

# Determinants of awareness on pictorial health warnings on tobacco products in an Eastern state of India

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## ABSTRACT

**Background:** Pictorial health warnings (PHW) are an effective strategy to deter or reduce tobacco use. This study was conducted to determine the level of awareness of PHWs on tobacco products and their correlates among adults attending the outpatient department (OPD) of a tertiary care facility in Eastern India. **Materials and Methods:** This cross-sectional study was conducted over a period of 3 months among 307 patients aged 18 years to 65 years. A pre-tested semi-structured questionnaire was used for the collection of data and inferential statistics were performed using JAMOVI version 2.3.21. **Results:** About 84% (95% CI, 78.9-87.2) of the participants were aware of PHW on tobacco products, 82.4% (95% CI, 77.8-86.3) for smoked forms and 51.8% (95% CI, 46.2-57.3) for smokeless forms. More than half of the participants felt that the current PHW were ineffective. Male [AOR, 3.13; 95% CI, 1.33-7.37], being educated [AOR, 3.37; 95% CI, 1.29-8.76], employment [AOR, 5.65; 95% CI, 1.21-26.30] and ever-tobacco use [AOR, 3.23; 95% CI, 1.43-7.2] were found to be independent correlates of PHW awareness for smoked tobacco products, whereas as being male [AOR, 2.01; 95% CI, 1.02-3.95] and being young (18-30 years) [AOR, 2.51; 95% CI, 1.08-5.84] were found to be the independent predictors of PHW awareness for smokeless tobacco products (SLT). **Conclusion:** Four out of every five individuals were aware of pictorial health warnings (PHW) on tobacco products; however, it was much less for SLT compared to smoked tobacco products. Male, being educated, employment and ever-tobacco use were independent correlates of awareness for the smoked form of tobacco products, whereas being young (18-30 years) was an independent predictor of awareness for SLT.

**Keywords:** Bihar, pictorial health warning, smokeless tobacco products, tobacco

## Introduction

Tobacco, the ubiquitous public health menace, is the leading killer among risk factors costing over 8 million lives every year.<sup>[1,2]</sup> When it does not kill, the price exacted is morbid, as tobacco use is a significant risk factor for cardiovascular diseases, chronic obstructive pulmonary disease, and a wide range of cancers.<sup>[3]</sup> The Global Adult Tobacco Survey (GATS) Fact Sheet, India, 2016-17, documented that 28.6% of all Indian adults (42.4% of

adult men and 14.2% of adult women) use tobacco, either the smoked or smokeless form.<sup>[4]</sup>

Stringent regulations, the bedrock necessary to curb this issue of grave concern, are laid out and overseen in India by the Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Act (COTPA, 2003). Section 7 of the act stipulates that all tobacco products in India must bear Pictorial Health Warnings (PHW).<sup>[5]</sup>

PHW warn the public of the harmful effects of tobacco use and are a proven strategy to decrease tobacco use by improving awareness of its health risks. The coverage area of the warning

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label was increased from the earlier 40% to 85% in 2014 on every tobacco product to increase the effectiveness of PHW.<sup>[6]</sup>

Studies have reported inadequacies in the awareness and understanding of PHWs in India.<sup>[7-12]</sup> Bihar is one of the states with reportedly high consumption of tobacco, particularly smokeless tobacco (SLT).<sup>[13]</sup> Therefore, this study was conducted to determine the level of awareness of PHWs on tobacco products and their correlates among adults attending the outpatient department (OPD) of a tertiary care facility in the state of Bihar, India.

## Materials and Methods

### Study design and duration

This was a hospital-based cross-sectional study conducted over a period of 3 months (September to November 2022).

### Study setting

This study was conducted in AIIMS Patna, an Institute of National Importance (INI) under the aegis of the Ministry of Health and Family Welfare (MoHFW), Government of India (GoI), with a capacity of 960 beds and a daily average footfall of 3000 out-patients.

### Study population

The study's population were adult patients aged 18 to 65 years attending the various out-patient department (OPD) of AIIMS Patna who provided written informed consent. The common OPD waiting area was chosen for this purpose. Debilitated patients, those with hearing difficulty, and patients under psychiatric care were excluded from the study.

### Sample size and sampling technique

According to Karinagannanavar *et al.*,<sup>[7]</sup> the awareness of PHWs among tobacco users was found to be 73%. Assuming an awareness level of 70% among the general population, we estimated a sample size of 292 at 5% absolute precision and 95% confidence level, after adjusting for a finite population of 3000. Considering a non-response rate of 5%, the final sample size was calculated to be 307.<sup>[14]</sup> The participants who were eligible and consented were enrolled consecutively till the sample size was achieved.

### Study tool and procedure

A pre-designed, semi-structured, and pre-tested questionnaire was used to obtain the data from the eligible participants. The questionnaire consisted of three sections, Section A included information regarding socio-demographic details like age, gender, and education. Section B inquired about tobacco use, including the form of tobacco used and the duration of use. Section C included items related to awareness of the PHWs on tobacco products like the image on the tobacco products, their perceived meaning, and the perceived effectiveness of these warnings.

The tool was drafted as a Google form for ease and uniformity of data collection, and tool was administered via face-to-face interview in the local language (Hindi), and responses recorded.

The participants who used either of the tobacco products within past 30 days of interview whether on a daily or non-daily basis were considered as current tobacco users. Ever tobacco users were those who had used tobacco products at least once in lifetime may not be at the time of interview and in the past 30 days.

### Statistical analysis

Data collected were entered and stored in MS Excel and analyzed using jamovi version 2.3.21. A descriptive analysis was performed to describe the socio-demographic details of the participants, and the proportion (with 95% confidence intervals) of awareness of PHWs on tobacco products. Univariate analysis was performed, and a *P* value < 0.2 was used to include variables in the multivariate logistic regression model to determine the correlates of awareness of PHW on tobacco products. A *P* value of < 0.05 was considered statistically significant.

### Ethical considerations

Written informed consent was taken from all the participants, and data privacy and confidentiality were maintained. Overall, the principles of ethics were adhered to throughout the study.

## Results

Table 1. depicts the main socio-demographic details of our study participants. Out of 307 participants, the predominant

**Table 1: Socio-demographic details of the participants (n=307)**

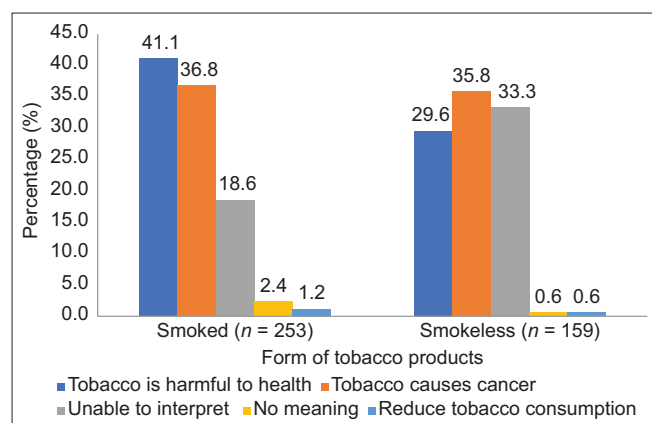
Variables	n (%)
Age	
<30 years	123 (40.1%)
30-50 years	139 (45.3%)
>50 years	45 (14.6%)
Gender	
Male	251 (81.8%)
Female	56 (18.2%)
Education	
Educated	265 (86.3%)
No formal education	42 (13.7%)
Employment status	
Employed	206 (67.1%)
Unemployed	101 (32.9%)
Ration card	
Yes	137 (44.6%)
No	170 (55.4%)
Type of family	
Nuclear	210 (68.4%)
Joint	97 (31.6%)
Marital status	
Married	196 (63.8%)
Not married	111 (36.2%)

respondents were male (81.8%), most were educated (86.3%), and two-thirds (67.1%) were employed. The mean age of the study participants was 35.8 [standard deviation (SD) 12.8], and the majority (85.4%) were between 18 and 50 years of age.

A total of 138 (45%) and 89 (29%) participants were ever and current tobacco users. Overall, 84% (95% CI, 78.9-87.2) were aware of the PHWs on at least one kind of tobacco product, and over half of the participants [53.1% (95% CI, 47.51-58.76)] believed that the current PHWs on tobacco products were ineffective. Awareness of the PHW on smoked tobacco products was reported by 253 [82.4% (95% CI, 77.8-86.3)] respondents. Among them, 193 (77.2%) reported seeing a picture of cancer on the package when asked about it, 54 (21.6%) did not remember the picture, and 3 (1.2%) recalled seeing the label “Smoking kills” on the product package. Figure 1. depicts the respondents’ perceived meaning of the PHWs on smoked tobacco products. 104 (41.1%) reported that the PHWs portray tobacco as being harmful to health, 93 (36.8%) stated that the PHWs meant to communicate that tobacco causes cancer, 47 (18.6%) of them reported an inability to interpret the PHWs, 6 (2.4%) claimed that the PHWs hold no meaning, and 3 (1.2%) believed the PHWs were meant to reduce tobacco consumption.

Awareness of the PHW on SLT products was reported among 159 [51.8% (95% CI, 46.2-57.3)] participants. Among them, 108 (67.9%) recalled seeing a picture of cancer on the package, while 51 (32.1%) reported they did not remember the picture. Figure 1 also details the respondents’ perceived meaning of the PHWs on smokeless tobacco (SLT) products. 57 (35.8%) responded that the PHWs meant to communicate that tobacco causes cancer, 53 (33.3%) reported an inability to interpret the PHWs, 47 (29.6%) claimed that the PHWs portray tobacco as being harmful to health, 1 (0.6%) respondent each stated that the PHWs hold no meaning and were meant to reduce tobacco consumption.

A history of ever tobacco use compared to those without was associated with higher awareness for both smoked [88.4% (95% CI, 81.85-93.22) vs 77.51% (95% CI, 70.46-83.56)] and



**Figure 1:** Perceived meaning of the Pictorial Health Warning (PHW) on smoked and smokeless tobacco (SLT) products

SLT [57.24% (95% CI, 48.54-65.62) vs 47.33% (95% CI, 39.61-55.14)] products. Higher awareness was also observed among males, educated, employed individuals and students for smoked products [Table 2], and among males, educated individuals and ration card holders for SLT [Table 3].

Multivariate analysis showed that male gender [Adjusted OR (AOR), 3.13; 95% CI, 1.33-7.37], being educated [AOR, 3.37; 95% CI, 1.29-8.76], and being employed [AOR, 5.65; 95% CI, 1.21-26.30] were independent predictors of awareness of PHWs on smoked tobacco products. Ever tobacco use [AOR, 3.23; 95% CI, 1.43-7.29] was also associated with awareness. Conversely, those who were married [AOR, 0.19; 95% CI, 0.04-0.89] had lower levels of awareness [Table 2].

Similarly, male gender [AOR, 2.01; 95% CI, 1.02-3.95] and belonging to the younger age group (18-30 years) [AOR, 2.51; 95% CI, 1.08-5.84] were independent predictors of awareness of the warnings on SLT. Possession of a ration card [AOR, 2.23; 95% CI, 1.35-3.68] was also a significant predictor of awareness [Table 3].

## Discussion

Pictorial warnings serve as an effective measure in motivating users to restrain from tobacco use, by understanding the gravity of its implications. A distinct advantage of visual media is that it is not subjected to provider-related variation in interpretation encountered in other modes of communication. They are a powerful, evocative medium and can influence people from all rungs and walks of life.

Four in every five participants in our study were aware of PHW on tobacco products. However, proportion PHW was significantly less for smokeless tobacco products (52%) compared to smoked ones (82%). Awareness among ever tobacco users was higher than non-users. This could be because users come in direct contact with tobacco products and are more likely to view the warnings. The low awareness on PHW over smokeless tobacco products is a grave concern as SLT is a major tobacco form consumed in India. The awareness on PHWs varies from 40% to 96% in India.<sup>[7,9,12,15]</sup> Higher proportion of awareness on PHW was reported from the hospital setting at a dental college in Bangalore (92.6%).<sup>[15]</sup> Similarly, higher proportion of awareness on PHW was reported among tobacco users from Bellary (72.5%) and Ranchi (96.1%).<sup>[7,9]</sup> However, lower proportion of awareness on PHW (39.5%) was reported in a community-based study in Rural Pondicherry.<sup>[12]</sup> The disparities in awareness may be due to differences in the study populations’ socio-demographic characteristics and the study settings.

In our study, males, educated individuals, employed persons, and ever tobacco users had significantly higher awareness on the pictorial warnings on smoked tobacco products than their counterparts. Awareness was higher among males, younger respondents (18-30 years) and those with ration cards for

**Table 2: Correlates of pictorial awareness of smoked tobacco products**

Correlates	Pictorial awareness of smoked tobacco products		Crude OR (95% CI, P)	Adjusted OR (95% CI, P)
	No (n=54), n (%)	Yes (n=253), n (%)		
Gender				
Male	28 (11.2%)	223 (88.8%)	6.90 (3.58-13.30, <0.001*)	3.13 (1.33-7.37, 0.009*)
Female	26 (46.4%)	30 (53.6%)	1	1
Education				
Educated	36 (13.6%)	229 (86.4%)	4.77 (2.36-9.65, <0.001*)	3.37 (1.29-8.76, 0.013*)
No formal education	18 (42.9%)	24 (57.1%)	1	1
Occupation				
Employed	20 (11.6%)	153 (88.4%)	4.59 (1.5-13.99, 0.007*)	5.65 (1.21-26.30, 0.027*)
Student	12 (14.1%)	73 (85.9%)	3.65 (1.12-11.9, 0.032*)	1.34 (0.25-6.98, 0.728)
Housewife	16 (48.5%)	17 (51.5%)	0.64 (0.19-2.16, 0.47)	3.10 (0.58-16.58, 0.185)
Unemployed	6 (37.5%)	10 (62.5%)	1	1
Type of family				
Nuclear	31 (14.8%)	179 (85.2%)	1.79 (0.98-3.28, 0.058)	1.27 (0.61-2.62, 0.514)
Joint	23 (23.7%)	74 (76.3%)	1	1
Marital status				
Married	40 (20.4%)	156 (79.6%)	0.56 (0.29-1.09, 0.088*)	0.19 (0.04-0.89, 0.036*)
Unmarried	14 (12.6%)	97 (87.4%)	1	1
Ever tobacco use				
Yes	16 (11.6%)	122 (88.4%)	2.21 (1.17-4.17, 0.014*)	3.23 (1.43-7.29, 0.005*)
No	38 (22.5%)	131 (77.5%)	1	1

Nagelkerke's R<sup>2</sup>: 0.272. CI=Confidence Interval, OR=Odds Ratio, P≤0.05 - \*Significant**Table 3: Correlates of pictorial awareness of smokeless tobacco products**

Correlates	Pictorial awareness of smokeless tobacco products		Crude OR (95% CI, P)	Adjusted OR (95% CI, P)
	No (n=148), n (%)	Yes (n=159), n (%)		
Age				
18-30 years	56 (45.5%)	67 (54.5%)	1.64 (0.82-3.26, 0.161)	2.51 (1.08-5.84, 0.032*)
30-50 years	66 (47.5%)	73 (52.5%)	1.51 (0.77-2.98, 0.231)	1.76 (0.82-3.76, 0.147)
>50 years	26 (57.8%)	19 (42.2%)	1	1
Gender				
Male	112 (44.6%)	139 (55.4%)	2.23 (1.22-4.07, 0.009*)	2.01 (1.02-3.95, 0.042*)
Female	36 (64.3%)	20 (35.7%)	1	1
Education				
Educated	121 (45.7%)	144 (54.3%)	2.14 (1.09-4.21, 0.027*)	1.48 (0.66-3.34, 0.344)
No formal education	27 (64.3%)	15 (35.7%)	1	1
Ration card				
Yes	54 (39.4%)	83 (60.6%)	1.901 (1.2-3.0, 0.006*)	2.23 (1.35-3.68, 0.002*)
No	94 (55.3%)	76 (44.7%)	1	1
Ever tobacco use				
Yes	59 (42.8%)	79 (57.2%)	1.49 (0.95-2.34, 0.084)	1.61 (0.96-2.70, 0.07)
No	89 (52.7%)	80 (47.3%)	1	1

Nagelkerke's R<sup>2</sup>: 0.0582. CI=Confidence Interval, OR=Odds Ratio, P≤0.05 - \*Significant

smokeless tobacco products. Our findings parallel those of the study by Majumdar *et al.*, which showed that male gender, higher educational status, and tobacco use were positive predictors of awareness of PHW on tobacco products.<sup>[12]</sup> Albeit conducted among tobacco users only, Karinagannavar *et al.* also reported that younger respondents (<25 years) and higher education levels predicted awareness of graphic warnings on tobacco products.<sup>[7]</sup>

Measures are to be directed at women, people with no formal education, people from low socio-economic status, and non-tobacco users to notice the PHW, especially on SLTs. SLT is the predominant form of tobacco consumed by the population, especially by lower socio-economic strata.<sup>[16,17]</sup> Studies have reported less effectiveness of graphic warnings on SLT

despite being changed from symbolic warnings.<sup>[11]</sup> SLT users, especially those from low socio-economic backgrounds and the uneducated, ignore the graphic warnings on tobacco products. The PHW on SLT in India has been reported to be stretched, and blurred with faded color, making it less understandable and noticeable especially by rural people who are usually less educated.<sup>[10]</sup> Making the graphic warnings on SLT more appealing and prominent by increasing its size, like cigarette packs, will improve awareness of PHW on SLT products. This can make the PHW on SLT more conspicuous and motivate users to quit.

Tobacco usage is not only disturbing the users health but also the emotional and social quotient of the users family and friends. Primary healthcare physicians and the family physicians are the

first and immediate point of contact and care for these tobacco users and can use this opportunity to promote their health and make them aware regarding the PHW issued on the tobacco products.

Our study is limited by its cross-sectional nature, due to which the causality of associations cannot be ascertained. Being a hospital-based study, the characteristics of our respondents might not mimic those of the general population, precluding us from making any generalizations. More male representation might have favored awareness of PHW on smoked tobacco products, as females generally do not consume them. However, the consumption of SLT by male individuals is higher than smoked products in Bihar.<sup>[13]</sup> Hence, we believe that a higher male representation might not have affected the results to a great extent.

## Conclusion and Recommendations

Four out of every five individuals were aware of the pictorial health warnings (PHW) on tobacco products; however, it was lesser for smokeless tobacco products (SLT) compared to smoked tobacco products. Every alternate individual was aware of PHW on SLT. More than half of the participants felt the ineffectiveness of the current PHW on tobacco products. Male, being educated, employment, and ever-tobacco use were found to be independent correlates of PHW awareness of the smoked form of tobacco products, whereas being young (18-30 years) was found to be an independent predictor of awareness of SLT.

Necessary measures need to be taken to improve the graphic warning on SLT in the form of increasing its size, enhancing its color and contrast to increase its appeal. This will make the PHW noticeable, understandable, and effective even among individuals who are less educated. As family members, women are uniquely placed to counsel and persuade against tobacco use. Tailor-made strategies to boost awareness among them can serve as a fruitful avenue in curbing tobacco consumption.

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## Conflicts of interest

There are no conflicts of interest.

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