Differential Impact of Pictorial Health Warnings on Combustible and Smokeless Tobacco: A Longitudinal Policy Review and Trend Analysis in Nepal

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ABSTRACT

Background

The WHO Framework Convention on Tobacco Control (FCTC) has its roots in the Pictorial health warnings (PHWs). There has been an increase of PHW in Nepal from 75% to 90%, thus making this a unique policy that needed to be evaluated. The aim of this study was to analyze the evolution of warning policies and to examine how the policies are associated with smoking, having in mind the current prevalence of smokeless tobacco (SLT).

Methods

This study utilized a longitudinal approach to conduct a policy review by examining Nepal's national legislation, government directives, as well as court records to track the timeframe of implementing Pictorial Health Warning in Nepal. The trend of tobacco usage was analyzed using a STEP-wise approach to surveilling non-communicable diseases. Data used in this analysis comprised of three years, which are six-year apart: 2007, 2013, and 2019.

Results

The regulatory framework of Nepal gradually evolved from 75% (enacted in the year 2021 and implemented in 2014) to 90% (implemented in 2015). This culminated in the directive for plain packaging in 2025. Notably, the prevalence of smoking significantly dropped from 26.2% in 2007 to 17.1% in 2019. On the other hand, there was a minimal shift in the usage of the smokeless tobacco. Whereas the usage of smokeless tobacco prevalence was at 18.6% in 2007, this prevalence dropped by only 0.3% (up to 18.3%) in 2019.

Conclusions

From this study, the expansion of pictorial health warning was seen to be related to the decrease in cigarette smoking. No significant relationship was noted between pictorial health warnings and the use of smokeless tobacco. These findings show that tobacco packaging interventions are both effective and sometimes inadequate in influencing different forms of tobacco usage. This study has revealed the need for a comprehensive strategy for tobacco control even as Nepal is going to implement the full plain packaging policies.

Keywords: tobacco control; pictorial health warnings; smokeless tobacco; health policy; Nepal.

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INTRODUCTION

Tobacco use remains the leading preventable cause of mortality and morbidity worldwide. Past studies have documented that both combustible tobacco and smokeless tobacco products pose significant health risks. Tobacco use is a major risk factor for non-communicable diseases (NCDs), including cancer, chronic obstructive pulmonary disease (COPD), asthma, tuberculosis, cardiovascular diseases, and premature mortality.[1] Globally, tobacco use is responsible for approximately eight million deaths annually, with nearly 80% of the world's 1.3 billion tobacco users residing in low- and middle-income countries (LMICs), including Nepal.[2] In Nepal, the prevalence of tobacco use among adults was approximately 25.8% in 2025, with higher use among males (42.7%) than females (8.6%).[3] It is alarming that the use of tobacco is increasing among school-going students and adolescents in Nepal.[4] The extensive use of smokeless tobacco presents another significant public health challenge in the country. The Government of Nepal has put in place initiatives for controlling the use of tobacco and for implementing these policies to ensure adherence to tobacco regulations Article 11 of the WHO Framework Convention on Tobacco Control (FCTC) recommends the use of pictorial warnings that are huge and rotating in order to increase the perception of tobacco usage risk and motivate people to quit.[5,6] Experimental evidence has consistently demonstrated that pictorial warnings do better than only text labels in painting the negative picture of effect of tobacco use and cognitive elaboration.[7-9] However, in countries like Nepal, implementing these rules is often a challenge. The diverse type of tobacco products sold in market also makes it difficult to enforce these pictorial warnings.

Nepal is a critical case study in the area of controlling tobacco use globally. Nepal has progressively implemented warning labels and exceeded the global average by a margin. Despite an industry litigation which delayed implementation, Nepal managed to expand from 75% to 90% of the principal display area.[10] In 2025, Nepal finally issued a directive that necessitates a 100% coverage of health warning with plain packaging.[11] These phased policy changes allow observation of how increasing warning label strength corresponds with population-level tobacco use over time.While the efficacy of PHWs on cigarette smoking is well-documented, much less is known about how these warnings influence smokeless tobacco use, which is a predominant form of use in South Asia. Within this context, it is critical to examine existing tobacco-related policies in Nepal. Accordingly, this paper aims to assess trends in tobacco use prevalence and to examine national tobacco use data to determine whether the implementation of stronger pictorial health warning policies was followed by comparable declines across different tobacco products.

METHODS

This study uses a longitudinal policy review over time with a secondary trend analysis of repeated cross-sectional surveillance data. To clearly distinguish between when policies were passed and when they were actually put into practice, we reviewed the Tobacco Product (Control and Regulatory) Act of 2011, the 2014 directives, and relevant Supreme Court of Nepal's decisions. These polices were cross checked using WHO FCTC implementation records and reports from civil society organizations to confirm when PHW began appearing on tobacco products. Tobacco use indicators were extracted from three rounds of the Nepal NCD Risk Factors (STEPS) survey (2007, 2013, and 2019).[12-14] These surveys utilize a standardized multistage cluster sampling design to generate nationally representative estimates.[12-14] Key indicators included current smoking, daily smoking, and current smokeless tobacco use. Descriptive statistics are reported in number and percentages. Given the limited number of survey waves and changes in age ranges across STEPS rounds, formal interrupted time-series or regression analyses were not conducted. Instead, this study focuses on policy chronology aligned with population-level prevalence trends.

RESULTS

Nepal ratified the WHO FCTC in 2006 and later

enacted the Tobacco Product (Control and Regulatory) Act (2011), which requires prominent warning messages and color pictures covering at least 75.0% of tobacco package.[15] Industry litigation delayed full market presence until April 2014. Subsequently, a 2014 Directive expanded warnings to 90.0% (75.0% pictorial, 15.0% text), which was effectively implemented in 2015.[10] Legal stability was achieved in 2022 when the Supreme Court dismissed industry petitions, affirming the government's authority to regulate packaging. Most recently, a 2025 Directive has mandated the transition to plain packaging (Pantone 448C) with 100.0% warning coverage, effective August 2025 (Table 1).[11]

STEPS survey data from first report on 2007 were used as the baseline period where the survey preceeded large pictorial health warnings in tobacco products. From 2007 to 2019, a period of 12 years, tobacco use trends showed a different pattern between combustible and SLT products. The prevalence of smoking declined gradually, with an absolute reduction of 9.1 percentage points. In contrast, the prevalence of SLT use showed little change over time, remaining close to 18.0% across all three survey periods (Table 2). Smoking prevalence declined steadily across survey rounds, whereas smokeless tobacco use showed no meaningful downward movement.

DISCUSSION

This study examines the progressive expansion of pictorial health warning (PHW) policies and tobacco use trends in Nepal alongside. Between 2007 and 2019, daily smoking prevalence declined substantially, while smokeless tobacco (SLT) use remained largely unchanged. There was a decrease in the rate of daily smoking from 23.8% in 2007 to

Table 1. Milestones in pictorial health warning policy of Nepal.

Year	Policy milestone	Regulatory detail & implementation status
2006	WHO Framework Convention on Tobacco Control (FCTC)ratification	Nepal ratified the FCTC, committing to Article 11 which requires large, health warnings.[5]
2011	Tobacco Product (Control and Regulatory) Act	Enactment of Tobacco Product (Control and Regulatory) Act; mandated 75.0% PHW coverage.[16]
2014	Tobacco Product Packaging and Labelling Directive	Mandated 90% coverage (75.0% pictorial + 15.0% text), making Nepal a global leader in warning size.
2015	Implementation of 90% Rule	Full implementation of 90.0% PHWs (75.0% image + 15.0% text) on principal display areas.[10]
2019	Evaluation	STEPS 2019 data: 75.7% of adults noticed warnings; 44.8% of smokers considered quitting due to labels.[14]
2022	Judicial Precedent	Supreme Court verdict upheld the 90.0% mandate, rejecting industry claims of "intellectual property violation".[15]
2025	Plain Packaging Directive	100.0% Coverage & Plain Packaging: A landmark directive passed in early 2025 (effective Aug 2025) mandates 100.0% coverage of the pack with warnings (80.0% pictorial + 20.0% text).[11]

Trends in Tobacco Prevalence (WHO STEPS, 2007, 2013 and 2019).

Table 2. Trends in tobacco use prevalence in Nepal.

Indicator	2007 (15-64 years)[12]	2012/13 (15-69 years)[13]	2019 (15-69 years)[14]	Trend Status
Any Tobacco Use (Smoke + Smokeless)	37.10%	30.80%	28.90%	Decreasing
Current Smokers (Total)	26.20%	18.50%	17.10%	Decreasing
Current Daily Smokers	23.80%	15.80%	13.30%	Decreasing
Current Smokeless Users	18.60%	17.80%	18.30%	Stationary

13.3% in 2019. This reduction is in line with Nepal's adoption of the WHO Framework Convention on Tobacco Control (WHO FCTC). It also aligns with the expansion of PHWs coverage from 75% to 90%. Although a direct causal relationship has not been found, the drop in smoking prevalence with bigger warnings implies that there is a positive contribution of PHWs to a drop in smokeless tobacco use. This is consistent with international evidence which indicates that larger warnings tend to decrease brand appeal and encourage people to quit tobacco more.[8,9] Nepal's implementation of 90% pictorial health warnings in 2015 puts the country in the list of the leading countries as far as tobacco packaging regulation is concerned. Related declines in smoking prevalence due to the introduction of large pictorial warnings have also been reported in countries such as Bangladesh, Thailand, India, and Sri Lanka. In these countries, warnings covering more than half of packaging were associated with increased noticeability, people's emotional response, and intentions to quit.[8,9,17,18] Furthermore, findings from the WHO STEPS and Global Adult Tobacco Survey (GATS) have indicated that a sizeable proportion of adults observed health warnings and nearly 50% of tobacco smokers thought about quitting upon seeing the warnings.[8] These findings therefore support the role of PHWs as an effective strategy for communicating to the target population especially in places that have varying literacy levels.[8]

As opposed to the reduction in smoking levels, the use of SLT Nepal remained relatively stable at about 18% over the same period. This pattern is consistent with evidence from neighboring countries where the use of SLT has also proven to be more resistant to control.[14,15] SLT products like khaini, gutkha, and surti are often sold in informal markets, unlike cigarettes. Packaging of SLT is usually in loose pouches or small sachets in which PHWs are likely to be absent, easily discarded or even distorted. SLT users are therefore less likely to be exposed to health warnings as compared to cigarette smokers. Moreover, the use of SLT in South Asia is deeply ingrained in social and cultural practices. This results in the perception that it is less harmful or even medicinal especially among rural populations of women and older adults.[14] These factors may greatly limit the effectiveness of warnings that are package based.

The case of Nepal has provided the importance of sustained political and legal commitment to tobacco control. The prolonged delay in the timeframe between the enactment of Tobacco Products Act in 2011 and its full enforcement of 90% PHWs depicts the influence of the tobacco industry in litigation. However, Supreme Court ruling in 2022 rejecting the industry's litigation affirmed the authority of the government to regulate tobacco packaging in the interest of public health. This ruling facilitated the 2025 directive on plain packaging and positioned Nepal as a global leading example among the low and middle-income countries that are adopting comprehensive packaging regulations in combating tobacco usage for better health outcomes.[19] The findings of this study ought to be interpreted cautiously, since multiple tobacco control measures were implemented concurrently. Furthermore, STEPS surveys tend to offer repeated cross-sectional rather than strictly individual-level longitudinal data. This can limit the generalizability of the results. The prevalent trends, however, mirror the introduction of new policies, thus supporting the efficacy of the warnings. In order to validate this relationship, future researchers may use comparative quantitative or quasi-experimental designs. Such design would clarify the causal pathways and also help to refine the rotation and design of warnings from different tobacco products.[20,21]

CONCLUSIONS

The results of this study demonstrate the effectiveness of strong PHW policies to reduce cigarette smoking at the population level. One key challenge observed was smokeless tobacco use showed little change over time. This indicated that uniform packaging interventions do not result in same impact for all tobacco products. Whereas the transition to plain packaging in 2025 is a step in the right direction, this study suggests plain packaging will not be solely sufficient to encourage the quitting of non-combustible tobacco products.

Progress toward national tobacco control goals will therefore require policies that extend beyond packaging. These new policies could include market restrictions for smokeless tobacco sale and targeted educational campaigns that address the specific behaviors for smokeless tobacco users in Nepal.

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