

Perceived Effectiveness of Pictorial Health Warning Labels of Tobacco Products and Associated Factors among Smokers and Quitters in Kaski District, Nepal

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ABSTRACT

Introduction: Globally, tobacco kills more than seven million people per year. In Nepal, more than fifty different types of tobacco products, both in smoke and smokeless forms, are available. Pictorial health warning labels (PHWLs) on tobacco products provide an effective way to aware both literates and illiterates about the health effects of tobacco use. This study aimed to assess the perceived effectiveness of pictorial health warning labels of tobacco products and associated factors among smokers and quitters.

Methods: The study design was community-based cross-sectional analytical with the quantitative method. We interviewed 389 adults (111 Quitters and 278 Smokers) of Kaski district. The sample was taken from both rural and urban areas based on existing household proportion. Ethical approval was taken from NHRC. We entered data in Epi-Data and analyzed in SPSS softwares. The perceived effectiveness scores of PHWLs were calculated (alpha ranges from 0.91 to 0.96) and compared among different groups using the Wilcoxon rank-sum test and Kruskal-Wallis test with the Dunn's multiple comparisons. The perceived effectiveness score of PHWLs were correlated with discrete covariates using Spearman rank correlation.

Results: Nearly one-third of the participants (32.7%) had bought a single piece of tobacco product, which is not allowed in Nepal. Nearly sixteen percentage of the participants were moderate to high level of nicotine dependent. Only twelve percent of participants wanted to quit or already quitted as s/he saw the PHWLs. Scores of Premature birth was statistically significant ($p=0.031$) on smoking status. Marital status, ethnicity, any family member use tobacco, age at first exposure psychological response, behavioral response and message credibility were statistically significant for the perceived effectiveness of PHWLs among smokers. Whereas place of resident, education status, age, psychological response, behavioral response, self efficacy and message credibility were statistically significant at $p<0.05$ for the perceived effectiveness of PHWLs among quitters.

Conclusions: This study concluded that premature type of PHWL was more effective than other type of PHWLs. The interventional program along with social and behavior change communication should be focused on the psychological, behavioral related and geographical setting. Further research is suggested to carryout the interventional study addressing behavioral and psychological factors.

Keywords: *Pictorial health warning, smoker, tobacco product, perceived effectiveness*

INTRODUCTION

Tobacco is one of the leading causes of human death and creates a great public health problem.¹⁻² It kills more than seven million people per year globally and nearly 80 percent of them are from developing countries.²⁻³ Tobacco use also accounted for 12 percent of all deaths among adults aged 30 years and above.² In Nepal, More than fifty different types of tobacco-related substances both smoke and smokeless are available in Nepal.⁴ WHO estimated that 4.1 million of Nepalese used the tobacco product.⁴ STEP survey in 2014 found 18.5 percent Nepalese (men 27.0%, women 10.3%) used tobacco.⁵ Likewise, NDHS 2016 revealed that its consumption was quite higher among men than their counterparts (27 % vs. 6 %).⁶ More than four out of five tobacco users depend on branded products.⁵ Up to 2003, in addition to import of foreign tobacco products and undocumented industries, there were four cigarette factories and

35 tobacco product related registered industries.⁴

Pictorial health warning labels on tobacco products provide an effective way to educate smokers and non- smokers about the harms of tobacco use.⁷⁻⁸ The use of images with pictures is more effective than text-only warnings.⁸ Theories suggest that text with the picture may be more persuasive than text alone.⁹⁻¹¹ PHWL studied in many countries have shown that PHWLs increase knowledge about the risks of smoking.^{12,13} Also promoting other psychological and behavioral responses that are related to smoking cessation, such as negative emotional reactions,¹⁴ credibility of the message,^{15, 16} thinking about quitting,¹⁷ and quit intention.¹⁸

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In June 2003, World Health Organization introduced the Framework Convention on Tobacco Control (WHO-FCTC) and implemented in February 2005.¹⁹ PHWL is one of the six key measures promoted by the WHO-FCTC to assist in reducing the demand for tobacco products.¹⁹ On May 31, 2011, Nepal government passed tobacco packaging regulations, including 75 percent coverage of both the front and back on tobacco package.²⁰ The warnings were implemented in April 2014 and government amended the regulations, increasing the coverage area of the warnings to 90 percent.²¹ This study opted to adapt warnings used by the government of Nepal.²² This study aimed as to assess the perceived effectiveness of pictorial health warning labels on tobacco product and associated factors among smoker and quitter in Kaski district, Nepal.

METHODS

We designed a community-based cross-sectional study to enroll 389 adults (both smokers and quitters) of 18 years and above from both rural and urban areas of Kaski district. Interviewer administered questionnaire was used for data collection from March to May 2019. Probability proportional to population size was adopted for selection of smokers but snowball sampling method was used for quitters. Participants included who did ever

used tobacco at least 100 times in their lifetime as well as had seen PHWL on tobacco products at least once in their lifetime. Ethical approval was taken from the NHRC with reg. no 263/2019. Permission was taken from local authorities written consent was taken from all the participants prior to data collection. Data entry was done in Epi-Data and analyzed in SPSS.



Figure 1: Existing PHWLs on tobacco products in Nepal (From left to right upper: P1-lung cancer, P2-brain hemorrhage, P3-premature birth; lower: P4-mouth and neck cancer, P5-oral cancer)

ANALYSIS

Score of wealth index was measure by International Wealth Index which contain 12 items.²³ Nicotine dependence was measured by Fagerstrom test for nicotine dependence tool,

which consists of six items. The total score ranges from 0 to 10, which is categorized into 5 groups i.e. 0 to 2 indicate very low cigarette dependence, from 3 to 4 low cigarette dependence, 5 medium, 6–7 high, and 8–10 very high cigarette dependence.²⁴ Smoker identity score was measured by self-evaluation having 3 items. Compute all three items to calculate the smoking identity score. The internal consistency of the rating scale for smoker identity was assessed Cronbach alpha was 0.74. Similarly, self-efficacy score was measured by smoker's belief around quitting smoking and confidence to quit smoking for smoker while confident to do not relapse for a quitter.

Psychological responses to PHWLs was assessing the two psychological responses to PHWLs those are attention to PHWLs and cognitive elaboration of risks. It is adapted from previous research.^{25,26} Similarly, behavioral responses to PHWLs was measured by made any effort to avoid looking at or thinking about the warning labels and forgoing of cigarettes due to PHWLs.^{25,26} Message cadibility was measured by perception of truthfulness or believability of the warning messages and intend to quit. The internal consistency of message credibility was assessed Cronbach alpha 0.52. Categories into two group more credible and less credible.

Perceived effectiveness score was measured by perception about effective in smoking prevention, effective in delivering message, avoid buying, and more concerned about the health risk of smoking. Those are adapted and revised in previous similar type of study²⁷⁻²⁹ These four items have high internal consistency in each PHWLs P1-lung cancer (alpha=0.95), P2-brain hemorrhage (alpha=0.94), P3-premature birth (alpha=0.92), P4-mouth and neck cancer (alpha=0.95), and P5-oral cancer (alpha=0.96). By adding the scores of all 4 items, dividing this score by the theoretical maximum (16 points), and multiplying the product by 100, it created a score that estimated the overall perceived effectiveness for each PHWLs with a score from 25 to 100.

Inferential statistic

The perceived effectiveness of the PHWLs across different subgroups was compared. The scores of each PHWLs were compared between 2 groups of different variables like sex, place of residence, marital status, religion, any family member use tobacco, age at first exposure and frequency of smoking was used the Wilcoxon rank-sum test. Comparison of the scores for different variables like education, ethnicity, nicotine dependency, type of smoker were conducted using the Kruskal-Wallis test and the Dunn test to adjust for multiple comparisons. Wealth index, age of the participants, smoker identity score, psychological response score, behavioral response score, other media exposure score, message credibility score and self-efficacy score was conducted using Spearman rank correlation.

RESULTS

Table 1: Socio-demographic characteristics

Characteristics	Smoker (n=278)		Quitter (n=111)		Total (n=389)	
	n	%	n	%	n	%
Sex						
Male	243	87.4	99	89.2	342	87.9
Female	35	12.6	12	10.8	47	12.1
Age of participants						
Young adult(18 to 35 years)	131	47.1	52	46.8	183	47
Middle adult(36 -55 years)	103	37.1	38	34.2	141	36.2
Older adult (>55 years)	44	15.8	21	18.9	65	16.7
Median (Q1-Q3) (Min, Max)	37 (25 -50) (18,-72)		38 (28-52) (18,- 65)		37(26-50.5) (18,72)	
Marital status						
Married	193	69.4	72	64.9	265	68.1
Unmarried	79	28.4	36	32.4	115	29.6
Divorced and widow	6	2.1	3	2.7	9	2.3
Ethnicity						
Brahmin/Chhetri	130	46.8	74	66.7	204	52.4
Dalits	57	20.5	11	9.9	68	17.5
Advantage Janajati	85	30.6	23	20.7	64	16.5
Disadvantage Janajati					44	11.3
Others caste*	6	2.1	3	2.7	9	2.3
Religion						
Hindu	251	90.3	96	86.5	347	89.2
Non-Hindu**	27	9.8	16	14.4	47	10.8
Education level						
Illiterate	41	14.7	15	13.5	56	14.4
Informal education	39	14	19	17.1	58	14.9
Basic education	18	6.5	7	6.3	25	6.4
Secondary education	125	45	33	29.7	158	40.6
Graduate	47	16.9	32	28.8	79	20.3
Post-graduated or above	8	2.9	5	4.5	13	3.3
Occupation						
Business, public and private services	108	38.9	50	45.0	158	40.6
Agriculture and wages	94	33.8	28	25.2	122	31.4
Unemployment, retired & student	76	27.3	33	29.7	109	28.1
Wealth index						
Median (Q1-Q3) (Min, Max)	69.14(47.91-93.5) (12.18, 100)		69.14(44.01-95.35) (12.18, 100)		69.14(54.2-95.35) (12.18-100)	

*Other castes are Muslim, Non-Dalit other terai castes; ** Non-Hindu are Buddhist and Muslim, Christian

Table 1 shows that a majority (90%) of the participants were male both in quitter (89.2%) and smoker (87.4%) and rest of them were female. The median age of the smoker was 37 (25 -50) years and among quitter was 38 (28-52) years. Nearly half (47%) of the participants were younger age between 18 to 25 years and followed by middle age (36.2%) and older adult aged above 55 years (16.7%). More than two-thirds (68.1%) of the

participants were married and a few participants (2.3%) were divorced and widow. More than half (52.4%) of the participants were Brahmin, Chhetri followed by Dalit, Advantage Janjati, Disadvantage Janajati and other ethnicities. The majority (89.2%) of the participants were Hindu. Two-fifth (40.6%) of the participants were studied secondary level education, followed by graduated, Illiterate, informal education and basic education. Around one-fifth (19.3%) of the participants were engaged in business and followed by private services, agriculture, daily wages, student, homemaker, unemployment, retired and government job. Among smoker, the median score of international wealth index was 69.14 (Q_1 - Q_3 :47.91- 93.5)while among the quitter median score of international wealth index were 69.14 (Q_1 - Q_3 : 44.01- 95.35).

Table 2: Smoking status

Variables	Smoker (n=278)		Quitter (n=111)		Total (n=379)	
	n	%	n	%	n	%
Any family members use tobacco						
No	201	72.1	83	74.77	284	73
Yes	77	27.9	28	25.23	105	27
Best friend is a tobacco user						
No	254	91.37	108	97.30	362	93.1
Yes	24	8.63	3	2.70	27	6.9
Age at debut of tobacco use						
Below Median age (17 years)	149	53.6	63	56.76	212	54.5
Above Median age	129	46.4	48	43.24	177	45.5
Median (Q1-Q3) (Min, Max)	17 (15-22) (8, 59)		17 (14-20) (10, 35)		17 (15-21) (8, 59)	
Type of smoke						
Smoked tobacco	152	54.7				
Smokeless tobacco	46	16.5				
Both smoke and smokeless tobacco	80	28.8				
Buy a piece or packet of tobacco						
Packet	187	67.3				
Piece	91	32.7				
Fagerstrom test for nicotine dependence						
Very low dependence	155	55.8				
Low dependence	79	28.4				
Moderate dependence	28	10.1				
High dependence	16	5.8				

Table 2 shows that, more than one-fourth (27%) of the participant's family members and seven (6.9%) of the best friend were consumed any kind of tobacco. The median age of first exposed to tobacco was 17 years with first quartile (15 years) and third quartile (21 years). Among the smoker, more than half (54.7%) of the participants were used smoked tobacco and rest of the participants use smokeless tobacco. Nearly one-third (32.7%) of the participants had bought a single piece which is

not allowed in Nepal. Nearly six (5.8%) Percent of the daily smokers were highly nicotine dependent where 10.1 percent of respondents were moderately nicotine dependent.

Table 3: Reasons to quit or intend to using tobacco

Reasons to quit or intend to quit	Quitter (n=111)		Intended to quit (n=85)	
	n	%	n	%
Health is the reason	68	62.4	73	45.3
Family health	24	22.0	22	25.9
It's a bad habit	26	23.9	8	9.4
Family wants me to quit	26	23.9	7	8.2
Doctor's advice	18	16.5	6	7.1
Seen PHWL is the reasons	6	5.5	17	20.0
I don't like being addicted	17	15.6	5	5.9
Audio-visual media	10	9.2	9	10.6
1. Printed media	9	8.3	5	5.9
Cost is the reason	11	10.1	0	0
Audio media	7	6.4	2	2.4
Reason for continuing tobacco consumption (n=278)				
Miss or crave tobacco too much	200	74.60		
Enjoy using tobacco	148	55.20		
I have too much stress in my life	120	44.80		

Many friends, family use tobacco	77	28.70
It's least problems	63	23.50
Don't believe to quit	45	16.80
Nervous or anxious or tense after quit	37	13.80
I don't believe using tobacco will hurt me	13	4.90

Table 3 shows that, Health (72.7%) was the major reason for not using tobacco products by the participants followed by family health (23.7%), bad habit (17.5%), family want to quit (17%), doctor advice (12.4%), seen PHWL (11.9%), don't addict (11.3%), audio-visual media (9.8%), printed media (7.2%), cost (5.7%), and audio media (4.6%). The major reasons for continuing the tobacco use among smoker participants was miss or crave tobacco too much (74.6%), more than half (55.2%) of the participants stated that they enjoy using tobacco products followed by too much stress (44.8%), family and friend used tobacco products (28.7%), it's the least problem (23.5%), don't belief to quit (16.8%), nervous or anxious (13.8%), tobacco is not harmful (4.9%), quitting might hurt my recovery other abuse (3.7%) and weight gain (1.9%).

Table 4: Pictorial health warning label on tobacco products

PHWLs	Had you ever seen this type of PHWL				Place of seen PHWL			
		No	Yes	Total	Smoked tobacco	Smokeless tobacco	Both	Total
P1-Lung cancer	n	5	384	389	383	0	1	384
	%	1.3	98.7	100	99.7	0	0.3	100
P2-Brain hemorrhage	n	99	290	389	269	1	20	290
	%	25.4	74.6	100	92.8	0.3	6.9	100
P3-Premature birth	n	183	206	389	54	33	119	206
	%	47	53	100	26.2	16	57.8	100
P4-Neck cancer	n	63	326	389	21	144	161	326
	%	16.2	93.8	100	6.4	44.2	49.4	100
P5-Oral cancer	n	81	307	389	17	85	206	307
	%	20.8	78.9	100.0	5.5	27.7	67.1	100.0

Table 4 shows that a great majority of the respondents (98.7%) had seen picture indicating lung cancer followed by third-fourths (74.5%) of the respondents had seen picture indicating brain hemorrhage but, nearly half (47%) of the respondents hadn't seen picture indicating premature birth of a child. The majority (93.8%) of the participants had seen the picture indicating neck and oral cancer. Whereas one-fifths (20.8%) of participants hadn't seen the picture indicating oral cancer.

Table 5: Differences in the perceived effectiveness of 5 different PHWLs on tobacco product between smoker and quitter

PHWL	Aggregate Score (Median (Q1-Q3))		p-value
	Quitter	Smoker	
P3 -Premature birth baby (n=206)	75(55-95)	65(50-80)	0.031*
P2 -Brain hemorrhage (n=268)	70(50-83.75)	65(45-80)	0.089
P4 -Oral and neck cancer (n=326)	70(40-85)	65(35-80)	0.141
P1- Lung cancer (n=383)	60(45-80)	60(35-80)	0.323
P5- Oral cancer (n=306)	70(40-90)	65(40-90)	0.496

*Statistically significant at $p < 0.05$

Table 5 shows that all five different PHWLs rated by participants. The scores of quitters and smokers for P3- Premature birth baby

was statistically different ($p=0.031$) but other four did not significantly different in these ratings.

Table 6: Perceived effectiveness of PHWLs (p1, p2 & p3) by sociodemographic and smoking factors

Variable	Lung cancer (n=274)				Brain hemorrhage (n=192)				Premature birth baby (n=153)			
	Smoker		Quitter		Smoker		Quitter		Smoker		Quitter	
	Median (Q1-Q3)	p value	Median (Q1-Q3)	p value	Median (Q1-Q3)	p-value	Median (Q1-Q3)	p-value	Median (Q1-Q3)	p-value	Median (Q1-Q3)	p-value
Sex												
Male	70(45-85)	0.226	65(55-80)	0.853	70(50-80)	0.481	65(55-80)	0.853	70(50-80)	0.412	75(55-95)	0.638
Female	80(60-95)		70(60-70)		77.5(60-80)		70(60-70)		75(50-80)		70(62.5-82.5)	
Place of residents												
Rural	70(45-82.5)	0.822	65(45-80)	0.014*	65(45-82.5)	0.451	65(45-80)	0.014*	70(50-80)	0.985	70(55-90)	0.318
Urban	75(50-85)		65(60-80)		72.5(60-80)		65(60-80)		67.5(50-80)		75(60-95)	
Marital status												
Married	80(47.5-90)	0.003*	67.5(57.5-80)	0.007	75(60-82.5)	0.001*	67.5(57.5-80)	0.007	70(50-80)	0.014*	80(60-95)	0.065
Others	57.5(40-80)		60(55-80)		60(40-80)		60(55-80)		65(40-80)		65(55-90)	
Religion												
Hindu	75(45-90)	0.212	67.5(57-80)	0.488	70(50-80)	0.477	67.5(57-80)	0.488	70(50-80)	0.632	80(57.5-95)	0.872
Non-Hindu	60(35-80)		60(55-70)		60(55-75)		60(55-70)		65(50-80)		65(55-70)	
Ethnicity												
Dalit	80(60-90)	<0.001**	65(52.5-72)	0.296	75(65-80)	0.003*	65(52.5-72)	0.296	72.5(60-80)	0.027*	55(37.5-75)	0.512
Disadvantage janajati	40(32.5-60)		60(55-60)		40(32.5-60)		60(55-60)		40(37.5-55)		65(55-70)	
Advantage	60(60-75)		72.5(60-80)		60(60-75)		72.5(60-80)		65(50-80)		80(60-90)	
Brahmin, Chhetri	75(45-80)		40(37.5-57)		75(45-80)		40(37.5-57)		70(50-80)		45(40-57.5)	
Educational status												
Illiterate, informal	80(47.5-90)	0.019*	65(55-75)	0.008*	72.5(57-80)	0.08	65(55-75)	0.008*	70(57.5-80)	0.125	70(60-880)	0.986
Basic and secondary	65(37.5-80)		67.5(52.5-80)		65(45-80)		67.5(52.5-80)		60(40-80)		75(55-95)	
Higher education	80(55-90)		62.5(57.5-80)		80(57.5-85)		62.5(57.5-80)		70(65-80)		92.5(52.5-100)	
Occupation												
Housemaker, unemployment	77.5(50-90)		70(60-80)	0.554	75(50-80)		70(60-80)	0.554	70(65-80)		70(55-90)	0.295
agriculture, Business	75(40-85)		67.5(50-80)		70(50-85)		67.5(50-80)		72.5(55-80)		67.5(52.5-90)	
Service related	65(47.5-85)		65(60-80)		70(60-80)		65(60-80)		60(45-90)		80(65-100)	
Any family member use tobacco												
No	75(45-85)	0.491	65(60-80)	0.756	60(40-75)	<0.001**	70(60-80)	0.368	65(42.5-80)	<0.001**	75(55-95)	0.616
Yes	65(45-87.5)		70(45-85)		80(60-85)		70(60-80)		75(57.5-80)		72(52-92)	
Age at first exposure												
Below median	60(40-80)	<0.001**	60(47.5-77.5)	0.138	70(45-80)	0.009*	65(50-80)	0.103	65(45-80)	0.19	67.5(52.5-92.5)	0.161
Above median	80(60-90)		72.5(60-80)		70(60-85)		77.5(60-100)		70(65-80)		80(60-100)	
Nicotine dependency [#]												
Very low dependence	80(40-90)	0.015*			75(60-85)	0.066			75(60-80)	0.048*		
Low dependence	52.5(30-80)				57.5(32-75)				50(32.5-75)			
Moderate dependence	65(40-77.5)				60(57.5-70)				65(60-80)			
High dependence	80(65-90)				80(75-80)				65(65-80)			

[#]Kruskal Wallis test with Dunn's post-test; *Statistically significant at $p<0.05$; ** Statistically significant at $p<0.001$

Table 6 shows while associating perceived effectiveness of PHWLs. Among Smoker, while associating perceivedthe effectiveness of P1-lung cancer PHWLs with independent variables marital status, ethnicity, and education status emerged

as statistically significant. Similarly, perceive the effectiveness of picture of P2-brain hemorrhage were statistically significant with marital status ($p=0.001$) and ethnicity (0.003) whereas perceived effectiveness of P3-premature birth of a baby was

statistically significant with marital status ($p=0.014$) and ethnicity ($p=0.027$). While associating perceive the effectiveness of P1-lung cancer PHWLs with independent variables nicotine dependency ($p=0.015$), type of smoker ($p<0.001$), age at first exposure ($p<0.001$) and frequency ($p=0.001$) emerged as statistically significant. Similarly, age at first exposure to tobacco ($p<0.001$) & frequency of smoker ($p=0.009$) were statistically significant with the perceived effectiveness of picture of P2-brain hemorrhage. Nicotine dependency ($p=0.048$), type of

smoker ($p=0.009$) and age at first exposure to tobacco, were statistically significant with the perceived effectiveness of P3-premature birth of a baby.

Among quitter, place of resident ($p=0.014$), marital status ($p=0.007$), educational level ($p=0.008$) were significantly associated with perceived effectiveness score of P1-lung cancer. Education status was associated with the perceived effectiveness of P1-lung cancer.

Table 7: Perceived effectiveness of PHWLs (P4 & P5) by sociodemographic and smoking factors

Variable	Oral & neck cancer (n=233)				Oral cancer (n=215)			
	Smoker		Quitter		Smoker		Quitter	
	Median (Q1-Q3)	p-value	Median (Q1-Q3)	p-value	Median (Q1-Q3)	p-value	Median (Q1-Q3)	p-value
Sex								
Male	75(60-90)	0.899	80(60-100)	0.878	80(60-95)	0.172	85(60-100)	0.829
Female	85(65-90)		70(67.5-82.5)		90(65-100)		90 (85-92.5)	
Place of residents								
Rural	75(52.5-90)	0.882	80(40-100)	<0.001**	80(60-95)	0.589	80(60-100)	0.001*
Urban	80(60-90)		80(70-95)		80(65-95)		90(70-95)	
Marital status								
Married	80(60-90)	0.004*	80(65-92.5)	0.03*	85(65-95)	<0.001**	87(70-95)	0.192
Others	67.5(42-82)		80(40-100)		70(42.5-85)		87.5(50-100)	
Religion								
Hindu	75(60-90)	0.595	80(67.5-100)	0.314	80(60-95)	0.996	90(60-100)	0.152
Non-Hindu	80(60-90)		67.5(60-85)		80(65-90)		80(65-100)	
Ethnicity								
Dalit	80(65-85)	<0.001**	70(45-85)	0.443	82.5(65-95)	<0.001**	35(27.5-67)	0.432
Disadvantage janajati	50(45-60)		65(60-85)		55(47.5-60)		80(65-95)	
Advantage	75(60-90)		82.5(70-100)		80(65-95)		90(70-100)	
Brahmin, Chhetri	80(55-90)		40(37.5-55)				50(37.5-60)	
Educational status								
Illiterate, informal	85(62.5-90)	0.003*	70(65-85)	0.093	85(65-97.5)	<0.001**	80(70-90)	0.21
Basic and secondary	65(45-85)		75(37.5-100)		75(50-75)		85(45-100)	
Higher education	80(70-90)		92.5(80-100)		90(70-100)		97.5(77.5-100)	
Occupation								
Housemaker, unemployment	80(65-90)		70(65-95)	0.05	82.5(65-95)		90(80-95)	0.062
agriculture, Business	80(60-90)		80(57.5-97.5)		80(65-95)		87.5(60-100)	
Service related	70(60-85)		85(70-100)		80(60-92.5)		80(70-80)	
Any family member use tobacco								
No	65(47.5-80)	<0.001**	80(65-100)	0.954	70(52.5-87.5)	<0.001**	90(65-100)	0.347
Yes	85(65-90)		70(50-95)		95(77.5-100)		70(50-90)	
Age at first exposure								
Below median	75(55-90)	0.003*	75(50-100)	0.406	80(70-95)	0.01*	80(55-97.5)	0.429
Above median	80(70-90)		80(70-95)		90(70-95)		90(80-100)	
Nicotine dependency [#]								
Very low dependence	82.5(60-90)	0.003*			90(60-100)	0.006*		
Low dependence	60(40-80)				62.5(37-80)			
Moderate dependence	65(60-75)				65(62-77.5)			
High dependence	85(65-90)				85(65-90)			

[#]Kruskal Wallis test with Dunn's post-test; *Statistically significant at $p<0.05$; ** Statistically significant at $p<0.001$

Among Smoker, Table 7 shows that perceived effectiveness of P4-oral and neck cancer were statistically significant with marital status ($p<0.001$), ethnicity ($p<0.001$) and educational status ($p=0.003$). Similarly, the perceived effectiveness of P5-oral cancer was statistically significant with marital status ($p<0.001$), ethnicity ($p<0.001$) and educational status ($p<0.001$). While associating perceive the effectiveness of P4 oral and neck cancer. Similarly, nicotine dependence (0.006), age at first exposed ($p<0.003$) and frequency of smoker ($p=0.01$) were

statistically significant with perceived effectiveness of P5-oral cancer.

Among quitter, Perceived effectiveness score of P4-neck and oral cancer and P5- Oral cancer statistically significant with a place of residents ($p<0.001$). Education status was associated with the perceived effectiveness of P1-lung cancer. Mean rank of higher education was statistically different from basic to primary education and illiterate to informal education.

Table 8: Correlation of effectiveness score and social, psychological and behavioral response

		Perceived effectiveness of pictorial health warning label on tobacco products									
Characteristics		Lung cancer		Brain hemorrhage		Premature birth of a baby		Neck & oral cancer		Oral cancer	
		Smoker	Quitter	Smoker	Quitter	Smoker	Quitter	Smoker	Quitter	Smoker	Quitter
International	ρ	-0.02	-0.1	-0.073	0.026	-0.099	0.157	0.019	-0.143	-0.017	-0.164
Wealth Index	n	274	109	196	72	153	53	233	93	215	92
Age of the participants	ρ	0.244**	0.292*	0.273**	0.187	0.257*	0.126	0.249**	0.184	0.32**	0.197
	n	274		196	72	153	53	233	93	215	92
Self & social identity	ρ	-0.091		-0.167*		-0.126		-0.087		-0.077	
	n	274		196		153		233		215	
Psychological reaction	ρ	0.407**	0.487**	0.368**	0.349*	0.408**	0.393*	0.428**	0.394**	0.378**	0.372**
	n	274	109	196	72	153	53	233	93	215	92
Behavioral reaction	ρ	0.549**	0.246*	0.482**	0.211	0.545**	0.451*	0.604**	0.395**	0.655**	0.439**
	n	274	109	196	72	153	53	233	93	215	92
Media exposure	ρ	-0.155	0.474*	-0.093	0.242	-0.07	0.41	-0.141	0.345	-0.166	0.366
	n	99	30	85	21	74	18	91	26	84	26
Impact of PHWL	ρ	0.451**	0.285*	0.484**	0.323*	0.391**	0.154	0.389**	0.349*	0.411**	0.28*
	n	274	109	196	72	153	53	233	93	215	92
Message credibility	ρ	0.48**	0.417**	0.502**	0.389**	0.529**	0.654**	0.52**	0.587**	0.526**	0.579**
	n	274	109	196	72	153	53	233	93	215	92
Self efficacy to quit or not to start	ρ	0.382**	0.173	0.378**	0.147	0.27**	0.009	0.366**	0.159	0.334**	0.197
	n	274	109	196		153	53	233	93	215	92

ρ =Spearman's rank correlation coefficient *Statistically significant at $p<0.05$; ** Statistically significant at $p<0.001$;

Table 8 shows that age, the psychological response, behavioral response, message credibility, and self-efficacy were statistically correlated with the all picture P1, P2, P3, P4, and P5. While, perceived effectiveness score of different pictures of P1-lung cancer, P2- brain hemorrhage, P3-premature birth of baby, P4-neck & oral cancer, P5- oral cancer were statistically significant with independents variables, psychological, behavioral response, perceived impact, message credibility. Age was statistically significant with P1-Lung cancer ($r=0.292$).

DISCUSSION

In this study, the majority (87.4%) of the participants were male. A similar type of study in Gulf country show that nearly two-third (60%) of the smokers were male. Where 56% of quitter in male.³⁰ Among the smokers, nearly half (47.1%) of the respondents were a young adult aged between 18 years to 35 years. A study conducted in Malaysia also had a similar distribution in age (53%) up to 40 years age group.³¹ Similarly,

more than two-third (69.4%) of the smoker were married whereas a similar type of study conducted in Malaysia also had a similar proportion (74%).³¹

Perceived Effectiveness of PHWLs by Smoking Status

In this study found that all smoker and quitter rated label P3 -Premature childbirth to be highly effective but similar type of study shod oral cancer and an oxygen mask to be effective.³⁰ In this study have not an oxygen mask PHWLs but oral cancer is not significant.

This study showed the P3-Premature birth having child ill, but the Mansour et.al. doesn't show higher effectively during pregnancy. Similarly, in a study in Mexico, PHWL of physical health effects were shown to be statistically significantly more than a symbolic picture.²⁷ Similarly in Bangladesh and India have also significant.³²

This study was found that more than one in five of the participants intend to quit within six months. A similar type of

study conducted in Indonesia also found that one-fourth (29%) of the adult want to quit within 6 months.²⁹

Perceived effectiveness of PHWLs by socio-demographic characteristics by sex, this study was not statistically significant of perceived effectiveness of PHWLs none of all 5 PHWLs both group smoker and quitter. In contrast, an 8-pregnancy-related PHWL is effective for sex.³⁰ However, this study had not any directly pregnancy-related PHWLs by sex. By education, among smoker this study was found that P1-Lung cancer, = 0.008. Whereas, a similar type of study was conducted in Gulf countries found that slightly significant by education ($p=0.049$).³⁰ Among both group smoker and quitter, there is not statistically significant between wealth index and perceived effectiveness of PHWLs. A similar type of study also not found significant by income.³⁰

Disadvantage janajati have perceived low effectiveness than other ethnicities. Age of the smoker and quitter was statistically significant with the perceived effectiveness by social, psychological and behavioral responses in all pictures. This study found that the mean score of smoking identity was 9.734 ± 3.03 . Where, a similar type of study conducted in Indonesia had 3.17 ± 0.99 .²⁹

This study found that the mean score of self-efficacy was 5.939 ± 2.196 among smoker. A similar type of study was conducted in Indonesia which showed that 2.94 ± 1.14 .²⁹ Smoker identity is statistically associated with perceive effectiveness, whereas the effectiveness is significantly effective to the smoker identity.²⁹ Psychological response ($p<0.001$) and behavioral response (0.001) were strongly associated with the perceive effectiveness and perceive the impact of PHWLs. In other hand, a similar type of study was conducted in Indonesia also found strongly associated at $P<0.001$ with the perceived effectiveness of PHWLs on tobacco products.²⁹

CONCLUSION

This study concluded that premature birth of baby warning label was found to be the most effective PHWL on tobacco products to control the tobacco use. Among smoker, age, marital status, ethnicity, education level, nicotine dependency, type of smoker, age at first exposure to tobacco use, the psychological response, behavioral response, message credibility, and self-efficacy were statistically significant with perceived effectiveness score among smokers. Similarly, among quitter, age, place of residence, marital status, and education level were statistically significant with perceived effectiveness of P1-lung cancer at $p<0.05$ and psychological response, behavioral response, message credibility are statistically significant at $p<0.05$ with perceived effectiveness of all five PHWLs. Policymakers need to develop credible message, psychological and behavioral related interventional package design with the major focus on the geographical

setting. Although Nepal government has restricted to sell the single piece of tobacco but still one-third of smoker had bought it. So, It needs to proper implementation. Large scale study is required to conduct at the community level among smoker and non-smoker for the perceived effectiveness. Interventional study also need to conduct for finding effectiveness.

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