



# Mediating Effect of Consumers' Awareness of Health Risks of Tobacco on the Relationship between Perception of Health Warning Labels and Intention to Quit

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## Abstract

The article explored the relationship among perception of health warning labels and consumers' intention to quit tobacco while examining the mediating role of consumers' awareness of health risks of tobacco. The study was based on primary data of 560 active tobacco consumers from the state of Haryana, India. Confirmatory factor analysis, structural equation modeling, and bootstrapping have been used for data analysis. The findings of the study implies that the characteristics of health warning labels such as its size and color, graphic design, and the information in the text were instrumental in measuring the tobacco consumers' perception of health warning labels. The consumers' awareness of health associated risks was assessed to find their knowledge of the harmful effects of tobacco consumption on the health. The intention to quit tobacco products was established from the information seeking behavior and the use of medication and helpline services by the tobacco consumers. The findings of the study indicated that the relationship between perception of health warning labels and consumers' intention to quit tobacco is partially mediated by awareness of health risks of tobacco use.

**Keywords:** Health warning labels, Intention to quit, Health associated risks, Tobacco products, India.

**Paper type :** Research Paper

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## Introduction

The pictorial health warning on tobacco products has been used in various countries since the early 2000s (Hammond, 2011). The countries have been formulating their own legislations governing the use of pictures and graphics on the package of tobacco products (FDA, 2019; GATS, 2017; Schoretsaniti et al., 2014). The use of tobacco health warning labels is an effective way of communicating the health risks of smoking and motivating people to quit smoking (Strahan et al., 2002; Azagba & Sharaf, 2012; Jung, 2016; Willemsen, 2005; Fathelrahman, 2009; Wu et al., 2015; Yong et al., 2014; Cameron et al., 2015; Emery et al., 2013). The pictorial warnings on tobacco products increases awareness of health associated risks among the consumers (Nakkash & Khalil, 2010; Rajeswary et al., 2012; Reid et al., 2017; Hammond et al., 2007; Kees et al., 2010; Costello et al., 2012). The consumers' awareness of health risks of tobacco and intention to quit tobacco have

been positively associated (Sansone, 2012; Raute, 2011; Mini et al., 2014; Coady et al., 2013; Kees et al., 2010). The health warning label of the governments is more effective than the labels of the e-cigarette companies (Lee et al., 2018). Barriers in quitting significantly affect cessation initiatives but when intention to quit is high barriers will remove automatically (Sabzmakan et al., 2020). High awareness about bad effects of tobacco consumption increases the intention to quit tobacco (Ng'ombe et al., 2020). As a public health concern, tobacco consumption has serious social and economic implications at global level (WHO, 2019). Near about one fourth, 23.6 per cent of adults aged 15 years and above in Haryana uses tobacco in some forms. It includes 39.1 per cent of men and 6.3 per cent of women as revealed in the Global Adult Tobacco Survey 2 (GATS 2, 2016-17). A large number of the studies have been conducted linking the perception of health warning labels on tobacco products with consumers awareness of health associated risks and intention to quit. But no study is found showing the mediation effect among the 03 variables.

## Aims

The study aimed to explore the relationship between the perception of health warning labels and consumers' intention to quit tobacco while examining the mediating effect of consumers' awareness of the health risks of tobacco.

## Method

### Sample

The study was conducted in the state of Haryana, India during the year, 2017. The target population for the study was active tobacco consumers from Haryana. The respondents were personally approached at dhabas, markets, railway stations, bus stops, etc. to collect the data. Initially, a total of 600 respondents participated in the study, and after dealing with missing variables, extreme level (outliers) or list wise deletion, 560 were found fit for further analysis. The response rate was 75% which is more than the average acceptable range from 57% to 71% for individual responses (Helakorpi et al., 2015).

## Measures

The primary data of the study was collected with the help of a self-structured questionnaire having 16 items (Table 1) on a 5-point Likert scale measuring consumers' awareness of health associated risks (CAHAR), consumers' intention to quit tobacco (CIQT) and perception of health warning labels (PHWL). The items of CAHAR and PHWL are available in the research articles of '(Ram & Shishpal, 2018)'; and '(Shishpal & Kumar, 2019)' respectively. The 05 items of CIQT were as follows: I contacted quit tobacco helpline (C5); I read literature on how to quit tobacco (C6); Accessed the quit information from the web (C7); Asked health professionals for help to quit (C8); Meditated to quit tobacco (C10). The item C5 was self-developed and the rest of 04 items of CIQT were adapted from Lader & Meltzer, 2003.

## Statistical Analysis

The constructs were tested for validity with the help of confirmatory factor analysis (CFA) by calculating composite reliability, convergent validity, and discriminant validity. The reliability of each multi-item construct was assessed with Cronbach's Alpha. It was ensured that the constructs meet the standard values (Fornell & Larcker, 1981; Cronbach, 1951; Nunnally, 1978; Sekaran, 2000; Hair et al., 2010) of the measures of validity and reliability. For analyzing the mediating effect, structural equation modeling (SEM) and Bootstrapping were applied.

## Results

### Demographic Characteristics of the respondents

The demographic characteristics of the respondents were as follows: Out of the total, 273(48.8%) respondents were from the age group of 20-30 years, 130 (23.2%) from 31-40 years, 78 (13.9) of from 41-50 years, and 79 (14%) above 50 years of age. The total sample consisted of 324 (57.9%) rural and 236 (42.1%) urban respondents. Based on educational qualifications, sample was divided into four categories, i.e., up to 7<sup>th</sup> class (123, 22%), 08-12<sup>th</sup> class (133, 23.8%), Graduate (153, 27.3%) and Post Graduate & above (151, 27%). Out of the entire sample, 109 (19.5%) respondents belonged to labor class, 150 (26.8%) self-employed, 58 (10.4%) health professionals, 98 (17.5%) employed in corporate, and 90 (16.1%) were students. The sample included 204 (26.4%) married and 356 (63.6%) unmarried respondents. Considering the type of family, 223(39.8%) belonged to the nuclear family, and 337 (60.2%) belonged to the joint family. When it comes to an annual income of respondents, 229 (40.9%) belonged to below 01 lakh category of income, 95 (17.0%) were from 01-02 lakhs of income level, 84(15%) were from 2-3 lakhs of income level, and 119 (21.3%) belonged to above three lakhs of income level.

### Indices of Reliability and Validity

The composite reliability (CR) for the 03 constructs reported a better internal consistency as the values of composite reliability were above 0.70 (Table 1). The chronbach alpha for all constructs was above 0.70 indicating better internal consistency. The factor loadings (Table 1 and Figure 1) for the all observed items and the AVE values were more than 0.5 which signify an acceptable convergent validity. Further the CR values of the constructs were more than the AVE values which indicated good convergent validity. The discriminant validity requirement was met as the values of maximum shared variance (MSV) for the latent variables were less than the AVE values. The standardized regression weights (Table 1) of the observed items of 03 factors were found significant ( $p < 0.05$ ). The factors were significantly represented the 16 observed items.

**Table 1 Questionnaire items, reliability and validity**

Constructs	Items	Factor loadings	AVE	CR	MSV	ASV	Chronbac $\alpha$
CAHAR	A1	0.635	0.513	0.861	0.091	0.066	0.856
	A4	0.606					
	A5	0.825					
	A6	0.776					
	A7	0.820					
	A10	0.594					
CIQT	C5	0.636	0.531	0.845	0.082	0.056	0.851
	C6	0.795					
	C7	0.937					
	C8	0.679					
	C10	0.531					

PHWL	D1	0.752	0.629	0.910	0.064	0.030	0.895
	D2	0.848					
	D3	0.844					
	D4	0.845					
	D5	0.801					
	D8	0.650					

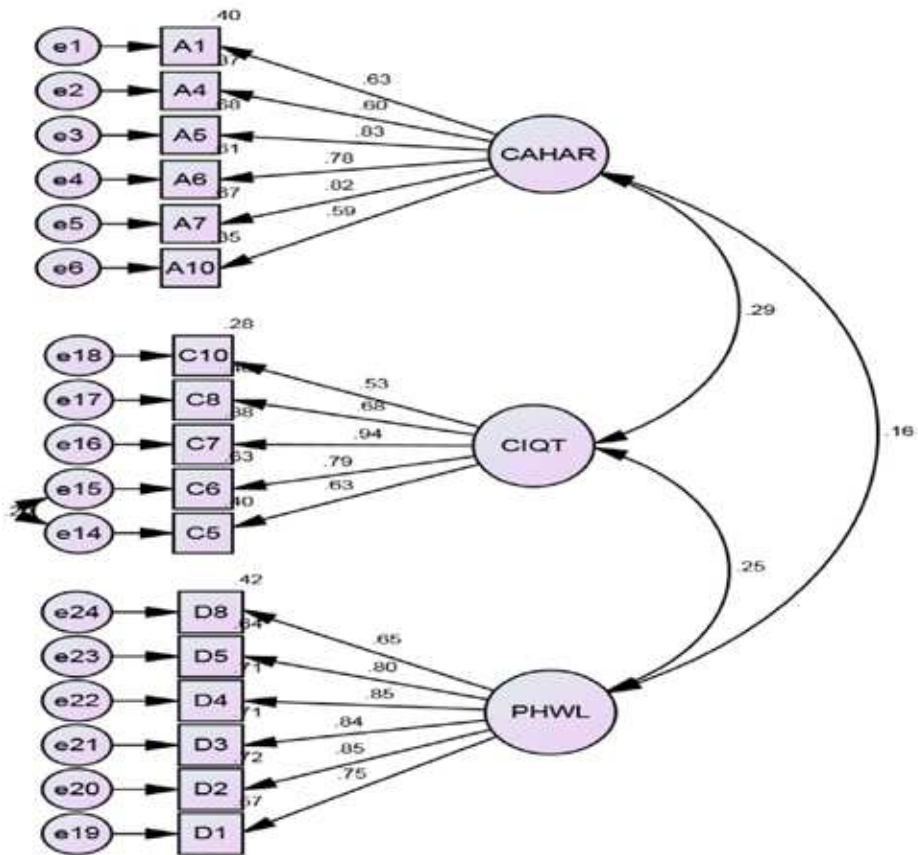
### First-order confirmatory factor analysis

The model fit indices of a first-order confirmatory model (Figure 1) of the 03 factors are shown in Table 2.

**Table 2 : Model fit indices of first-order confirmatory factor analysis**

Model fit summary: Results of CFA								
Model	CMIN	DF	CMIN/DF	GFI	CFI	IFI	TLI	RMSEA
Default	461.820	115	4.016	0.913	0.931	0.931	0.918	0.073

**Figure 1 : First order confirmatory factor model**



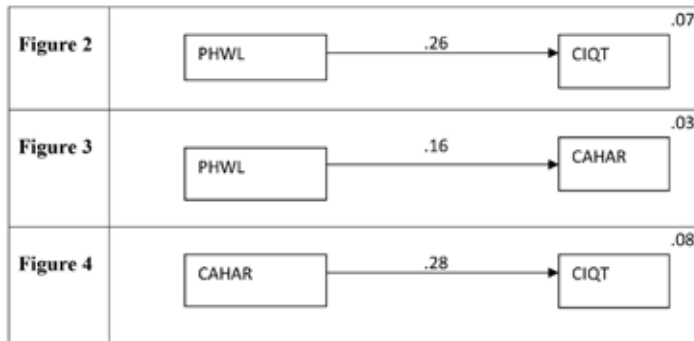
Source: Amos output

The CMIN/DF value (Table 2) is less than the recommended value (<5). The incremental and baseline comparisons indices for the final model are above 0.90 showing that the model has high goodness of fit. The RMSEA is 0.073 which is below the recommended value (<0.10) indicating the goodness of fit of the model. The correlation coefficients (Figure 1) among the three latent constructs are found significant by critical ratio ( $> \pm 1.96$ ;  $p < .001$ ). It is concluded that the respective latent constructs are significantly represented by the observed variables.

### Structural models of the effects

The 03 possible combinations of different structural models showing the effects are shown in Table 3. The structural equation models indicated that the all the 03 direct effects were found significant and positive by critical ratio test ( $> \pm 1.96$ ,  $p < 0.05$ ).

**Table 3: Simplified structural models of different effects**



### Mediating effect of CAHAR on the relationship between PHWL and CIQT

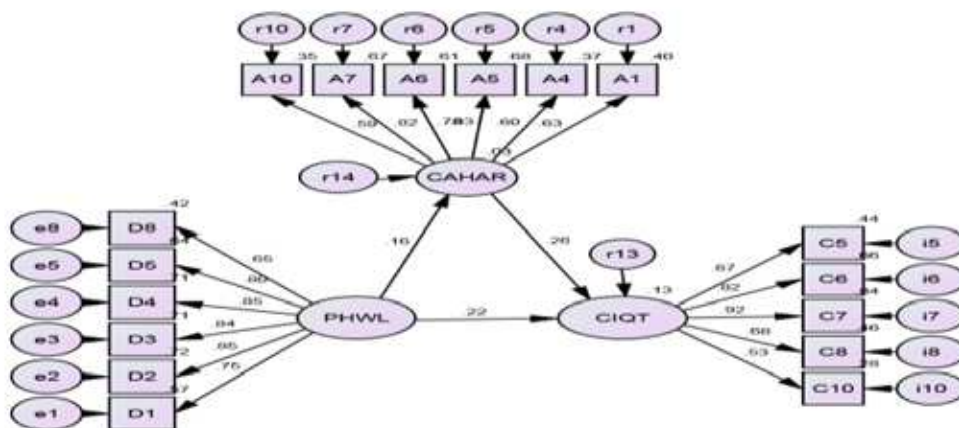
The total effect of PHWL on CIQT without mediator is 0.26 (Table 4). The standardized direct effect of PHWL on CIQT with a mediator is 0.22 (Figure 5). The standardized total effect of PHWL on CAHAR is 0.16, and the standardized total effect of CAHAR on CIQT is 0.26. So, the standardized indirect effect of PHWL on CIQT is 0.041. Both indirect effects (PHWL to CAHAR) and (CAHAR to CIQT) are significant. As the indirect effect (0.041) is less than the direct effect (0.22), the mediation is confirmed. The type of mediation is partial as the direct effect is still significant after the mediator enters in the model. Jointly PHWL and CAHAR explain 13 percent (as the SMC is 0.13) variance in CIQT.

**Table 4 : Results of Bootstrapping**

Variables	Independent variable (PHWL)								
	Total effect			Direct effect			Indirect effect		
	STE	CI	SE	SDE	CI	SE	SIE	CI	SE
Mediator (CAHAR)	0.159***	0.050 – 0.260	0.052	0.159***	0.050 – 0.260	0.052	0.000	0.000 – 0.000	0.000
Dependent (CIQT)	0.263***	0.186 – 0.344	0.042	0.222***	0.138 – 0.305	0.042	0.041***	0.016 – 0.073	0.014
Conclusion	CAHAR has a significant mediating effect between PHWL and CIQT at 95% BC (biased corrected) confidence level Note:- STE=Standardized Total Effect    CI=Confidence interval SE= Standard error                      SDE= Standardized Direct Effect SIE= Standardized Indirect Effect								

To cross check Baron and Kenny (1986) rule of mediation, the bootstrapping technique is also applied. With 95 percent level of accuracy, 2000 bootstrap samples were taken to analyze the relationship among the constructs. The indirect effect (Table 4) through the mediator is 0.041 with the confidence interval 0.016-0.073 and standard error 0.014 which is found to be significant at the 5 per cent level of significance. The results confirm that CAHAR has a partial mediation effect between PHWL and CIQT. The similar signs of direct effect and total indirect effects also verify the mediation in this model.

**Figure 5 : Mediating effect of CAHAR on the relationship between PHWL and CIQT**



Source: Amos output

### Findings and Discussion

The questionnaire has passed the specified tests of validity and reliability which provided support to further analysis of data conducted by applying confirmatory factor analysis wherein the first order confirmatory model has been found to satisfy the indices of goodness of fit. The standardized regression weights of structural equation models of were found significant and the bootstrapping has justified the presence of mediating effect among the factors. The statistical results have added empirical value to the qualitative nature of relationships explored in the study. The findings of the study implies that the characteristics of health warning labels such as its size and color, graphic design, and the information in the text were instrumental in measuring the tobacco consumers’ perception of health warning labels. The consumers’ awareness of health associated risks was assessed to find their knowledge of the harmful effects of tobacco consumption on the health. The intention to quit tobacco products was established from the information seeking behavior and the use of medication and helpline services by the tobacco consumers. It is found that the perception of health warning labels has a positive significant effect on the consumers’ intention to quit tobacco and awareness of the health risks of tobacco. The health warning label and graphic/pictorial displays on tobacco product reduce consumption of tobacco products which is considered tantamount to intention to quit. At the same time, the perception of warning labels increases the perception of health risk and change the attitude towards tobacco products. The awareness of health associated risks of tobacco also has a positive significant effect on consumers’ intention to quit tobacco by creating fear in the minds of consumers. The presence of partial mediating effect among the 03 factors support to explain

that the perception of health warning labels directly and indirectly through awareness of health associated risks influences intention to quit tobacco products.

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