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Original Article

# The Impact of Graphic Health Warning Labels on Smokeless Tobacco Packets on Motivation to Quit among Current Users: A Cross-Sectional Study

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**Abstract**

**Background:** Smokeless tobacco (SLT) use constitutes a considerable public health concern, especially in India, where there are more than 300 million users. This study seeks to assess the influence of graphic health warning labels (GHWLs) on smokeless tobacco (SLT) packaging on encouraging cessation among users.

**Methods:** A cross-sectional study was conducted at the Faculty of Dental Sciences, BHU, Varanasi outpatient department, from December 2023 to April 2024. The study involved 387 participants, selected via simple random sampling, who were current smokeless tobacco users. Data was collected through structured interviews using a validated questionnaire. Statistical analysis was performed using SPSS version 21.0, with a significance level set at $P<0.05$.

**Findings:** Awareness of GHWLs was high, with 91.7% of participants recognizing the labels. Among these, 66% considered quitting or reducing smokeless tobacco use due to the labels. Increased health awareness and serious consideration to quit were reported by 50.1% of participants, while 28.9% reported no impact. Awareness of tobacco cessation clinics was moderate at 48.1%, and 66.1% expressed willingness to seek help, primarily due to health concerns. Positive correlations were found between education level and awareness ($r=0.387$) and education and attitude towards quitting ($r=0.227$). Younger participants and those with shorter durations of smokeless tobacco use exhibited higher health awareness and a greater likelihood of considering cessation.

**Conclusion:** GHWLs are a potent tool in tobacco control, significantly influencing smokeless tobacco users' intentions to quit. A multifaceted approach involving GHWLs and comprehensive support systems can substantially reduce smokeless tobacco use and its associated health risks.

**Keywords:** Education, Smokeless tobacco, Tobacco cessation, Cross-sectional survey

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## Introduction

Smokeless tobacco, as defined by the World Health Organization's Framework Convention on Tobacco Control, refers to tobacco products consumed without burning, either orally or nasally.[1]

Smokeless tobacco (SLT) includes a variety of products, exceeding 40 distinct sorts, including pan, paan masala, khaini, sarda, mawa, gutka, mishri, and gudakhu. These products may be chewed, snorted, or directly administered to the teeth and gums.[2,3] In India, the utilization of SLT is notably prevalent. Over 10% of the populace utilizes khaini, a combination of tobacco and lime. Gutka, a mixture of tobacco, lime, and areca nut, is utilized by approximately 7% of the population. Approximately 6% of individuals eat betel quid with tobacco, but approximately 4% utilize oral applications such as mishri, gul, and gudakhu.[4]

Over 300 million individuals globally utilize smokeless tobacco.[5] This widespread consumption is linked to an estimated 650 000 deaths each year.[6] The Indian scenario reveals a concerning trend in tobacco use, as highlighted by the Global Adult Tobacco Survey (GATS) for the year 2016–17. Nearly 30% of adults in India engage in some form of tobacco consumption. Among these, approximately 20 million adults, 21.4% of the population, are regular users of smokeless tobacco.[7] This comprises 29.6% of males and 12.8% of females. Notably, smokeless tobacco use is twice as prevalent as smoking, with 21.4% of adults using SLT compared to 10.7% who smoke.[7,8] This issue transcends men, profoundly affecting other at-risk demographics, including adolescents, children, and women of reproductive age.[9]

A broad spectrum of policies has been implemented across 57 countries to control smokeless tobacco use, showcasing a range of strategies tailored to diverse

regional contexts. These measures span several regions: 16 policies from the Americas, 10 from the Eastern Mediterranean, 9 from Africa, 8 from the Western Pacific, 7 from Europe, and 7 from Southeast Asia. The policies encompass a variety of approaches, including taxation, regulation of product contents, mandatory labeling requirements, and even comprehensive bans. Prominent examples include the Comprehensive Smokeless Tobacco Health Education Act in the USA and India's Tobacco-Free Film and Television Rules. Global tobacco control efforts are also guided by frameworks such as the World Health Organization's Framework Convention on Tobacco Control (FCTC) and the MPOWER package of measures.[10-14]

The World Health Organisation (WHO) has delineated six MPOWER initiatives to address tobacco consumption, one of which is the enforcement of graphic health warnings.[15] These labels aim to enhance the visibility of health hazards and deter consumption. Article 11 of the Framework Convention on Tobacco Control (FCTC) posits that graphic warnings provide a significant benefit by effectively communicating to persons with limited literacy skills.[16]

In 2016, India mandated that health warning labels (HWLs) cover 85% of all tobacco product packaging, including smokeless tobacco. The Tobacco Pack Surveillance System (TPackSS) has been monitoring compliance with these HWL regulations across the country since 2013.[17,18]

Research has shown that graphic health warning labels (GHWLs) effectively enhance awareness and comprehension of the health hazards linked to cigarette smoking. Studies demonstrate that visual warnings are generally more effective than warnings composed solely of text. For instance, numerous participants in the study conducted by Gupta et al[18] acknowledged comprehending these warnings, indicating that they heightened their awareness of the hazards associated with tobacco use and facilitated their efforts to cease consumption. Iacobelli et al[19] have observed the efficacy of GHWLs in facilitating behavior change across diverse situations, hence endorsing their use in tobacco control methods.

Despite the successes of pictorial warnings on tobacco control, research on the effectiveness of GHWLs for smokeless tobacco products is limited (Hammond et al).[20] Existing studies reveal a mixed picture regarding the impact of health warnings on smokeless tobacco. The diverse packaging formats of smokeless tobacco products pose significant challenges for standardizing health warnings. The variation in shapes and sizes of packaging makes it difficult to identify a consistent primary surface area for warning labels (Saraf et al).[21] Consequently, health warnings may need to be customized for different packaging types to effectively convey the associated health risks (Mudey et al)[22]. This complexity complicates the task of ensuring that consumers are adequately informed about the dangers of smokeless tobacco products.

Given these complexities, evaluating the impact of GHWLs, specifically for smokeless tobacco products, is necessary. Understanding how these warnings influence current users' motivation to quit can provide valuable insights into their effectiveness and inform future tobacco control strategies. This study aimed to address this gap by assessing the role of GHWLs in motivating SLT users to quit, thereby contributing to the broader goal of reducing tobacco-related harm.

## Methods

### *Study Setting and Duration*

A cross-sectional study was conducted at the Outpatient Department (OPD) of the Faculty of Dental Sciences, BHU, Varanasi, between December 2023 and April 2024.

### *Ethical Considerations*

Before the study commenced, its purpose and procedures were outlined, and permission was secured from the relevant authority at the Faculty of Dental Sciences, IMS, BHU, Varanasi. The study received approval from the Institutional Ethics Committee, Institute of Medical Sciences, Banaras Hindu University (IEC No. Dean/2023/EC/6696).

### *Sample Size Determination*

The sample size was estimated using the data obtained from a previous study conducted by Gravely et al[23] Sample size was determined using the following formula:

$$N = Z^2 P (1 - p) / d^2$$

where $N$ is the estimated minimum sample size, $Z$ is the statistic corresponding to confidence level, which is 1.96 at 95% confidence level, $P$ is the proportion of awareness about SLT packages containing health warning graphic labels, and $d$ is the precision. Considering the proportion of awareness about SLT packages containing health warning graphic labels to be 0.27 and a precision of 5%, the estimated sample size was 304.

### *Inclusion and Exclusion Criteria*

Inclusion criteria for participant selection comprised current smokeless tobacco users willing to participate in the study. Subjects who did not consent to participate in the study were excluded.

### *Sampling Method*

The participant selection process used simple random sampling, ensuring that every eligible current smokeless tobacco user had an equal chance to participate in the study.

### *Data Collection*

Information regarding socio-demographics, tobacco consumption, awareness of pictorial health warning labels, and elements associated with the Tobacco Cessation Clinic was collected using a systematic and validated questionnaire through interviews. The questionnaire underwent rigorous validation, including pilot testing and expert evaluation, to guarantee its clarity and pertinence. It exhibited acceptable validity and reliability, with a Cronbach's alpha coefficient exceeding 0.70.

Individuals were categorized as smokeless tobacco users if they responded "Yes" to currently using smokeless tobacco, irrespective of their cessation intentions. Participants who utilized tobacco were informed and educated regarding quitting services offered by the tobacco cessation clinic at the Faculty of Dental Sciences, BHU, Varanasi. This effort sought to provide extensive support and guidance for individuals attempting to cease tobacco use, encompassing counseling, behavioral therapies, and medicines when suitable.

### *Data Analysis*

The data were coded, tabulated, and analyzed using version 21.0 of the Statistical Package for the Social Sciences (SPSS) software. Analytical and descriptive statistics (frequency distribution) were used for data analysis. A chi-square test was used to evaluate the association between independent variables and tobacco consumption. The significance threshold was established at $P < 0.05$ with a 95% confidence range.

### *Standards for Reporting*

This study followed the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) principles to guarantee thorough and transparent reporting of procedures and outcomes, which aligns with the best observational study practices.

## Results

The study involved 387 smokeless tobacco users, with a mean age of 43.95 ± 12.18 years. Participants varied in their daily smokeless tobacco use frequency: 234 (60.5%) used it 5 times or less per day, 112 (28.9%) used it 6 to 10 times, 25 (6.5%) used it 11 to 15 times, 5 (1.3%) used it 16 to 20 times, and 11 (2.8%) used it more than 20 times.

Table 1 shows the demographic distribution: 53 participants (13.7%) were illiterate, 27 (7%) had primary education, 181 (46.8%) had secondary education, and 126 (32.6%) were graduates or had higher education. Regarding tobacco use duration, 180 participants (46.5%) had used tobacco for less than 10 years, while 207 (53.5%) had used it for 10 years or more.

Awareness of graphic health warning labels was high, with 355 participants (91.7%) aware of the labels. Among the aware participants, 259 (66.9%) had considered quitting or reducing their use. The impacts of these labels were varied: 194 participants (50.1%) reported increased health awareness and serious consideration to quit, 35 (9%) felt disgusted and less interested in tobacco, 61 (15.8%) felt guilty and thought about quitting, 46 (11.9%) were motivated by fear of health consequences, and 112 (28.9%) reported no impact.

In terms of tobacco cessation clinics, 186 participants (48.1%) were aware of such clinics, and 256 (66.1%) were willing to seek help. Among the latter group, motivations included health concerns for 227 (58.7%), cost of tobacco use for 24 (6.2%) participants, support from family and friends for 42 (10.9%), advice from healthcare professionals for 29 (7.5%) participants, and no particular motivation for 112 (28.9%) participants.

Figure 1 illustrates the relationships among education, age, awareness, attitude, frequency, and duration of tobacco use. A notable positive link existed between education and awareness ($r = 0.387$) and between education and attitude ($r = 0.227$). The length of tobacco use exhibited a notable negative connection with attitude ($r = -0.103$). A notable positive link existed between awareness and attitude ($r = 0.347$). Age had substantial negative relationships with both awareness ($r = -0.234$) and attitude ($r = -0.210$).

Table 2 highlights the role of education in responses to smokeless tobacco warning labels and motivations for seeking help from tobacco cessation clinics. Participants with higher education levels exhibited the most pronounced effects from the warning labels. Specifically, 77 participants (61.1%) with graduate or higher education reported increased health awareness and serious consideration to quit, compared to 15 participants (28.3%) with no formal education, 4 participants (14.8%) with primary education, and 98 participants (54.1%) with secondary education. This association was highly significant, with a $P$ value < 0.001.

Regarding the impact of feeling guilty and contemplating quitting, the highest percentage was among those with graduate or higher education, with 34 participants (27.0%) reporting this effect. In contrast, 3 participants (5.7%) with no formal education, 4 participants (14.8%) with primary education, and 20 participants (11.0%) with secondary education reported feeling guilty. This association was also highly significant ($P < 0.001$).

When it comes to motivations for seeking help from tobacco cessation clinics, 85 participants (67.5%) with graduate or higher education mentioned worries about health as a motivating factor. This was the highest percentage compared to 24 participants (45.3%) with no formal education, 14 participants (51.9%) with primary education, and 104 participants (57.4%) with secondary education. This association was significant, with a $P$ value of 0.0

Table 3 provides insights into how the duration of

**Table 1.** Frequency distribution of responses concerning the questionnaire

| Domain | | Variables | Frequency | Percentage |
|---|---|---|---|---|
| Education | 1 | Illiterate | 53 | 13.7 |
| | 2 | Primary (up to grade 5th) | 27 | 7 |
| | 3 | Secondary (6th to 12th grade) | 181 | 46.8 |
| | 4 | Graduate and above | 126 | 32.6 |
| Duration of tobacco consumption in years | 1 | Less than 10 years | 180 | 46.5 |
| | 2 | More than or equal to 10 years | 207 | 53.5 |
| Are you aware of the graphic health warning labels on smokeless tobacco packets? | 1 | Yes | 355 | 91.7 |
| | 2 | No | 32 | 8.3 |
| Have they ever prompted you to consider quitting or reducing your tobacco use? | 1 | Yes | 259 | 66.9 |
| | 2 | No | 128 | 33.1 |
| If yes, please elaborate on the specific impact these warning labels had on your thoughts about quitting tobacco use | 1 | Increased health awareness and serious consideration for quitting the habit. | 194 | 50.1 |
| | 2 | Made me feel disgusted and less interested in using tobacco. | 35 | 9 |
| | 3 | Made me feel guilty and made me think about quitting. | 61 | 15.8 |
| | 4 | Fear of health consequences motivated me to quit. | 46 | 11.9 |
| | 5 | Nothing | 112 | 28.9 |
| Are you aware of the existence of tobacco cessation clinics or programs? | 1 | Yes | 186 | 48.1 |
| | 2 | No | 201 | 51.9 |
| Would you be willing to get help from them to quit or cut down on using smokeless tobacco? | 1 | Yes | 256 | 66.1 |
| | 2 | No | 131 | 33.9 |
| If yes, what would encourage you to seek help from a tobacco cessation clinic? | 1 | Worries about my health | 227 | 58.7 |
| | 2 | Cost of using tobacco | 24 | 6.2 |
| | 3 | Support from family and friends | 42 | 10.9 |
| | 4 | Advice from doctors and nurses | 29 | 7.5 |
| | 5 | Nothing | 112 | 28.9 |

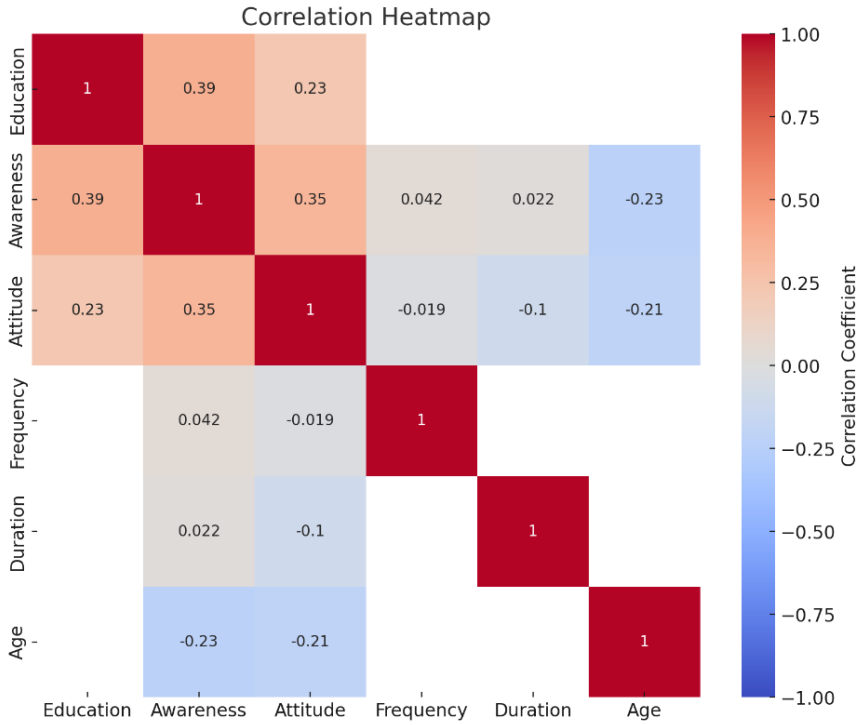


**Figure 1.** Heatmap displaying the correlation among education, age, awareness, attitude, frequency, and duration of tobacco consumption. Shades of red: positive correlations. White or light shade: near-zero correlations. Shades of blue: negative correlation

**Table 2.** Association between education, smokeless tobacco warning labels, and tobacco cessation clinic-related factors.

| Questions | Responses | Illiterate | Primary (up to grade 5th) | Secondary (6th to 12th grade) | Graduate and above | *P* value |
|---|---|---|---|---|---|---|
| If yes, please elaborate on the specific impact these warning labels had on your thoughts about quitting tobacco use. | Increased health awareness and serious consideration for quitting the habit. | 15 (28.3%) | 4 (14.8%) | 98 (54.1%) | 77 (61.1%) | <0.001* |
| | Made me feel disgusted and less interested in using tobacco. | 2 (3.8%) | 1(3.7%) | 16 (8.8%) | 16 (12.7%) | 0.18 |
| | Made me feel guilty and made me think about quitting. | 3 (5.7%) | 4 (14.8%) | 20 (11.0%) | 34 (27.0%) | <0.001* |
| | Fear of health consequences motivated me to quit. | 9 (17.0%) | 5 (18.5%) | 19 (10.5%) | 13 (10.3%) | 0.38 |
| If yes, what would encourage you to seek help from a tobacco cessation clinic? | Worries about my health | 24 (45.3%) | 14 (51.9%) | 104 (57.4%) | 85 (67.5%) | 0.03* |
| | Cost of using tobacco | 5 (9.4%) | 0 | 6 (3.3%) | 13 (10.3%) | 0.02* |
| | Support from family and friends | 0 | 3 (11.1%) | 27 (14.9%) | 12 (9.5%) | 0.02* |
| | Advice from doctors and nurses | 13 (24.5%) | 0 | 5 (2.8%) | 11 (8.7%) | <0.001* |

Chi-square test; (*) *P* value = 0.05 is considered statistically significant.

smokeless tobacco use affected responses to warning labels and motivations to seek help. Eighty-eight respondents (45.4%) reported increased health awareness and serious consideration to quit, compared to 106 respondents (54.6%) in the ≥ 10 years group ($P = 0.64$). Feeling disgusted and less interested in using tobacco was reported by 15 respondents (42.9%) in the < 10 years group and 20 respondents (57.1%) in the ≥ 10 years group ($P = 0.64$). Guilt and thoughts of quitting were noted by 35 respondents (57.4%) in the < 10 years group versus 26 respondents (42.6%) in the ≥ 10 years group ($P = 0.06$). Fear of health consequences motivated 29 respondents (63.0%) in the < 10 years group compared to 17 respondents (37.0%) in the ≥ 10 years group ($P = 0.01$). Regarding seeking help from tobacco cessation clinics, concerns about health were a factor for 112 respondents (62.2%) in the < 10 years group and 115 respondents (55.6%) in the ≥ 10 years group ($P = 0.18$). The cost of using tobacco was a concern for 17 respondents (9.4%) in the < 10 years group compared to 7 respondents (3.4%) in the ≥ 10 years group ($P = 0.01$). Support from family and friends was noted by 17 respondents (9.4%) in the < 10 years group and 25 respondents (12.1%) in the ≥ 10 years group ($P = 0.40$). Advice from doctors and nurses was a motivator for 21 respondents (11.7%) in the < 10 years group compared to 8 respondents (3.9%) in the ≥ 10 years group ($P = 0.004$).

## Discussion

The study sought to evaluate the influence of graphic health warning labels (GHWLs) on smokeless tobacco packaging in encouraging users to cease using. Key findings reveal that 91.7% of participants were aware of the GHWLs, with 66% of these individuals considering quitting or reducing their smokeless tobacco use due to the labels. Of those who were aware, 50.1% reported increased health awareness and serious consideration of quitting, while 9% felt disgusted and less interested in tobacco, and 15.8% experienced guilt and thoughts of quitting. Additionally, 66.1% of participants were willing to seek help from cessation clinics, primarily driven by health concerns.

Among the 387 participants in this study, 91.7% (355) were aware of the graphic health warning labels, indicating a high level of reach and recognition. This finding was consistent with Vanishree et al's[24] study, which reported that 92.6% of participants noticed pictorial warnings. Similarly, Mudey et al[22] found that over 90% of tobacco users observed graphic health warnings, reflecting their broad visibility. Klein and colleagues demonstrated that male smokeless tobacco users exposed to graphic health warnings had a 76% recollection rate, which was notably higher than those exposed to textual warnings alone.[25] Additionally, the Global Adult Tobacco Survey 2 (GATS 2) 2016–17 revealed that 83% of current smokers noticed pictorial health warnings on cigarette packs.[7] Together, these studies highlighted the effectiveness of graphic elements in health communication, aligning with the present study's findings.

In the present study, 259 (66%) of participants considered quitting or reducing their smokeless tobacco use due to the graphic health warning labels. This result compares favorably with findings from the Global Adult Tobacco Survey 2 (GATS 2), which reported that approximately 77% of current smokers who noticed pictorial health warnings on cigarette packs contemplated quitting.[7] GATS 2 highlighted that graphic health warnings significantly influenced smokers' intentions to quit in India, showing an increasing trend over time.[7] Similarly, Gupta et al[18] found that pictorial tobacco packet warnings heightened awareness of the adverse effects of tobacco use and supported efforts to reduce or quit these habits. Their study concluded that graphic warnings were more impactful than text warnings, reinforcing the effectiveness of graphic elements in motivating behavior change, as observed in the present study.

In the present study, 194 (50.1%) of participants reported increased health awareness and serious consideration to quit smokeless tobacco due to the graphical health warning labels. This finding was consistent with the

**Table 3.** Association between duration of smokeless tobacco consumption, smokeless tobacco warning labels, and tobacco cessation clinic-related factors

| Questions | Responses | <10 years | ≥10 years | *P* value |
|---|---|---|---|---|
| If yes, please elaborate on the specific impact these warning labels had on your thoughts about quitting tobacco use. | Increased health awareness and serious consideration to quit the habit | 88 (45.4%) | 106 (54.6%) | 0.64 |
| | It made me feel disgusted and less interested in using tobacco. | 15 (42.9%) | 20 (57.1%) | 0.64 |
| | It made me feel guilty and made me think about quitting. | 35 (57.4%) | 26 (42.6%) | 0.06 |
| | Fear of health consequences motivated me to quit. | 29 (63.0%) | 17 (37.0%) | 0.01* |
| If yes, what would encourage you to seek help from a tobacco cessation clinic? | Worries about my health | 112 (62.2%) | 115(55.6%) | 0.18 |
| | Cost of using tobacco | 17 (9.4%) | 7 (3.4%) | 0.01* |
| | Support from family and friends | 17 (9.4%) | 25 (12.1%) | 0.40 |
| | Advice from doctors and nurses | 21 (11.7%) | 8 (3.9%) | 0.004* |

Chi-square test; (*) *P*-value=0.05 is considered statistically significant.

broader literature on pictorial warning labels (PWLs). Francis et al[26] reviewed 31 studies and found that PWLs, whether on cigarette or smokeless tobacco packs, generally led to higher levels of attention, stronger cognitive and emotional reactions, more negative attitudes toward the product, and increased intentions to quit compared to text warnings. Their review underscored that PWLs were perceived as more effective than text warnings in eliciting these responses. Similarly, Noar et al[27] highlighted that pictorial warnings significantly attracted and maintained attention, leading to greater cognitive processing and more intense adverse affective reactions. This was in line with the present study's observation that graphical health warnings generated increased health awareness and motivated participants to consider quitting seriously. Both sets of findings emphasized the effectiveness of pictorial warnings in producing emotional responses that contributed to behavior change, reinforcing the impact observed in the current research.

In the present study, 35 (9%) participants reported feeling disgusted and less interested in using tobacco, while 61 (15.8%) experienced guilt and considered quitting, and 46 (11.9%) were motivated by fear of health consequences. These findings aligned with Yong et al's[28] research, which demonstrated that warning label salience, inducing emotional reactions such as fear and worry, was positively associated with increased intention to quit and subsequent quit attempts. Their study revealed that health warning labels effectively stimulated thoughts about smoking risks, heightened health concerns, and led to stronger secession intentions, ultimately predicting future quit attempts. Moreover, Witte et al[29] found that pictorial warnings elicited greater fear-oriented reactions than text warnings. This supported the present study's observations, where participants' feelings of guilt and fear reflected the heightened emotional impact of pictorial warnings. Such fear appeals were consistent with previous research, which indicated that pictorial warnings could effectively induce fear as a mechanism for attitude, intention, and behavior change.[27]

However, 112 (28.9%) of participants reported no impact from the warning labels. This lack of effect might be attributed to psychological reactance, as Noar et al[27] noted, where some individuals resisted the message due to perceived manipulation or coercion. This resistance potentially diminished the effectiveness of health warnings for specific individuals, highlighting the need for continued evaluation and refinement of warning strategies to address diverse reactions.

The current study indicated that 186 participants (48.1%) were cognisant of tobacco cessation clinics, consistent with the findings of Monshi et al[30] who found a 60% awareness rate among tobacco users regarding fixed smoking cessation clinics (SCCs). The current study revealed a strong positive connection between education and awareness ($r=0.387$), suggesting that elevated education levels correlate with increased awareness of the health concerns of smokeless tobacco. There was a notable positive association between education and attitude ($r=0.227$), indicating that those with higher education levels tend to possess a more favorable attitude towards discontinuing smokeless tobacco use. This aligns with the study of Monshi et al[30] who discovered that educated tobacco users are more likely to be aware of and visit SCCs.

In the present study, 256 participants (66.1%) expressed a willingness to seek help from cessation clinics, primarily motivated by health concerns, followed by support from family and friends, advice from healthcare professionals, and cost considerations. This result aligned with Lee et al[31], who found that high awareness of smoking cessation policies was strongly associated with a higher intention to quit smoking, indicating that greater awareness and support significantly influenced the decision to seek help. Additionally, the present study observed a significant positive correlation between health awareness and a positive attitude towards quitting ($r=0.347$), reflecting that higher awareness of health risks was linked to more favorable quitting attitudes. Conversely, the study reported negative correlations between age and health awareness ($r=-0.234$) and quitting attitude ($r=-0.210$), suggesting that older participants generally had lower awareness and less positive attitudes towards health warnings. This finding was consistent with Grills et al[32], who found that

older age was associated with lower awareness of the dangers of tobacco usage and fewer secession attempts.

Furthermore, participants with less than 10 years of smokeless tobacco use demonstrated higher health awareness and greater consideration to quit (45.4%) compared to those with longer use (54.6%). The study also noted a negative correlation between the duration of tobacco use and attitude towards quitting ($r$ = -0.103), suggesting that longer use duration slightly decreased positive attitudes towards quitting. These findings aligned with Grills et al,[32] who highlighted a combination of high tobacco usage prevalence and low awareness, emphasizing the need for effective interventions.

In the current study, GATS 2 revealed a notable rise in the intention to quit among younger adults aged 25–44, attributed to visual health warnings, in contrast to older-age cohorts.[7] Wang et al[33] further corroborated the findings of the present study, indicating that physicians' recommendations to cease smoking had the most significant impact on the readiness to quit, followed by health literacy. Their research identified links between the propensity to stop and variables like age, gender, education, family income, and prior cessation attempts, with higher education exerting a significant influence. Younger individuals who possess more education and have elevated salaries are more inclined to cease smoking. A heightened understanding of the health risks associated with smoking and counsel from healthcare professionals substantially incentivize individuals to cease smoking.[32] The findings underscored the need for health literacy and the provision of professional help to improve smoke cessation initiatives. This study indicated that focused educational and clinical treatments through tobacco cessation clinics can effectively promote tobacco cessation.

**Strengths**

The study demonstrated several strengths. The substantial sample size of 387 participants enhanced the findings' reliability and generalizability. It revealed that 91.7% of participants were aware of graphic health warning labels (GHWLs), underscoring these warnings' widespread recognition and effectiveness. The results are generalizable to similar populations and contexts and have broader implications for public health strategies and policies. The study demonstrated that GHWLs effectively motivated behavior change, suggesting their potential efficacy in diverse settings and various demographic groups. This supports their role in global efforts to reduce smokeless tobacco use and improve health outcomes. Additionally, the comprehensive analysis of the correlations between demographic factors and tobacco cessation motivation provided valuable insights into how GHWLs influence behavior change, contributing to a nuanced understanding of their impact.

**Limitations**

This study relied on self-reported data, which can introduce biases such as recall bias and social desirability bias, potentially affecting the accuracy of the findings.

**Future Research Recommendation**

Future studies should investigate the causality between exposure to graphic health warning labels and motivation to quit smokeless tobacco use. Future research should examine the long-term effectiveness of graphical health warning labels on smokeless tobacco cessation and assess the combined impact of these labels with other tobacco control strategies, such as digital health interventions and community-based support programs.

**Conclusion**

The present study effectively evaluated the impact of graphic health warning labels (GHWLs) on smokeless tobacco packets in motivating current users to quit. Findings revealed that 91.7% of participants were aware of the warning labels, indicating high recognition and reach. The study showed that GHWLs were a powerful tool in motivating smokeless tobacco users to consider quitting, with 66% of participants contemplating cessation due to these warnings. This underscored the effectiveness of graphic elements in communicating health risks and influencing behavior change. The awareness of tobacco cessation clinics was moderately high among participants (48.1%), and there was a significant positive correlation between education and awareness ($r$ = 0.387), as well as education and attitude ($r$ = 0.227). This suggested that higher education levels were associated with greater awareness and a more positive attitude towards quitting.

Additionally, 66.1% of participants expressed willingness to seek help from cessation clinics, primarily driven by health concerns, followed by support from family and friends, advice from healthcare professionals, and cost concerns.

Furthermore, the study highlighted that younger participants and those with shorter durations of smokeless tobacco use were more likely to report increased health awareness and serious consideration of quitting. GHWLs on smokeless tobacco packets were highly effective in raising awareness and motivating cessation among users. Targeted educational interventions and professional support through tobacco cessation clinics should be prioritized to enhance their impact. This multifaceted approach can significantly contribute to reducing smokeless tobacco use and its associated health risks.

**Authors' Contribution**

**Conceptualization:** Jadhav Sachin Kumar, Mahesh Khairnar.

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**Methodology:** Mahesh Khairnar, Puvvadi Gopalakrishna Naveenkumar**,** Jadhav Sachin Kumar, Neha Chauhan.
**Project administration:** Mahesh Khairnar, Puvvadi Gopalakrishna Naveenkumar.
**Supervision:** Mahesh Khairnar, Puvvadi Gopalakrishna Naveenkumar.
**Validation:** Mahesh Khairnar, Puvvadi Gopalakrishna Naveenkumar, Jadhav Sachin Kumar.
**Visualization:** Mahesh Khairnar, Puvvadi Gopalakrishna Naveenkumar**,** Neha Shukla,and Neha Chauhan.
**Writing – original draft:** Jadhav Sachin Kumar, Mahesh Khairnar, Zainab Akram, Neha Chauhan, Neha Shukla.
**Writing-review & editing:** Neha Shukla, Neha Chauhan, Zainab Akram.

**Competing Interests**
The authors declare that they have no conflicts of interest.

**Ethical Approval**
The study received approval from the Institutional Ethics Committee, Institute of Medical Sciences, Banaras Hindu University (IEC No. Dean/2023/EC/6696).

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