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# The Nexus of Economic and Sociodemographic with Smoking in Indonesia

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## Abstract

Tobacco kills half of its users if they don't stop. Cigarettes kill more than 8 million people every year, including an estimated 1.3 million passive smokers who are exposed to active smokers. Smoking behavior is truly an action that has a negative impact on smokers themselves and their entire community. About one in seven deaths worldwide are caused by smoking. This research was conducted by analyzing the results of the National Socioeconomic Survey (*Survei Sosial Ekonomi Nasional/SUSENAS*). SUSENAS 2021 was carried out by the Statistics Indonesia (Central Statistics Agency/BPS) in March 2021. It covered all provinces in Indonesia. It was done to meet the need of social and economic development data at district, province, and national level, including data on sustainable development goals. The unit analysis of this study was population aged 15 years and above who smoke nicotine cigarettes. The unweighted number of the respondents in the study was 1888. The dependent variable was whether the smoke nicotine cigarette or not. The independent variables were gender, age, marital status, education, place of residence, island of dwelling, and working status. The in this study were analyzed using univariate, bivariate, and multivariate analyses to assess, respectively, the sample characteristics, percentage distribution of those who reported crimes by demographic and socioeconomic factors, and demographic and socioeconomic causes of crime reporting. A binary logistic regression was used to investigate demographic and socioeconomic factors of crime reporting. The probability of smoking was higher among those who were males, were aged 30-54 years, had no schooling/incomplete primary school and complete primary school, lived in urban areas, dwelled in Bali and Nusa Tenggara Island, and were not working

**Keywords:** Socioeconomic Determinants, Sociodemographic, Smoking, Indonesia

## 1. Background

Tobacco kills half of users if they don't quit (Doll et al., 2004, Bank et al., 2015, Siddiqi et al., 2020). Cigarettes kill more than 8 million people every year (Roser, 2021), including an estimated 1.3 million people who are passive smokers who are exposed to active smokers (Global Burden of Disease Database, 2019). Smoking behavior has a negative impact on smokers themselves and their entire community. About one in seven deaths worldwide is caused by smoking (Roser, 2021). Millions of people live in poor health because of smoking. Smoking is the leading cause of early death through heart disease and cancer. Smoking is a risk factor (Allender et al., 2009) for chronic complications, including cancer, cardiovascular disease, and premature death (Ekpu & Brown, 2015). It is estimated that around 100 people died prematurely from smoking, mostly in rich countries in the 20th century (Richie & Roser, 2023). The health impacts of smoking and tobacco use are enormous. Smoking and using tobacco results in communicable diseases such as tuberculosis and other respiratory diseases (Heriyani et al., 2013; Liew & Hsu, 2009) and non-communicable diseases such as diabetes (Soewondo & Pramono, 2011), cardiovascular disease, cancer.

Smokers' income is significantly lower than nonsmokers (Darlen et al., 2020). Smokers tend to have more health issues and disabilities and are less productive than non-smokers (CDC Tobacco Free, 2019). Smokers are more absent from work and have an impact on being less productive. Office policies allowing time for smoking breaks can also reduce productivity—if the workplace has a ban on smoking indoors, a smoker will need to break work hours to go outside for a smoke break. Additionally, the additional health care costs experienced by smokers can ultimately be detrimental to employers due to the higher costs of providing health insurance to their workers. Globally, more than one in five cancer deaths is related to smoking behavior. This means that tobacco kills more people every day than terrorist deaths do in one year. Smoking has a more immediate impact on wages for women than for comparable men. This is consistent with research conducted by others showing that obesity has a greater impact on women's wages compared to comparable men's wages. (Cawley, 2013; Gilleskie et al., 2017; Mason, 2012).

Other than premature death, the most detrimental aspect of smoking is the loss of productivity due to premature death. It is estimated that economic losses due to lost productivity amount to US\$ 151 billion as a result of premature deaths of smokers, who have an average life expectancy 10 years lower than non-smokers (Centers for Disease Control and Prevention, 2014).

Tobacco smoking is one of the world's biggest health problems. Smoking, both active and passive, harms and damages human health and is associated with economic costs. Smoking cigarettes is a cause of preventable disease, causes premature death, and is the cause of a number of health problems. The World Health Organization (WHO) estimates that every year there is an economic loss of half a trillion US Dollars (Gonzales, 2015). Costs due to smoking can be classified into direct, indirect and intangible costs. About 15% of total health care expenditure in high-income countries is attributable to smoking. In the USA, the proportion of health care expenditures attributable to smoking ranges between 6% and 18% in various states. In England, the direct costs of smoking to the NHS are estimated to be between £2.7 billion and £5.2 billion, which equates to around 5% of the total NHS budget each year. Estimates of the economic burden of smoking on GDP show that smoking accounts for about 0.7% of China's GDP and about 1% of US GDP. As part of the indirect (non-health related) costs of smoking, the total productivity loss caused by smoking each year in the US is estimated at US\$151 billion (Ekpu & Brown, 2015).

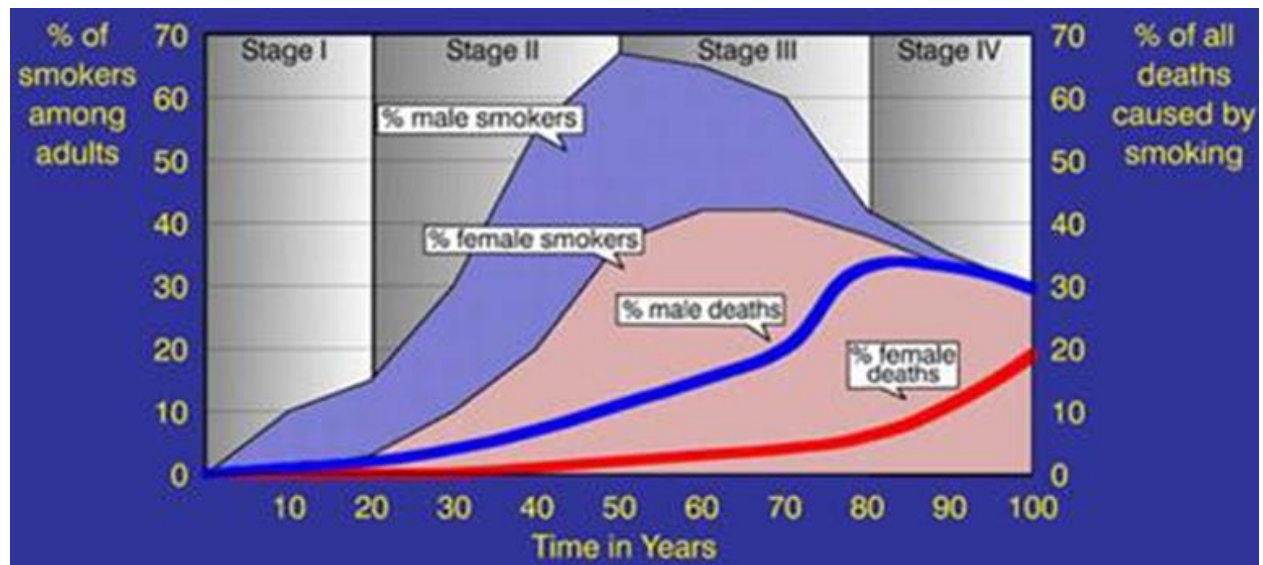


Figure 1: A Model of The Cigarette Epidemic

Source: Lopez et al (1994) and Greenhalgh et al (2023)

A paradigm that describes the general development of tobacco use throughout the world, first proposed by Lopez et al. (1994) is shown in Figure 1. It seems that the experience of tobacco use patterns in Indonesia fits this model. Stage I of this model is characterized by low smoking prevalence (below 20%), generally limited to men and accompanied by a slight increase in tobacco-related chronic diseases. Countries in phase I are not yet the main consumers of the global tobacco economy, but represent untapped potential of the tobacco industry. In the phase II paradigm, smoking prevalence in men increases to more than 50%, and smoking rates in women also begin to increase. Cigarette uptake occurs at an early age, and although there is evidence of an increase in lung cancer and other chronic diseases due to smoking among men, public and political understanding of and support for tobacco control initiatives is still not widespread. Countries entering this transition stage include Japan, several countries in Southeast Asia. Phase III of the epidemic has been reached when the prevalence of smoking reaches its peak and begins to decline in both sexes, although smoking-related deaths continue to increase due to the high rates of smoking in the past. Health education programs were better developed, and smoking became less accepted among more educated groups. Smoking is becoming less socially acceptable and the climate is becoming more conducive to the implementation of tobacco control policies. The evolution to stage IV is characterized by a continuous but gradual decline in smoking prevalence, in both men and women. Men's deaths from smoking are starting to decline, but women's death rates continue to rise, reflecting past smoking patterns.

The total number of cigarettes reported sold in the US or given away by major manufacturers in 2021, was 190.2 billion cigarettes, representing a decrease of 13.5 billion cigarettes (6.7 percent) compared to 2020. Advertising and promotion spending increased from 2020 to 2021, up from \$7.84 billion to \$8.06 billion. The largest spending category in 2021 was price discounts paid to cigarette retailers to lower cigarette prices to consumers, which amounted to \$6.01 billion (74.6 percent of total advertising and promotion spending). (Federal Trade Commission, 2023). Economically, in 2020, the USA lost US \$436.7 million as a result of smoking (The Lancet, 2022). 1.7% of GDP loss of personal income and 0.4% of GDP loss of household productivity.

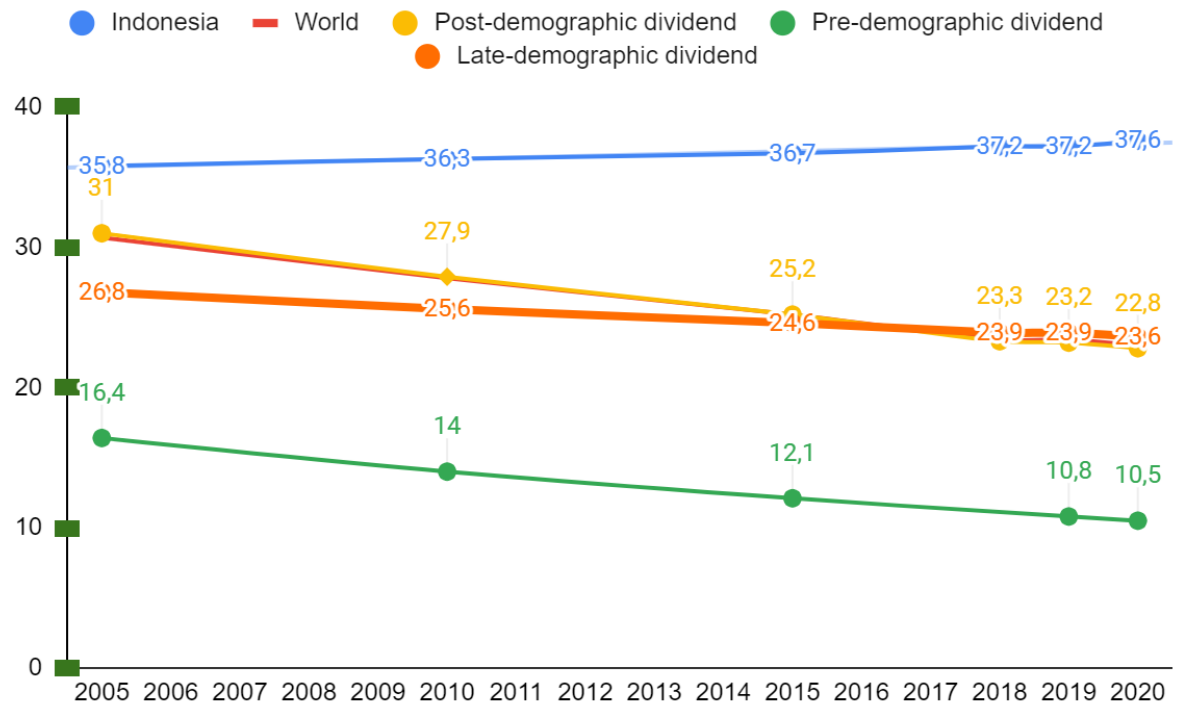


Figure 2: Prevalence of current tobacco use (% of adults), Indonesia, World, and Demographic Dividend Countries, 2005- 2020.

Source: Global Burden of Disease (2023). Author calculation.

In Figure 2, the prevalence of the adult population who smoke from 2005 - 2020 is presented. It can be seen that the trend of world smoking prevalence, and country groups based on demographic dividend, tends to decrease. However, in Indonesia the opposite happened, that the smoking trend actually increased in the period 2005 – 2020. The prevalence of smokers in Indonesia was 35.8% of the adult population in 2005 and this figure continued to increase to 37.6% in 2020. In 2019, the prevalence of ever smoking among the adult male population in Indonesia reached 64.5% (Meilissa, et al., 2022). Meilissa et al. (2022) also reported that the prevalence of smoking in the population aged 10-18 increased from 7.2% in 2013, to 9.8% in 2018. It was 51.3% of the entire adult population and 66.2% of the young population aged 13-15 years. regularly exposed to passive smoking.

The Ministry of Health (2022) using the results of a survey conducted by the Global Adult Tobacco Survey - GATS, - reported that in Indonesia during 2012-2021 there was an increase in the number of adult smokers from 60.3 million people in 2011 to 69.1 million people in 2021. The prevalence of e-smokers increased 10-fold from 0.3% (2011) to 3% (2021). Spending on cigarettes in Indonesia reaches Rp. 64 trillion in 2021. The prevalence of passive smoking is 120 million people in 2021. Exposure to cigarette smoke is high in public places such as restaurants, households, government buildings, workplaces, public transportation and health facilities. Even though there has been a significant decrease in attention to cigarette advertising, promotions or sponsorship, there has been an increase in exposure to cigarette advertising on the internet from 1.9% in 2011 to 21.4% in 2021 (an increase of more than 10 times). Jayani (2022) and Sari (2023) found that in Indonesia the poorer the people, the higher their consumption<sup>1</sup>. Male cigarette consumption was highest in the lowest quintile (82%), followed by the middle quintile (73.3%), upper middle quintile (70.2%), and upper quintile (58.2%). Cigarettes are the main consumption of poor people in Indonesia. Cigarettes contribute to poverty by 11.38% in rural areas and 12.22% in urban areas (Sari 2023). Poor households spend an average of Rp. 286,000 per month. This figure is higher than buying nutritious food for children. Children of chronic smoking parents have a lower body weight of 1.5 kg

<sup>1</sup> Consumption of poor people in Indonesia from the largest to small percentages: tobacco/cigarettes, purebred chicken eggs, purebred chicken meat, granulated sugar, instant noodles, shallots, ground coffee and instant coffee, cobs, bread, cayenne pepper and wet cakes

compared to children of non-smoking parents (Jayani, 2022). Meilissa et al. (2022) also found that economic losses due to smoking in 2019 ranged from IDR 184.36 trillion to IDR 410.76 trillion (1.16%–2.59% of gross domestic product). The National Medium-Term Development Plan 2020–2024 (Bappenas, 2015) states that smoking is one of the threats to the national development plan.

## 2. Literature Review

Several studies present the determinants of smoking and cigarette consumption (Avey, 2011,; Carvajal et al., 2000; Garret et al., 2019; Kendler et al., 1999; Simons-Morton, 2002; Wang and Wu 2020; Wood et al., 2019).

Wood et al. (2019) proposed a chart of smoking determinants presented in Figure 3. The key characteristics that influence adult smokers are a combination of age, ever smoking or drinking; and parental, sibling and peer smoking. An increased risk of smoking is associated with increasing age, lower socioeconomic status, poor academic performance, a rebellious or sensation-seeking nature, intention to smoke in the future, a tendency to promote tobacco, having family or friends who smoke, and exposure to cigarettes. in the film. Factors that play a protective role in the emergence of smoking habits are higher self-esteem and high levels of parental supervision.

Other factors are thought to have a greater or lesser influence on behavior at different stages in a person's life: the determinants of smoking in early adolescence may differ from the factors that are important in middle to late or early adolescence adulthood. Determinants of smoking may vary depending on the stage of smoking initiation, for example the development of an intention to smoke versus nicotine dependence. There are certain determinants that influence smoking behavior among adolescents at the smoking stages (such as never smoking, experimental smokers, and regular smokers), hanging out with friends who smoke. Low levels of exposure to school were found to have a greater influence on the early stages of smoking. Alcohol use was found to have an influence on the early stages of smoking prevalence. Other predictors that influence smoking behavior include depression, delinquency, parental smoking habits, and connectedness to family.

For teenagers aged 14 years, several psychological factors were found, such as rebellious attitudes and sensation seeking. Temperament, family experiences and interactions with the wider environment all influence adolescents in developing individual characteristics that make them more vulnerable to drug use and dependence.

Research in Australia (Wood et al., 2019) tested predictors of changes in adolescent smoking behavior in three analytical models based on data from students in Grades 7–10 conducted with analysis over 12 months.18. it was found that in men, the frequency of risk-taking behavior and the level of friendship with male smokers were strong predictors of behavior change to becoming a smoker. Meanwhile, for women, the main predictor is whether at least one of their parents is a smoker.

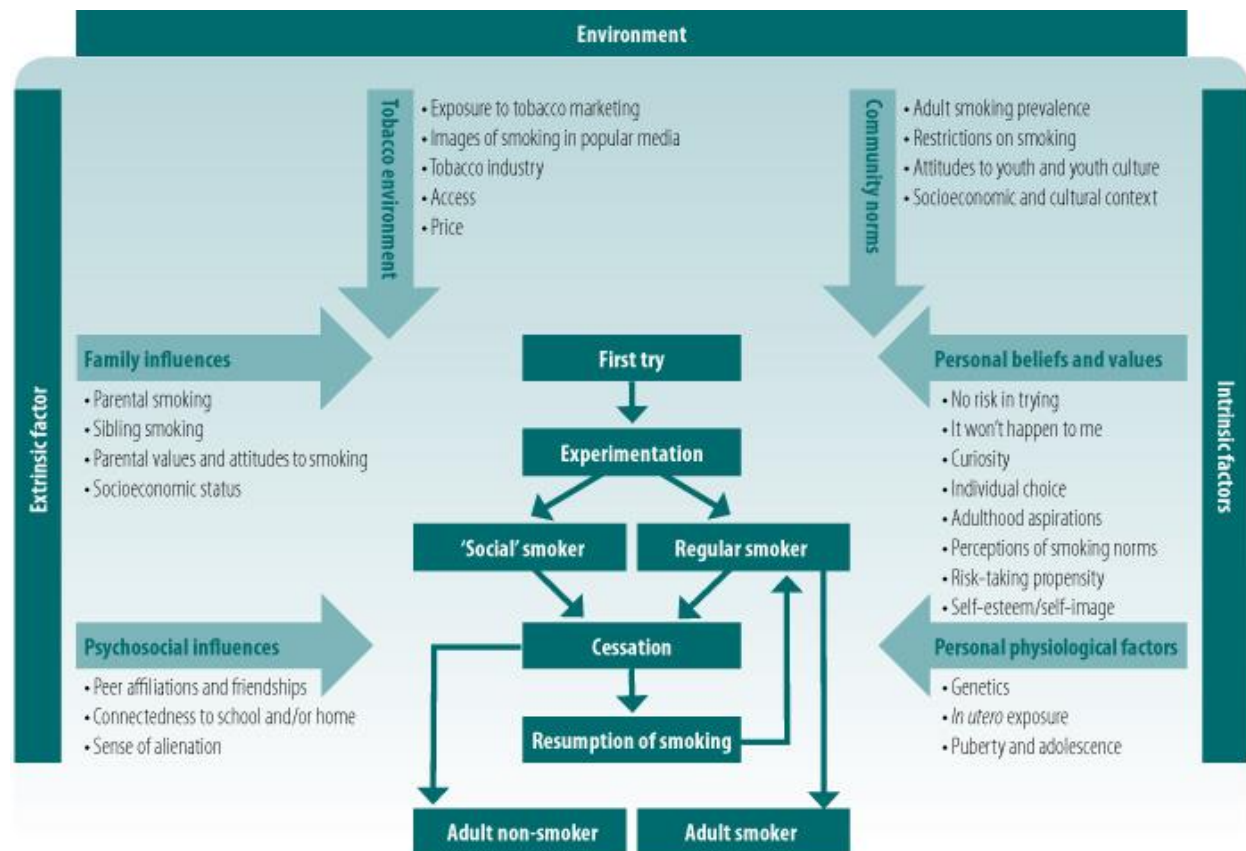


Figure 3: Determinants of smoking

Source: Wood et al. (2019)

Meanwhile, the results of a study in Canada (Wood et al., 2019) found that the main factors that trigger the start of smoking are poor academic performance, stress and alcohol use. Smoking by parents, siblings, and especially friends, as well as susceptibility to tobacco advertising are higher risk factors for initiating and continuing to smoke. Research also shows that pleasurable experiences during early smoking trials are an important factor in the transition to smoking, potentially play a greater role in smoking behavior

Avey (2011) lists a number of smoking backgrounds as social, economic and psychological, namely low education, low income, working class job (Barbeau et al., 2000). Those with low self-confidence and low optimism appear to be the groups most at risk for increasing smoking habits. Attitudes, peer norms, parental norms, perceived behavioral control, and perceived prevalence were consistent predictors of all smoking status outcomes. (Carvajal et al., 2000). Smoking was also positively associated with lower levels of education, extroversion, mastery, and self-esteem, higher levels of neuroticism and dependency, and a history of mood disorders and alcohol use. (Kendler et al. 1999), problems in interacting with peers, and depression (Simons-Morton, 2002).

Wang G. and Wu L. (2020), proposed social determinants of cigarette smoking and ever using electronic cigarettes (e-cigarettes). There are differences in smoking between demographic and socioeconomic backgrounds. Non-Hispanic white male youth are more likely to become smokers as they grow older. Younger residents with lower levels of education, living below the poverty line, and having poor physical health status have a higher prevalence of smoking. Past e-cigarette use is more likely to be associated with subsequent cigarette use among younger generations.

Low socioeconomic status interacts with a variety of other factors to influence smoking behavior, including race/ethnicity, cultural characteristics, social marginalization (e.g., lesbian, gay, bisexual, and transgender communities, people with mental illness and substance use disorders), stress, and lack of empowerment. public. Another factor that has a big impact is the social determinants of health. Income is a determinant of tobacco smoking. Macroeconomic factors also have an influence, such as the distribution of resources, inequality in social

services which can result in disparities that have an impact on tobacco consumption in the USA. (Brady, 2020). Arrazola et al., (2023) found that smoking prevalence is also determined by race and ethnicity. Garrett et al. (2019) found that lower socioeconomic status was associated with increased smoking across age, race/ethnicity, region regardless of gender.

A study conducted by Sreeramareddy et al., (2015) in Eastern Europe showed that the prevalence of smoking in men was 40% higher than the prevalence of smoking in women. Smoking in men is associated with higher age, lower education, and poverty. Meanwhile, among women, the prevalence of smoking is higher among those with higher education and who are more prosperous/wealthier. Smoking in men and women is associated with unskilled workers, living in urban areas and being single. Garrett et al., (2019) found that the determinants of smoking are education, wealth/economic status in the USA. Overall, for both men and women, there was a significant inverse association between current smoking and education. Smoking prevalence was higher in groups with lower levels of education. The current smoking prevalence is 31.6% in residents who do not have a high school diploma, 27.5% in residents who have a high school diploma, 25.1% in residents who have tertiary education but do not have a bachelor's degree, and 10.8% of the population has a bachelor's degree.

Examining differences in sociodemographic background by age, race/ethnicity, and US region, education remains a determinant of smoking. Based on age group, the highest number of smokers is in the youngest age group (25-44 years) with a high school diploma for both men and women. The prevalence of smoking was higher among white and black men with and without a high school diploma than among Hispanic adult men with similar levels of education. The prevalence of smoking was higher among white and black adult women with or without a high school diploma than among Asian and Hispanic adult women with similar education. The lowest smoking prevalence occurs in men and women living in the West, including those with low levels of education.

Overall smoking prevalence was 41.1% among men with incomes below the federal poverty level and 23.7% among men with incomes at or above the poverty level. Smoking prevalence was 32.5% among women with incomes below the federal poverty level and 18.3% among those with incomes at or above the poverty level. Both men and women with incomes below the federal poverty level had a significantly higher smoking prevalence than those living at or above the poverty level, with the exception of Asian women and Hispanic men. High smoking prevalence was found in certain groups of men and women with incomes below the federal poverty level: white men (50.9%), white women (44.8%), black men (44.1%), black men (44.1%), American Indian/Alaskan native (53.7%), and American Indian/Alaska Native women (49.0%).

Even though the global prevalence of smoking has decreased (from 22.7% in 2007 to 17% in 2021) (Figure 3), the percentage of smokers still remains high. Globally, at least 940 million men and 193 million women aged 15 years and over were active smokers in 2019. More than 75% of male daily smokers live in countries with a medium or high human development index (HDI), while more 53% of female daily smokers live in countries with very high HDI (Figure 3). Three-quarters of male daily smokers currently live in countries with moderate or high HDI, while more than half of female daily smokers live in countries with very high HDI. The prevalence of smoking between genders is higher in the group of countries with a higher HDI. The prevalence of smoking in the low HDI country group is 4.2% for men and 3.3% for women. The prevalence of male smoking was 20.90% at Medium HDI and 54.90% at High HDI and decreased to 19.90% at high HDI. The prevalence of smoking in women has increased significantly according to the HDI. As many as 13.50% of women smoke in Medium HDI countries, 29.90% in High HDI, and this increases sharply to 53.3% in very high HDI.



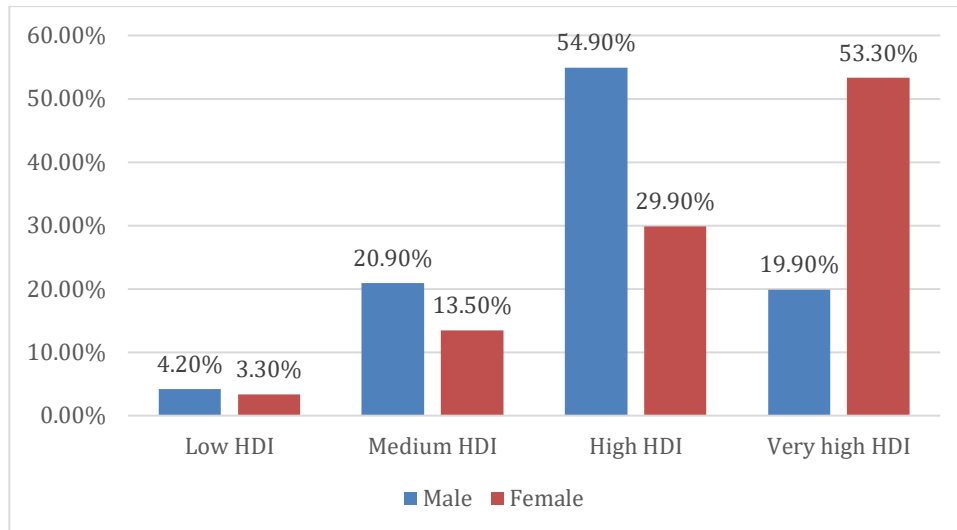


Figure 4: Distribution of smokers by sex (age 15+ years), by country HDI 2019

Source: GBD, 2019. Author calculation

Figure 4 presents the 10 countries with the highest number of smokers in the world (2019). The countries with the highest number of smokers in the world are China, India, Indonesia, USA, Russian Federation, Bangladesh, Japan, Turkey, Viet Nam and the Philippines. In the ten countries, there are significant differences in the incidence of smoking between men and women. As many as 318.1 million men and 23.2 million women smoked in China in 2019. In the same year as many as 58 million men and 3.5 million women smoked in Indonesia. From this data it can be seen that gender is a background determinant of smoking.

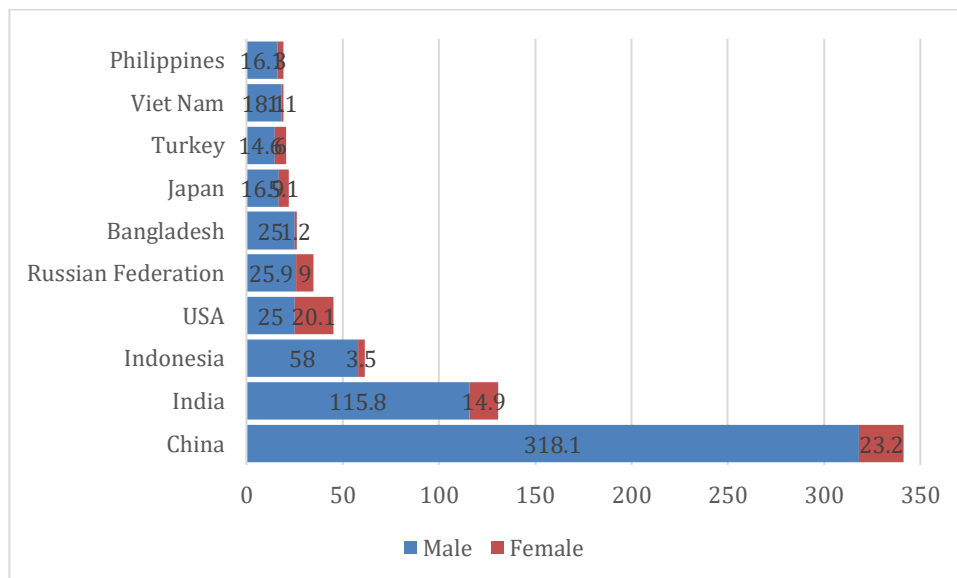


Figure 5: Countries with the highest number of smokers (age 15+ yrs) (millions), 2019

Source: GBD, 2019. Author calculation

### 3. Data and Analysis Methods

This research was conducted by analyzing the results of the National Socioeconomic Survey (*Survei Sosial Ekonomi Nasional/SUSENAS*) in 2021. SUSENAS 2021 was carried out by the Statistics Indonesia (Central Statistics Agency/BPS) in March 2021. It covered all provinces in Indonesia. It was done to meet the need for social and economic development data at district, provincial, and national levels, including data on sustainable development goals.

The unit analysis of this study was population aged 15 years and above who smoke nicotine cigarette. The unweighted number of the respondents in the study was 1888. The dependent variable was whether the smoke nicotine cigarette or not. The independent variables were gender, age, marital status, education, place of residence, island of dwelling, and working status.

The in this study were analyzed using univariate, bivariate, and multivariate analyses to assess, respectively, the sample characteristics, percentage distribution of those who reported crimes by demographic and socioeconomic factors, and demographic and socioeconomic causes of crime reporting. A binary logistic regression was used to investigate demographic and socioeconomic factors of crime reporting. The model was as follows.

$$n \left( \frac{p}{1-p} \right) = \beta_0 + \beta_1 \text{GENDER} + \beta_2 \text{AGE} + \beta_3 \text{MARITAL} + \beta_4 \text{EDUCATION} + \beta_5 \text{URBAN} + \beta_6 \text{ISLAND} + \beta_7 \text{WORK} + \varepsilon$$

$p$  is the probability of reporting crime to the police.  $\beta_0$  is the model intercept.  $\beta_k$  is the regression coefficient of the  $k$ -th independent variable  $k$ ,  $k = 1, 2, \dots, 7$ .  $\varepsilon$  is the error term.

Diagnostic test of multi-collinearity was done using correlation coefficient. In addition, to measure the overall goodness-of-fit test, Hosmer and Lemeshow test and chi-square ( $\chi^2$ ) test were also done. Further, scalar measure of goodness of fit test of the was carried out employing the Nagelkerke determination coefficient ( $R^2$ ).

#### 4. Results and Discussion

The results of univariate, bivariate and multivariate analyzes are presented in Tables 1, 2 and 3. From Table 1 it can be seen that 61.6% of respondents do not smoke. The largest percentage of respondents were women (64.5%), aged 30-54 years (57%), married (81%), had a complete senior secondary school education (38.4%), lived in rural areas (61.7%), live on the island of Java (29.8%), and work (73.8%).

Table 1: Percentage distribution of smoking by background characteristics, SUSENAS 2021.

Background characteristics		Number of observation	Percentage
<b>Number of smoking</b>			
	No	1163	61.6
	Smoking	725	38.4
<b>Gender</b>			
	Male	1218	64.5
	Female	670	35.5
<b>Age (years)</b>			
	15-29	510	27.0
	30-54	1076	57.0
	55+	302	16.0
<b>Marital status</b>			
	Not yet married	359	19.0
	Married	1529	81.0
<b>Education</b>			
	No schooling/incomplete primary school and complete primary school	500	26.5
	Complete junior secondary school	345	18.3
	Complete senior secondary school	723	38.4
	Complete university	320	16.9
<b>Place of residence</b>			
	Urban	724	38.3
	Rural	1164	61.7
<b>Island of residence</b>			
	Sumatera	556	29.4
	Java	563	29.8
	Bali and Nusa Tenggara	112	5.9

	Kalimantan	161	8.5
	Sulawesi	287	15.2
	Maluku and Papua	209	11.1
<b>Working status</b>			
	Working	1393	73.8
	Not working	495	26.2
<b>Total</b>		1888	100

Source: SUSENAS 2021 (Author' compilation).

From Table 2 we can see the bivariate analysis of respondents. The highest percentage smoked according to background characteristics. Percentage of smoking men (61.6%), women (98%), aged 15-29 years (25.3%), aged 30-54 years 45.8%, aged 55+ years 34.1%, not married (22.0%), married (41.4%), No schooling/incomplete primary school and Complete primary school (45.4%), Complete junior secondary school (39.1%), Complete senior secondary school (39.4%), Complete university (24.4%). Urban (34.5%), Rural (44.8%), Sumatra (39.4%), Java (40%), Bali and Nusa Tenggara (48.2%), Kalimantan (32.3%), Sulawesi (32.8%), Maluku and Papua (38.4%)

Table 2: Percentage distribution of number of smoking status by background characteristics, SUSENAS 2021

Background characteristics		Number of smoking		Total (%)
		Yes	No	
<b>Gender</b>				
	Male	61.6	38.4	100.0
	Female	98.1	1.0	100.0
<b>Age (years)</b>				
	15-29	25.3	74.7	100.0
	30-54	45.8	54.2	100.0
	55+	34.1	65.9	100.0
<b>Marital status</b>				
	Not yet married	22.0	78.0	100.0
	Married	41.4	58.6	100.0
<b>Education</b>				
	No schooling/incomplete primary school and Complete primary school	45.4	54.6	100.0
	Complete junior secondary school	39.1	60.9	100.0
	Complete senior secondary school	39.4	60.6	100.0
	Complete university	24.4	75.6	100.0
<b>Place of residence</b>				
	Urban	34.5	65.5	100.0
	Rural	44.8	55.2	100.0
<b>Island of residence</b>				
	Sumatera	39.4	60.6	100.0
	Java	40.0	40.0	100.0
	Bali and Nusa Tenggara	48.2	51.8	100.0
	Kalimantan	32.3	67.7	
	Sulawesi	32.8	67.2	100.0
	Maluku and Papua	38.4	61.6	100.0
<b>Working status</b>				
	Working	53.8	46.2	100.0
	Not working	83.4	16.6	100.0
<b>Total</b>		38,4	61,6	100.0

Source: SUSENAS 2021 (Author' compilation)

Table 4: Odds ratio of the binary logistic regression of the determinants of smoking, SUSENAS 2021

Covariates		Odds ratio [95% CI]	p-value
<b>Gender (ref: Male)</b>			
	Female	0.014 [0.008-0.025]	< 0.001
<b>Age (years) (ref: 55+)</b>			
	15-29	1.149 [0.725–1.820]	> 0.001

	30-54	1.682 [1.218–2.323]	< 0.005
<b>Marital status (ref: Married)</b>			
	Not yet married	0.659 [0.425–1.021]	>0.005
<b>Education (ref: Complete University)</b>			
	No schooling/incomplete primary school and complete primary school	3.964 [2.709-5.800]	< 0.001
	Complete junior secondary school	3.614 [2.379-5.490]	< 0.001
	Complete senior secondary school	2.851 [2.018–4.028]	< 0.001
<b>Place of residence (ref: Rural)</b>			
	Urban	1.296 [1.006–1.669]	< 0.001
<b>Island of residence (ref: Maluku and Papua)</b>			
	Sumatera	1.121 [0.749–1.680]	> 0.001
	Java	1.386 [0.920–2.089]	>0.001
	Bali and Nusa Tenggara	2.138[1.148–3.981]	> 0.001
	Kalimantan	0.630 [0.402–0.987]	> 0.001
	Sulawesi	0.911 [0.400–0.810]	> 0.001
<b>Working status (ref: Not working)</b>			
	Working	0.569 [0.974–1.005]	0.002
<b>Constant</b>		0.328	< 0.001

Source: SUSENAS 2021 (Author' compilation)

The results of multivariate analysis were presented in Table 3. It can be seen that statistically, significant demographic and socioeconomic causes of crime reporting in Indonesia were gender, age, marital tatus, education, place of residence, island of dwelling, and working status.

The results of the multivariate analysis show that higher probability of smoking was associated with being male, being aged 30-54 years, married, having no schooling/incomplete primary school and complete primary school, living in urban areas, dwelling in Bali and Nusa Tenggara Timur, and being not working. Other things being the same, (i) females were 0.014 times more likely to smoke than males, (ii) those who were aged 30-54 years were 1.682 times more likely to smoke than those who were aged 55 + years, (iii) those who No schooling/incomplete primary school and complete primary school were 2.964 times tend to smoke than those who complete universities, (iv) those who lived in urban areas were 1.296 time times more likely to smoke than those who lived in rural areas, (v) those who dwelled in Bali and Nusa Tenggara was 2.138 times more likely to smoke than those who dwelled in Maluku and Papua, and (vi) those who were working 0.269 times less likely to smoke than those who were working. The findings from this study support the results of previous studies on the importance of demographic and socioeconomic on the probability of reporting crime to the police.

## 5. Conclusion

The results of this study show that 61.6 % of population aged 15 years and above did not smoke. The percentage of those who reported smoke was higher among males, age between 30 – 54 years, married, complete senior secondary school, live in urban, dwelled in Java, and working.

After controlling for other factors, the probability of smoking was higher among those who were males, were aged 30-54 years, had no schooling/incomplete primary school and complete primary school, lived in urban areas, dwelled in Bali and Nusa Tenggara Island, and were not working. The results of this study imply the need to improve the information, education, and communication about the danger of smoking particular among those all population.

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