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The association between tobacco prices and smoking onset-Evidence from the TCP India Survey

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Abstract

Background—Tobacco use is prevalent among youth and adults in India. However, direct evidence on how increasing taxes or prices affect tobacco use onset is scarce.

Objective—To analyze the associations between cigarette and bidi prices and smoking onset in India, and how these associations differ by socioeconomic status.

Methodology—The Wave 1 of the Tobacco Control Policy Evaluation (TCP) India Survey by the International Tobacco Control Project contains information on the age at smoking onset for cigarettes and bidis. Using this information, data were expanded to a yearly pseudo-panel dataset that tracked respondents at risk of smoking onset from 1998 to 2011. The associations between bidi prices and bidi smoking onset, between cigarette prices and cigarette smoking onset, and between bidi and cigarette prices and any smoking onset were examined using a discrete-time hazard model with a logit link function. Stratified analyses were conducted to examine the difference in these associations by rural versus urban division.

Results—We found that higher bidi prices were significantly associated with a lowered hazard of bidi smoking onset (OR=0.42, 95%CI: 0.35–0.51). Higher cigarette prices were significantly (OR=0.87, 95%CI: 0.83–0.92) associated with a lowered hazard of cigarette smoking onset among urban residents, but this association was non-significant when standard errors were clustered at the state level. In addition, the association between increasing bidis prices and lowered hazards of bidi smoking onset was greater for urban residents than for rural ones ($p<0.01$).

Conclusions—Under the new regime of a central GST system, policy makers may need to raise the prices of tobacco products sufficiently to curb smoking onset.

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Keywords

smoking onset; cigarettes; bidis; prices and taxes

Introduction

India has one of the largest number of tobacco users in the world.[1, 2] In 2009–2010, 24.3% of male adults and 2.9% of female adults in India were current tobacco users. Tobacco use is also prevalent among youth. The 2009 Global Youth Tobacco Survey in India shows that 19% of boys and 8.3% of girls were currently using some tobacco product.[3] Additionally, 15.5% of youth never smokers were likely to initiate smoking within the next year, showing the harmful impacts that tobacco poses to the population health in India.[3]

Since tobacco use is addictive, preventing never users from initiating tobacco use is a key area for tobacco control. As a signing Party of the World Health Organization Framework Convention on Tobacco Control (WHO FCTC),[4–6] India is in the progress of implementing a comprehensive set of tobacco control policies, many of which have been shown to reduce tobacco use onset.[7, 8] In particular, increasing taxes or prices is the most effective strategy in reducing tobacco use.[9, 10] A growing number of studies have shown that this strategy in general reduces demand for tobacco products in India,[11–15] suggesting that increasing cost may reduce tobacco use onset. However, direct evidence on how increasing taxes or prices affect tobacco use onset is scarce.

Furthermore, several tobacco products, including cigarettes, bidis, and smokeless tobacco, are popular in India.[16] Due to their low cost, bidis and smokeless tobacco are more commonly used by lower-income tobacco users.[17] As Indian consumers' income grows, cigarettes have been gradually displacing bidis.[18, 19] Although most existing studies find prices of at least one product negatively associated with demand,[11–15] how the price effects differ by products or different tobacco use margins (i.e., smoking onset and cessation) is unclear.[20, 21] Evidence on the relationships among these products (i.e., whether they are substitutes or complementarities) is also mixed and indicates that such relationships may vary by socioeconomic status.[13, 14, 22]

To our knowledge, only one study evaluated the price effect on smoking onset in India. Using Global Adult Tobacco Survey (GATS) data from 14 primarily low- and middle-income countries, Kostova et al. (2015) showed that increasing prices reduced smoking onset in low- to lower-middle income countries but not in upper-middle income countries.[23] However, that study was conducted in a cross-country context, and India was used as one of many countries to derive the price elasticity of smoking onset for low- and middle- income countries. There is lack of evidence on the tax or price effects on tobacco use onset specific to India.

This study aimed to fill this research gap by examining the associations between tobacco prices and smoking onset in four Indian states, which will in turn inform tax policies in the newly established central goods and service (GST) system.[12] Capitalizing on the self-reported retrospective information about the age at smoking onset, we constructed yearly

pseudo panel datasets and examined the associations between prices and the hazards of smoking onset using a discrete-time hazard model. We also stratified the analyses by rural versus urban region to examine the difference in these associations by socioeconomic status.

Data and Measures

Tobacco Control Policy (TCP) India Survey

Tobacco Control Policy India Survey (TCP India) was conducted by the International Tobacco Control Policy Evaluation Project (the ITC Project) and the Healis-Sekhsaria Institute for Public Health, as part of the ITC parallel surveys in many countries.[21, 24] It is a prospective cohort survey of adults aged 15 years or older, including 8,051 tobacco users (1,255 smoked tobacco users, 5,991 smokeless tobacco users, and 805 mixed users) and 2,534 non-users, in four Indian states: Maharashtra, Madhya Pradesh, Bihar and West Bengal.[24] In each state, respondents came from urban cities and their surrounding rural districts (Patna in Bihar, Kolkata in West Bengal, Indore in Madhya Pradesh, and Mumbai in Maharashtra). The first wave was conducted between August 2010 and October 2011, and was used for the analyses.

Age at smoking onset in TCP data—Among current tobacco users, TCP India asked ever smokers of bidis and cigarettes to report their smoking onset using the following questions: “At what age did you start smoking cigarettes?”, and “At what age did you start smoking bidis?”. Using the above self-reported retrospective information, we were able to identify the ages of cigarette and bidi smoking initiation, as well as the age when any form of smoking initiated (i.e. the initiation of either bidi or cigarette smoking). Specifically, for smokers who had smoked both bidis and cigarettes, we compared their age at bidi smoking onset with the age at cigarette smoking onset, and used the younger onset age to identify any smoking initiation. Among smokers who had smoked both bidis and cigarettes, 62% (309 out of 502 smokers) reported to initiate bidi and cigarette smoking at the same age.

Among non-users of tobacco, some had used tobacco products before. However, TCP India did not ask them about their age of onset. As a result, we dropped 114 non-users who had smoked in the past but were abstinent at the time of the survey. The self-reported onset age of cigarette and bidi smoking are plotted in Figures 1a–1b. For both products, most frequently reported onset ages were 15, 18, 20, and 25.

Tobacco prices

Price data for bidis and cigarettes were collected monthly by experts in major cities of 24 states, including the four Indian states in the TCP India survey, as part of routine large-scale price surveys used to construct consumer price indices (CPI) during the period 1998–2011. The collected prices were standardized to prices per 25 bidi sticks and prices per 10 cigarette sticks. Chewing tobacco prices were also collected for some of the states during a shorter period. Due to the missing data issue, we did not use chewing tobacco prices to examine smokeless tobacco onset in the analyses. Cigarette and bidi prices from 1998 to 2011 were used in the analyses. Given that TCP India primarily surveyed respondents in Patna (Bihar), Kolkata (West Bengal), Indore (Madhya Pradesh), and Mumbai (Maharashtra), and their

surrounding rural districts. We merged price data collected from Kolkata, Indore, and Mumbai to the TCP India using state identifiers. Unfortunately, tobacco prices from Patna were not available. Therefore, we merged the average tobacco prices of the Bihar state with respondents from that state in the TCP data. Finally, these prices were adjusted for inflation and converted to 2010 Rupees using the Indian national CPI reported in the World Development Indicator (WDI) database.

Method

Pseudo panel construction

Following previous studies,[23, 25–28] we expanded the TCP India Survey to annual pseudo panel data by generating data entries for each year or age when respondents were at risk of onset but had not yet initiated. First, we assumed that everyone became at risk of smoking onset at age five. This cutoff was selected by examining the age at onset reported in the TCP data, the age range of the survey (15 or above), and the availability of price data (1998–2011). In other words, age five is the base-line for the subsequent annual follow-ups and smoking onset would be observed since age six and onwards. Next, the onset outcome variable was a dummy that is “0”, when a respondent in that year or at that age had not become a smoker. Once a respondent started to smoke (i.e., reached the age that they reported in the survey to start smoking), the dummy was assigned with a “1”. After a respondent became a smoker, the subsequent years were dropped from the sample. Therefore, for each respondent who eventually became a smoker, we observed the value “1” only once, which indicates the onset. For never-smokers including never tobacco users and smokeless tobacco users who never smoked, the outcome dummy is always “0”. Such format is suitable for a survival analysis or a discrete-time hazard model that measures the probability of a change or a transition, such as smoking onset.[23, 28, 29]

The annual pseudo panel dataset was constructed separately for cigarette smoking onset, bidi smoking onset, and any smoking onset. In the dataset used for estimating cigarette smoking onset, 0 implies that the respondent had not initiated cigarette smoking that year, whereas 1 implies that the respondent initiated cigarette smoking that year. Similarly in the dataset used for estimating bidi smoking onset, 0 implies that the respondent had not initiated bidi smoking that year, whereas 1 implies that the respondent initiated bidi smoking that year. Finally, in the dataset used for estimating any smoking onset, 0 implies that the respondent had not initiated bidi or cigarette smoking (the respondent was a never smoker) that year, whereas 1 implies that the respondent initiated smoking bidis or cigarettes or both that year.

Data merging and Discrete-Time Hazard model

To conduct the analyses, we merged the annual pseudo panel datasets with cigarette and bidi prices using year and state identifiers. The final analytical datasets span from 1998 to 2011. The associations between tobacco prices and smoking onset were then estimated using weighted logistic regressions, which have been commonly used in the literature to estimate a discrete-time hazard model.[27, 30] Specifically, we regressed cigarette onset on cigarette prices, bidi onset on bidi prices, and any smoking onset on both cigarette and bidi prices. In the regression analyses, we controlled for a linear year trend, state fixed effects, time-

varying age dummies, age squared, gender, and urban residency at the time of survey (Model 1). We also controlled for duration dependency, which is a log form of years since age five.[29] Duration dependency controls for the hazards of outcomes change over time (i.e. how likely smoking onset would occur overt time).[28] Analyses were also evaluated by replacing the linear year trend with year fixed effects (Model2), which is a difference-in-difference approach. We conducted both Models 1 and 2 because cigarette and bidi prices were highly correlated with state and year fixed effects in the study period—they together explained 97% of variation in cigarette prices and 96% in bidi prices. Nonetheless, Model 2 was taken as the benchmark model throughout this study.

We further analyzed the benchmark model using subsamples stratified by urban versus rural residency at the time of the TCP survey and tested the difference in the associations between prices and smoking onset by residency. By doing so, we made the assumption that respondents did not move between urban and rural areas over time. Additional analyses stratified by gender were also conducted and results are available upon request. We conducted two sets of sensitivity analyses using the benchmark model. The first set used age six instead of age five as the youngest age to be at risk of smoking onset. The second set used only price data from 2003–2011 because some Indian states may have changed their data collection method around 2002, although this change did not seem to happen in the four Indian states in the TCP survey. All regressions accounted for inter-temporal correlations within the same individual and were conducted using Stata 14.1.

Findings

In Table 1, we report summary statistics for the samples used to analyze cigarette smoking onset (N=111,996), bidi smoking onset (N=113,566), and any smoking onset (N=105,402), and for samples stratified by rural/urban division. The average probabilities of initiating smoking were 6.2–6.3%. The means of other independent variables were roughly the same across the three samples. The percentage of males ranged from 54% to 57%, and the percentage of respondents living in rural areas was 26–27%. The duration dependency measured using the log form of years since age five was around 3.2. The average age was 35–36 years. Bidi prices per 25 sticks were around 6 Rupees, and cigarette prices per 10 sticks were around 19 Rupees. In addition, smoking onset probabilities were almost identical across urban and rural regions.

Table 2 contains results from estimating the associations between tobacco prices and smoking onset using two alternative models. Time trend was controlled for using a linear year trend in the first model, and using year fixed effects in the second model. When a linear year trend instead of year fixed effects was controlled for, higher cigarette prices were significantly associated with a lowered hazard of cigarette smoking onset (Model1 Column1: OR=0.87, 95%CI: 0.83–0.92). However, this association became non-significant once the linear trend was replaced by year fixed effects as control variables. In addition, higher bidi prices were significantly associated with a lowered hazard of bidi smoking onset (Model 2 Column4: OR=0.42, 95%CI: 0.35–0.51), and with a lowered hazard of any smoking onset (Model2 Column6: OR=0.67, 95%CI: 0.56–0.81) prices were associated with a lowered hazard of any smoking initiation. Interestingly, Model 1 (Column 5) suggests that higher

cigarette prices were associated with a lowered hazard of any smoking onset. However, once year fixed effects were controlled for (Model 2 Column6), the association between cigarette prices and any smoking onset turned positive.

Table 3 contains results from stratified regressions by rural vs. urban region, which show distinctive patterns for the association between cigarette prices and smoking onset by the stratification. Specifically, for respondents who lived in urban areas at the time of survey, higher cigarette prices were significantly (Column1: OR=0.91, 95%CI: 0.86–0.97) associated with a lowered hazard of cigarette smoking onset. In contrast, for respondents who lived in a rural area at the time of survey, higher cigarette prices were associated with an increased hazard of cigarette smoking onset (Column2: OR=1.35, 95%CI: 1.19–1.53). For both urban and rural residents, higher bidi prices were associated with a lowered hazard of bidi smoking onset (Column3, Urban: OR=0.27, 95%CI: 0.22–0.34; Column4, Rural: OR=0.64, 95% CI:0.41– 1.00). Furthermore, cigarette prices were not significantly associated with any smoking onset in urban areas, and positively associated with any smoking onset in rural areas (Column 6: PR=1.34, 95%CI: 1.2–1.5). Bidi prices were significantly associated with lowered hazards of smoking onset in both areas (Column5, Urban: OR=0.54, 95%CI: 0.43–0.68; Column6, Rural: OR=0.69, 95%CI: 0.46–1.02).

Wald tests suggest that, for both urban and rural residents (Table 3, Columns5 and 6), the association between bidi prices and any smoking onset significantly differs from that between cigarette prices and any smoking onset ($p<0.01$). Chow test results indicate that the associations between cigarette prices and smoking onset (cigarette smoking onset and any smoking onset) significantly differ by rural/urban division ($p<0.01$). In addition, the association between increasing bidis prices and lowered hazards of bidi smoking onset was greater for urban residents than for rural ones ($p<0.01$). Sensitivity analyses using an age six cutoff as the baseline for being at risk of smoking onset and using the price data from 2003–2011 both showed very similar results.

Discussion

We estimated that higher bidi prices were significantly associated with lowered hazards of bidi smoking onset and smoking onset in general. Further, for urban residents in the four Indian states, higher cigarette prices were significantly associated with a lowered hazard of cigarette smoking onset. These findings add to the evidence that increasing taxes and prices of tobacco products may reduce tobacco use onset in India. Kostova et al. (2015) suggest that increasing tobacco prices likely reduce smoking through reducing smoking onset in low- to lower-income countries, including India, and through promoting quitting in upper middle- income countries.[30] Combined with evidence that prices were not significantly associated with quitting in India,[20] this study provides additional support to the mechanism discussed in Kostova et al. (2015) with regards to the differential impacts of increasing prices on smoking dynamics by countries' income levels.

Our results also suggest that, for urban residents at the time of survey, the negative association between bidi prices and bidi smoking onset appeared more pronounced than the association between cigarette prices and cigarette smoking onset. These findings indicate

that bidi prices may have a greater impact on reducing smoking onset than cigarette prices. However, this pattern needs to be explained in the context of existing literature on the comparison between cigarette and bidi prices with regard to their effects in reducing smoking. Some earlier studies found that the effects of bidi prices on smoking appear to be greater than the effects of cigarette prices.[11, 14] However, studies using more recent data suggest that cigarette taxes have a greater impact on reducing smoking and that cigarettes have been displacing bidis in recent years. [15, 18, 19] Given that we used historical price data from 1998–2011 linked with retrospective information on smoking initiation, it is not surprising that the associations between bidi prices and smoking onset were found to be greater than the associations between cigarette prices and smoking onset. In addition, because bidi prices have been much cheaper than cigarette prices, they may play a bigger role in smoking onset.

Previous studies also suggest that tobacco use and price effects in India may differ by socioeconomic status.[12, 13, 18] Selvaraj et al. (2015) found that the price effects on tobacco use were greater for poorer groups.[12] Therefore, we conducted stratified analyses by rural versus urban division. Unlike previous studies, we found that the negative associations between higher tobacco prices and lowered hazards of smoking onset were greater among urban residents than among rural residents. In fact, for rural respondents at the time of survey, cigarette prices were positively associated with smoking onset.

There are several potential explanations. First, rural respondents in the TCP survey came from rural districts close to cities. With a growing economy, smokers may become more likely to initiate with cigarettes despite higher cigarette prices compared to bidi prices. There are studies documenting that cigarettes have been displacing bidis in recent years, which also support this hypothesis. [18, 19] Second, we could not observe migration between rural and urban divisions in the survey data and assumed that respondents never moved during the study period. This assumption may be violated and thus lead to biased estimates if people who smoked became poor and as a result moved from urban to poorer rural districts. Third, we used price data collected from major cities, which may differ from the prices in rural areas and lead to biased estimates.

Our results also add to the literature on the association between tobacco prices and smoking onset in low- and middle- income countries. Three recent studies investigated the effects of increasing tobacco prices on smoking onset in South Africa, Argentina, and Vietnam, respectively. [26, 27, 31] Two of those studies used national-level prices over time in the analyses and could not control for the time trend of tobacco use behaviors and tobacco control actions.[26, 31] Nonetheless, they found that increasing prices significantly reduce smoking onset, with a price elasticity for onset hazards ranging from −0.4 to −0.9. Unlike those studies, our study employed within-state price variation over time in India to evaluate the relationship between prices and smoking onset, and thus was able to tease out the common time trend and state-level time-invariant sentiment towards tobacco control and tobacco use. Our findings suggest greater price elasticity estimates for onset hazards, which centered on a range from −1.5 to −2.5. The magnitude of these elasticity estimates are large but comparable to another study that also used local-level prices in Vietnam to identify the price impacts on smoking onset.[27]

Although this study does not identify the causal impact of prices on smoking onset, there is suggestive evidence that the results likely remain robust despite of challenges in the identification strategy. First, the tobacco prices may be endogenous. However, according to Jha et al. 2011,[19] bidi industry has a large number of small manufacturers and none of these manufacturers took more than 5% of the market share. Therefore, prices of bidis in an almost perfect competitive market can be considered as exogenous. Furthermore, the association between bidi prices were robust to clustering at the state level and the additional control of state-specific year trends despite of a small number of states (Appendix Table). Finally, although smokeless tobacco users were considered together with non-tobacco users in the analyses, the prices of smokeless tobacco may not bias the results because different tobacco products in India have distinct markets.[13, 19]

Similar to many other studies, this study is subject to several limitations. First, the TCP India did not contain information of smoking onset for respondents who were no longer smokers at the time of survey. Second, ages at smoking onset were self-reported and may contain recall errors. The reported onset ages also appear to be heaping at certain ages such as 10, 15, 20, and 25. Third, the TCP India is not nationally representative and we cannot infer the population-level effects of increasing prices on smoking onset. Because there were only four states in the survey, we could not adjust for inter-temporal correlations among respondents who lived in the same state. The results may be subject to omitted variable bias, such as time-varying tobacco control sentiment and preferences for tobacco. In addition, price data were collected from major cities and may not reflect tobacco prices in rural areas. Lastly, this study relies on several assumptions (e.g., respondents never moved between rural and urban areas) and violation of these assumptions may lead to biased estimates.

In sum, we found that increasing cigarette and bidi prices were significantly associated with lowered hazards of smoking onset in four Indian states, particularly among urban residents. Among rural residents who lived near cities in those states, increasing bidi prices were significantly associated with lowered hazards of smoking onset. However, we also found that cigarette prices were positively associated with the hazards of smoking onset among rural residents, which may be a result of cigarettes replacing bidis in the rural districts. Under the new regime of a central GST system, policy makers may need to raise the prices of tobacco products sufficiently to curb smoking onset.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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‘What this paper adds’

Our study provides empirical evidence on the associations between cigarette and bidi prices and smoking onset in four Indian states, and how these effects differ by rural vs. urban division. We found that increasing cigarette and bidi prices significantly reduced smoking onset among urban residents in four Indian states.

“What is already known on this subject”

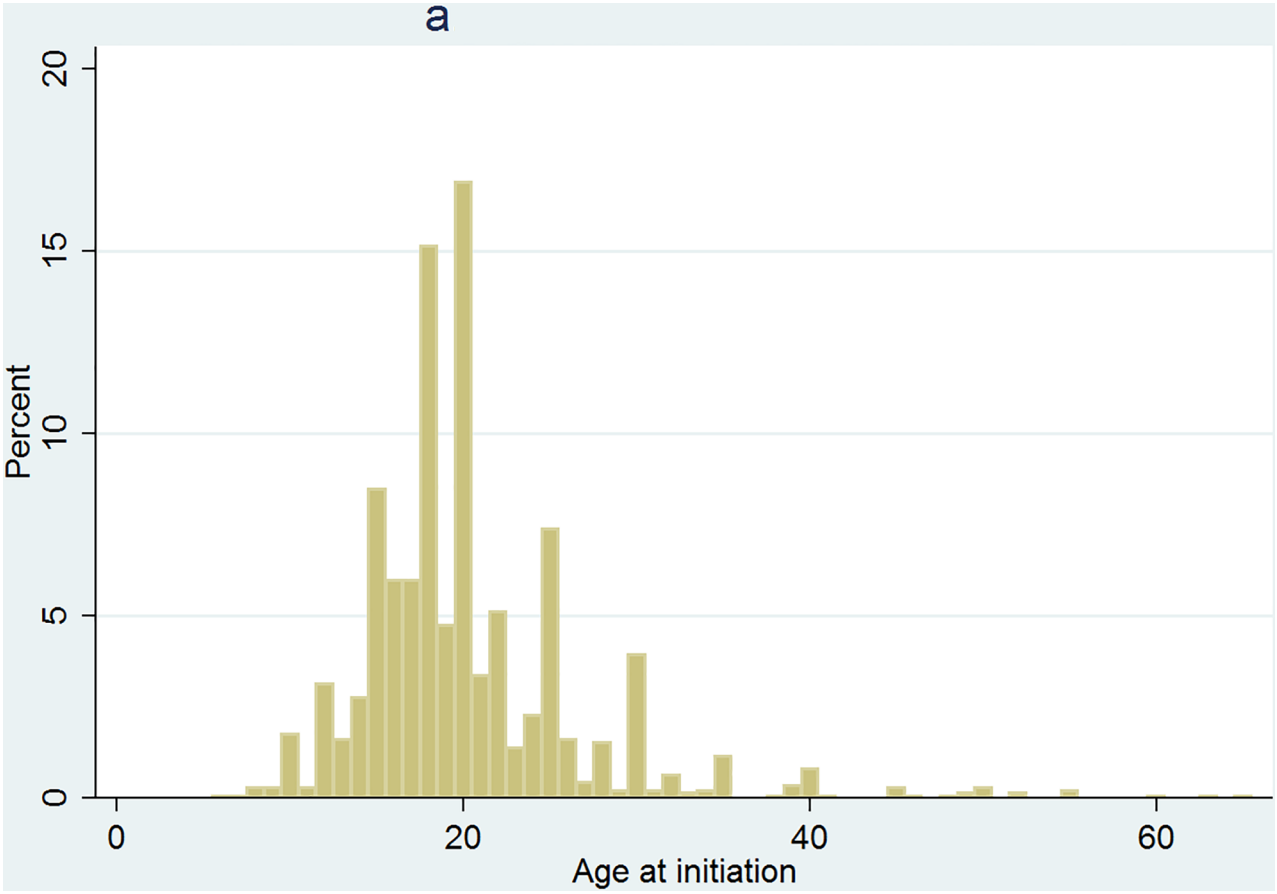
Increasing tobacco prices reduce tobacco demand in India. These price effects tend to differ by socioeconomic status.

“What important gaps in knowledge exist on this topic”.

To our knowledge, very few studies examined how bidi and cigarette prices were associated with smoking onset in India. There is lack of evidence on how price effects on smoking onset differ by products and by socioeconomic status.

“What this study adds”

- Higher bidi prices were significantly associated with a lowered hazard of bidi smoking onset.
- Higher cigarette prices were significantly associated with a lowered hazard of cigarette smoking onset among urban residents.
- The association between increasing bidis prices and lowered hazards of bidi smoking onset was greater for urban residents than for rural ones.
- Under the new regime of a central GST system, policy makers may need to raise the prices of tobacco products at the lower-priced end such as bidis to curb smoking onset.



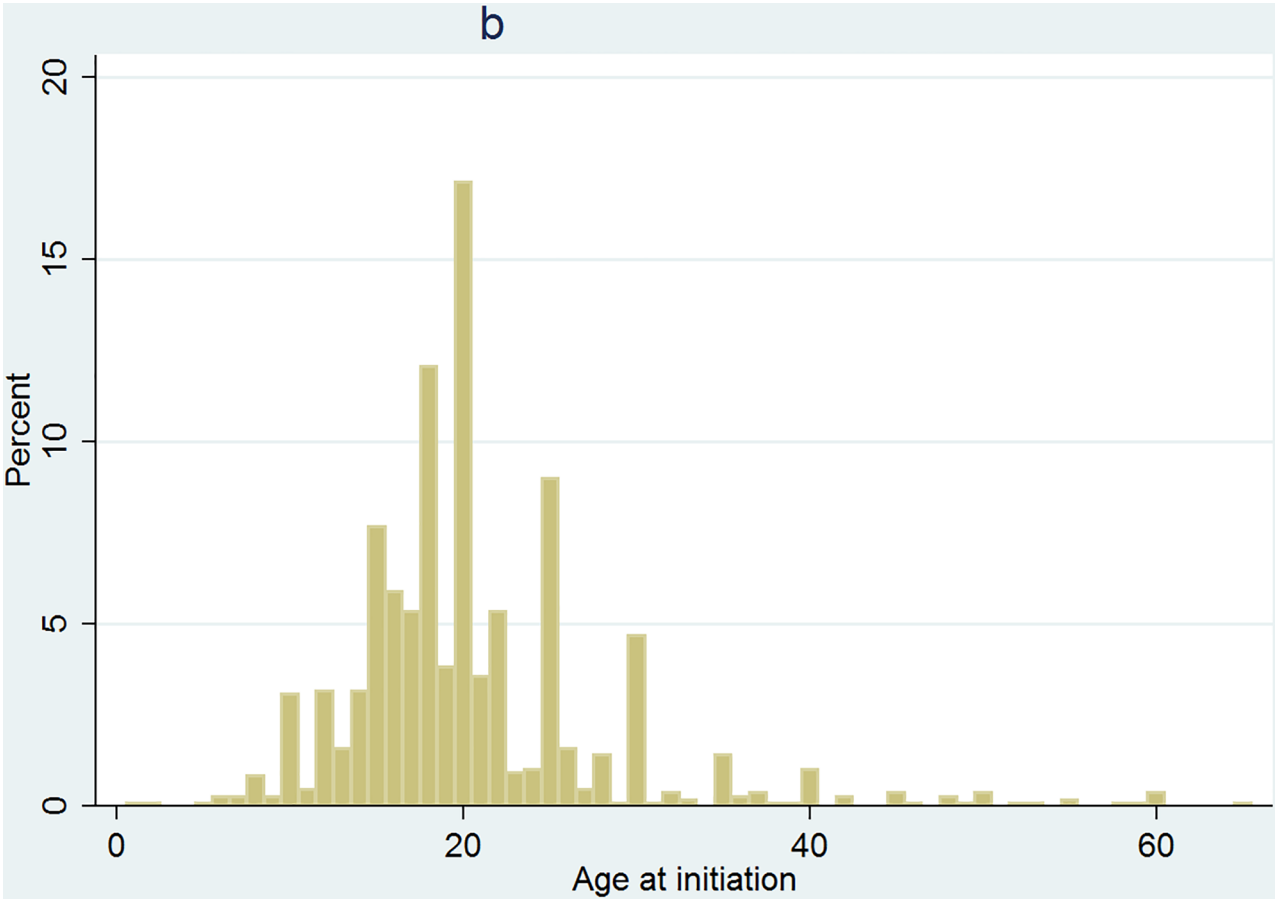


Figure 1.

a. Age at cigarette smoking onset

b. Age at bidi smoking onset

Table 1

Weighted summary statistics.

Variable/ Mean (SD)	Full sample	Urban	Rural
Cigarette onset	(N=111,996)	(N=81,387)	(N=30,609)
Cigarette onset	0.063 (0.243)	0.062 (0.242)	0.064 (0.245)
Male	0.561 (0.496)	0.559 (0.497)	0.565 (0.496)
Rural	0.272 (0.445)	--	--
Duration dependency	3.181 (0.722)	3.188 (0.718)	3.166 (0.732)
Time-varying age	34.587 (16.644)	34.692 (16.61)	34.305 (16.73)
Cigarette prices	18.601 (3.959)	18.562 (3.932)	18.705 (4.027)
Bidi onset sample	(N=113,566)	(N=84,576)	(N=28,990)
Bidi onset	0.062 (0.242)	0.062 (0.241)	0.063 (0.243)
Male	0.569 (0.495)	0.578 (0.494)	0.544 (0.498)
Rural	0.254 (0.435)	--	--
Duration dependency	3.169 (0.715)	3.181 (0.707)	3.134 (0.739)
Time-varying age	34.159 (16.421)	34.375 (16.342)	33.526 (16.636)
Bidi prices	6.018 (1.261)	6 (1.248)	6.069 (1.297)
Smoking onset	(N=105,402)	(N=77,584)	(N=27,818)
Smoking onset	0.063 (0.241)	0.062 (0.241)	0.063 (0.243)
Male	0.536 (0.499)	0.54 (0.498)	0.524 (0.499)
Rural	0.262 (0.44)	--	--
Duration dependency	3.155 (0.73)	3.165 (0.724)	3.127 (0.747)
Time-varying age	34 (16.659)	34.181 (16.595)	33.486 (16.828)
Bidi prices	6.037 (1.268)	6.019 (1.257)	6.086 (1.297)
Cigarette prices	18.582 (3.957)	18.55 (3.93)	18.67 (4.03)

Table 2,

The effects of tobacco prices on smoking onset.

Variable	Cigarette smoking onset (N=111,996)		Bidi smoking onset (N=113,566)		Any smoking onset (N=105,402)	
	(1)	(2)	(3)	(4)	(5)	(6)
Cigarette prices (OR, 95% CI)	0.87*** (0.83, 0.92)	1.03 (0.98, 1.08)	--	--	0.87*** (0.83, 0.9)	1.08*** (1.03, 1.13)
Bidi prices (OR, 95% CI)	--	--	--[a]	0.42*** (0.35, 0.51)	0.84* (0.70, 1.02)	0.67*** (0.56, 0.81)
Model 1: Linear year trend	Yes	No	Yes	No	Yes	No
Model 2: Year effects	No	Yes	No	Yes	No	Yes

Note:

* p<0.1

** p<0.05

*** p<0.01.

Weighted logistic regressions also controlled for duration dependency, time-varying age, age squared, gender, a dummy of residing in rural areas at the time of survey, and state fixed effects. Standard errors were clustered to adjust for inter-temporal correlations within the same individual. Elasticity esimtates for significant negative associations between cigarette prices and smoking onset are −2.4 (Column1) and −2.5 (Column5). Elasticity esimtates for significant associations between bidi prices and smoking onset are −4.8 (Column4), −1.0 (Column5), and −2.2 (Column 6).

[a] the logit regressions with a linear year trend did not converge.

Table 3,

The effects of tobacco prices on smoking onset, by urban vs. rural division.

Variable	Cigarette smoking onset		Bidi smoking onset		Any smoking onset	
	(1)	(2)	(3)	(4)	(5)	(6)
Residence at the time of survey	Urban (N=81,387)	Rural (N=30,609)	Urban (N=84,576)	Rural (N=28,990)	Urban (N=77,584)	Rural (N=27,818)
Cigarette prices (OR, 95% CI)	0.91*** (0.86, 0.97)	1.35*** (1.19, 1.53)	--	--	0.98 (0.92, 1.03)	1.34*** (1.2, 1.5)
Bidi prices (OR, 95% CI)	--	--	0.27*** (0.22, 0.34)	0.64* (0.41, 1.01)	0.54*** (0.43, 0.68)	0.69* (0.46, 1.02)

Note:

* p<0.1

** p<0.05

*** p<0.01.

Weighted logistic regressions also controlled for time-varying age, age squared, gender, year fixed effects, and state fixed effects. Standard errors were clustered to adjust for inter-temporal correlations within the same individual. Elasticity esimtate for the significant negative association between cigarette prices and smoking onset is −1.5 (Column1). Elasticity esimtates for significant negative associations between bidi prices and smoking onset are −7.3 (Column3), −2.5 (Column4),,−3.5 (Column5), and −2.1 (Column 6).