



# Awareness and Attitude Towards Tobacco Products and Tobacco Industry and Perception about Government's Role in Tobacco Control among the Adult Rural Population: A Cross-sectional Study in the Indian State of Bihar

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## Abstract

**Background:** Attitudes and impressions toward the tobacco industry and tobacco products among the general public are important determinants for curbing the menace of the tobacco epidemic. Accordingly, this study aimed to assess the knowledge and perceptions about the tobacco industry and tobacco products and analyze attitudes towards social denormalization (SD) of tobacco use and tobacco industry denormalization (TID) among the rural population of Bihar, India.

**Methods:** This community-based cross-sectional survey was conducted on 421 adults aged 18 to 65 years who were selected using multistage systematic random sampling in a rural area of Bihar State in India from January to March 2022. Results were presented as proportions and the factors associated with support for TID and SD were identified using the chi-square test and binary logistic regression.

**Findings:** Out of 421 participants, 342 (81.2%) did not consider smokeless tobacco to be very dangerous. Nearly half (192, 45.6%) of the individuals believed that tobacco companies never tell the truth about the ill effects of tobacco use on health. Maximum, 345 (89.5%) also believed that the tobacco industry is responsible for adverse health effects of tobacco use and that the government should sue them. The prevalence of favorable attitudes toward TID and SD was found to be 55.1% [95% CI: 50.3% – 59.8%] and 38.2% [95% CI: 33.7% – 42.9%], respectively.

**Conclusion:** One out of every two and one out of every three individuals showed favorable attitudes toward TID and SD, respectively. There is a need to inform and educate the public on the ill effects of tobacco and the deceptive strategies used by the tobacco industry to help them choose health over tobacco.

**Keywords:** Health attitude, Tobacco industry, Smokeless tobacco, Tobacco use, Government

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## Introduction

Tobacco use in India has taken the form of an epidemic with devastating consequences. Tobacco smoking is regarded as a major risk factor for several non-communicable diseases, such as cancer, diabetes, chronic obstructive pulmonary disorder (COPD), and cardiovascular diseases, which contribute to more than 60% of all-cause mortality in India.<sup>1,2</sup> It is also well known that tobacco use and poverty are mutually reinforcing. Every year, millions of tobacco users or their families are forced into poverty. The negative effects of tobacco usage extend beyond merely physical and social concerns to

include cultural, economic, and geopolitical aspects.<sup>3</sup> India is the second largest consumer of tobacco in the world behind China. Tobacco consumption has shown annual growth of 2%-3% in India.<sup>3</sup> Given the problems induced by tobacco use globally, the World Health Organization (WHO) adopted the Framework Convention on Tobacco Control (FCTC) in 2003.<sup>4</sup>

A major obstacle in efficiently implementing the policies to reduce tobacco use is the tobacco industry. Article 5.3 of the WHO-FCTC gives various strategies to combat the interference of the tobacco industry in tobacco control efforts.<sup>5</sup> One of these is to make people aware of



the deceptive strategies used by the tobacco industry to promote its products to the public.<sup>6</sup> Being a signatory to the WHO-FCTC, India is committed to various tobacco control activities. Despite these efforts, the prevalence of tobacco use has not come down very far in the country (GATS 1: 35%, GATS 2: 29%).<sup>7</sup>

A helpful tool for evaluating the nation's progress toward tobacco control measures is the Tobacco Industry Interference Index (TIII), which is based on Article 5.3 criteria of the WHO-FCTC.<sup>8</sup> Based on the most recent assessment using TIII (January 2019– March 2021), India is placed in the 42<sup>nd</sup> position among 80 countries assessed.<sup>9</sup>

In India, lack of public awareness or ignorance is one of the main barriers to anti-tobacco activities. The tobacco business manipulates the general public's perception for its purposes<sup>10–12</sup>; nevertheless, a small group of informed citizens might be vital to tobacco control efforts, even in terms of suggesting legislation.<sup>13,14</sup> The truth lies in the dishonest methods that the tobacco industry employs to weaken, divert attention from, and undermine tobacco control legislation and other tobacco control initiatives. Recently, tobacco industry denormalization (TID) has been identified as the fourth strategy to combat the tobacco menace in many developed countries, in addition to prevention, protection, and cessation activities.<sup>15,16</sup> Denormalization is the term used to describe actions taken expressly to reframe the tobacco industry and its products in a way that is consistent with their addictive and dangerous nature, the negative effects of tobacco use on one's health, society, and finances, and the methods the industry uses to market its goods and foster goodwill among the public.<sup>17</sup> The TID aims to educate people about the dishonest strategies used by the tobacco industry to ensure its survival and to encourage the public's use of tobacco products. TID has been shown as an effective tool in controlling the tobacco epidemic.<sup>16</sup> Though the concept of TID began in the United States, of late, different countries are exploring TID as a valuable tool for tobacco control.<sup>18,19</sup> India is in a unique position, as the use of smokeless products (often considered harmless by the public) is more prevalent than smoking.

Social denormalization (SD) is another tobacco control strategy that shows tobacco use to be an undesirable habit and deviant social behavior.<sup>20</sup> SD strategies have been associated with quit attempts among tobacco users and are implicated in preventing youth from taking up tobacco use.<sup>20–22</sup>

Tobacco use is ingrained in Indian culture and accounts for huge societal as well as economic losses.<sup>3</sup> The Government of India implemented the National Tobacco Control Program (NTCP) in 2009–10 and enacted tobacco control acts such as the Cigarette and Other Tobacco Products Act (COTPA) in 2003.<sup>23</sup> Many civil society organizations are also involved in various tobacco control

activities. The public is being informed about the harmful effects of tobacco use through billboards, printed health warnings on tobacco packages, anti-tobacco messages before shows at cinema theatres or during TV shows, and tobacco victim's stories (e.g., Mukesh – Voice of Tobacco Victims (2011) who died of gutka chewing; Sunita (2015) who suffered from oral cancer due to smokeless tobacco). The knowledge, attitudes, and practices related to tobacco use among different parts of the population have been extensively studied in India. However, public perceptions of the tobacco industry and tobacco products have not been adequately explored in the country, nor have public perceptions of denormalization measures been studied. Findings on these topics will be useful for preparing mass communication materials to create public awareness and support. Public support is important for any policy to be implemented effectively at the grassroots level. India does not have a comprehensive policy that addresses the tobacco industry's involvement in contributing to the tobacco pandemic. This led to the design of the current study, which aimed to evaluate public attitudes towards tobacco use and TID as well as the public's knowledge and opinions of the tobacco industry and tobacco products among adults in a rural area, in Bihar, India.

## Methods

### *Study setting*

This study was conducted in the rural area of Patna which is the capital of the State of Bihar along the south bank of the River Ganges in northeast India. Patna has six medical teaching institutions apart from various primary- and secondary-level healthcare centers. This study was conducted in the rural field practice area “Naubatpur Block” attached to the Department of Community and Family Medicine (CFM) of one of the medical colleges in this region. Naubatpur Block has a population of 2,03,594 (Census 2011, India), residing in 110 villages. The rural health training center attached to this department provides comprehensive primary healthcare to a population of around 15000 spread across five villages with an average population of 3000 per village and also includes community-based outreach activities. These five villages were included in the study.

### *Study design and duration*

This explorative study adopted a community-based cross-sectional design for three months from January 2022 to March 2022.

### *Study participants*

The study population included the adults living in the study areas who were selected based on the inclusion and exclusion criteria. The inclusion criteria for selecting areas and participants were as follows: (1) the area selected should have a minimum of 50 households; (2) the

household selected should comprise permanent residents or persons residing in the study area for at least 6 months; and (3) the selected individual in the household should be aged between 18 and 65 years. The exclusion criteria were (1) seriously ill persons and (2) being under psychiatric care based on self-report.

### **Sample size and sampling technique**

The sample size was calculated using various components/items of TID<sup>15</sup> with the help of OpenEpi software. Around 56% of the population thought cigarettes and tobacco products were too dangerous to be sold at all. The maximum sample size was calculated to be 420 at an absolute precision of 5% with a 95% confidence interval (5% alpha error), 80% power, and 10% refusal rate.

The multistage sampling technique was used to select the sample for the study. In the first stage, five rural areas were conveniently selected to include a predetermined 80-90 households each. In the second stage, about 80-85 households were selected from each selected area using systematic random sampling. In the third stage, from each selected household, one adult individual was selected and if there was more than one eligible individual in the same household, the older one was selected for the study. The selected individual was enrolled after obtaining written informed consent. If there was no eligible individual, the household was not giving consent, or there was a locked house, a replacement household was chosen as per stage two of the sampling method.

### **Study tool**

The study tool included a pre-tested semi-structured interview schedule with closed-ended questions and items/statements on a Likert scale. The study tool adopted was prepared in English and translated into the local language (Hindi) with the help of a medical social worker and a senior resident in the Department of Community and Family Medicine. The translated version was pre-tested in the rural field practice area of the Department of Community and Family Medicine which was not included in the study. Necessary changes based on the feedback were made in the study tool. The tool was back-translated into English to be reviewed by the investigators. Again, the reviewed English version was translated into the final Hindi version by the senior resident and medical social worker of the department according to WHO protocols for translation. The final tool had three sections; section 1 included relevant information on sociodemographic details of the participants, section 2 included questions related to the awareness of the tobacco industry and tobacco products as well as perceptions about the tobacco industry and tobacco products, and section 3 included questions related to attitudes towards TID, SD, and government responsibilities towards tobacco control which was adapted from Ashley's TID study.<sup>15</sup>

Information on TID was collected in two domains. Five items in the first TID domain dealt with attitudes towards the tobacco industry and tobacco products. "Tobacco goods are too harmful to be sold", "Smokeless tobacco products are equally dangerous as smoking tobacco products", and "The tobacco industry is mostly to blame for young people's introduction to tobacco use" were a few of the statements made. The second domain for TID had four items on attitudes towards tobacco control strategies that the government should adopt. Some examples of the items included "Tobacco should be regulated as a hazardous product" and "Tobacco companies should be sued for various health problems associated with tobacco use".

Information on attitudes toward the social perception of tobacco use and government responsibilities had 5 items each. Some examples of the items included "Society disapproves tobacco use", "Is it ok for you if your son or daughter uses tobacco products?", "The government has a definite role in health promotion", and "The government should encourage people to quit tobacco use". All the items on TID, SD, and government responsibilities were on a 3-point Likert scale: agree, don't know, and disagree. The items on the TID and SD questionnaires were scored one mark for each favorable response. All items were finalized in consultation with experts in the field of tobacco control. The items of TID and SD had a Cronbach's alpha of 0.77 (good internal consistency).

### **Study procedure**

Two data collectors (A medical social worker and a postgraduate student in the department of CFM) were trained on the survey and interview details for this research project. As previously mentioned, the trained interviewers visited the chosen houses and recruited the participants. The participants were interviewed face-to-face in their houses using the study tool. Throughout the study, privacy and confidentiality were maintained. The data collected were checked for correctness and completeness every week by the investigators.

### **Statistical analysis**

The collected data were entered into MS Excel and descriptive analysis was performed using Jamovi (version 2.3.13).<sup>24</sup> Categorical variables were presented as proportions and percentages. Individuals with "high scores" were considered to be supporting TID and SD. An individual who agreed on six or more items of TID was considered to have a "High score" for TID. Similarly, an individual who had socially acceptable responses on three or more items of SD was considered to have a "High score" for SD. The proportions of people supporting TID and SD were calculated and presented as percentages with a 95% confidence interval. The factors associated with support for TID and SD were identified using the chi-square test followed by binary logistic regression

analysis. Crude odds ratio and adjusted odds ratio with a 95% confidence interval were used to develop a model. A *P* value of less than 0.05 was considered statistically significant.

## Results

### *Sociodemographic details of the participants*

A total of 421 participants participated in the study. The largest participant age group (128, 39.5%) was 30 to 44 years old. The majority of participants were male (418, 99.3%) and had studied up to class 10 (252, 59.9%). Almost three-fourths (319, 75.9%) of the participants were in semi-skilled and skilled jobs. More than two-thirds (259, 69.1%) possessed ration cards given by the public distribution system (PDS) of the state government.<sup>25</sup> Among them, almost 259 (89%) belonged to the lower socioeconomic status [below poverty line (BPL) category] of the PDS of India.<sup>26</sup>

Furthermore, 81 (20.1%) participants had a family history of chronic diseases. Close to three-fourths (58 out of 81, 71.6%) of the family members with chronic diseases were reported to be using some form of tobacco. About one-fourth (108, 25.1%) of the participants reported a death in the family in the last 10 years. Of these total deaths, about 79.6% (86.108) were reported to be due to chronic diseases (cancers, heart attacks, asthma, diabetes). Moreover, 59.4% (250) and 59.6% (251) of the total participants were ever and current tobacco users, respectively (Table 1).

### *Awareness of tobacco products, the consequences of tobacco use, and the tobacco industry*

The majority (418, 99.3%) of participants were aware of the availability of any form of tobacco products. Around 399 (94.8%) and 368 (87.4%) participants were aware of smokeless tobacco products and smoking tobacco, respectively (Table 2).

The most common negative consequences of tobacco use reported by participants were cancer (307, 72.9%) followed by asthma (166, 39.4%), other lung problems (157, 37.3%), and heart diseases (74, 17.6%) (Figure 1).

Nearly more than half (243, 57.7%) of the participants did not know who manufactures tobacco products. In addition, 128 (20.4%) participants reported farmers as the manufacturers of tobacco products. A few respondents (27, 6.4%) reported the government as the manufacturer of tobacco products. More than half (243, 57.7%) of the participants responded that they did not know what constitutes the tobacco industry. Nearly one-third (133, 31.6%) considered only tobacco manufacturers as the tobacco industry (Table 2).

### *Attitudes towards tobacco products and the tobacco industry*

About half (224, 53.2%) of the participants agreed that

**Table 1.** Sociodemographic details of the participants (N=421)

Variables	Categories	N	%
Age (y) Mean (SD)=42.1(17.6)	<30	121	28.7
	30-45	128	30.4
	45-60	82	19.5
	≥60	90	21.4
Gender	Male	418	99.3
	Female	3	0.7
Education	No Formal education	44	10.5
	Up to class 10	252	59.9
	Beyond class 10	125	29.7
Occupation*	Not working	50	11.9
	Unskilled job	51	12.1
	Semi-skilled/Skilled job	319	75.9
Ration card	No	130	30.9
	Yes	291	69.1
Socioeconomic status <sup>#</sup>	BPL	259	89
	APL	32	11
Marital status	Married	339	80.5
	Unmarried	82	19.5
Type of family	Nuclear	71	16.9
	Extended	329	78.1
	Single-parent	21	5
Family history of chronic diseases	No	340	80.8
	Yes	81	19.2
Deaths in the family in the last ten years	Yes	108	25.7
	Deaths due to chronic diseases (n=108)	86	79.6

APL, above poverty line; BPL, below poverty line

\*Not working includes the retired, students, and housewives; Unskilled jobs include laborers, daily wage workers, coolies; Semi-skilled/Skilled jobs include farmers, carpenters, plumbers, electricians, drivers, security guards, engineers, government and private jobs

<sup>#</sup>Socioeconomic status based on ration card color, based on the public distribution system of Bihar, n=291.

tobacco products are too dangerous to be sold. However, only 79 (18.8%) agreed to this for smokeless tobacco products. Less than half (192, 45.6%) of the participants believed that tobacco manufacturers rarely or never tell the truth about the ill effects of tobacco use. The majority agreed that the tobacco industry is responsible for the health problems of tobacco users (345, 89.5%) and the initiation of tobacco use by young people (380, 90.3%) (Table 3).

### *Attitudes towards TID strategies and government responsibilities for health promotion*

Almost 342 (81.2%) participants agreed that tobacco should be regulated as a hazardous product. More than 80% of the participants believed that tobacco companies should be sued for the ill health effects of tobacco use and also should be fined for the money they earn from selling tobacco to children. However, only one-fourth

**Table 2.** Awareness of the availability of tobacco products and beliefs about the tobacco industry (N=421)

Variables	Categories	N	%
Awareness of the existence of tobacco products	Any form	418	99.3
	Smokeless forms	399	94.8
	Smoking forms	368	87.4
Awareness regarding who manufactures tobacco products	Don't Know	243	57.7
	Farmers	128	20.4
	The government	27	6.4
	Companies (private and corporate)	23	5.5
Beliefs regarding the constitution of the tobacco industry	Don't know	266	63.2
	Tobacco manufacturers (Govt and private)	133	31.6
	Farmers	22	5.2

(104, 24.7%) agreed that the government should sue tobacco companies for the illegal sale of tobacco products including smuggling (Table 3).

The majority (413, 98.1%) of participants believed that the government has a definite role in health promotion but only half of them (211, 50.1%) agreed that the government should declare tobacco products illegal. More than 95% (413, 98.3%) of the participants also believed the government should develop strategies, policy measures, and programs to reduce the level of tobacco use (Table 3).

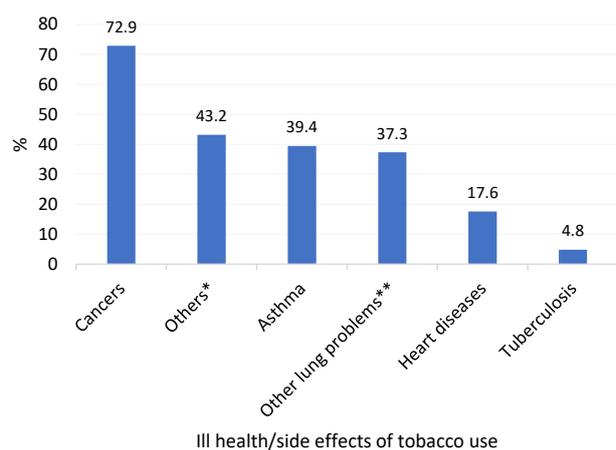
#### Attitudes towards social norms of tobacco use

More than one-third (149, 35.4%) of the participants agreed that society disapproves of the use of tobacco. The majority (402, 95.5%) of the participants would not like their children or any family members to use tobacco products. Nearly two-thirds (275, 65.3%) of the participants also opined that people close to them would not like them to use tobacco products. However, only 255 (60.6%) would dislike neighbors using tobacco products (Table 3).

#### Support for TID and SD

The supports for TID and SD were found to be 55.1% [95% CI: 50.3% – 59.8%] and 38.2% [95% CI: 33.7% – 42.9%], respectively.

Of the different characteristics of the respondents, only awareness of any tobacco products and awareness of side effects were found to be significantly associated with TID, whereas occupation and family structure were found to be significantly associated with SD. Though statistically not significant, the support for TID was found to be proportionately higher among young adults (< 30 years), females, formally educated individuals, no job holders, BPL categories, the unmarried, those belonging to extended families, and those who had never used tobacco



**Figure 1.** Awareness of ill health and side effects of tobacco products (N=421). \* Multiple response items; \* Others-kidney diseases, stroke, liver diseases, infertility, social problems like poverty, family disputes, addiction; \*\*Other lung problems-Infections, chronic cough, breathlessness, etc.

products compared to their counterparts (Table 4).

A higher proportion of individuals were old adults ( $\geq 30$  years), males, job holders, those belonging to BPL families, those who never used tobacco or were not aware of any tobacco products, and those aware of the side effects of tobacco products who showed support for SD (Table 4).

On univariate analysis, being aware of the smoke form of tobacco products [COR:0.3, 95% CI: 0.16-0.8], the perception that “tobacco products are too dangerous to be sold” [COR: 0.27, 95% CI: 0.15-0.47], and the perception that “smokeless tobacco products are equally dangerous” [COR: 3.9, 95% CI: 2.3-6.8] were statistically significant for favorable TID. On adjustment with education status, occupation, ration card holders, current tobacco use, awareness about the tobacco industry (TI), current tobacco use [AOR: 0.39, 95% CI: 0.2-0.8], awareness of the smoke form of tobacco [AOR: 0.14, 95% CI: 0.05-0.4], the perception that “tobacco products are too dangerous to be sold” [AOR: 6.6, 95% CI: 3.2-13.4], and the perception that “smokeless tobacco products are equally dangerous” [AOR: 7.7, 95% CI: 3.3-17.5] were independent correlates of favorable TID. Similarly, the perception that “smokeless tobacco products are equally dangerous” [AOR: 2.69, 95% CI: 1.36-5.34] was an independent correlate of favorable SD after adjustment with education status, occupation, ration card holders, current tobacco use, awareness of the smoke form of tobacco, awareness of TI, ill effects of tobacco use, and the perception that “tobacco products are too dangerous to be sold” (Table 5).

#### Discussion

In this study, in a limited rural area of Patna, the majority of participants disapproved of tobacco use (especially smoking) and supported the SD of tobacco. The respondents, however, lacked adequate knowledge

**Table 3.** Attitudes of the participants towards tobacco products, TI, tobacco control strategies, social norms for tobacco use, and government responsibilities for health promotion (N=421)

Domains	Items	Agree	Neutral/Don't know	Disagree
<b>Attitudes towards tobacco products or TI</b>	Tobacco products are too dangerous to be sold	224 (53.2)	11 (2.6)	186 (44.2)
	Smokeless tobacco products are equally dangerous as smoking tobacco products	79 (18.8)	41 (9.7)	301 (71.5)
	The tobacco industry rarely/never tells about the health effects of tobacco use	192 (45.6)	37 (8.8)	192 (45.6)
	The tobacco industry is mostly or completely responsible for the health problems of tobacco users	377 (89.5)	17 (4)	27 (6.4)
	The tobacco industry is most responsible for young people starting to use tobacco products	380 (90.3)	26 (6.2)	15 (3.6)
<b>Attitudes towards TID strategies</b>	Tobacco should be regulated as a hazardous product	342 (81.2)	53 (12.6)	26 (6.2)
	The tobacco industry should be fined for the money they earn from tobacco use among children and adolescents	337 (80)	14 (3.3)	70 (16.6)
	Tobacco companies should be sued for various health problems associated with tobacco use	345 (81.9)	35 (8.3)	41 (9.7)
	The government should sue tobacco companies for the illegal sales of tobacco products including smuggling	104 (24.7)	59 (14)	258 (61.3)
<b>Attitudes towards (SD)</b>	Society disapproves of tobacco use	149 (35.4)	89 (21.1)	183 (43.5)
	Is it ok for you if your son or daughter uses tobacco products?	15 (3.6)	4 (1)	402 (95.5)
	Is it ok for you if your family members/close relatives use tobacco products?	61 (14.5)	2 (0.5)	358 (85)
	Is it ok for you if your neighbor or any other person from your locality uses tobacco products?	161 (38.2)	5 (1.2)	255 (60.6)
	There are fewer and fewer places where I feel comfortable using tobacco products	291 (69.1)	41 (9.7)	89 (21.1)
	People who are important to me believe I should not use tobacco products	275 (65.3)	54 (12.8)	92 (21.9)
<b>Government responsibility</b>	The government has a definite role in health promotion	413 (98.1)	2 (0.5)	6 (1.4)
	The government should formulate policies and programs to reduce the level of tobacco use	414 (98.3)	1 (0.2)	6 (1.4)
	The government should encourage people to quit tobacco use	374 (88.8)	15 (3.6)	32 (7.6)
	The government should discourage young people from taking up tobacco use	33 (7.8)	100 (23.8)	288 (68.4)
	The government should declare tobacco products illegal	211 (50.1)	109 (25.9)	101 (24)

regarding the dangers of smokeless tobacco. They also had a limited understanding of what the tobacco industry constitutes. The majority of them thought that tobacco product makers mislead about their products and are accountable for the harm caused to consumers. Besides, most of the participants were in favor of TID and SD.

#### ***Attitudes towards tobacco products and the tobacco industry***

Awareness of the harms of smokeless tobacco products among the participants in this study was lower than that of smoking tobacco. Many factors including perceiving smokeless products as harmless, less addictive, and less risky for health are the obstacles to its control.<sup>27</sup> As smokeless forms are the most prevalent forms of tobacco use in India, it is of utmost importance to make the public aware of the fact that smokeless products are equally dangerous as smoking forms. The majority of the respondents were not aware of what constitutes the tobacco industry. However, they were aware of tobacco

manufacturers and considered them as the tobacco industry. Campaigns should be launched to inform people that anyone cultivating tobacco plants, collecting tobacco leaves or flowers, or involved in any capacity in manufacturing or selling tobacco products is a part of the tobacco industry which is killing millions every year.<sup>28</sup> This may help them to become aware of the tobacco industry and its deceptive strategies.

It has been found that smokers are generally not reported to have strong anti-tobacco industry feelings. However, smokers with anti-tobacco industry beliefs are reported to have more intention to quit smoking.<sup>22</sup> Nearly half of the participants in the present study considered tobacco manufacturers to be dishonest as they do not tell the truth about the ill effects of tobacco use. Similar findings have been reported by the studies conducted in Canada (75%), Hong Kong (56%), the US (76%), the UK (70%), and Australia (83%).<sup>15,20,29</sup> The majority, around 90%, of the participants in the present study also believed that tobacco companies are responsible for the health

**Table 4.** Association of attitudes towards TID and SD with sociodemographic variables (N=421)

Variables	Categories	Favorable attitudes towards TID [%; 95% CI]	Favorable attitudes towards SD [%; 95% CI]
Age (y)	<30	57.9 (48.9-66.3)	34.7 (26.8-43.5)
	≥30	54 (48.4-59.5)	39.7 (34.3-45.3)
Gender	Male	55 (50.2-59.7)	38.3 (33.7-43.1)
	Female	66.7 (20.7-93.8)	33.3 (6.1-79.2)
Education	No formal education	47.79 (33.8-62.1)	38.6 (20-46.5)
	Formal education	56 (50.9-60.9)	38.2 (33.4-43.2)
Occupation <sup>#</sup> (P=0.05)	Unemployed	56 (42.3-68.8)	26 (15.8-39.5)
	Employed	55 (49.9-59.9)	39.9 (35.1-44.9)
Socioeconomic status <sup>*</sup>	BPL	54.4 (48.3-60.4)	39.8 (34-45.8)
	APL	53.1 (36.4-69.1)	25 (13.2-42.1)
Marital status	Married	19.2 (15.4-23.7)	36.9 (31.9-42.1)
	Unmarried	20.7 (13.4-30.7)	43.9 (33.6-54.6)
Family structure <sup>#</sup> (P=0.04)	Extended	18.5 (14.7-23.1)	41 (35.8-46.2)
	Nuclear	22.5 (14.4-33.5)	31 (21.4-42.8)
	Single-parent	23.8 (10.6-47.5)	19 (7.6-40)
Tobacco use	Ever	18 (13.7-23.2)	37.2 (31.4-43.3)
	Never	21.6 (16.1-28.4)	39.8 (32.7-47.25)
Awareness of any tobacco products <sup>**</sup> (P<0.001)	No	66.7 (20.8-93.8)	66.7 (20.7-93.8)
	Yes	19.1 (15.7-23.1)	38 (33.5-42)
Awareness of side effects <sup>**</sup> (P=0.04)	No	22.2 (6.3-54.7)	33.3 (12.06-64.6)
	Yes	55.8 (51-60.5)	38.3 (33.8-43.1)
Awareness of what tobacco companies are	No	54.9 (48.9-60.7)	39.5 (33.8-45.5)
	Yes	55.5 (47.6-63.1)	36.1 (28.9-43.9)

\*n=291; \*\*Statistically significant by chi-square test for favorable TID across awareness of tobacco products and side effects of tobacco products; #Statistically significant for favorable SD by chi-square test across occupation and family structure

problems of tobacco users and the initiation of tobacco use which indicates public awareness of the misdeeds of tobacco manufacturers and disapproval of the same. This supports TID measures and can be useful in the formulation of policies against the interference of the tobacco industry in tobacco control. Compared to the findings of the present study, a Canadian survey found that 22% of participants thought the tobacco industry was to blame for the health issues associated with tobacco use as well as having a part in the commencement of tobacco use.<sup>15</sup>

#### **Attitudes towards tobacco control strategies and government responsibilities for health promotion**

Tobacco products are still legally permitted to be manufactured, distributed, and sold in India. Legal restriction applies only to their promotion, use in public places, and sale to minors or around educational

institutions.<sup>30</sup> When tobacco products are legal, the general public presumes them to be safe or less hazardous than they are. However, more than 80% of the respondents in this study opined that tobacco products are dangerous and should be made illegal. Participants expressed worry over the sale of tobacco products to minors and were firmly in favor of the government penalizing the tobacco industry for the same. The majority of the participants did not show support for government policies aimed at reducing the level of tobacco use. A contrasting opinion has been reported by others elsewhere as well. Only half (56%) in Canada thought cigarettes are too dangerous to be sold.<sup>15</sup> Tobacco companies are expanding their customer base by attracting children with new promotional schemes (brand stretching, brand extension, and other surrogate activities). Given the support of the public, mass anti-tobacco campaigns can be organized against surrogate advertisements by the tobacco industry.

#### **Support for TID and SD**

The findings of this study, which indicated that more people supported TID than SD, are positive indicators for the anti-tobacco strategy. TID attracted more support than SD. Moreover, about one-third of the respondents in the study agreed that society disapproves of tobacco use. In a multinational study, around 80% of smokers thought similarly.<sup>20</sup>

More than others, respondents were worried about their loved ones using tobacco products. Tobacco use, in any form and by anyone, is a matter that must be addressed if a comprehensive tobacco control policy is to be successful. More of the younger respondents were supportive of TID than of SD. Maybe younger people tend to consider tobacco as pleasant and try to experiment with it. Older people consider tobacco products to be socially acceptable. A study in Hong Kong among adolescents also reported that the younger age group was associated with TID beliefs.<sup>29</sup> The employed were more in favor of SD compared to those who were unemployed. Similarly, respondents belonging to extended families were more in support of SD compared to those belonging to nuclear families. This study also found that those respondents who were aware of the side effects of tobacco use were more in favor of TID than their counterparts. No statistically significant difference was found between the support for TID and SD based on other sociodemographic factors. Chen et al in Hong Kong also reported the same.<sup>29</sup> Ever-tobacco users showed less support for TID and SD compared to never users. Weak to moderate supports for TID and SD have been reported by studies in other countries like Canada, Australia, the UK, and the USA.<sup>15,21,29</sup> A multicenter study involving four nations reported that smokers have negative attitudes towards the tobacco industry.<sup>20</sup> This study revealed that favorable TID was independently

**Table 5.** Correlates of TID and SD among the participants

Variables	Categories	TID		SD	
		COR (95% CI)	AOR (95% CI)	COR (95% CI)	AOR (95% CI)
Education	No formal education	1	1	1	1
	Formal education	0.6(0.3-1.2)	1.15(0.5-2.9)	0.6(0.2-1.4)	0.73(0.3-1.9)
Occupation	Unemployed	1	-	1	1
	Employed	1.5(0.7-3.6)	-	2(0.59-6.7)	2.1(0.6-6.9)
Ration card	BPL	1	1	1	-
	APL	1.8(0.8-4)	0.83(0.3-2.3)	0.55(0.12-2.42)	-
Current tobacco use <sup>b</sup>	No	1	1	1	1
	Yes	0.8(0.5-1.3)	0.39(0.2-0.8)	0.9(0.49-1.7)	6.3(0.3-12.3)
Awareness of smoking forms of tobacco <sup>ab</sup>	No	1	1	1	-
	Yes	0.3(0.16-0.56)	0.14(0.05-0.4)	0.87(0.37-2.3)	-
Awareness of TI <sup>b</sup>	No	1	1	1	1
	Yes	0.8(0.5-1.4)	0.38(0.2-0.8)	0.75(0.38-1.5)	0.67(0.3-1.3)
Awareness of ill effects of tobacco use	No	1	1	1	1
	Yes	0.5(0.06-4.1)	1.43(0.05-40.2)	1.1(0.12-8.5)	1.1(0.1-8.8)
The perception that tobacco products are too dangerous to be sold <sup>ab</sup>	Disagree	1	1	1	1
	Agree	0.27(0.15-0.47)	6.6(3.2-13.4)	1.1(0.59-2.1)	1.1(0.55-1.9)
The perception that smokeless tobacco products are equally dangerous <sup>abcd</sup>	Disagree	1	1	1	1
	Agree	3.9(2.3-6.8)	7.7(3.3-17.5)	2.74(1.4-5.3)	2.69(1.36-5.34)
Nagelkerke R <sup>2</sup>		0.35		0.07	

<sup>a</sup> Statistically significant for favorable TID on univariable analysis; <sup>b</sup> Statistically significant (correlates) for favorable TID on multivariable analysis; <sup>c</sup> Statistically significant for favorable SD on univariable analysis; <sup>d</sup> Statistically significant (correlates) for favorable SD on multivariable analysis

associated with knowledge of the smoking form of tobacco and the perceptions that “tobacco products are too harmful to be sold” and “smokeless tobacco products are equally dangerous”. A study from Canada reported that non-smoking, knowledge about health effects caused by tobacco, and support for the role of the government in health promotion were predictors of favorable TID.<sup>15</sup> The perception that “smokeless tobacco products are dangerous” was an independent predictor of favorable SD in this study. In a multinational study, regulations aimed at controlling tobacco use, like enforcing stricter workplace smoking bans and observing health warnings on packaging, were strongly associated with SD and anti-tobacco industry attitudes.<sup>20</sup>

Although the idea of tobacco denormalization was developed in Western nations like the United States and Australia, it is gradually gaining traction in other areas of the world as well. In Iran, several measures have been taken including strict legal decisions to regulate tobacco import and developing a strong tobacco surveillance system.<sup>31</sup> However, in South Asian countries including India, the concept of TID is lacking despite the high consumption of tobacco products. As the tobacco control campaign is gaining momentum in India and the public is being informed about the ill effects of tobacco use, denormalization measures should be supported to influence policymakers for the implementation of tobacco control measures.

Health belief models state that people will accept an intervention or a product if they find it beneficial for their health.<sup>32</sup> If they perceive the product to be harmful, they will reject it. Tobacco control professionals and organizations need to play a significant role in bringing the reality of tobacco products and the tobacco industry in front of the people.

### Strength and Limitations

This study is the first of its kind in the South-East Asian region, as far as we are aware. However, the results of this study need to be interpreted cautiously while extrapolated to majority of Indian context and compared with the other studies. The health system related factors that affect the perception and use of tobacco products could not be assessed. These factors influence the awareness about tobacco products and their harmful effects as well as the tobacco industry. Bihar is one of the poor-performing states in India as far as the health system is concerned. The sample size though adequate, was small and limited to the rural region chosen in the Indian state of Bihar; thus, it might affect the generalizability of the findings to the whole Indian context. Larger multicenter studies would allow results from smokers and non-smokers to be compared, leading to more precise targeting of awareness and advocacy activities. This was a cross-sectional study and the results reflected the snapshot of characteristics and attitudes hence, it may not be able to

capture the dynamic changes in attitudes and perceptions over time. Additionally, we were unable to collect data on the frequency or amount of exposure to tobacco control measures as well as tobacco industry promotion. Moreover, social desirability bias could have played a role in the responses. To counter this effect, the interviewers were instructed to build a good rapport with the participants and explain the utility of the project to them. Despite the efforts, the social desirability bias may not have been eliminated. Besides, the female representation in this study was less because of the local cultural background of this state where the head of the family is mostly a male. The study would have wider representation if we could include more female participants and take their views too. In addition, concerning sampling, the oldest member of the family was selected if more than one eligible member was present in the study. This might have created a bias in the awareness level. The study did not provide enough information on the specific strategies and policies that have been implemented in India to reduce the level of tobacco use, and the effectiveness of these strategies. Further research in this area is mandatory. Furthermore, the study could have benefited from the use of more advanced statistical analysis methods to better evaluate the relationships between the variables of interest. Additionally, the study did not examine the participants' knowledge of the tobacco industry interference as defined by Article 5.3 of the WHO-FCTC. Future research in this area would benefit the policymakers. Moreover, the study did not examine the perceptions of the participants about the effectiveness of the government's role in tobacco control and the laws and regulations in place including the National Tobacco Control Programme which was way out of the scope of the study. Future research in this area would benefit the government.

### Conclusion

Only a small proportion of the study participants perceived smokeless tobacco products to be as dangerous as smoking forms. Six in ten and four in ten respondents supported TID and SD measures, respectively. The attitudes towards various facets of TID and SD vary considerably among the study participants. The results of the study revealed the majority of the participants supported tobacco denormalization measures, albeit in a confined area.

### Recommendations

There is a need to inform and educate the public about the negative consequences of tobacco in general, smokeless tobacco in particular, and the deceptive tactics employed by the tobacco industry, especially if results from studies conducted elsewhere are in line with those of the current study. The widely held idea that manufacturers are accountable for the damage caused by their products and

the introduction of those products even by minors can be used to persuade policymakers to support TID policy measures against industry meddling in tobacco control. The widespread belief that tobacco products should be made illegal can support anti-tobacco campaigns against surrogate advertisements for tobacco products. Tobacco control needs to do more to expose the truth about tobacco products and the tobacco industry. Future research including larger samples, more representative of the Indian population, and on perceptions about the role of governments and existing laws on tobacco, COTPA, and WHO-FCTC would benefit the policymakers to curb the burden of use of tobacco in India.

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### Authors' Contribution

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### Competing Interests

The authors declare no conflict of interest.

### Ethical Approval

This study was approved by the Institutional Ethics Committee of All India Institute of Medical Sciences, Patna, India (AIIMS/Pat/IEC/2021/837). We adhered to the principles of ethics thereafter. Informed written consent was taken from the eligible participants.

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