting an inverse association between tax/price and consumption/affordability of tobacco products:

***Consumption*:** Five studies conducted in India,[33–35,41,42] two in Bangladesh[36,38] and one each in Nepal,[43] Thailand,[44] Sri Lanka,[45] Myanmar[46] and Indonesia[39] reported an inverse association between price and consumption of tobacco products (Table 3 and supplementary table S10). Out of the five studies in India, two studies showed an inverse association between price and consumption exclusively for smoking tobacco (cigarettes and bidis),[41,42] one exclusively for smokeless tobacco,[35] while the remaining two for both smoking and smokeless tobacco products.[33,34] The price elasticity of smokeless tobacco ranged between -0.09 to -0.87 (-0.09,[35] -0.59[33] and -0.87[34]) while that for smoking tobacco ranged between -0.27 to -0.92; -0.92[34] and -0.27[33] for bidis, and -0.38[34] to -0.41[33] for cigarettes. A study conducted in Bangladesh, using two waves of ITC survey (2009 and 2010) estimated the cigarette price elasticity to be -0.49.[38] Another study from Bangladesh also using the ITC survey data estimated the price elasticity for smokeless tobacco to be -0.39 to -0.64.[36] Similarly, negative price elasticity estimates for smoking tobacco products were estimated for Nepal (-0.88 for cigarettes and bidis),[43] Indonesia (-0.02 for cigarettes)[39] and Myanmar (-0.36 for cheroots and -0.25 for cigarettes)[46]. One study estimated the overall price elasticity for all tobacco products to be -0.53 in Sri Lanka.[45] A cross-sectional telephonic survey among 504 daily smokers in Thailand reported that in response to an increase in cigarette excise tax from 80% to 85%, 48% of the daily smokers reduced their amount of cigarettes smoking.[44] Around 17.3% and 7.6% of smokers reduced the number of smoking days and number of cigarettes per day, respectively (Table 3 and supplementary table S10).[44]

***Affordability*:** We did not identify any studies reporting an inverse association between tax/price and affordability of tobacco products.

b) Studies reporting a positive or no association between tax/price and consumption/affordability of tobacco products.

Consumption: One study each from Thailand[47], Sri Lanka,[48] Indonesia[40] and Myanmar [49] reported positive or no association between price and consumption of tobacco products. In Bangladesh two studies reported a positive[56,57] association between price/tax of tobacco products with their consumption.

Affordability: There were three studies from India that reported no or a positive association between price and affordability of tobacco products (Table 3 and supplementary table S10).[11,14,18] One of the studies suggested that smoked (cigarettes and bidis) products became cheaper between the year 2000 and 2017 [2] and another suggested all the tobacco products (cigarettes, bidis and chewing tobacco) became cheaper between the year 1996 and 2007, despite the increase in the price of tobacco products.[23] Additionally, one study each in Thailand[47] and Indonesia[52] reported direct or no change in the consumption as well affordability of tobacco products besides the increase in their price.

c) Studies with unclear interpretations of the relation between tax/price and consumption/affordability of tobacco products

Consumption: A study in Thailand,[37] using two panel datasets from ITC surveys (2005 and 2006) to investigate the response of cigarette smokers to increase in price found that 50% of the smokers decreased their consumption, but 19.9% of smokers also increased the intensity of smoking (more than 1%) despite the price change. Hence, no clear cut inference could be drawn based on these findings.[37] Another multi-country study (Myanmar, Indonesia and Thailand)[53] demonstrated a mixed impact of taxation (as a % age of price) on cigarette consumption. While the author did not explicitly state the results for Myanmar, the findings suggested increased cigarette smoking prevalence in Indonesia and decreased smoking prevalence in Thailand in response to increase in cigarette prices/taxes (Table 3 and supplementary table S10).[53] Another multi-country study (Thailand and India),[54] discussed the role of prices and consumption of cigarettes. The study concluded that high prices decrease cigarette consumption. Although the study enlisted the prices and prevalence of smoking for the respective countries, it did not explicitly state/discuss the impact of prices on consumption for the respective countries.[54]

Affordability: The study conducted by Blecher et al. reported increased affordability of cigarettes in India, Bangladesh and Sri Lanka, and decreased affordability of cigarettes in Indonesia and Thailand from 1990 to 2001. However, individual price increase for respective countries for the change in affordability were not explicitly stated in the study.[8] Another study conducted in India[22] reported that tobacco products have become more affordable (i.e. cheaper) after the enactment of the Goods and Services Tax (GST in 2017-18) when compared to the period where Value Added Tax (VAT) was implemented between 2015-16, due to no revisions in taxes under the GST regime unlike the VAT regime (Table 3 and supplementary table S10). The authors reported that bidis had become less affordable in the states with lower VAT rates, after the first year of GST implementation, but this reduction in the affordability of bidis was not sustained in the consecutive years due to no revisions in the taxes. The authors did not explicitly state separate values for prices and affordability of products in the VAT and GST period in the analysis. Therefore, no clear-cut inference could be drawn regarding the impact of taxes on the affordability of tobacco products.

2. The impact of tobacco tax/price on the consumption/affordability of tobacco products by SES

***Consumption*:** The studies conducted by Hussain et al.[47] and Nargis et al.[38] reported the price response of tobacco products of their consumption by education status. Hussain et al. reported a higher likelihood of consumption of upper-tier price brands amongst individuals with higher education attainment (Table 4 and supplementary table S11). Studies conducted by Nargis et al. (2014),[49] Arunatilake et al. (2000),[45] Adioetomo et al. (2005),[39] Ayurkel et al. (2003)[43] used household income or expenditure to report the change or associations with consumption of tobacco products. Four of these studies[38,39,43,46] suggested a higher price sensitivity of tobacco use among poor households or lower SES as compared to the rich/higher SES **(**Table 4 and Table S11**)**.

***Affordability*:** A study conducted in Bangladesh with data from 2009 to 2015 reported increased affordability of cigarettes among people belonging to higher SES (marginal effect coefficient -2.09, S.E (0.38)) (Table S 11).[6] Another study assessing the trends in affordability of cigarettes and bidis from the year 2000 to 2018 in India, reported that low SES households pay lower

prices for bidis in comparison to the high SES households.[2] The study reported an increasing gap in self-reported prices of bidis between high and low SES households, while for cigarettes the self-reported prices for high and low SES were almost similar (Table 4 and supplementary table S11).[2]

3. Cross-price elasticity and consumption

Eight studies reported the cross-price elasticity or change in consumption of one tobacco product due to the change in the price of other tobacco product/s (Table 4 and supplementary table S11). Three studies reported the change in consumption of smokeless tobacco due to a change in smoked tobacco prices (cross-price elasticity).[34,36,37] Some studies also reported changes in cigarette prices leading to a significant shift to other tobacco product consumption[36,37,41]; and vice-versa.[34,50] Three studies reported both the change in consumption and cross-price elasticity of tobacco products in their respective findings.[34,46,51] A study conducted in Thailand, demonstrated that an increase in the price of manufactured cigarettes increased the likelihood of consumption of hand-rolled cigarettes (RYO) and vice-versa.[37] Another study reported the cross-price elasticity of cigarettes to bidis (i.e. *change in bidi consumption in response to cigarette prices*) to be -0.091 and -0.455 for urban and rural region respectively (Table S11). However, the coefficient for cross-price elasticity was small and insignificant.[34] The cross-price elasticity often helps in indicating a shift in consumption to substitutes/complementary products. Besides directly stating the cross-price elasticity of tobacco products few studies also linked the increase in the price of one tobacco product leading to the shifting of tobacco consumers to other tobacco products or brands.[48,50] We, however, do not describe the findings of product shifting/substitution in detail in this paper and limit ourselves to reporting clear findings of cross-price elasticity only.

Study quality

The mean quality score for studies in our review was 7.5. Most (n=21) studies were of high quality; six studies were of moderate quality and only one study was of low quality. There were no major differences in the findings of studies (regarding the impact of tobacco prices on their consumption/affordability) based on the quality of studies. The mean score for quality of studies reporting inverse association, direct or no association; and unclear association between price and

consumption/affordability of tobacco products were 7.9, 7 and 7.3 respectively. The detailed scoring for each study is provided in Table S12.

DISCUSSION

The findings of this review found that the majority of the studies examining the impact of tax/price on tobacco product consumption report an inverse association. This is consistent with what is already known of this relationship: i.e., the true association of cigarette taxes/prices are statistically significant and negative towards cigarette consumption, making tax/price measures effective in controlling cigarette consumption.[55] Nevertheless, a number of studies also report positive associations, or no association, between tax/price and consumption of tobacco products. The differences in findings might be attributed to the fact that studies showing an inverse association tend to be those that comprehensively adjust for SES variables/ or cross price elasticity of tobacco products in their analysis, whilst those reporting positive or no association tend not to. The range of price elasticity estimates reported by the studies included in the current review (smokeless tobacco -0.09 to -0.90 and smoking tobacco -0.02 to -0.88) was wide, but includes those reported in the 2003 review (the short and long-run price elasticity as -0.50 and -0.70 respectively) focusing on the SEAR region.[18] For affordability, all studies identified reported either a positive/no association; or unclear findings.

Tobacco users from lower SES groups were found to be more price-sensitive in comparison to those belonging to more affluent groups. A few studies reported the increase in consumption of one tobacco product in response to the increase in the price of other tobacco product (cross-price elasticity). Other studies further linked the cross-price elasticity to product or brand shifting as well.[48,50] Therefore, as per our stated secondary outcome in the protocol, we limited ourselves to reporting clear findings of cross-price elasticity only.

The existing literature suggests that for tobacco products, the price is an important determinant of consumption/affordability.[18,56–58] However, while price plays a role in regulating the consumption/affordability of tobacco products, the per capita income growth of the country can influence this relationship.[17,59] The reported positive associations or lack of association between the price and consumption of tobacco products by some studies conducted in Bangladesh,[6,38,51] Thailand,[47] India[2,24] and Indonesia[40] could be due to higher economic growth (and therefore,

higher income growth) relative to the increase in tobacco prices in these countries. Further, product-substitution involving switching to cheaper alternatives,[6,37,47,50,52] and heterogeneity among the tobacco prices along with their complex taxation tiers[23,52] are also potential reasons for no or positive association between tobacco product prices and consumption.[60] The heterogeneity in prices of tobacco products may incentivise tobacco users to migrate to cheaper alternatives, thereby diluting the impact of an increase in tobacco prices on consumption.[61,62]

The findings of this review indicate that lower SES groups are more price responsive than the higher SES groups,[43,46,48,50] suggesting that tobacco tax/price measures could contribute to addressing the tobacco-related health inequalities within and across countries. This is particularly important for tobacco epidemic in the LMICs, where the majority of smokers live and the health and economic burden of tobacco use is greatest, including those in the SEAR.

Implications for Policy, Practice and Research:

Our review supports the use of tobacco tax and price measures as effective tools to address the tobacco epidemic, as well as the socio-economic discrepancies in tobacco consumption and tobacco-related health and economic burden,[57,58] [56] in the SEAR. However, our findings also suggest that there is need to increase the tobacco taxes and prices to levels that are sufficient to result in an increase the real price (and therefore reduce affordability) of tobacco products, in order to reduce consumption. In addition, specific taxes and levying taxes uniformly across all tobacco products, without any exceptions or tiers would help to address shifting to cheaper alternatives/ product substitution and tax pass through, and therefore strengthen the effects of tobacco-related fiscal policies.[63] The administrative costs involved in levying and collecting taxes on tobacco are small when compared with the health benefits. Revenue from taxes can be used by governments to fund vital health and other services for populations in the region. There are diverse micro as well macro level socio-economic, geographical, and cultural challenges associated with tobacco epidemic across various countries. However, by focusing on a regional level, our review contributes to a better understanding of what policies countries might need to work together on, and advocate for, collectively to address the cross-country and cross-cultural challenges. Our policy recommendations could also be replicated in other similar regions.[64]

We recommend future SEAR studies on this topic to utilise robust study designs and data analysis approaches that allow for causal inferences, for both affordability and consumption. Studies investigating the relationship between tobacco taxes/prices and their real as well as nominal price is particularly needed. In the present review we did not identify any study meeting our eligibility criteria for a few of the SEAR countries such as the Democratic Republic of Korea (DPRK), Timor-Leste, Maldives and Bhutan. Therefore, more country specific research should be encouraged in order to help to understand both the country- and regional-level impact of tax and price tobacco control measures. The deficiency of comprehensive approaches to measure the impact of tobacco control measures in general as well as across SES is also acknowledged in previous reviews.[65]

Strengths and Limitations

As far as we are aware, this is the first systematic review after the advent of MPOWER strategies, to examine the tax/price response of all the tobacco products (smoking and smokeless tobacco) on their consumption/affordability in countries of SEAR. We have drawn our interpretations based on the studies conducted in this region, without any limitation on the time frame. We have also disaggregated the impact of taxes/price on their consumption/affordability by SES indicators. The study has certain limitations. Due to the limited number of studies and wide heterogeneity across the studies in terms of their intervention as well as reporting of outcomes, we were unable to conduct a meta-analysis. Although we have mentioned the given tax/price estimates for each study in the supplementary files, we could not present the impact of taxes on real or nominal price of tobacco products. There was no major difference in the change in affordability/price elasticity estimates within studies for smoking and smokeless tobacco.. Hence, we did not present estimates separately for smokeless and smoking tobacco products. However, the tables in the results section do present the estimates separately for each product (cigarettes, bidis, smokeless or any other) from the respective studies. The majority of studies in the review were retrospective in design, drawing estimates from previous datasets such as the GATS, TCP, ITC, etc. Although such studies encompassed large populations, the outcome estimates derived from them can vary in survey designs, sampling methods, populations as well country specific differences .

CONCLUSION

The majority of included studies examining the impact of tax/price on tobacco product consumption report an inverse association, thereby supporting the use of tobacco tax and price measures as effective tools to address the tobacco epidemic. Our findings however also emphasise the importance of increasing tobacco product taxes and prices sufficiently to outweigh the effects of income growth, in order for the measures to be effective in reducing the affordability and consumption of tobacco products. The availability of cheaper alternatives (often due to tiered and complex taxation systems) can also undermine the effect of fiscal policies in tobacco control. These should be considered when designing future tobacco tax policies in the region.

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