



# NICOTINE ADDICTION IN INDIA: A COMPREHENSIVE ECONOMIC STUDY

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*Abstract:* Smoking remains a major public health concern in India, particularly among its youth population. This research paper examines the impact of anti-smoking campaigns on youth in India, focusing on smoking behaviour and awareness. Leveraging a mixed-methods approach, including surveys and qualitative interviews, the study investigates the effectiveness of state-sponsored anti-smoking mass media campaigns in influencing individual exposure to advertisements and their subsequent influence on smoking habits among young Indians. Additionally, the study suggests that overstating the side effects of smoking in advertisements may diminish their impact on smokers' cessation efforts.

*Keywords:* Tobacco, Nicotine, Addiction

## I. INTRODUCTION

### BACKGROUND AND SIGNIFICANCE OF THE STUDY

Nicotine addiction is a pressing global health issues with far-reaching economic implications. In recent years, India has witnessed a staggering rise in tobacco and nicotine-based product consumption, posing as a looming challenge not only to public health by also economic stability. This research papers aims to delve deeper and study the complex dynamics of nicotine addiction in India, offering a comprehensive economic study to shed light on its multifaceted impact.

India, home to a diverse population of over 1.4 billion people, represents a unique and complex setting for studying nicotine addiction. The paper aims at understanding the economic dimensions of nicotine addiction within the region, not only to understand the formulation of effective public health policies but also for mitigating its adverse consequences on the broader economy.

### RESEARCH OBJECTIVES AND QUESTIONS

The primary objectives of this research paper are as follows:

- To assess the economic costs of nicotine addiction across India.
- To investigate the socio-economic factors that contribute to the prevalence of nicotine addiction.
- To analyse the effectiveness of current tobacco control policies and initiatives in curbing nicotine addiction and mitigating its economic impact.

- To explore potential policy recommendations aimed at reducing nicotine addiction and its economic burden.

## SCOPE AND LIMITATIONS OF THE STUDY

While the research paper aims to provide a comprehensive study of nicotine addiction in India, it is essential to acknowledge certain limitations:

- **Data Availability:** The availability and quality of data on nicotine addiction and its economic consequences may vary across the states, and the sample selected might not represent the trends in other states, potentially limiting the depth of our analysis.
- **Regional Diversity:** India comprises diverse states with distinct regional, cultural, social, and economic characteristics. As a result, some findings may be more applicable to certain subregions or states than others.
- **Time Constraints:** Given the dynamic nature of nicotine addiction and tobacco control policies, the findings pertaining to this research paper may reflect a specific time frame, and subsequent developments may not be factored.

## OUTLINE OF THE PAPER

The remainder of this research paper is structured as follows:

- **Literature Review:** This section reviews existing literature on nicotine addiction, economic studies and tobacco control efforts in India.
- **Methodology:** This section outlines the research methods and data sources used in conducting this research and the economic analysis and surveys related to nicotine addiction in India.
- **Nicotine Addiction in India:** This section provides an overview of the nicotine industry and a historical context of tobacco usage in India.
- **Evolution of the Nicotine Industry:** This section explores the historical roots of nicotine and its consumption in India, traces the evolution of the industry, and examines emerging trends and products that shape the current landscape.
- **Impact of Nicotine Addiction:** This section delves into the economic, health, social, and environmental consequences of nicotine addiction, offering insights through existing case studies.
- **Challenges and Barriers:** This section discusses the socio-economic, cultural, regulatory, and marketing-related challenges and barriers that impact the levels of nicotine distribution and prevalence.
- **Policy Recommendations:** This section presents evidence-based policy suggestions derived from the analysis of studies and our primary research.
- **Conclusion:** This section summarises the key findings of the research paper, their implications for public health and policy and future prospects and ongoing research efforts.

## II. LITERATURE REVIEW

### HISTORICAL CONTEXT OF TOBACCO USE IN INDIA

Tobacco use in India has a long and intricate history dating back centuries.<sup>1</sup> Tobacco is used in a variety of ways in India and its use has unfortunately been well recognized among adolescents.<sup>2</sup> Tobacco was introduced to India by the Portuguese 400 years ago and the tradition of tobacco trade was established in their colony of Goa, and 200 years later the British introduced commercially produced cigarettes to India and established tobacco production in the country.<sup>3</sup> With increasing demand for tobacco in India, the Imperial Tobacco Company, now the Indian Tobacco Company (ITC) Limited was established in India in 1910.<sup>4</sup> The historical roots of tobacco and its cultural significance within India provide important context for understanding the contemporary challenges posed by nicotine addiction.

<sup>1</sup> Chadda, R., & Sengupta, S. (2002). "Tobacco Use by Indian Adolescents." *Tobacco Induced Diseases*, 1, 111.

<sup>2</sup> Ibid

<sup>3</sup> Chaly, P. E. (2007). "Tobacco Control in India." *Indian Journal of Dental Research*, 18, 2-5.

<sup>4</sup> Rao, V., & Chaturvedi, P. (2010). "Tobacco and Health in India." *Indian Journal of Cancer*, 47(Suppl 1), S3-S8. DOI: 10.4103/0019-509X.64373

## HEALTH CONSEQUENCES OF NICOTINE ADDICTION

The health consequences of nicotine addiction are well-documented and profound. The emergence of the epidemic of nicotine addiction in India and other nations is a global public health tragedy of untoward proportions.<sup>5</sup> Nicotine acts on the brain and other parts of the nervous system.<sup>6</sup> Nicotine addiction is primarily associated with the use of tobacco products. Using tobacco, primarily smoking cigarettes, has been strongly and causally linked with several adverse health consequences such as cancers (especially lung cancer), cardiovascular disease and chronic obstructive pulmonary disease.<sup>7</sup> The tobacco epidemic is estimated to kill 8 million people annually, with 80% of deaths in developing countries by 2030.<sup>8</sup>

## Perception Amongst Smokers and Non-Smokers about the Effects of Smoking

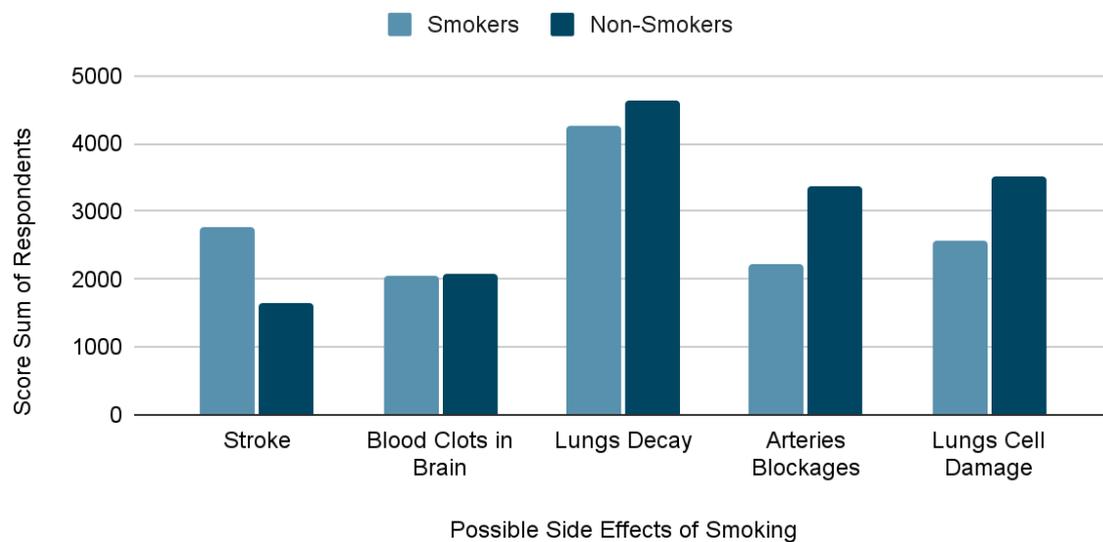


Figure 1: Perception Amongst Smokers and Non-Smokers about the Effects of Smoking

This bar graph depicts the perception among smokers and non-smokers about the possible effects of smoking on health. The data compares the number of respondents who believe in the stated effects of smoking, categorised into two groups: smokers and non-smokers.

It is notable that a higher proportion of smokers (2761) compared to non-smokers (1656) believe that smoking can lead to a stroke. This suggests that smokers may be more aware of this health risk, possibly due to experiencing related health concerns or receiving information on the subject. Whereas, the perception of the risk of developing blood clots in the brain due to smoking is relatively similar between smokers and non-smokers, with only a slight difference in favour of non-smokers.

A higher proportion of non-smokers (4637) compared to smokers (4256) believe that smoking can result in lung decay. This suggests that non-smokers may have a more pronounced awareness of the detrimental impact of smoking on lung health. In addition to this, a significantly higher number of non-smokers (3365) compared to smokers (2232) also believe that smoking can result in artery blockages. This indicates a substantial difference in awareness, with non-smokers being more informed about this risk associated with smoking.

Lastly, a higher number of non-smokers (3503) compared to smokers (2582) believe that smoking can result in damage to lung cells. This suggests that non-smokers may have a more comprehensive understanding of the potential harm inflicted on lung cells by smoking.

<sup>5</sup> Handa, Sahil; Kour, Haneet; Khurana, Charu. "Insight into Nicotine Addiction." The HealthCare Roundtable Innovations Journal, vol. 2, no. 4, 2017.

<sup>6</sup> Jiloha, R. C. (2010). "Biological Basis of Tobacco Addiction: Implications for Smoking-Cessation Treatment." Indian Journal of Psychiatry, 52(4), 301-307. doi: 10.4103/0019-5545.74303.

<sup>7</sup> Ibid

<sup>8</sup> World Health Organization. WHO Report on the Global Tobacco Epidemic, 2008: The MPOWER Package. Geneva, Switzerland, 2008.

However, according to our primary research and survey conducted, out of the aforementioned side effects, none of our respondents observed a heart stroke or other cardiovascular disease but report respiratory issues and increased irritability as one some of the health issues they believe to be nicotine-use related.

To summarise the bar graph, the analysis of the data reveals variations in the perception of smoking-related health risks between smokers and non-smokers. Non-smokers generally exhibit a more pronounced awareness of the harmful effects of smoking on health, particularly in the case of lung decay, artery blockages, and lung cell damage. This divergence in perception highlights the importance of public health campaigns and education initiatives to increase awareness among both groups about the risks associated with smoking.

## ECONOMIC IMPACT OF NICOTINE ADDICTION

The economic impact of nicotine addiction extends far beyond individual health costs. We examine how nicotine addiction places a substantial economic burden on India, encompassing healthcare expenditure, lost productivity, and the strain on social services. Smoking related medical costs account for 6% to 15% of healthcare costs in high-income countries.<sup>9</sup> With roughly 10% of the world's smokers, India is the second largest consumer of tobacco in the world<sup>10</sup>, second only to China. However, the tobacco industry claims that it has a major contribution to the economy with its employment generation in agriculture and manufacturing and revenues in the form of exports and taxes.<sup>11</sup> According to the World Bank Report, the tobacco industry estimates that 33 million people are engaged in tobacco farming, of which 3.5 million are in India.<sup>12</sup>

In India, tobacco export is mainly unmanufactured. Excise duty is imposed on the entire range of manufactured tobacco products, although the major contribution is from cigarettes. In 2000–01, tobacco contributed Rs. 81,820 million to the Indian economy and accounted for about 12% of the total excise collections.<sup>13</sup>

In 2009, India was the third largest producer of tobacco in the world. It produced 620,000 (MT) of tobacco worth 987,513 (Int \$1000) in 2009. India exported 230,804 tonnes of unmanufactured tobacco, with a worth value of 748,553 (\$1000) in 2009.<sup>14</sup>

## PREVIOUS RESEARCH ON NICOTINE ADDICTION IN INDIA AND NEIGHBOURING COUNTRIES

Nicotine Addiction has been significantly researched in India from various aspects while conducting the secondary research, we studied 8 different pieces of research very thoroughly to conduct our research.

1. **Global Adult Tobacco Survey (GATS)<sup>15</sup>:** The GATS survey organised by the World Health Organization was conducted to see the variations in age, gender, socio-economic status in India. We used this comprehensive study to understand that a significant proportion of addicted users are looking for effective programs in an attempt to quit.
2. **The Global Burden of Disease Study (GBD)<sup>16</sup>:** The GBD Survey by The Institute for Health Metrics and Evaluation helps understand the medical impact of nicotine addiction in India which includes premature mortality, lung cancer, and heart disease amongst others.
3. **Economics Studies:** We look at multiple economic studies for this research, however, one prominent one used in understanding the overall cost including consumer, societal, and government costs associated with nicotine

<sup>9</sup> World Bank. (1999). "Curbing the Epidemic: Governments and the Economics of Tobacco Control." Washington, DC, USA: World Bank.

<sup>10</sup> Ibid

<sup>11</sup> Mishra, Gauravi A., et al. "An Overview of the Tobacco Problem in India." Indian Journal of Medical and Paediatric Oncology: Official Journal of the Indian Society of Medical & Paediatric Oncology, vol. 33, no. 3, 2012, pp. 139-145.

<sup>12</sup> Ibid

<sup>13</sup> Ibid

<sup>14</sup> Food and agriculture organization of the United Nations. FAO available from: <http://faostat.fao.org/site/339/default.aspx>

<sup>15</sup>World Health Organization. "Global Adult Tobacco Survey."

<sup>16</sup>Institute for Health Metrics and Evaluation. "Global Burden of Disease (GBD)."

was "The Economic Costs of Smoking in India: A Preliminary Estimate"<sup>17</sup> by Prabhat Jha and Ranson by the National Institute of Health.

4. **Tobacco Industry Influence:** Research on tobacco industry influence in India often references the work of researchers such as Monika Arora and K. Srinath Reddy. Their studies have highlighted industry tactics to undermine tobacco control policies.<sup>18</sup>
5. **Effectiveness of Tobacco Control Policies:** The effectiveness of tobacco control policies in India has been studied by various researchers and institutions, including Prabhat Jha and Sir Richard Doll, whose work "Curbing the Epidemic: Governments and the Economics of Tobacco Control"<sup>19</sup> published in *The World Bank* contributed to understanding the impact of higher tobacco taxes.
6. **Gender-Specific Studies:** Ranjani Ramachandran and Shruti Bassi's research "Patterns of Tobacco Use in India: Gender and Socioeconomic Disparities"<sup>20</sup> published in *J Epidemiol Global Health*. This study has found that typically in India women are more likely to smoke as compared to men.
7. **Smokeless Tobacco Studies:** Tobacco consumption can be had in other methods beyond smoking. For this understanding, we looked at "Smokeless Tobacco: A Major Public Health Problem in the SEA Region: A Review"<sup>21</sup> by Gupta, P. C., Ray, C. S., Sinha, et al. in *the Indian Journal of Public Health*. They have extensively studied the health risks associated with smokeless tobacco products.
8. **Cultural and Societal Factors:** In countries like India with high poverty rates, and many cultural factors exploring cultural factors in a quantitative manner is imperative to fully comprehend the extent to which such factors influence nicotine addiction, impact, and remedies. The one quantifiable study we found we looked at was "Developing a Smokeless Tobacco Risk Reduction Intervention in Bangalore, India. *Social Science & Medicine*"<sup>22</sup> by Nichter, M., Nichter, M., et al. Even though this study is focused on Bangalore, a city in India, we believe that overall, it highlights key underlying factors of relevance which can be extrapolated to India.

Finally, these specific researchers and studies have made significant contributions to understanding nicotine addiction and tobacco-related issues in India and the broader South Asian region. Their work has informed policies and interventions aimed at addressing this public health challenge and guided our research.

### III. METHODOLOGY

#### DATA COLLECTION

- a. **Primary Data Sources:** The collection of primary data forms a crucial component of this research. Surveys and interviews were conducted to gather firsthand information on nicotine addiction patterns, economic costs, and associated factors within India. These data sources enabled us to obtain real-time insights from individuals affected by nicotine addiction.
- b. **Secondary Data Sources:** To complement our primary data, we extensively reviewed existing research papers, studies, government reports, and publications from reputable sources such as World Bank, World Health Organization (WHO), etc. These secondary data sources will provide historical context, national statistics, and relevant background information necessary for a comprehensive analysis.

<sup>17</sup> Ibid

<sup>18</sup> Arora, M., & Reddy, K. S. *Global Adult Tobacco Survey (GATS) India 2009-10*. Mumbai, India: Ministry of Health and Family Welfare, Government of India, 2004.

<sup>19</sup> Jha, Prabhat, Emmanuel Guindon, Renu A Joseph, Arindam Nandi, Rijo M John, Kavita Rao, Frank J Chaloupka, Jagdish Kaur, Prakash C Gupta, M Govinda Rao. "A Rational Taxation System of Bidis and Cigarettes to Reduce Smoking Deaths in India." *Economic & Political Weekly*, vol. XLVI, No. 42, Oct 15, 2011.

<sup>20</sup> Ramachandran, R., & Shyamala, P. (2018). Patterns of Tobacco Use in India: Gender and Socioeconomic Disparities. *J Epidemiol Global Health*, 8(1-2), 1–6.

<sup>21</sup> Gupta, P. C., Ray, C. S., Sinha, D. N., Singh, P. K., & Singh, G. (2008). Smokeless Tobacco: A Major Public Health Problem in the SEA Region: A Review. *Indian Journal of Public Health*, 52(4), 200–204.

<sup>22</sup> Nichter, M., Nichter, M., Van Sickle, D., & Padmajam, S. (2004). "Developing a Smokeless Tobacco Risk Reduction Intervention in Bangalore, India." *Social Science & Medicine*, 59(9), 1743–1756.

SAMPLE SELECTION

The selection of an appropriate sample is pivotal to ensure the research’s representativeness and reliability. We will try to employ a stratified sampling method to ensure that data collection is balanced across different regions, age groups, and urban-rural divides within India. The stratified approach aims to capture the diverse socio-economic and demographic factors contributing to nicotine addiction.

BUSINESS AND STATISTICAL TOOLS

We have designed a system by conducting primary and secondary research combined with analytical and statistical tools which are specifically designed to diagnose the underlying factors, decide upon strategies for hospitals, and deliver recommendation.

	DIAGNOSE	DECIDE
PESTLE		
SWOT		
Probability Analysis		
Normal Distribution		
Market Entry Modes		

- c. **PESTLE:** This PESTLE analysis provides a comprehensive examination of the various external factors that influence the issue of nicotine addiction in India from political, economic, social, technological, legal, and environmental perspectives.
- d. **SWOT:** This SWOT analysis highlights the internal and external factors that can impact efforts to address nicotine addiction in India comprehensively. This would provide insights into the overall industry and the subsections present in the industry like Hookah, E-Cigarettes, Cigarettes, and Bidi.
- e. **Probability Analysis:** We will use Probability Analysis to examine the effectiveness of government intervention advertisements in influencing people's willingness to quit smoking. This analytical method will allow us to assess the likelihood of individuals making a positive decision to quit smoking after exposure to government-sponsored anti-smoking campaigns.
- f. **Normal Distribution:** This fundamental statistical concept will be utilized to analyse and interpret data distributions related to nicotine addiction rates, economic costs, and other relevant variables. This tool enables us to make informed inferences and draw valid conclusions.
- g. **Market Entry Modes:** This framework will provide us insights into the options a firm has when it wishes to expand into the nicotine market. We will examine various market strategies employed by tobacco companies. An analysis of market entry modes will shed light on how multinational tobacco companies establish and expand their presence in India.

## ETHICAL CONSIDERATION

Ethical considerations will be rigorously adhered to throughout the research process. Consent has been obtained from all survey participants and interviewees, ensuring their anonymity and privacy. Ethical approval has been sought from relevant institutions, and the research strictly follows ethical guidelines and standards to protect the rights of all involved parties.

## IV. NICOTINE ADDICTION IN INDIA

## PREVALENCE AND TRENDS

- **Smoking Rates**

Examining the prevalence and trends of smoking withing India is essential for understanding the scope of nicotine addiction. The few reports of tobacco use in different population groups report its prevalence from about 15% to over 50% among men.<sup>23</sup> The consumption pattern of tobacco has likely changed over the last decade in response to substantially higher income in India paired with population growth and perhaps in response to modest tobacco control efforts.<sup>24</sup> The most common types of smoked tobacco in India are bidis (which are locally manufactured smoked tobacco wrapped in the leaf of another plant, and contain about a quarter of the tobacco of cigarettes) followed by cigarettes.<sup>25</sup> The data shows that smoking rates have exhibited an increase in tobacco consumption.

However, according to our primary research we conducted, a significant majority of our respondents, accounting for 78.9% of the total, reported their current use of nicotine-containing products. 30 respondents affirmed their usage of nicotine-containing products, while 8 indicated otherwise.

- **Smokeless Tobacco Use**

Smokeless tobacco, better known as spit tobacco, chewing tobacco, chew, and dip is commonly used and increasingly so, especially as new forms of smokeless tobacco have been emerging over the last few decades, enticing new consumers.<sup>26</sup> Smokeless tobacco use, a prevalent form of nicotine consumption in India is an emerging trend that we aimed at studying and gathering data for. In India, per capita smokeless tobacco consumption has increased among the poor between 1961 and 2000 in both rural and urban areas.<sup>27</sup>

- **Government Intervention**

In an attempt to curb the nicotine addiction in India, government has implemented a range of interventions. These interventions encompass a comprehensive spectrum of strategies including public awareness campaigns, regulatory policies, taxation measures, and more. However, among these, anti-smoking advertisements have emerged as a prominent and widely recognized initiative. As per our survey, a cumulative of 19 respondents out of 38 state that they don't find government policies effective in curbing nicotine addiction.

- Very Effective (5 respondents): A small minority of respondents, comprising 5 individuals (15.2% of respondents), considered governmental policies and regulations to be very effective in curbing nicotine addiction.
- Effective (2 respondents): Only 2 respondents (6.1% of respondents) rated the policies and regulations as effective, indicating a modest level of perceived effectiveness.
- Somewhat Effective (7 respondents): Seven respondents (21.2% of respondents) expressed a belief that these measures are somewhat effective in curbing nicotine addiction, reflecting a moderate level of confidence in their impact.
- Ineffective (7 respondents): An equal number of respondents, specifically 7 individuals (21.2% of respondents), considered the policies and regulations to be ineffective in curbing nicotine addiction. This suggests a critical view of the current measures' ability to address the issue.

<sup>23</sup> Jindal, S.K., Aggarwal, A.N., Chaudhry, K., Chhabra, S.K., D'Souza, G.A., Gupta, D., Katiyar, S.K., Kumar, R., Shah, B., Vijayan, V.K. "Tobacco Smoking in India: Prevalence, Quit-rates, and Respiratory Morbidity."

<sup>24</sup> Ibid

<sup>25</sup> Ibid

<sup>26</sup> Ibid

<sup>27</sup> Ibid

- Very Ineffective (12 respondents): The largest group of respondents, comprising 12 individuals (36.4% of respondents), rated the policies and regulations as very ineffective in curbing nicotine addiction. This indicates a prevailing perception of limited effectiveness among a significant portion of the surveyed population.

While the government of India has employed various approaches to combat smoking addiction, it is worth noting that a significant proportion of the population encounters these interventions through advertisements.

$$P(\text{Tried Quitting Smoking} \cap \text{Saw Ad}) = \frac{\text{Number of people who Tried Quitting Smoking and Saw Ad}}{\text{Number of people who Saw The Ad}}$$

$$0.975 = \frac{822}{840}$$

The Probability Analysis conducted to assess the effectiveness of government intervention advertisements in influencing people's willingness to quit smoking yielded promising results. With a dataset of 906 individuals who are smokers, 822 of whom tried to quit, and 840 who saw the advertisements, the analysis reveals that a staggering 97.5% of people who saw the ads attempted to quit smoking.

The analysis clearly demonstrated that government intervention advertisements have a remarkably high impact on encouraging individuals to attempt smoking cessation. These ads can trigger a substantial shift in behaviour among smokers and the willingness is indicated by the high percentage, indicating that the messaging in these ads resonated with the target audience.

### Effects of Ad Campaign on Smokers

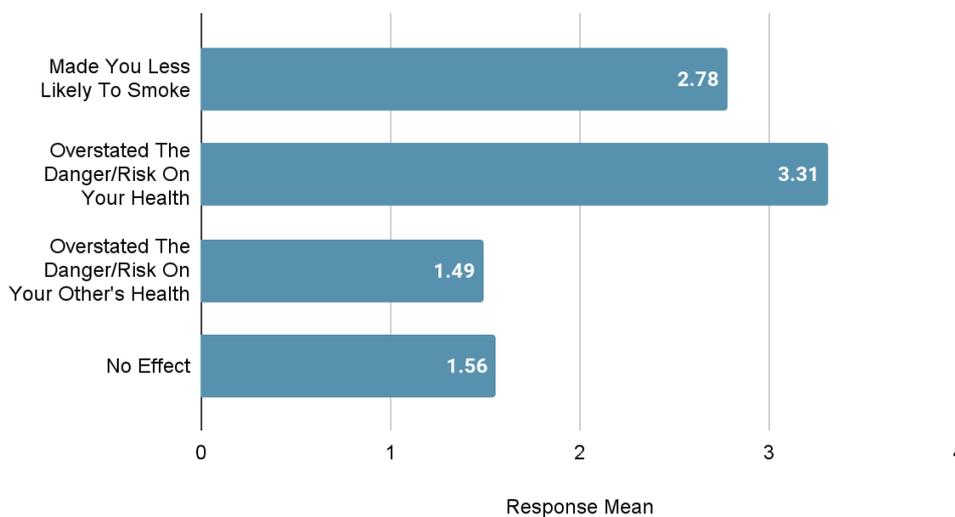


Figure 2: Effects of Ad Campaign on Smokers

Another analysis aims to assess the impact of four major anti-smoking campaigns hosted by the Indian government, namely “Mukesh”, “Dhuan”, “Sponge”, and “Child” on smokers’ perception. The dataset provides response mean for four key categories, offering insights into the effectiveness of these campaigns in influencing smokers’ attitudes towards smoking and its associated risks. Here is a breakdown for the four categories:

The analysis suggests that the Indian Government's anti-smoking campaigns have been effective in raising awareness about the health risks of smoking but have had a mixed impact on smokers' behavior, however, these ads overstated the harmful effects of smoking on the person exposed to passive smoking. Also, 2% of respondents voted "No Effect," indicating that the campaigns did not have an impact on their perception of health risks related to smoking.

### ● Age and Gender

Nicotine addiction exhibits distinct patterns across different age groups within India. We will analyze the prevalence of nicotine addiction among different age brackets, from youth to elderly populations. This will allow us insights into age-specific trends which are vital for tailoring prevention policies and effectively address the needs of diverse age demographics.

There are almost 267 million tobacco users in India.<sup>28</sup>

- Among adults (age 15+), 28.6% of the population currently uses tobacco products (men 42.4%; women 14.2%)<sup>29</sup>
  - 21.4% of adults use smokeless tobacco (men 29.6%; women 12.8%)
  - 10.7% of adults smoke (men 19.0%; women 2.0%)
  - The majority of adult smokers smoke bidis (7.7% of adults overall)
- Among youth (ages 13-15):
  - 8.5% currently use some form of tobacco (boys 9.6%; girls 7.4%); and
  - 4.1% smoke tobacco and 4.1% use smokeless tobacco.<sup>30</sup>

As per our survey, we had 12 female respondents out of which 6 (50%) affirm their tobacco and nicotine usage however, out of the 26 male respondents 24 (92.31%) affirm their tobacco and nicotine usage.

### ● Socioeconomic Status

## Factors Leading to Smokers Wishing To Quit Smoking

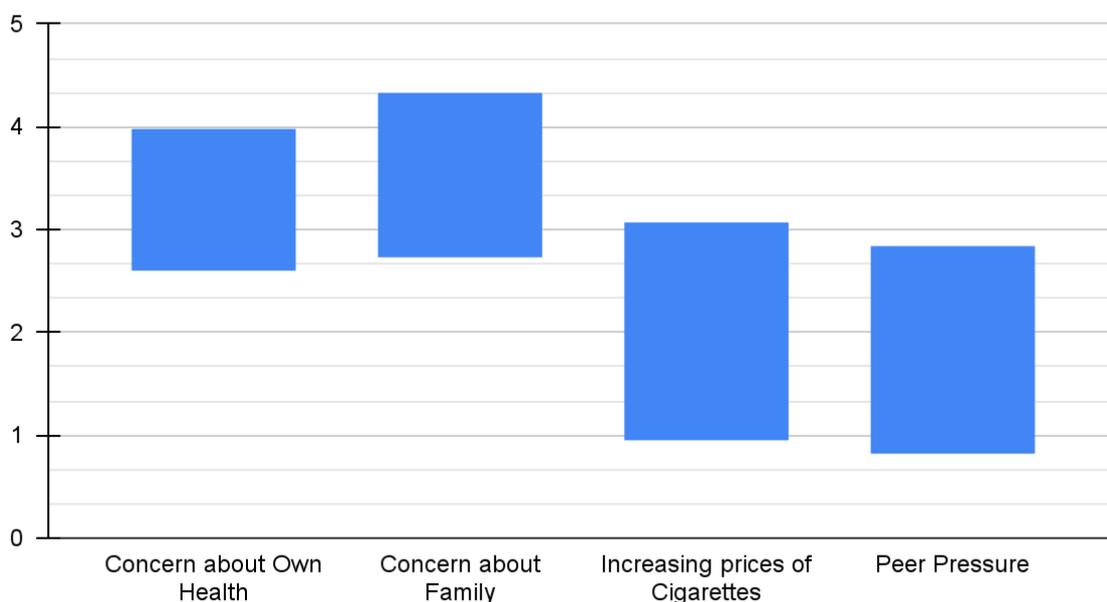


Figure 3: Factors Leading to Smokers Wishing to Quit Smoking

The analysis focuses on the influence of socioeconomic status as a critical determinant of nicotine addiction. We examine how individuals' concerns about health, family, increasing cigarette prices, and peer pressure relate to their decision to smoke. The dataset provides means and standard deviations for each of these factors, offering insights into the role of socioeconomic status in shaping perceptions and behaviours related to nicotine addiction.

Our analysis of the interpretation states that individuals tend to have a higher level of concern about the impact of nicotine addiction on their family members and also concerns about their own health. While concerns about health and family are relatively consistent across different socioeconomic groups, the impact of factors like

<sup>28</sup> India Global Adult Tobacco Survey (GATS) 2016-17. Centers for Disease Control and Prevention (CDC).

<sup>29</sup> Ibid

<sup>30</sup> India Global Youth Tobacco Survey (GYTS). National, 2019.

cigarette prices and peer pressure on nicotine addiction perceptions varies where concerns about the increasing prices of cigarettes are relatively low, indicating that this factor may not be a strong deterrent for nicotine addiction and peer pressure appears to have the least influence on concerns related to nicotine addiction.

## V. HEALTH CONSEQUENCES

### HEALTHCARE COSTS

Nicotine addiction exerts a substantial economic burden through healthcare expenditures. There are costs associated with treating tobacco-related diseases, including hospitalisation, medication, and outpatient care. By examining these costs, we aim to emphasise the economic rationale for more robust tobacco control measures.

Tobacco is deadly in any form or disguise. Scientific evidence has unequivocally established that exposure to tobacco smoke causes death, disease and disability.<sup>31</sup> Ninety percent of all lung cancer deaths in men and 80% in women are caused by smoking.<sup>32</sup> India has one of the highest rates of oral cancer in the world, with over 50% attributable to smokeless tobacco use.<sup>33</sup>

- From 2017–2018, economic cost of tobacco-attributable disease and death in India INR 1773.4 billion (USD\$ 27.5 billion).<sup>34</sup>
  - Direct health care costs were 22% of the total cost (INR 387.1 billion or US\$6 billion) and indirect costs (from lost productivity due to illness and death) were 78% (INR 1386.3 billion or US\$21.5 billion).
  - The costs of premature death alone were 75% of the total economic costs (INR 132.4 billion or US\$20.5 billion).
- The total costs of tobacco equate to 1.04% of India's GDP, and direct medical costs equate to 5.3% of total health expenditure.<sup>35</sup>

### MORTALITY AND MORBIDITY RATES

Nicotine addiction contributes significant to premature mortality and morbidity. Tobacco consumption is the leading cause of the preventable deaths globally, killing about 6 million people annually around the globe.<sup>36</sup>

In country like India, the public spending on health is merely 1.04% of the gross domestic product. Thus, these financial constraints and economic burden to tackle mortality and morbidity related to tobacco can take a major hit on a low middle-income country like India. In 2011, the total economic cost attributable to tobacco consumption from all diseases in India for middle-aged group was about US\$22.4 billion. Direct medical costs of hospital care and treatment of tobacco attributable disease amounted to US\$3.6 billion and associated indirect morbidity cost to US\$3.1 billion.<sup>37</sup>

- Smoking and exposure to second-hand smoke kill about 1.2 million Indians each year.<sup>38</sup>
  - Smokeless tobacco use kills over 230,000 Indians each year.<sup>4</sup>
  - Nearly 90% of oral cancers in India are attributable to smokeless tobacco use.
  - 27% of all cancers in India are attributable to tobacco use.

<sup>31</sup>World Health Organization. "A global epidemic of addiction and disease. Tobacco: deadly in any form or disguise." WHO Tobacco Free Initiative. ISBN 92 4 156322 2 (NLM classification: QV 137) ISBN 978 92 4 156322. World No Tobacco Day 2006.

<sup>32</sup> Ibid

<sup>33</sup> Boffetta P, Hecht S, Gray N, Gupta P, Straif K. "Smokeless tobacco and cancer." *Lancet Oncol* 2008;9:667-75.

<sup>34</sup> Ibid

<sup>35</sup> Ibid

<sup>36</sup> Shah S, Dave B, Shah R, Mehta TR, Dave R. "Socioeconomic and cultural impact of tobacco in India." *J Family Med Prim Care*. 2018 Nov-Dec;7(6):1173-1176. doi: 10.4103/jfmpc.jfmpc\_36\_18. PMID: 30613493; PMCID: PMC6293949.

<sup>37</sup> Ibid

<sup>38</sup> Ibid

## VI. EVOLUTION OF THE NICOTINE INDUSTRY

The nicotine industry in India has undergone a profound transformation over the years, marked by a shift from traditional tobacco consumption to the emergence of novel nicotine delivery products.

## TRADITIONAL TOBACCO PRODUCTS

Historically, traditional tobacco products have played a central role in nicotine consumption throughout India. This category includes products such as cigarettes, bidis, hookahs, and various forms of smokeless tobacco like gutka, paan, and khaini. These products have deep-rooted cultural and social significance, with long-standing traditions associated with their use.

In India, tobacco is used as smoked and smokeless forms. There are myriad forms; in this review, cigarettes, beedis, and smokeless tobacco (SLT) used orally are considered. Cigarettes are available in various types, filtered/unfiltered, length based, and flavoured. Beedi is an indigenous form of tobacco product, made with 0.2 to 0.3 g of tobacco wrapped in temburni leaf and tied with a small string. Beedis contain 3 times more nicotine and 5 times more amount of tar than the regular cigarette, and they are also available in flavours of strawberry, mango, and chocolate. Smokeless tobacco is a form of tobacco that need not be ignited for use, applied orally and nasally. Oral use of SLT is ubiquitous; types and their regional orientation are described elsewhere in detail.<sup>39</sup>

Beedis accounted for the largest proportion of smoked tobacco consumed in India, especially among the lower socio-economic group, they consume beedis 8 to 10 times more than cigarette smoking.<sup>40</sup>

## EVOLUTION OF THE NICOTINE INDUSTRY

In recent decades, the nicotine industry has witnessed a shift towards modern nicotine delivery systems, responding to changing consumer preferences and evolving technologies. Some notable developments include:

- **Cigarettes:** Traditional cigarettes have evolved in terms of packaging, marketing, and product design. Filtered cigarettes, low-tar and low-nicotine variants, and flavoured cigarettes have become popular, targeting specific consumer segments. According to our primary research and survey, 21 respondents out of 38 (70% of nicotine users) reported using traditional cigarettes.
- **E-Cigarettes (Electronic Cigarettes):** E-cigarettes, often referred to as vaping devices, have gained considerable popularity within India. These battery-powered devices heat a liquid (e-liquid or vape juice) containing nicotine, producing an aerosol for inhalation. The convenience, perceived harm reduction, and various flavours have contributed to their appeal. According to our primary research and survey, 25 respondents out of 38 (83.3% of nicotine users) favoured e-cigarettes or vaping devices.
- **Vapes and Other Alternates:** Beyond e-cigarettes, a spectrum of alternative nicotine delivery systems has emerged, including pod systems, heat-not-burn devices, and nicotine pouches. These innovations have diversified the nicotine market, providing consumers with alternatives to traditional tobacco products.

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>● Large Consumer Base</li> <li>● Cultural Acceptance</li> <li>● Diverse Product Portfolio</li> <li>● Established Distribution Networks</li> </ul>	<p><b>Weakness</b></p> <ul style="list-style-type: none"> <li>● Stringent Regulations</li> <li>● Health Concerns</li> <li>● Increasing Taxation</li> <li>● Emerging Health Trends</li> </ul>
<p><b>Opportunities</b></p>	<p><b>Threats</b></p>

<sup>39</sup> Mohan P, Lando HA, Panneer S. "Assessment of Tobacco Consumption and Control in India." Indian Journal of Clinical Medicine. 2018;9. doi:10.1177/1179916118759289.

<sup>40</sup> Ibid

<ul style="list-style-type: none"> <li>● Smokeless Alternatives</li> <li>● Technological Innovation</li> <li>● Export Potential</li> </ul>	<ul style="list-style-type: none"> <li>● Regulatory Challenges</li> <li>● Health Awareness</li> <li>● Environmental Concerns</li> <li>● Anti-Tobacco Advocacy</li> </ul>
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### Strengths

- **Large Consumer Base:** India boasts a massive population, providing a substantial consumer base for tobacco products, both traditional tobacco and emerging alternative like smokeless tobacco products.
- **Cultural Acceptance:** Tobacco has deep cultural and social roots in many regions of India, contributing to a steady demand for tobacco products.
- **Diverse Product Portfolio:** The Indian tobacco market offers a wide range of products, including bidis, cigarettes, smokeless tobacco, and emerging alternatives like e-cigarettes and nicotine pouches, catering to diverse consumer preferences.
- **Established Distribution Networks:** The tobacco industry has well-established distribution networks, ensuring widespread availability of products even in remote areas.

### Weaknesses

- **Stringent Regulations:** The Indian government has implemented stringent regulations on tobacco advertising, packaging, and labelling. This can restrict marketing and branding opportunities for industries.
- **Health Concerns:** There is an increasing awareness of health risks associated with tobacco which has led to decline in smoking rates and a shift towards healthier alternatives, impacting traditional tobacco sales.
- **Increasing Taxation:** High tobacco taxes have been imposed to discourage consumption and fund healthcare programs, potentially affecting pricing strategies and profitability for companies.
- **Emerging Health Trends:** The shift in consumer preferences towards healthier lifestyles may further diminish the demand for traditional tobacco products.

### Opportunities

- **Smokeless Alternatives:** There is a growing demand for smokeless tobacco alternatives, such as nicotine pouches and snus, which presents an opportunity for market players to diversify their product offerings.
- **Technological Innovation and Advancement:** Investing in technology and innovation can enable the development of reduced-risk products, aligning with shifting consumer preferences.
- **Export Potential:** The Indian tobacco industry has the potential to expand its export markets, particularly for products like bidis and flavoured smokeless tobacco.

### Threats

- **Regulatory Challenges:** Government regulations, including bans on flavoured tobacco and graphic health warning, pose a significant threat to the industry's marketing and sales strategies.
- **Health Awareness:** The increasing awareness of tobacco-related health risks may lead to further declines in consumption, particularly among younger generations.
- **Environmental Concerns:** The environmental impact of tobacco cultivation and production may face increasing scrutiny, affecting the industry's sustainability efforts.
- **Anti-Tobacco Advocacy:** Strong anti-tobacco groups continue to pressure governments for stricter regulations and comprehensive tobacco control policies.

## REGULATORY FRAMEWORK AND CHALLENGES

The evolution of the nicotine industry has posed significant challenges to regulatory authorities and public health advocates. The rapidly changing landscape, coupled with aggressive marketing strategies by manufacturers, has led to concerns about youth initiation, product safety, and the overall impact on public health. Regulatory responses have ranged from product bans and flavour restrictions to taxation and awareness campaigns.

Most of the SLT products are produced in the traditional markets in the unorganised sector and remain away from regulations, and therefore greatly vary in their composition and health risks.<sup>41</sup> India has taken tobacco control steps both at national and subnational levels which has resulted in significant reduction in tobacco use between 2009-2010 and 2016-2017 but with wide regional variations.<sup>42</sup>

Although all tobacco products are taxed at the highest bracket of existing goods and services tax in the country, the tax law does not provide for tax paid stamp on any tobacco product. Sale to and by minors is banned under tobacco control and child protection laws, however its legal enforcement remains a challenge.<sup>43</sup>

One of the key measures recommended under Article 16 of the WHO FCTC to prevent minors access to tobacco, that is, the ban on the sale of tobacco products in loose or in small units, is not implemented, as more than 70% of the tobacco products are sold loose in the country.

Unlike the ban on smoking in public places, smokeless tobacco use was not banned; however, some of the local jurisdictions in the country dealt with this by prohibiting spitting in public places. Several countries have also banned spitting in public places. In wake of the COVID-19 pandemic the Ministry of Health and Family Welfare, Government of India, issued advisory to ban sale, use and spitting in public places.<sup>21</sup> Pictorial health warnings are implemented on all tobacco products including smokeless tobacco products, while several countries have already adopted plain packaging of tobacco products.<sup>44</sup>

Other laws applied on SLT control include the ban on the use of tobacco and nicotine as an ingredient in any food item by the Food Safety and Standards Authority of India (FSSAI). This led to the ban on the sale of gutkha, a scheduled tobacco product and other flavoured smokeless tobacco products in the country.

## VII. IMPACT OF NICOTINE ADDICTION

Nicotine addiction in India exacts a multifaceted impact that extends far beyond just individual levels. We will delve deeper into the various dimensions of its impact, examining both direct and indirect costs, evaluating the effectiveness of tobacco control measures, and conducting a PESTLE analysis to further understand the broader context.

### DIRECT COSTS

- **Healthcare expenditure:** Nicotine addiction imposes a substantial burden on healthcare systems. The costs associated with diagnosing and treating tobacco-related illnesses, including cancer, heart diseases, and respiratory disorders, are significant.
- **Productivity Loss:** Tobacco-related illnesses not only result in healthcare costs but also lead to significant productivity losses due to absenteeism and reduced on-the-job efficiency.

### INDIRECT COSTS

- **Loss of Human Capital:** Nicotine addiction contributes to the premature loss of human capital, who could have been potential contributors of economic growth.
- **Environmental Impact:** Tobacco cultivation, manufacturing, and consumption have adverse environmental effects.

### PESTLE ANALYSIS

A PESTLE analysis examines the external factors that can influence or impact an industry or an organization. We will apply the PESTLE framework to nicotine addiction within India considering Political, Economic, Sociocultural, Technological, Legal, and Environmental factors that shape the landscape of nicotine consumption and control policies.

<sup>41</sup> Yadav, A., Singh, P. K., Yadav, N., et al. "Smokeless Tobacco Control in India: Policy Review and Lessons for High-Burden Countries." *BMJ Global Health*, 2020, vol. 5, e002367.

<sup>42</sup> Ibid

<sup>43</sup> Ibid

<sup>44</sup> Ibid

### Political Factors

- **Regulatory Framework:** The Indian tobacco industry operates within a highly regulated political environment. Government policies, such as taxation, advertising restrictions, and packaging regulations significantly impact the industry's operations and profitability.
- **Health Initiatives:** Political pressure from public health advocacy groups and international organizations has led to strict tobacco control measures. Government initiatives to reduce tobacco consumption and improve public health are a prominent political factor.

### Economic Factors

- **Taxation:** High taxation on tobacco products generates significant revenue for the government and acts as a deterrent to consumption. Taxation policies have a direct impact on pricing and profitability within the industry.
- **Employment:** The tobacco industry is a significant employer, especially in rural areas where tobacco is primarily cultivated.

### Socio-cultural Factors

- **Cultural Significance:** Tobacco has cultural and social significance in various regions of India. Social customs, rituals, and traditional practices involving tobacco contribute to its continued consumption.
- **Health Awareness:** India has seen a significant shift in the awareness of health risks associated with tobacco consumption which is also significantly impact the consumer behaviour and preferences, leading to a decline in smoking rates and a shift towards smokeless alternatives.

### Technological Factors

- **Product Innovation:** Technological advancements play a vital role in the development of new tobacco and nicotine deliverables. Emerging alternatives like e-cigarettes and nicotine pouches are driven by technology and innovation posing as a playground for market players.
- **Agricultural Practices:** Technological improvements in tobacco cultivation and processing can impact the efficiency and sustainability of the industry.

### Legal Factors

- **Regulations:** Legal factors encompass government regulations related to tobacco advertising, packaging, and labelling. These regulations often pose as a challenge since they can limit marketing strategies and branding opportunities.
- **Litigation:** The tobacco industry has faced legal challenges globally, including lawsuits related to health claims and product liability. Legal battles can result in financial penalties and damage the industry's reputation.

### Environmental Factors

- **Deforestation:** Tobacco cultivation contributes to deforestation, which has environmental implications. Environmental concerns surrounding land use and pesticide use are important factors that companies need to keep into consideration.
- **Sustainability:** Increasing awareness of environmental sustainability may push the industry to adopt more eco-friendly practices.

## VIII. CHALLENGES AND BARRIERS

Addressing nicotine addiction in India also involved navigating a complex landscape filled with various challenges and barriers. We will explore the key obstacles that firms and corporations face while entering the market.

### SOCIO-CULTURAL FACTORS INFLUENCING TOBACCO USE

- **Cultural Acceptance:** The use of tobacco has deep-rooted cultural significance in many parts of India. Traditional rituals, social gatherings, and religious practices often involve the use of tobacco in various forms. These cultural norms can contribute to the social acceptability of tobacco use, making it challenging to implement effective prevention measures.
- **Social Pressures:** Social pressure, such as peer influence and family traditions, can encourage tobacco initiation and discourage cessation. Understanding the socio-cultural dynamics that promote tobacco use can help us tailor interventions that resonate well with local people and communities.

## MARKET PLAYERS ENTRY BARRIERS

The tobacco industry presents unique challenges and barriers for market players looking to enter this market in India. These challenges can be shaped by a combination of regulatory, economic, and sociocultural factors.

**I. Regulatory Challenges**

- A. **Strict Regulations:** The tobacco industry faces extensive government regulations and restrictions on advertising, packaging, and product labeling. Market players must navigate regulatory frameworks imposed by the government.
- B. **Taxation Policies:** High tobacco taxes are common in the country to discourage and fund healthcare programs. Market players seeking to enter the Indian market must adapt to varying tax rates and structures, which can impact their pricing strategies and profitability.

**II. Social and Health Concerns**

- A. **Public Health Awareness:** There is a growing public awareness of the health risks associated tobacco and nicotine consumption. Market players face increasing scrutiny and negative public perception, which can ultimately affect their brand's image and market acceptance.
- B. **Consumer Health Trends:** Changing consumer preferences towards healthier lifestyles and increasing demands of smokeless tobacco alternatives pose challenges to traditional tobacco products. It becomes important for market players to adapt to these shifting trends and invest in alternative product development that meets the evolving demand of consumers.

**III. Competition and Market Saturation**

- A. **Dominance of Established Players:** The tobacco industry in India is dominated by well-established multinational corporations with significant market share. New entrants may struggle to compete with these giants in terms of distribution channels, brand recognition, and economies of scale.
- B. **Market Saturation:** The market for traditional tobacco products, such as cigarettes and smokeless tobacco products may be nearing saturation in some regions. New market players must identify their niches or differentiate themselves to gain a foothold in this market.

**IV. Ethical and Sustainability Concerns**

- A. **Ethical Dilemmas:** The ethical consideration surrounding the tobacco industry, including its impact on public health and contribution to addiction, can deter potential market entrants concerned about corporate responsibility and ethical business practices.
- B. **Environmental Impact:** Tobacco cultivation and manufacturing have well-documented negative environmental consequences, including deforestation and extensive pesticide use. Market players may face sustainability challenges and backlash from environmentally conscious consumers.

**V. Counterfeit and Illicit Trade**

- A. **Counterfeit Products:** The tobacco industry in India is plagued by counterfeit products and smuggling. Market players must invest in robust supply chain security measures to protect their brands and revenues.
- B. **Illicit Trade Networks:** Illicit trade networks, including smuggling and tax evasion, pose economic and legal challenges to market players. It is important for new entrants to have effective strategies to combat illicit trade for safeguarding market share and profitability.

Option	Description	Cost	Governance Mechanism	Pros	Cons
<b>Direct Exports</b>	Taking orders in home market and shipping them direct to customers in a new market	Low	Contractual Relationship with Distributors	Broad market, Minimal investment, low financial commitment	Limited control over distribution and marketing, vulnerable to trade barriers and tariffs
<b>Exporting via Local Distributor</b>	Entering an agreement for a local distributor to sell goods produced in home market in a new market	Low	Distributor Agreements	Access to local market expertise and distribution channels	Limited control over distributor's operation and marketing
<b>Licensing</b>	Entering an agreement for local manufacturer to produce and sell goods in a new market	High	Licensing Agreements	Quick market entry, low initial investment, access to local partners' resources	Limited control over licensees, risk of license violation and quality control, potential infringement issues
<b>Sales Operation</b>	Setting up a sales team in a new market to sell goods produced in home market	High	Wholly Owned Sales Teams	Direct sales and distribution control, better market responsiveness, enhanced brand visibility and customer interaction	High operational and logistical costs, requires significant investment in infrastructure, initial challenges in establishing sales network
<b>Equity Investment</b>	Purchase minority stake in an existing firm in a new market, enter an agreement to work with the firm in that market	Low	Equity Stakes in Local Entities	Direct ownership and control over operations, ability to influence strategic decisions, potential for long-term returns on investment	Requires substantial financial commitment, exposure to market risks and uncertainties, cultural and regulatory challenges
<b>Joint Venture</b>	Creation of a new entity in a new market with one or more other	High	Joint Venture Agreements	Shared financial risk, local partner's knowledge of the market,	Potential conflicts with partners, Shared profits and decision-

	firms as joint owners in the new entity			Access to local resources and distribution channels	making, risk of technology and knowledge transfer to partner
<b>Acquisition</b>	Purchasing a majority stake in an existing firm in a new market	High	Full Majority Ownership and Integration	Immediate market presence, control over existing assets and infrastructure, elimination of competition	High acquisition costs, integration challenges, cultural and organizational differences
<b>Greenfield</b>	Setting up a new operation from scratch in a new field	High	Direct Investment in New Operations; Full Ownership	Full control over operations, customized operations and brand development, ability to align with corporate strategy	High initial capital investment, time-consuming establishment process, market entry may take longer than other modes

IX. CONCLUSION

This research paper has explored various aspects of nicotine addiction in India, focusing particularly on consumer perceptions of government interventions aimed at curbing addiction. In the context of B2C (business-to-consumer) consumption of nicotine, our study sheds light on consumer understanding and attitudes toward government interventions, including advertisements and policy regulations.

Consumer Understanding of Government Interventions

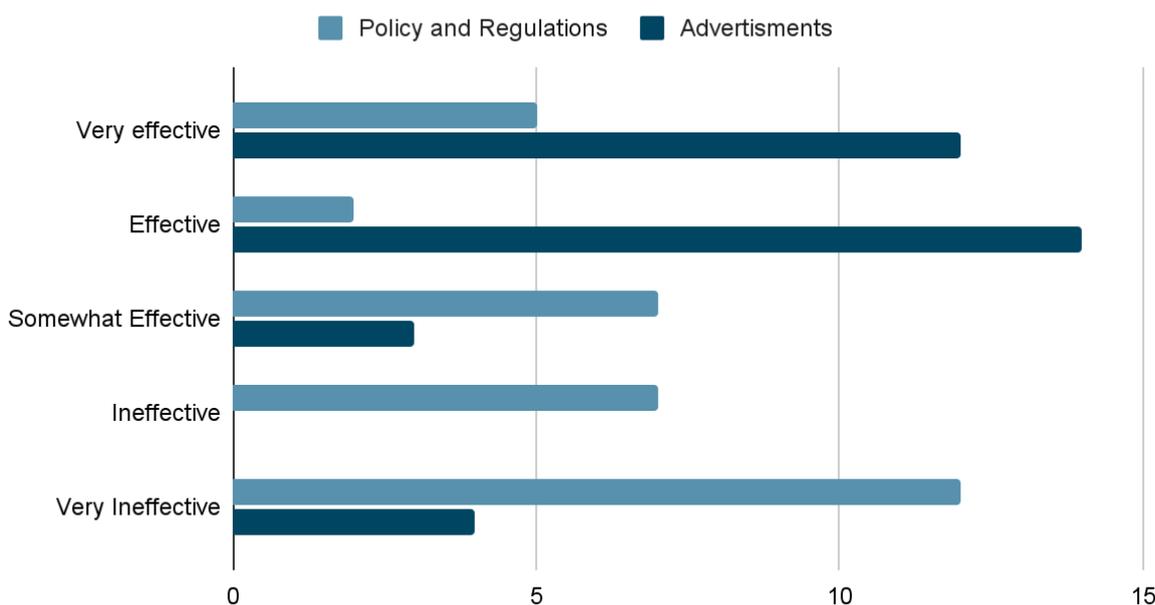


Figure 4: Consumer Understanding of Government Interventions

One of the key findings of our research is that advertisements have a significant impact on consumers' motivation to quit tobacco consumption. A substantial majority of respondents perceived anti-smoking advertisements as very effective or effective in motivating them to quit. This perception highlights the potential of mass media campaigns to drive behavioural change and reduce nicotine addiction. However, it has brought to light an important nuance in the effectiveness of anti-smoking advertisements. It is evident from the findings that while advertisements can be powerful motivators for individuals to quit smoking, their impact may vary based on the accuracy and balance of the information presented. Specifically, our research indicates that smokers are less likely to be motivated to quit when advertisements overstate the side effects of smoking.

Also, in contrast, our study also revealed that consumers tended to view policy regulations as ineffective in curbing addiction. A notable portion of respondents considered these regulations to be ineffective or very ineffective. This finding suggests that there may be room for improvement in the design and implementation of policy measures related to tobacco and nicotine products.

Based on these findings, we recommend that policymakers consider allocating more resources to anti-smoking advertisements as part of their efforts to combat nicotine addiction. The positive impact and perception of advertisements on consumer motivation to quit tobacco indicated their effectiveness. However, TV was identified as the least effective medium but cinema halls and radio emerged as leading touch points for these campaigns and advertisements.

In the B2B context, India's position as the world's second-largest tobacco manufacturer underscores the importance of stricter government regulations. Policymakers should consider stronger policies to govern the production and distribution of tobacco products in this sector. These stringent policies can help address the health and economic challenges linked to nicotine addiction.

#### X. REFERENCES

- Arora, M., & Reddy, K. S. Global Adult Tobacco Survey (GATS) India 2009-10. Mumbai, India: Ministry of Health and Family Welfare, Government of India, 2004.
- Boffetta P, Hecht S, Gray N, Gupta P, Straif K. "Smokeless tobacco and cancer." *Lancet Oncol* 2008;9:667-75.
- Chadda, R., & Sengupta, S. (2002). "Tobacco Use by Indian Adolescents." *Tobacco Induced Diseases*, 1, 111.
- Chaly, P. E. (2007). "Tobacco Control in India." *Indian Journal of Dental Research*, 18, 2-5.
- Chauhan, Aakansha, and Rahul Sharma. "Impact of Anti Smoking Campaigns on Youth." January 2017.
- Ganti, Akhilesh. "Central Limit Theorem (CLT)." *Investopedia*, June 21, 2023.
- Gupta, P. C., Ray, C. S., Sinha, D. N., Singh, P. K., & Singh, G. (2008). Smokeless Tobacco: A Major Public Health Problem in the SEA Region: A Review. *Indian Journal of Public Health*, 52(4), 200–204.
- Handa, Sahil; Kour, Haneet; Khurana, Charu. "Insight into Nicotine Addiction." *The HealthCare Roundtable Innovations Journal*, vol. 2, no. 4, 2017.
- India Global Adult Tobacco Survey (GATS) 2016-17. Centers for Disease Control and Prevention (CDC).
- India Global Youth Tobacco Survey (GYTS). National, 2019.
- Indian Journal of Cancer. "Tobacco and Health in India." *Indian Journal of Cancer*, vol. 47, no. 1, 2010, pp. 3-8.
- Institute for Health Metrics and Evaluation. "Global Burden of Disease (GBD)." *Healthdata.org*.

Jha, Prabhat, Emmanuel Guindon, Renu A Joseph, Arindam Nandi, Rijo M John, Kavita Rao, Frank J Chaloupka, Jagdish Kaur, Prakash C Gupta, M Govinda Rao. "A Rational Taxation System of Bidis and Cigarettes to Reduce Smoking Deaths in India." *Economic & Political Weekly*, vol. XLVI, No. 42, Oct 15, 2011.

Jiloha, R. C. (2010). "Biological Basis of Tobacco Addiction: Implications for Smoking-Cessation Treatment." *Indian Journal of Psychiatry*, 52(4), 301-307. doi: 10.4103/0019-5545.74303.

John, R M., et al. "Economic Cost of Tobacco Use in India, 2004." *Tobacco Control*, vol. 18, no. 2, 2009, pp. 138-143.

Mohan P, Lando HA, Panneer S. "Assessment of Tobacco Consumption and Control in India." *Indian Journal of Clinical Medicine*. 2018;9. doi:10.1177/1179916118759289.

Nichter, M., Nichter, M., Van Sickle, D., & Padmajam, S. (2004). "Developing a Smokeless Tobacco Risk Reduction Intervention in Bangalore, India." *Social Science & Medicine*, 59(9), 1743–1756.

Ramachandran, R., & Shyamala, P. (2018). Patterns of Tobacco Use in India: Gender and Socioeconomic Disparities. *J Epidemiol Global Health*, 8(1-2), 1–6.

Rao, V., & Chaturvedi, P. (2010). "Tobacco and Health in India." *Indian Journal of Cancer*, 47(Suppl 1), S3-S8. DOI: 10.4103/0019-509X.64373.

Reddy, K. Srinath, and Shuchi Anand. "Tobacco use among youth in India: Evidence from Global Youth Tobacco Survey (GYTS)." *Indian Journal of Medical Research*, vol. 132, no. 6, 2010, pp. 681-682.

Shah S, Dave B, Shah R, Mehta TR, Dave R. "Socioeconomic and cultural impact of tobacco in India." *J Family Med Prim Care*. 2018 Nov-Dec;7(6):1173-1176. doi: 10.4103/jfmpc.jfmpc\_36\_18.

The World Bank. "Curbing the Epidemic: Governments and the Economics of Tobacco Control." *Tobacco Control*, vol. 8, 1999, pp. 196-201.

World Bank. (1999). "Curbing the Epidemic: Governments and the Economics of Tobacco Control." Washington, DC, USA: World Bank.

World Health Organization. "A global epidemic of addiction and disease. Tobacco: deadly in any form or disguise." WHO Tobacco Free Initiative. ISBN 92 4 156322 2 (NLM classification: QV 137) ISBN 978 92 4 156322. World No Tobacco Day 2006.

World Health Organization. "Global Adult Tobacco Survey." WHO Noncommunicable Diseases (NCDs) - Global Adult Tobacco Survey.

World Health Organization. WHO Report on the Global Tobacco Epidemic, 2008: The MPOWER Package. Geneva, Switzerland, 2008.

Yadav, A., Singh, P. K., Yadav, N., et al. "Smokeless Tobacco Control in India: Policy Review and Lessons for High-Burden Countries." *BMJ Global Health*, 2020, vol. 5, e002367.

## APPENDIX 1: PERCEPTION OF AMONGST SMOKERS AND NON-SMOKERS ABOUT THE POSSIBLE SIDE EFFECTS OF SMOKING

This appendix provides additional information and analysis related to the impact of state-sponsored anti-smoking mass media campaigns on the perception of youth regarding the possible side effects of smoking. The data presented here is based on individual self-reported exposure to anti-smoking advertisements.

In the study "Impact of Anti Smoking Campaigns on Youth" conducted by Aakansha Chauhan and Rahul Sharma, a sample of youth was surveyed regarding their smoking behavior, exposure to anti-smoking advertisements, and their perception of the possible side effects of smoking.

Table 1: Descriptive Statistics for Side Effects of Smoking as per Smokers

Description	Smoking causes stroke	Smoking causes blood clots in the brain	Smoking causes decay in lungs	Smoking blocks up arteries in lungs	Smoking causes damage to the genes in lungs cells	Any two of the above	Most of the above
Score Sum	2761	2064	4256	2232	2582	3153	4458
Score Mean	3.06	2.29	4.71	2.47	2.86	3.49	4.93
Std. Dev.	1.159	0.98	0.78	1.36	1.23	0.72	0.56

This table reveals that the majority of smokers (23%) demonstrated awareness of all the side effects of smoking, as indicated by a total awareness score of 4458. This ranked first among smokers, primarily because of its high mean score of 4.93. Following closely was the awareness of the peril 'smoking causes decay in the lungs,' which ranked second with a mean score of 4.256.

In contrast, the lowest ranking, seventh place, was assigned to the awareness of the peril 'smoking causes blood clots in the brain,' which had a mean score of 2.28. The rankings for other perils were as follows: awareness of any two out of the five side effects was ranked third, 'smoking causes strokes' ranked fourth, 'smoking causes changes in the lungs' ranked fifth, and 'smoking blocks arteries in the lungs' ranked sixth.

Table 2: Descriptive Statistics for Side Effects of Smoking as per Non-Smokers

Description	Smoking causes stroke	Smoking causes blood clots in the brain	Smoking causes decay in lungs	Smoking blocks up arteries in lungs	Smoking causes damage to the genes in lungs cells	Any two of the above	Most of the above
Score Sum	1656	2073	4637	3365	3503	4837	5017
Score Mean	1.83	2.29	5.13	3.72	3.87	5.36	5.56
Std. Dev.	0.79	0.81	1.31	1.05	0.80	0.61	0.74

The table presents descriptive statistics regarding the perception of side effects of smoking among non-smokers. It is evident from the table that non-smokers exhibited a high level of awareness regarding the various perils associated with smoking, as indicated by the highest mean score of 5.017. However, it's noteworthy that most non-smokers were unaware that smoking could lead to strokes, which ranked the lowest with a mean score of 1.83 and a sum score of 1656.

The depiction of the harmful effects of smoking on lungs in both the "Sponge Ad" and "Mukesh Ad" seems to have significantly contributed to the knowledge about lung decay due to smoking. This knowledge ranked third with a mean score of 5.13.

Table 3: Recall Anti-Smoking Advertisement

	Smokers		Non-Smokers	
	Males	Females	Males	Females
Yes	65% (546)	35% (294)	49% (61)	51% (64)
No	80% (50)	20% (13)	16% (3)	84% (18)
<b>Recall With respect to Particular Advertisements</b>				
	Smokers		Non-Smokers	
	Males	Females	Males	Females
Mukesh AD	73% (146)	27% (34)	46% (34)	54% (38)
Dhuan AD	70% (91)	30% (39)	23% (4)	11% (13)
Sponge AD	69% (118)	81% (52)	47% (9)	53% (10)
Child AD	63% (52)	37% (31)	36% (8)	64% (14)
All of the Above	60% (160)	40% (120)	67% (20)	33% (15)
None	45% (9)	55% (11)	45% (10)	55% (12)
<b>Recall With respect to Media</b>				
	Smokers		Non-Smokers	
	Males	Females	Males	Females
Television	60% (30)	40% (20)	23% (3)	77% (10)
Radio	65% (60)	35% (32)	59% (20)	41% (14)
Cinema Hall	64% (415)	26% (225)	38% (28)	62% (46)
Internet	75% (91)	25% (30)	54% (14)	46% (12)

In this table, it is evident that respondents most vividly recalled the 'Mukesh Advertisement,' followed by the 'Sponge Advertisement,' 'Dhuan Advertisement,' and 'Child Advertisement.' The study highlights that the most effective medium for anti-smoking advertisements was the cinema hall. Approximately 68% of the respondents indicated that they could easily recall advertisements shown in cinema halls. This effectiveness can be attributed to the fact that cinema halls predominantly cater to a youthful audience.

On the contrary, television was identified as the least effective medium, with only 6% of respondents expressing ease in recalling advertisements shown on TV. The other media channels, including the internet (14%) and radio (12%), fell in between. This discrepancy can be attributed to the fact that most youth prefer watching movies in cinema halls, and these venues do not offer the option to skip advertisements. In contrast, other media platforms provide viewers with the choice to skip, resulting in less complete exposure to these anti-smoking advertisements.

Table 4: Quitting Behavior

Tried Quitting Smoking	Males	Females	Total
Yes	67% (550)	33% (272)	91%
No	57% (46)	43% (35)	9% (81)

This table reveals that a significant 91% of all smokers made attempts to quit smoking after being exposed to these advertisements. Furthermore, the results indicate that a higher percentage of male smokers (92%) attempted to quit smoking in comparison to female smokers (88%).

Table 5: Descriptive Statistics for Effects of Campaign on Smokers

Description	Made you less likely to smoke cigarettes	Overstate the danger or risk if smoking on your health	Overstated the risk of your smoking on the person around you	No effect
Score Sum	2513	2987	1347	1412
Score Mean	2.78	3.31	1.49	1.56
Std. Dev.	0.73	0.71	0.51	0.59

This table provides descriptive statistics on the effects of the campaign on smokers. Notably, the campaign had a profound impact on youth, with a mere 2% of smokers opting for the fourth option, 'No effect,' which had the lowest score mean of 1.56. Among smokers, the highest rank, rank 1, was assigned to the second option, 'overstated the dangers and risks of smoking on their health,' with a score mean of 3.307. One of the primary reasons for this could be attributed

to the fact that two of the four ads, namely 'Dhuan Ad' and 'Mukesh Ad,' vividly depicted the harmful effects of tobacco smoking on one's health.

After exposure to these advertisements, smokers were notably less inclined to smoke cigarettes. This decrease in smoking likelihood is reflected in the score mean of 2.78, which led to the second rank being assigned to the first option. Additionally, both 'Dhuan Ad' and 'Child Ad' emphasized the harmful effects of smoking on individuals exposed to passive smoking, contributing to the campaign's effectiveness.

## APPENDIX 2: QUESTIONNAIRE

We hosted a set of Questionnaire which was distributed in various schools in Hyderabad for students to fill out in the paper copy format. Furthermore, there was an online Google Form created (<https://forms.gle/gVFYAG6RpJ4wvBps7>) which the respondents had an option of filling out online. For the purpose of our study, we have compiled both the data and have not taken the mode of filling out the questionnaire as a relevant factor in the responses selected by candidates.

These questions were crafted predominately to used consumer awareness, and health concerns. We fully understand that the scope of research can be far exceeding these limits. However, it is impossible to cover all data in one research.

### 1. Personal Information

- a. Name:
- b. Gender:

### 2. Do you currently use any nicotine-containing products?

- a. Yes
- b. No

### 3. If yes, please specify the type(s) of nicotine products you use:

- a. Cigarettes
- b. Bidis
- c. Smokeless Tobacco
- d. E-Cigarettes/Vaping
- e. Others (please specify) \_\_\_\_\_

### 4. How long have you been using nicotine-containing products?

- a. Less than 1 year
- b. 1-5 years
- c. 6-10 years
- d. More than 10 years

### 5. Have you experienced any health issues that you believe are related to nicotine use?

- a. Yes
- b. No

### 6. If yes, please describe the health issues you have experienced: \_\_\_\_\_

### 7. Have you sought medical treatment or counselling to help you quit or reduce your nicotine use?

- a. Yes
- b. No

### 8. Are you aware of the health risks associated with nicotine addiction?

- a. Yes
- b. No

### 9. Are you aware of any governmental policies or regulations related to tobacco and nicotine products in India?

- a. Yes
- b. No

### 10. In your opinion, how effective are these policies and regulations in curbing nicotine addiction?

- a. Very effective
- b. Effective
- c. Somewhat Effective
- d. Ineffective

e. Very Ineffective

**11. How effective do you perceive advertisements and public awareness campaigns regarding the consequences of tobacco use?**

- Very effective
- Effective
- Somewhat Effective
- Ineffective
- Very Ineffective

**12. Where do you most often see these ads?**

- TV
- Cinema Halls
- Radio
- Internet
- Others

**13. How effective do you find these advertisements in motivating you to quit tobacco consumption?**

- Very effective
- Effective
- Somewhat Effective
- Ineffective
- Very Ineffective

**14. Is there anything else you would like to share or any additional comments you have regarding nicotine addiction in India?**

### APPENDIX 3: QUESTIONNAIRE RESULTS

The questionnaire collected the data from 36 individuals located in Hyderabad and Mumbai. These individuals' range in age from 16 years-old to 45 years-old to get a more cohesive set of consumer base.

**DISCLAIMER:** *This survey has been predominantly conducted by reaching out to friends and peers within our social circles. As such, it is essential to acknowledge that the data collected may skew towards modern means of smoking, such as e-cigarettes, as opposed to traditional practices like bidi consumption which may be prevalent among a different section of the population. The limitation arises from the nature of our survey's sampling, which primarily relied on individuals who are accessible to us through personal networks, Therefore, the survey's findings may not fully represent the broader and more diverse smoking habits within the entire population.*

### Background Information: Gender

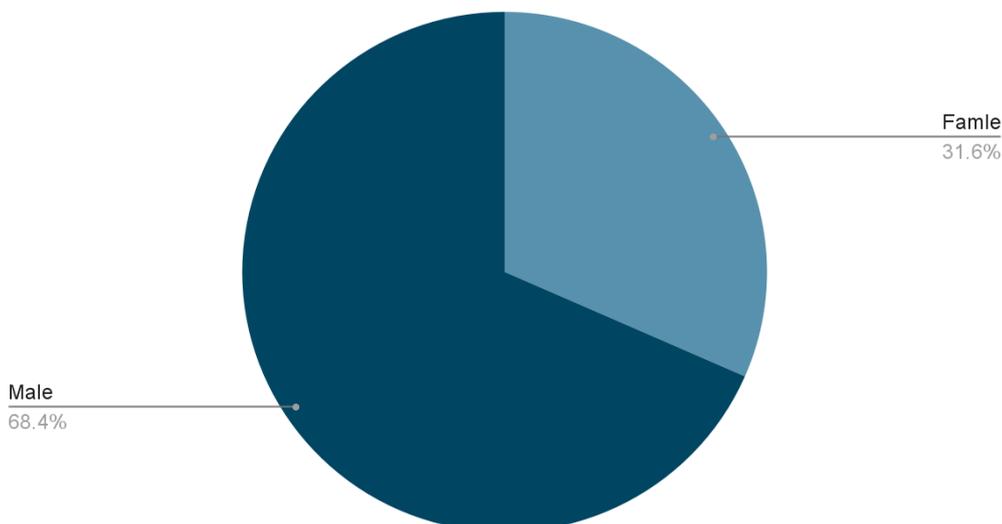


Figure 5: Background Information of Respondents: Gender

The pie chart represents the gender distribution of respondents for our survey “Smoking Habits Among Youth”. A total of 38 respondents took part in the survey, with 26 identified as males and 12 as females.

### Do you currently use any nicotine-containing products?

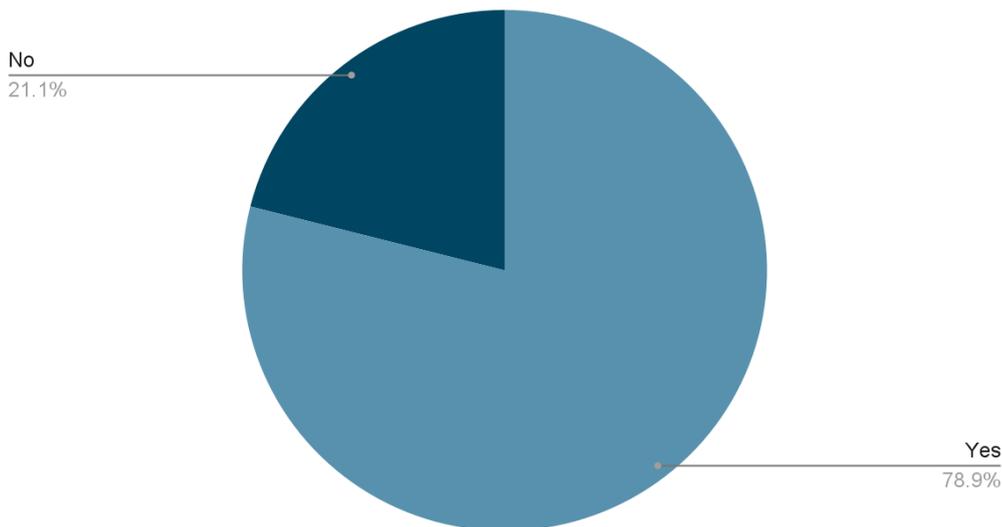


Figure 6: Current use of nicotine-containing products among respondents

A significant majority of our respondents, accounting for 78.9% of the total, reported their current use of nicotine-containing products. 30 respondents affirmed their usage of nicotine-containing products, while 8 indicated otherwise.

### If yes, please specify the type(s) of nicotine products you use:

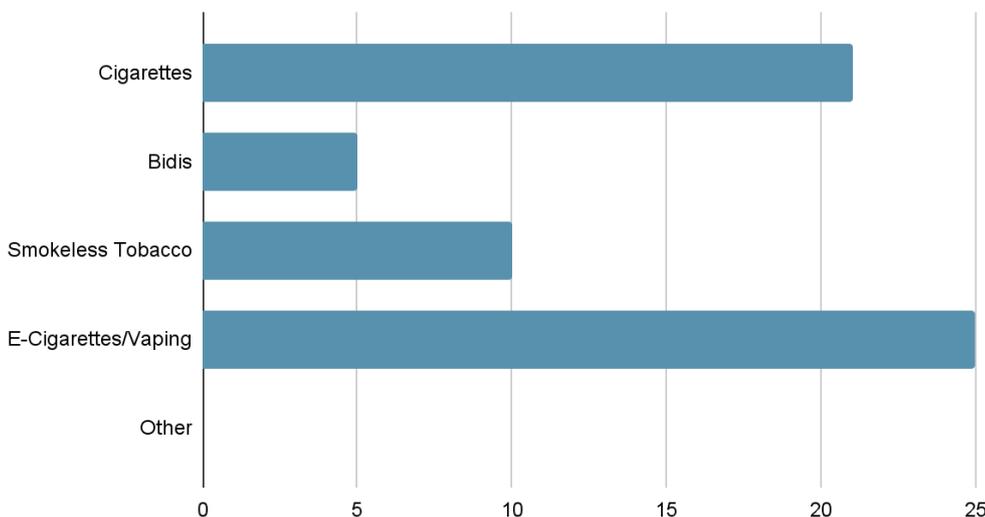


Figure 7: Types of Nicotine Products used by Respondents

The responses to the question regarding the types of nicotine products used revealed the following statistics:

- Cigarettes: 21 respondents (70% of nicotine users) reported using traditional cigarettes.
- Bidis: 5 respondents (16.7% of nicotine users) indicated bidi use.
- Smokeless Tobacco: 10 respondents (33.3% of nicotine users) consumed smokeless tobacco.
- E-Cigarettes/Vaping: 25 respondents (83.3% of nicotine users) favoured e-cigarettes or vaping devices.
- Other Products: None of the respondents reported using alternative nicotine products.

How long have you been using nicotine-containing products?

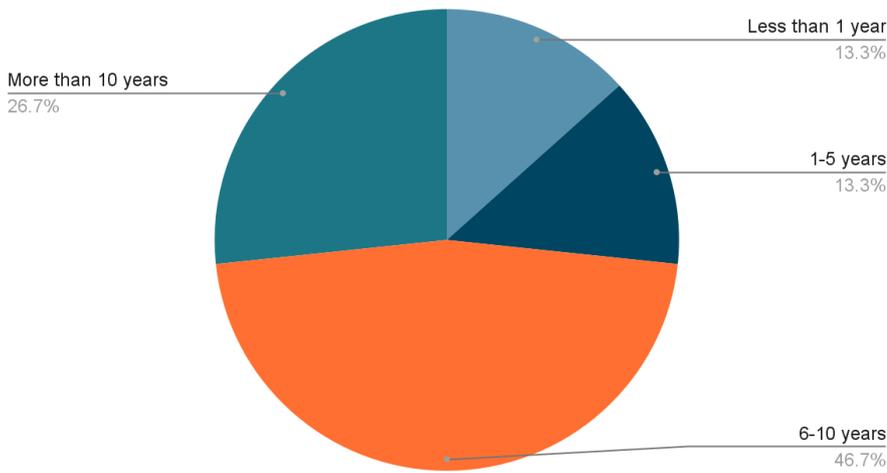


Figure 8: Timeline of nicotine-usage among respondents

The response to the question regarding the duration of nicotine-containing product usage revealed insights into the longevity of nicotine consumption habits amongst the respondents, with the following being the result:

- Less than 1 year: 4 respondents (10.5%)
- 1-5 years: 4 respondents (10.5%)
- 6-10 years: 14 respondents (36.8%)
- More than 10 years: 8 respondents (21.1%)

Have you experienced any health issues that you believe are related to nicotine use?

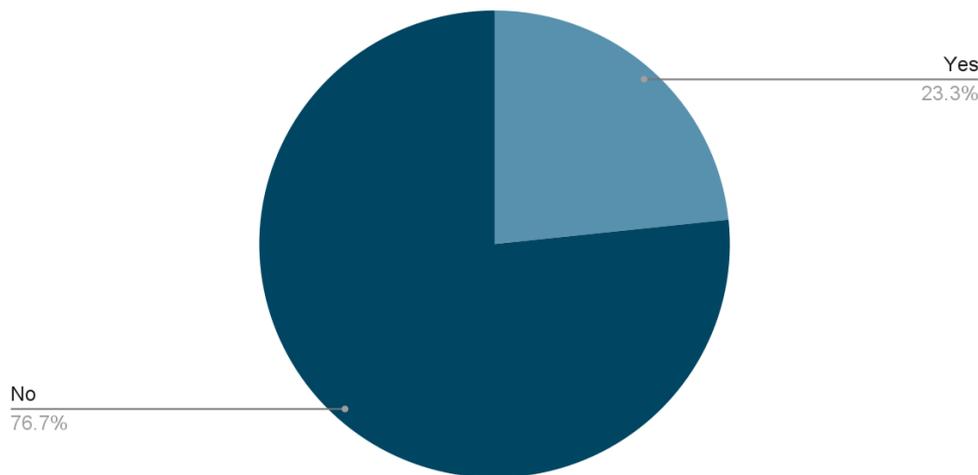


Figure 9: Nicotine-related health issues

The responses to the question about whether respondents have experienced health issues they believe were related to nicotine use provide insights into the perceived health impact of nicotine consumption. The results were:

- Yes: Seven respondents (23.3% of the total) reported experiencing health issues that they attribute to nicotine use.
- No: In contrast, a majority of respondents, comprising 23 individuals (76.7%), reported that they have not experienced health issues they attribute to nicotine use.

Have you sought medical treatment or counseling to help you quit or reduce your nicotine use?

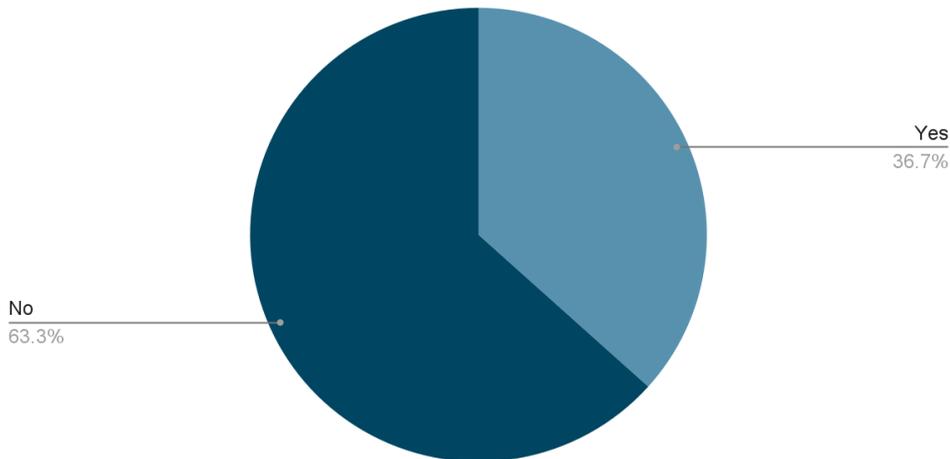


Figure 10: Medical treatment sought for nicotine use or not

The following question inquires whether respondents who reported experiencing health issues related to nicotine use sought medical treatment or counselling. The responses revealed the following:

- Yes (11 respondents): Eleven participants (36.7% of respondents) acknowledged seeking medical treatment or counselling to aid in quitting or reducing their nicotine use.
- No (19 respondents): In contrast, a majority of respondents, comprising 19 individuals (63.3%), reported not seeking medical treatment or counselling for nicotine addiction.

Are you aware of the health risks associated with nicotine addiction?

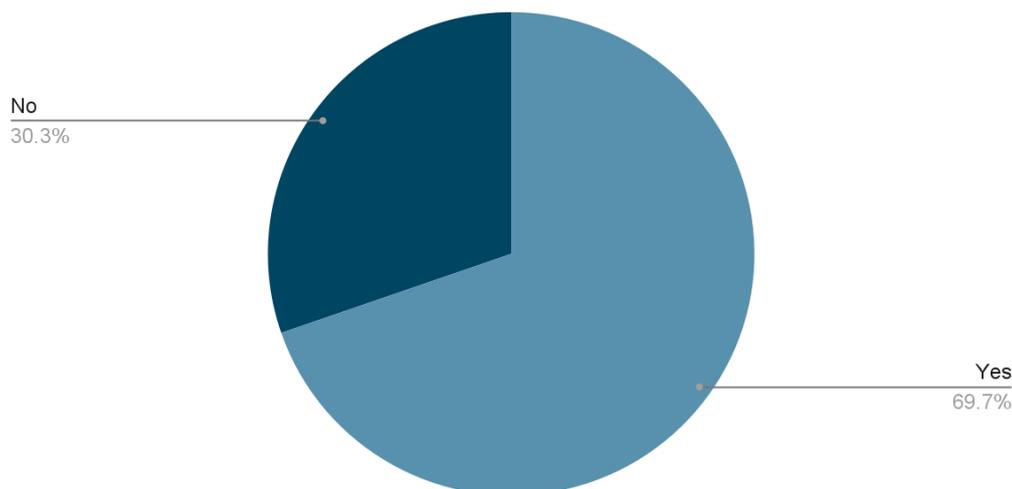


Figure 11: Awareness of nicotine-related health risks

The responses to the question about awareness of health risks associated with nicotine addiction provided insights into the level of understanding among the respondents, and following were the responses:

- Yes (23 respondents): A significant majority of respondents, comprising 23 individuals (69.7% of respondents), reported being aware of the health risks associated with nicotine addiction.
- No (10 respondents): However, a notable portion of respondents, specifically 10 individuals (30.3%), indicated that they are not aware of the health risks associated with nicotine addiction.

Are you aware of any governmental policies or regulations related to tobacco and nicotine products in India?

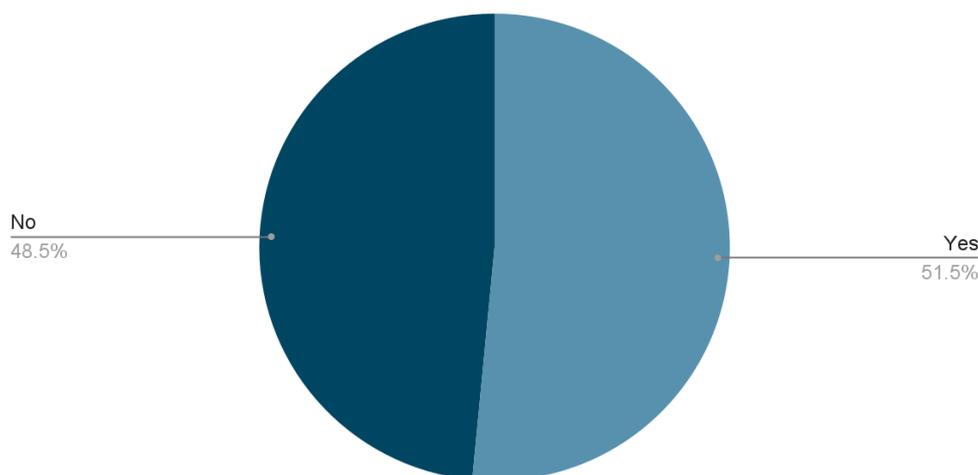


Figure 12: Awareness of nicotine-related governmental policies or not

The responses to the question about awareness of governmental policies or regulations related to tobacco and nicotine products in India provide insights into the familiarity with existing regulatory framework and the following were the responses:

- Yes (17 respondents): A notable proportion of respondents, consisting of 17 individuals (51.5% of respondents), reported being aware of governmental policies or regulations.
- No (16 respondents): A substantial number of respondents, specifically 16 individuals (48.5%), indicated that they are not aware of governmental policies or regulations.

In your opinion, how effective are these policies and regulations in curbing nicotine addiction?

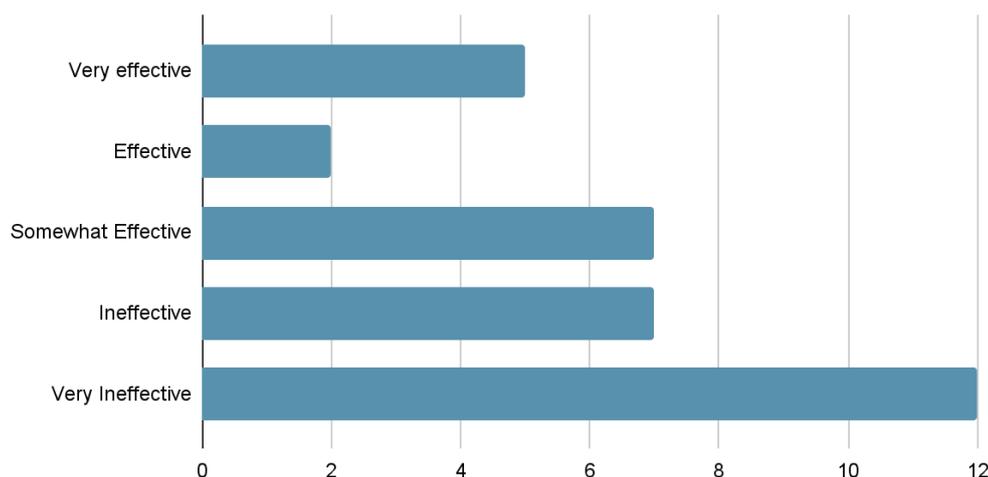


Figure 13: Effectiveness of government policies and regulations in curbing nicotine addiction

The responses to the next question regarding the perceived effectiveness of governmental policies helps us understand the population's assessment of the impact of these measures taken by the government. The survey revealed the following:

- Very Effective (5 respondents): A small minority of respondents, comprising 5 individuals (15.2% of respondents), considered governmental policies and regulations to be very effective in curbing nicotine addiction.
- Effective (2 respondents): Only 2 respondents (6.1% of respondents) rated the policies and regulations as effective, indicating a modest level of perceived effectiveness.
- Somewhat Effective (7 respondents): Seven respondents (21.2% of respondents) expressed a belief that these measures are somewhat effective in curbing nicotine addiction, reflecting a moderate level of confidence in their impact.

- Ineffective (7 respondents): An equal number of respondents, specifically 7 individuals (21.2% of respondents), considered the policies and regulations to be ineffective in curbing nicotine addiction. This suggests a critical view of the current measures' ability to address the issue.
- Very Ineffective (12 respondents): The largest group of respondents, comprising 12 individuals (36.4% of respondents), rated the policies and regulations as very ineffective in curbing nicotine addiction. This indicates a prevailing perception of limited effectiveness among a significant portion of the surveyed population.

### How effective do you perceive advertisements and public awareness campaigns regarding the consequences of tobacco use?

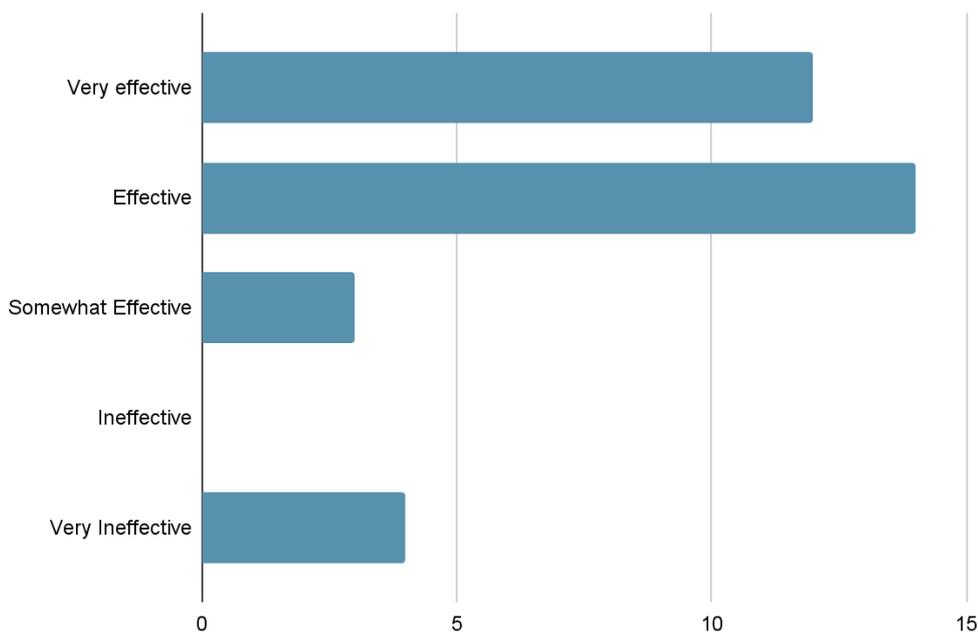


Figure 14: Effectiveness of ads and public awareness campaigns for tobacco use

The responses to the question regarding the perceived effectiveness of advertisements and public awareness campaigns regarding the consequences of tobacco use provide insights into population's evaluation of these government initiatives:

- Very effective (12 respondents): A substantial number of respondents, comprising 12 individuals (36.4% of respondents), considered advertisements and public awareness campaigns to be very effective in conveying the consequences of tobacco use. This indicates a positive perception of the impact of these campaigns among a significant segment of the surveyed population.
- Effective (14 respondents): Fourteen respondents (42.4% of respondents) rated the advertisements and campaigns as effective, signifying a widespread belief in their ability to effectively communicate the consequences of tobacco use.
- Somewhat Effective (3 respondents): A smaller group of respondents, specifically 3 individuals (9.1% of respondents), perceived these efforts as somewhat effective, reflecting a moderate level of confidence in their impact.
- Ineffective (0 respondents): Interestingly, no respondents indicated that advertisements and campaigns were ineffective in conveying the consequences of tobacco use. This suggests a general consensus among the surveyed population that these communication initiatives have some degree of effectiveness.
- Very Ineffective (4 respondents): However, four individuals (12.1% of respondents) rated the advertisements and campaigns as very ineffective, indicating a minority perspective that these efforts may not be impactful.

## Where do you most often see these ads?

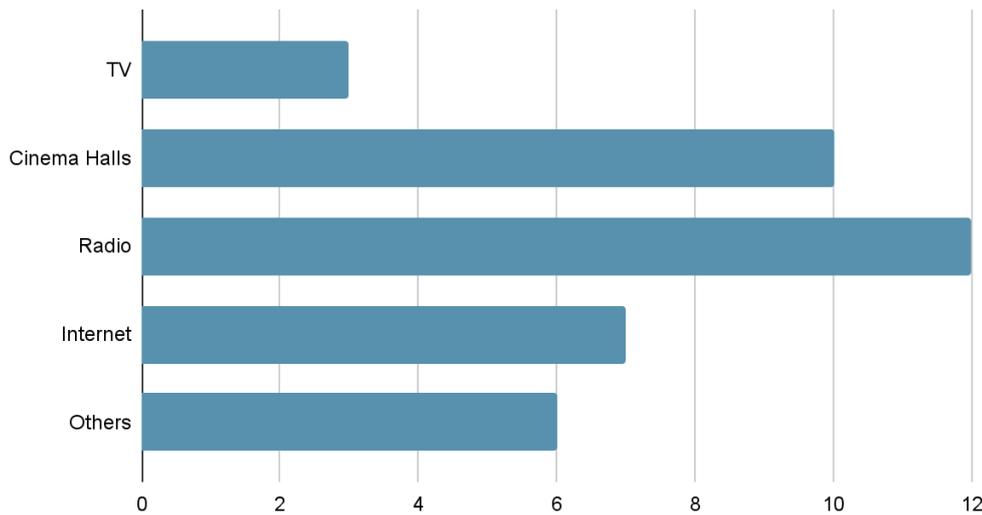


Figure 15: Touch point of ads

The responses to the question regarding the most common platforms for viewing anti-smoking ads provide insights into the media channels through which the surveyed population predominantly encounters these advertisements.

- TV (3 respondents): A small minority of respondents, consisting of 3 individuals (9.1% of respondents), reported most often seeing anti-smoking ads on television. This suggests a limited exposure to such ads through this traditional broadcast medium.
- Cinema Halls (10 respondents): Cinema halls emerged as the primary platform for viewing anti-smoking ads, with 10 respondents (30.3% of respondents) indicating this as the most common location. This highlights the effectiveness of cinema advertising in reaching the surveyed population.
- Radio (12 respondents): Radio was another prominent medium for encountering anti-smoking ads, as reported by 12 respondents (36.4% of respondents). This suggests that audio-based messages are widely disseminated through radio broadcasts.
- Internet (7 respondents): Seven individuals (21.2% of respondents) cited the internet as the platform where they most often come across anti-smoking ads, indicating a digital presence of these campaigns.
- Others (6 respondents): A smaller group of respondents, specifically 6 individuals (18.2% of respondents), mentioned other sources as the primary location for viewing anti-smoking ads, implying diversity in advertising channels.

## How effective do you find these advertisements in motivating you to quit tobacco consumption?

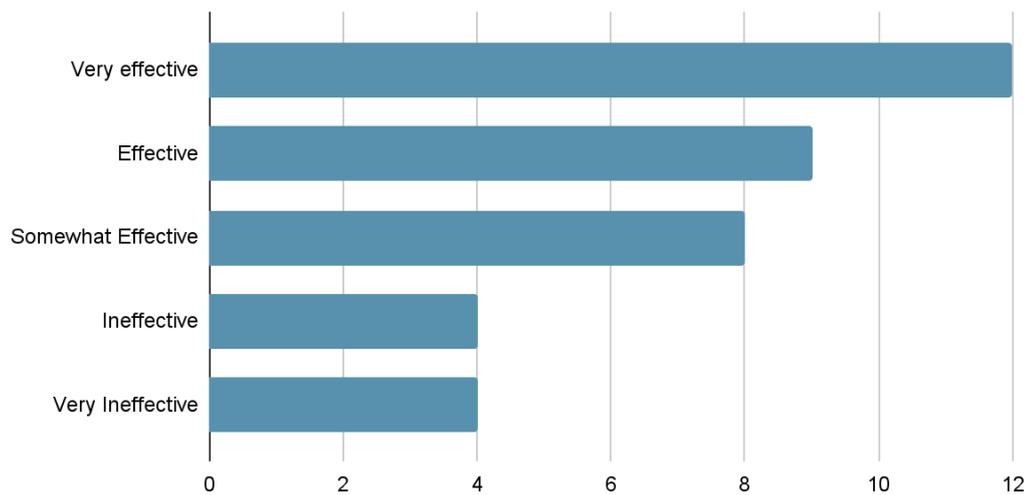


Figure 16: Effectiveness of advertisements in motivation tobacco cessation

The response to the question regarding the perceived effectiveness of anti-smoking advertisements in motivating individuals to quit tobacco consumption provide insights into how these campaigns influence the surveyed population's intentions.

- Very effective (12 respondents): A notable proportion of respondents, 12 individuals (36.4% of respondents) considered anti-smoking advertisements to be very effective in motivating them to quit tobacco consumption.
- Effective (9 respondents): Nine respondents (27.3% of respondents) rated the advertisements as effective, indicating a positive influence on their motivation to quit tobacco use.
- Somewhat Effective (8 respondents): A group of 8 individuals (24.2% of respondents) perceived these advertisements as somewhat effective, reflecting a moderate level of motivation induced by the campaigns.
- Ineffective (4 respondents): Four respondents (12.1% of respondents) found the advertisements to be ineffective in motivating them to quit tobacco consumption, suggesting a limited impact on their intentions.
- Very Ineffective (4 respondents): 4 individuals (12.1% of respondents) rated the advertisements as very ineffective in influencing their motivation to quit, indicating a minority perspective that these campaigns may not be impactful in this regard.