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EFFECTIVENESS OF CIGARETTE PRICE INCREASES THROUGH EXCISE TAXES ON SMOKING PREVALENCE: A SYSTEMATIC REVIEW

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ABSTRACT

Smoking prevalence in Indonesia remains high, while substantial evidence demonstrates that increasing cigarette prices through excise and taxation is one of the most effective economic interventions to reduce tobacco consumption. However, the magnitude of these impacts varies across countries due to differences in socioeconomic conditions, cigarette market structures, affordability levels, and prevailing fiscal policies. This study conducted a Systematic Literature Review of 12 studies from various countries to evaluate the effectiveness of cigarette price increases in reducing smoking prevalence. The findings indicate that price increases consistently lower smoking prevalence across all countries reviewed, with the strongest effects observed among adolescents and low-income populations. The highest effectiveness was found in countries with simpler excise structures and routine annual tax adjustments. For Indonesia, these findings highlight the need for stronger excise reforms, including simplifying the tax structure, implementing real annual tax increases, and eliminating low-priced cigarette segments to achieve more substantial and sustainable reductions in smoking prevalence.

Keywords: Cigarette, Price Increases, Excise Taxation, Smoking Prevalence.

INTRODUCTION

Tobacco smoking remains one of the leading preventable causes of death worldwide. According to the World Health Organization (WHO), tobacco use contributes to more than 8 million deaths annually, of which over 7 million are caused by direct consumption, while the remainder result from exposure to secondhand smoke (WHO, 2023). The impact of tobacco extends beyond individual health, imposing a substantial burden on national health systems and hindering progress toward achieving the Sustainable Development Goals, particularly the target of reducing premature mortality from non-communicable diseases (WHO, 2017).

In many low and middle-income countries, including Indonesia, the prevalence of smoking remains high. The Global Adult Tobacco Survey 2021 reported that 34.5% of adults aged ≥15 years equivalent to approximately 70.2 million people use tobacco products. A striking gender disparity persists, with smoking prevalence reaching 65.5% among men, compared to only 3.3% among women (GATS Indonesia,

2021). Despite various public health efforts including education campaigns and cessation programs, these measures have not been sufficiently effective in reducing smoking prevalence (WHO, 2021; CDC, 2025).

A substantial body of international evidence indicates that economic policies, particularly price increases through higher taxes and excise duties, are among the most effective strategies for reducing tobacco consumption. A global study covering 97 countries from 2014 to 2020 found that stronger excise tax policies were associated with up to a 9% reduction in per capita cigarette consumption (Ngo et al., 2024). Evidence from Africa shows that higher cigarette prices significantly reduce the likelihood of smoking and decrease consumption intensity, with a price elasticity of participation of -0.362 (Filby, 2024). In India, price increases were statistically significant in preventing smoking initiation, with an average elasticity of -0.024, meaning a 10% price increase results in a 0.24% reduction in initiation (Dauchy & John, 2022). Likewise, recent findings from the United States demonstrate that stronger excise tax policies not only reduce cigarette consumption but also increase tax revenue per capita, offering dual health and economic benefits (Lee et al., 2024).

WHO recommends that countries adopt a simplified excise tax structure dominated by specific excise taxes to effectively raise prices, while ensuring that tax policies are regularly adjusted for inflation and economic growth. WHO emphasizes that substantial increases in tobacco taxes and prices represent the most effective and efficient measure for reducing tobacco use, particularly among low-income groups who are more price-sensitive. Beyond lowering morbidity and mortality, tobacco taxes also reduce the economic burden of tobacco-related diseases and contribute significantly to government revenue in the short and medium term (WHO, 2023).

However, cigarette affordability remains high in many countries, including Indonesia. Although cigarette excise taxes increased by up to 23% in 2020, cigarette prices have remained relatively stable and highly affordable. In 2021, cigarettes were still 3.6 times more affordable compared to 1998. As a result, smokers can easily shift to cheaper alternatives such as single-stick cigarettes or illicit products, which contributes to persistently high smoking prevalence (CISDI, 2024).

The effectiveness of price and tax increases varies considerably across countries, influenced by differences in excise structures, industry compliance, the size of the illicit market, and variations in price elasticity across socioeconomic groups. Understanding which groups are most responsive to price changes is therefore essential. In Indonesia, this need is particularly urgent given the persistently high smoking prevalence and the limited impact of recent tax increases. Lessons from other countries can provide valuable insights for strengthening national tobacco control policies. Thus, this review is important to assess how effective tobacco price increases driven by higher taxes or excise duties are in reducing smoking prevalence across countries, and to inform evidence-based strategies for tobacco control in Indonesia.

LITERATURE REVIEW

Elasticity Theory

Elasticity is an economic concept used to measure the extent to which the quantity demanded or supplied of a good changes in response to changes in certain factors, particularly price and income. In the context of demand, elasticity reflects the degree of consumers' sensitivity to changes in the price of a good. Demand is considered elastic when a relatively small change in price leads to a large change in the quantity demanded (E>1), whereas demand is inelastic when a change in price results in only a relatively small change in the quantity demanded (E<1) (Sui et al., 2019)

Demand elasticity specifically describes the percentage change in the quantity of a good demanded as a result of changes in price or consumer income, assuming other factors remain constant. Price elasticity of demand indicates the magnitude of change in demand resulting from changes in the price of the good itself, while income elasticity measures changes in demand in response to changes in consumer income. In addition, cross-price elasticity captures changes in the demand for a good in response to changes in the price of another good, reflecting substitution or complementary relationships between goods (Nghiem et al., 2013).

The magnitude of demand elasticity is influenced by several factors, including the availability of substitute goods, the nature of the good (whether it is a necessity or a luxury), the proportion of consumer expenditure devoted to the good, and the length of time consumers have to adjust to price changes. Necessities and addictive goods tend to have inelastic demand, whereas goods with many available substitutes are generally more elastic (WHO FCTC, 2019).

In the context of public policy, the concept of elasticity plays an important role because it can be used to predict the impact of price-based policies, such as taxes and subsidies, on consumer behavior. Information on demand elasticity helps policymakers design interventions aimed at controlling the consumption of certain goods, enhancing the effectiveness of fiscal policies, and estimating the economic and social impacts of implemented price changes.

RESEARCH METHOD

This study is a Systematic Literature Review (SLR) approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 Checklist (PRISMA Statement, 2020). The population, intervention, comparison, and outcome (PICO) framework was defined based on the research question: "To what extent does cigarette price increase driven by tax or excise hikes influence the reduction of smoking prevalence in a country?"Relevant literature was identified through a comprehensive search of verified scientific databases, including PubMed, Scopus, and ProQuest, using the following main keywords: "tobacco price," "tobacco tax," "tobacco excise," "tobacco smoking prevalence," "tobacco consumption," and "smoking cessation." The search was limited to english-language peer-reviewed journal articles published within the last five years (2020–2024). The inclusion criteria consisted of economic and public health policy studies examining cigarette price increases due to higher taxes or

excise duties and their impact on public health outcomes, particularly the reduction in smoking prevalence. Additional inclusion criteria were population-based studies, smoker population panel data analyses, modeling studies, and original research articles. The exclusion criteria included articles that did not provide relevant findings or explanations aligned with the research objectives.

The article search was conducted in several stages, beginning with identification, screening, eligibility assessment, and final synthesis of studies that met the inclusion criteria. A total of 2,119 articles were identified during the initial identification stage, and 94 duplicate articles were removed prior to screening, leaving 2,025 articles for the screening process. After screening the titles, abstracts, and full texts based on the PICO framework, 63 articles proceeded to the agreement test (kappa test) and eligibility assessment, which employed an adaptation of the JBI Checklist for Economic Evaluation Studies. Following all assessment procedures, 12 articles were deemed eligible and met the inclusion criteria for data extraction, as outlined in the PRISMA flow diagram (Figure 1).

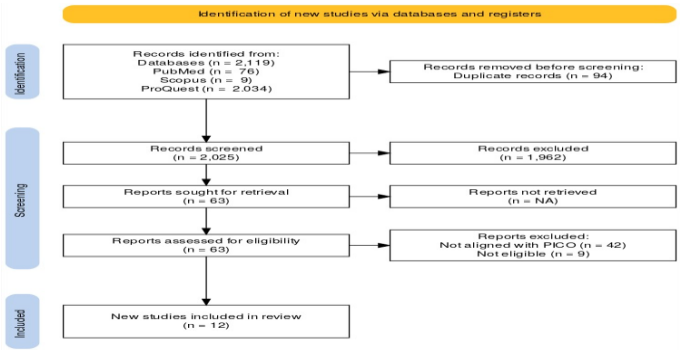

Figure 1. PRISMA Flowchart Diagram

RESEARCH RESULTS

Table 1. Data Extraction Results From Included Studies In The Systematic Literature Review

No	Author (Year)	Title	Country	Method/Design	Results
1	Jovanović & Zubović, 2023 (Jovanović & Zubović, 2023)	Impacts of Tobacco Tax Increases on Tax Revenues and Public Health in Serbia	Serbia	Simulation model based on national data, with a baseline of 2023 for projections for 2024 and 2025.	A 15% annual increase in specific taxes is projected to raise retail prices by 10.2% in 2024 and 11.3% in 2025, reducing tobacco

No	Author (Year)	Title	Country	Method/Design	Results
					consumption by 4.7% and 5.3%. Smoking prevalence declines from 38% (2023) to 36.8% (2024) and 35.5% (2025), or a 3.1% and 3.4% annual drop. This prevents over 17,000 youth from starting to smoke and averts 320 deaths in 2024 and 678 in 2025. A 10% price increase cuts premium cigarette consumption by 2.2%, mid-price by 6.3%, and economy by 10.8%, indicating strongest responsiveness among low-price smokers.
2	Hudcovský & Morvay, 2024 (Hudcovský & Morvay, 2024)	Expediting Tobacco Taxation in Slovakia: More Gains, Fewer Pains	Slovakia	Comparative model simulation between the current cigarette excise system (bi-annual tax increase) vs. the proposed scenario (annual increase) for	Price elasticity shows that a 10% price increase reduces premium consumption by 4.5%, mid-price by 8.2%, and economy by 11.3%, with economy smokers being the most

No	Author (Year)	Title	Country	Method/Design	Results
				the period 2024-2028	responsive. Annual excise increases raise prices by 44.9% and cut consumption by up to 23%, outperforming the two-year system, which raises prices by only 28.1% and reduces consumption by 12.5%. Smoking prevalence also declines more under annual adjustments, 10.5% among adults and 21.1% among adolescents, compared with 6.6% and 13.2% under the two-year system, confirming stronger effectiveness, especially for adolescents.
3	Huque et al., 2024 (Huque et al., 2024)	Price Elasticity of Cigarette Smoking in Bangladesh: Evidence from the Global Adult Tobacco Surveys	Bangladesh	Analysis of national survey data (2009-2017) using a "two-part" model.	Cigarette demand elasticity (-0.51 to -0.73) shows that a 10% price increase lowers demand by 5.1-7.3%. With prevalence

No	Author (Year)	Title	Country	Method/Design	Results
					elasticity at -0.69 and intensity at -0.04, the same price rise reduces smoking prevalence by 6.9% and cigarette intensity by 0.4%. Low-income groups (-0.92) and rural populations (-0.71) are the most price-sensitive, indicating stronger consumption reductions in these groups.
4	Hong et al., 2024 (Hong et al., 2024)	National Prevalence of Smoking Among Adolescents at Tobacco Tax Increase and COVID-19 Pandemic in South Korea, 2005–2022	South Korea	Observational analysis with interrupted time-series analysis design using ARIMA model, using data from 2005–2022.	A 2015 cigarette tax increase doubled the price of cigarettes in South Korea from 2,500 to 4,500 won and reduced the prevalence of teenage smoking from 11.5% to 6.5%. During the COVID-19 pandemic, the prevalence continued to fall to 4.3%, although some

No	Author (Year)	Title	Country	Method/Design	Results
					continued to smoke daily.
5	Cizmovic et al., 2022(Cizmovic et al., 2022)	Effectiveness of Tax Policy changes in Montenegro: Smoking Behaviour by Socio-economic Status	Montenegro	Quantitative analysis with 2006-2017 Household Budget Survey data, using a two-part model for smoking decisions (logit) and smoking intensity (Deaton's model).	A 58.3% tax increase reduces cigarette consumption by 11.25% and raises government revenue by 8.07%. Price elasticity is stronger among low-income groups (prevalence -0.595; intensity -0.424) than high-income groups (-0.344; -0.258), showing that tax-driven price increases more effectively reduce smoking among lower-income populations.
6	Cruces et al., 2022 (Cruces et al., 2022)	Differential Price Responses for Tobacco Consumption : Implications for Tax Incidence	Argentina	Quantitative analysis based on household data using the price elasticity estimation method for cigarette demand.	A 10% price increase reduces smoking prevalence by 8.5% among the lowest-income group (-0.849) and 4.4% among the highest-income group

No	Author (Year)	Title	Country	Method/Design	Results
					(-0.437), showing that low-income smokers are nearly twice as price-sensitive. Young smokers (15-24) are also more responsive, with a 7.7% decline (-0.767) compared with adults (25-65), whose prevalence falls by 4.5–6.8% (-0.454 to -0.684).
7	Norashidah Mohamed Nor et al., 2022 (Norashidah Mohamed Nor et al., 2022)	Impact of Tobacco Control Policies on Cigarette Consumption in Malaysia	Malaysia	Time-series or cointegration analysis using the Fully Modified Ordinary Least Squares estimation method	A 10% increase in cigarette prices reduces consumption by about 7.69% in the long run (elasticity –0.769).
8	Le & Jaffri, 2022 (Le & Jaffri, 2022)	The Association Between Smoking Behaviors and Prices and Taxes per Cigarette Pack in the United States from 2000 through 2019	United States	Longitudinal observational analysis using Behavioral Risk Factor Surveillance System) data 2000–2019, using linear mixed-effect models.	A $1 increase per pack reduces smoking prevalence by 0.5-0.6 points and increases quit attempts by 1.3-1.7 points, with the strongest effects among adolescents, young adults (18-24), and

No	Author (Year)	Title	Country	Method/Design	Results
					men. Higher-income groups also show greater reductions in consumption than lower-income groups.
9	Viet Nguyen et al., 2021 (Viet Nguyen et al., 2021)	The Impact of Cigarette Prices on Smoking Participation and Tobacco Expenditure in Vietnam	Vietnam	Quantitative analysis with 2SLS regression using national data: GATS 2010 & 2015 and VHLSS 2006-2016.	Real cigarette prices rose 4% from 2010-2015. Each 1% price increase reduces daily smoking prevalence by 0.08 points (elasticity -0.26), meaning a 10% rise lowers men's prevalence from 30.7% to 29.9%. A 1% increase also cuts household cigarette spending by 0.43%, showing that higher prices effectively reduce consumption.
10	Lim & Khang, 2020 (Lim & Khang, 2020)	Tobacco Price Increases in Korea and their Impact on Socioeconomic Inequalities in Smoking and Subsequent	South Korea	Modeling study to estimate price elasticity of smoking prevalence and cross sectional cox model to assess mortality risk	Smoking prevalence was 22.93% and average consumption 2.94 cigarettes/day. An 80% price increase (2,500 to 4,500 KRW) corresponds

No	Author (Year)	Title	Country	Method/Design	Results
		Socioeconomic Inequalities in Mortality		over 10 years.	to a 10% price rise reducing prevalence by 4.42% (-0.442) and consumption by 2.4% (-0.241). Simulations show prevalence falling to 21.94% and consumption to 2.8. A 100% price increase lowers prevalence to 14.74% and consumption to 2.3, and over 10 years reduces mortality from 5.09% to 4.99%, a roughly 2% decrease in death risk.
11	Immurana et al., 2021 (Immurana et al., 2021)	The Effects of Tobacco Taxation and Pricing on the Prevalence of Smoking in Africa	Africa	Quantitative analysis using the Panel data estimator system Generalized Method of Moments (GMM)	With an average smoking prevalence of 13.4%, a US$3.47 cigarette price, and taxes making up 37.4% of the retail price, a 1% price increase reduces prevalence by 0.11-0.14%, while a 1% tax increase reduces it by 0.25-0.36%.

No	Author (Year)	Title	Country	Method/Design	Results
12	Chaiton et al., 2021 (Chaiton et al., 2021)	Tobacco Endgame Simulation Modelling: Assessing the Impact of Policy Changes on Smoking Prevalence in 2035	Canada	The model simulation uses Ontario SimSmoke, a tobacco control policy model using 5 endgame strategies to project smoking prevalence through 2035.	Five simulated policies: plain packaging, free cessation services, reducing retail outlets, higher tobacco taxes, and raising the minimum age to 21, lower smoking prevalence from 12.9% (no intervention) to 8.5% when combined. Tax increases give the largest impact (10.1%), followed by raising the age to 21 (10.5%) and reducing outlets (11.4%), while plain packaging and free cessation services yield smaller effects.

Characteristics of Included Studies

A total of 12 articles met the inclusion criteria and were analyzed in this systematic review. The studies encompassed diverse country contexts, including Serbia, Slovakia, South Korea (2 articles), Bangladesh, Montenegro, Argentina, Malaysia, Vietnam, the United States, Canada, and several countries in Africa. The study designs consisted of fiscal policy modeling, panel data analysis, household surveys, and economic simulations using various tax or excise increase scenarios. All studies assessed the impact of cigarette

price increases (resulting from higher taxes or excise duties) on reductions in smoking prevalence and consumption among the general population, adolescents, or specific socio economic groups (Table 1).

Key Findings

The review of 12 studies shows consistent evidence that increasing cigarette prices through taxes or excise policies effectively reduces smoking prevalence. Although the magnitude varies across countries, all studies confirm a significant negative relationship between cigarette price increases and smoking prevalence.

In Serbia and Slovakia, excise-driven price increases lowered smoking prevalence while raising government revenue. In Serbia, a 15% excise increase that raised prices by over 10% reduced prevalence from 38% to 35.5% within two years, with low-income groups showing high elasticity (a 10% price increase cut consumption by 10.8%) and government revenue rising by 6.6% (Jovanović & Zubović, 2023). In Slovakia, annual excise increases were more effective than biennial ones, raising prices up to 44.9% and reducing prevalence by 10.5% among adults and 21.1% among adolescents; low-income groups again responded most, with a 10% price increase reducing consumption by 11.3% (Hudcovský & Morvay, 2024). Similar findings in Bangladesh and Montenegro show excise increases most strongly reduce smoking among poor and rural populations. In Bangladesh, a 10% price increase cut consumption by 5–7%, especially among low-income and rural groups (Huque et al., 2024). In Montenegro, a 58.3% excise increase was projected to reduce consumption by 11.25% and increase revenue by 8.07%, with low-income smokers showing higher elasticity (-0.595) than high-income groups (-0.344) (Cizmovic et al., 2022).

In East Asia, particularly South Korea, excise-driven price increases reduced smoking prevalence and smoking-attributable mortality. A 10% price increase lowered prevalence from 22.93% to 21.94%, while a 100% increase reduced it to 14.74%, decreasing smokers' mortality risk by 2% over ten years (Lim & Khang, 2020). The 2015 tax reform also reduced youth smoking from 11.5% to 6.5% (Hong et al., 2024). Evidence from Argentina shows stronger effects among low-income groups (an 8.5% reduction vs. 4.4% in high-income groups), and greater impact on young smokers (7.7% reduction among ages 15–24) than adults (4.5–6.8%) (Cruces et al., 2022). In the United States, a USD 1 increase in cigarette taxes reduced smoking prevalence by 0.5–0.6 percentage points and increased quit attempts by 1.3–1.7 points, with stronger effects among youth, young adults, and men (Le & Jaffri, 2022).

Studies from Malaysia, Vietnam, and Africa similarly confirm that price increases reduce smoking, though effects vary. In Malaysia, a 10% price increase reduced long-term prevalence by 7.69% (Norashidah Mohamed Nor et al., 2022). In Vietnam, a 1% price increase reduced daily smoking by 0.08 points, lowering male prevalence from 30.7% to 29.9% with a 10% increase (Viet Nguyen et al., 2021). In Africa, a 1% increase in price reduced prevalence by 0.11–0.14%, and a 1% tax increase reduced it by 0.25–0.36%, reflecting low regional tax levels (Immurana et al., 2021). In Canada, excise tax increases are the most effective and cost-efficient strategy to reduce smoking. Their impact is greater when combined with other tobacco

control measures. Evidence from Canada shows that combining five policies excise increases, outlet restrictions, plain packaging, free cessation services, and raising the minimum purchase age could reduce prevalence to 8.5% by 2035, compared with 10.1% from excise increases alone (Chaiton et al., 2021).

Across all countries, cigarette price increases consistently reduce smoking prevalence, although effect sizes vary due to market conditions, population characteristics, and policy strength. Countries with lower prices and tax levels below WHO recommendations tend to show lower elasticity. Even so, fiscal measures remain the strongest evidence-based tool for reducing smoking at the population level.

DISCUSSION

Effectiveness of Price Increases on Smoking Prevalence

This SLR shows strong and consistent evidence that increasing cigarette prices through higher tobacco taxes/excise is highly effective in reducing smoking prevalence. Although tobacco is an inelastic good due to its addictive nature, health-economic evidence demonstrates that tobacco consumption still responds to price increases, enabling fiscal policies to significantly influence smoking behavior (WHO FCTC, 2019). Nevertheless, even though tobacco is considered inelastic, evidence from health economics consistently shows that tobacco consumption remains responsive to price increases, allowing fiscal policies to significantly influence smoking behavior.

Cross-country findings confirm this pattern: Serbia and Slovakia show greater reductions in smoking when taxes are raised annually (Hudcovský & Morvay, 2024; Jovanović & Zubović, 2023). Bangladesh and Montenegro show decreased consumption alongside increased government revenue (Cizmovic et al., 2022; Huque et al., 2024). Argentina and the United States report reduced smoking prevalence and increased cessation efforts (Cruces et al., 2022; Le & Jaffri, 2022), and South Korea shows reductions in both smoking prevalence and smoking-attributable mortality (Hong et al., 2024; Lim & Khang, 2020). These results align with WHO recommendations identifying tobacco taxation as the most cost-effective measure to reduce tobacco use (WHO, 2023). Higher tobacco taxes effectively increase cigarette prices, and the resulting price shock reduces overall tobacco use, prompting active smokers to quit.

The IARC review further supports these conclusions: in high-income countries, price elasticity ranges from -0.2 to -0.6, while in low- and middle-income countries it is higher (-0.5 to -0.8), indicating greater responsiveness (IARC, 2011). Despite overall inelasticity, consumers consistently reduce cigarette use as prices rise, making excise-driven price increases one of the most effective tools for lowering smoking prevalence across diverse economic contexts.

Price Increase Responsiveness by Age Group

Across the 12 studies, four examined age-specific responsiveness to cigarette price increases, consistently showing that

adolescents and young adults are the most price-sensitive. In Slovakia, annual excise increases reduce smoking prevalence by 10.5% among adults and 21.1% among adolescents, whereas biennial increases result in smaller declines of 6.6% and 13.2%, respectively, confirming that adolescents respond most strongly to regular tax hikes (Hudcovský & Morvay, 2024). Evidence from South Korea shows a similar pattern, where a doubling of cigarette prices reduced adolescent smoking from 11.5% to 6.5% (Hong et al., 2024). In Argentina, a 10% price increase lowers smoking prevalence by 7.7% among those aged 15–24, compared with 4.5–6.8% among adults aged 25–65 (Cruces et al., 2022). In United States studies likewise show the greatest impact among adolescents and young adults (18–24 years), particularly males (Le & Jaffri, 2022).

Adolescents and young adults are the most price-responsive groups compared with older adults. From an economic perspective, these groups have higher price elasticity due to limited purchasing power, which makes cigarette price increases a direct financial barrier to consumption (Chaloupka & Pacula, 2023). Behaviorally, adolescents have lower nicotine dependence, making them more likely to quit or reduce smoking when prices rise (National Cancer Institute and World Health Organization, 2016). Global evidence further confirms that individuals under 25 show the largest reductions in smoking prevalence in response to tax- or price-related increases (Antonopoulos et al., 2023). Overall, higher cigarette prices or excise taxes are especially effective in reducing smoking initiation and prevalence among adolescents and young adults.

Response by Socioeconomic Status and Place of Residence

Five of the 12 studies examined price responsiveness by socioeconomic status, consistently showing that low-income groups are the most responsive to cigarette price increases. In Serbia, a 10% price increase reduced consumption by 10.8% among low-income smokers (Jovanović & Zubović, 2023), while in Slovakia the same increase reduced consumption by 11.3% (Hudcovský & Morvay, 2024). Bangladesh also showed high elasticity among low-income groups (–0.92) compared with –0.41 among high-income groups (Huque et al., 2024). Montenegro reported similar findings, with smoking prevalence elasticity of –0.595 for low-income groups versus –0.344 for high-income groups (Cizmovic et al., 2022). In Argentina, a 10% price increase lowered smoking prevalence by 8.5% among the poorest compared with 4.4% among the richest (Cruces et al., 2022).

Economically, low-income groups are more price-sensitive because cigarettes take up a larger share of their income, making higher prices a stronger deterrent (Casetta et al., 2017; Farrelly et al., 2012). Cheaper brands are also more commonly used among low-income smokers, so price increases directly affect them. Meanwhile, high-income individuals face less financial pressure and have more product alternatives, making them less responsive (Nargis et al., 2021). These patterns indicate that tobacco taxation may have an equity-enhancing effect, as greater consumption reductions occur among low-income populations who also face higher tobacco-related health risks (Guindon et al., 2023).

One study also assessed responsiveness by place of

residence. In Bangladesh, a 10% price increase produced a larger consumption decline in rural areas (–0.71) than in urban areas (–0.62), showing that rural populations are more price-responsive (Huque et al., 2024). Evidence from India supports this trend, as rural areas consistently show higher price elasticity due to lower incomes, limited access to cheaper or illicit products, and a larger share of household spending on tobacco (Selvaraj et al., 2015). Thus, tobacco tax increases may lead to greater reductions in smoking among rural communities.

Cross-Country Variation in Effectiveness

This SLR shows substantial cross-country variation in the effectiveness of cigarette price increases, influenced by socioeconomic conditions, market structure, and fiscal policy context. Countries such as Serbia, Slovakia, Bangladesh, Montenegro, and Argentina exhibit the strongest responses, with low-income smokers and consumers of low-priced cigarettes showing 8–11% consumption reductions for every 10% price increase (Cizmovic et al., 2022; Cruces et al., 2022; Hudcovský & Morvay, 2024; Huque et al., 2024; Jovanović & Zubović, 2023). Strong effects are also observed in South Korea, especially among adolescents (Hong et al., 2024).

Vietnam shows more moderate elasticity due to relatively small price increases (Viet Nguyen et al., 2021), while Malaysia demonstrates significant long-term effects when combining price measures with non-price controls (Norashidah Mohamed Nor et al., 2022). Several African countries also show high sensitivity because of limited purchasing power (Immurana et al., 2021). In high-income settings like Canada and the United States, tax increases remain the most effective intervention, though behavioral responses are smaller compared with low-income countries (Chaiton et al., 2021; Le & Jaffri, 2022). Overall, cross-country differences reflect variations in purchasing power, smoker demographics, and availability of low-cost substitutes. Countries with more low-income smokers or more aggressive price policies typically achieve larger reductions in smoking prevalence.

Policy Implications for Indonesia

The SLR findings have strong relevance for Indonesia, where smoking prevalence remains high because cigarettes are still highly affordable. Rising household income has outpaced cigarette price increases, making affordability grow despite annual excise hikes. Indonesia's multi-tiered excise structure also enables industry and smokers to shift to cheaper products, limiting the impact of tax increases, consistent with evidence that price policies are effective only when low-priced alternatives are absent (WHO Indonesia, 2020).

Therefore, Indonesia needs to eliminate downtrading opportunities by simplifying the excise system toward a more streamlined structure or a single specific rate, ensuring uniform price increases across all segments. Annual tax adjustments must also consider inflation and income growth so that real cigarette prices continue to rise. Strengthening enforcement against cheap and illicit cigarettes is equally crucial, as their availability undermines tax policies. With consistent implementation and alignment with non-price tobacco control measures, Indonesia could achieve greater reductions in

cigarette consumption and smoking prevalence.

CONCLUSION

Increases in cigarette prices through higher tobacco taxes or excise duties consistently reduce smoking prevalence across countries, although the magnitude of the effect varies by context. The strongest impacts are observed among adolescents and low-income populations, who are more price-sensitive. The greatest effectiveness occurs in countries with simplified excise structures and sufficiently large annual tax increases. In the context of Indonesia, where smoking prevalence remains high, these findings underscore the need for stronger excise reform, particularly through simplifying the tax structure, increasing annual tobacco tax rates, and eliminating low-priced cigarettes to achieve more substantial reductions in smoking prevalence.

POLICY RECOMMENDATIONS

Given Indonesia's persistently high smoking prevalence, the evidence highlights the urgent need for comprehensive tobacco excise reform. Key policy priorities include:

1. Simplifying the multi-tiered excise structure to prevent downtrading to cheaper cigarette brands.
2. Implementing substantial annual tax increases that outpace inflation and income growth to ensure real price increases.
3. Eliminating low-priced cigarettes and strengthening enforcement against illicit tobacco to maintain the effectiveness of price-based policies.

Collectively, these measures are essential for achieving more meaningful reductions in tobacco consumption and protecting public health in Indonesia.

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