

Exploring context specific anti-smoking warning labels on cigarette packs: A quasi-experiment

Atiya Abdul Karim, Sumera Inam, Muhammad Tahir Rizwan Khan, Kashif Shafique

Abstract

Objective: To evaluate the impact of introducing newly-designed warning labels in relation to the available conventional cigarette packs.

Method: The quasi-experimental study was conducted at four co-educational academic institutions selected using cluster random sampling technique in Gulshan-e-Iqbal town of Karachi from September 2016 to October 2017. The respondents, aged 16-24 years, were exposed with an experimental condition using five graphic cards; each comprising of two separate labels; label 1 being a cigarette pack currently rotated, and label 2 being the newly designed graphic and text warning label. Each participant responded over efficacy measures for each label separately. The difference in the efficacy scores between the two labels was assessed using repeated measure ANOVA with Bonferroni correction in analysis.

Results: Of the 388 students, 256(66%) were males and 132(34%) were females. The overall mean age was 18 ± 2.76 years. Also, 188(48.5%) subjects were studying in higher secondary, 179(46.1%) undergraduate and 21(5.4%) postgraduate level. Of them, 104(26.8%) were ever-smokers and 284(73.2%) reported to be never-smokers. A difference was observed in the efficacy of the newly designed label "poverty" compared with current cigarette pack on the measure of not to start smoking ($p=0.006$). Never-smoking males perceived newly-designed label element 'dead person' as fear-arousing ($p=0.045$), while never-smoking females considered 'look after family' as efficacious ($p=0.024$).

Conclusion: There was some evidence of variation in efficacy scores after stratifying on gender and smoking status. A more holistic approach is needed in this regard.

Keywords: Cigarette packaging, Cigarette smoking, Health warning labels, Quasi-experiment, Self-efficacy, Tobacco.

(JPMA 72: 71; 2022) DOI: <https://doi.org/10.47391/JPMA.1803>

Introduction

Tobacco is a preventable cause of mortality and morbidity killing more than 6 million people each year.¹ In response to the emerging tobacco epidemic, a global treaty, the World Health Organisation Framework Convention on Tobacco Control (WHO-FCTC), was introduced whose Article 11 requires all parties to adopt best practices for tobacco packaging which involve usage of pictorial warning labels to promote abstinence, increasing the coverage of warning label to at least 50% to increase noticeability, and timely replacement of old warning labels with new ones to sustain abstinence.²

In this regard, Pakistan, being a signatory to the treaty since 2005, has fallen short of the targets.³ Over the span of eight years, the warning label on the cigarette packs had occupied 40% of the principal display and featured a single warning message comprising a picture of oral cancer and a text in local language to the effect that 'tobacco causes mouth cancer'.

Although there has been a recent revision in packaging policy to increase the coverage up to 60% or more (SRO 127-128 KE/2017).⁴ However, Pakistan has still adopted

School of Public Health, Dow University of Health Sciences, Karachi, Pakistan.

Correspondence: Atiya Abdul Karim. Email: atiya.abdulkarim@gmail.com

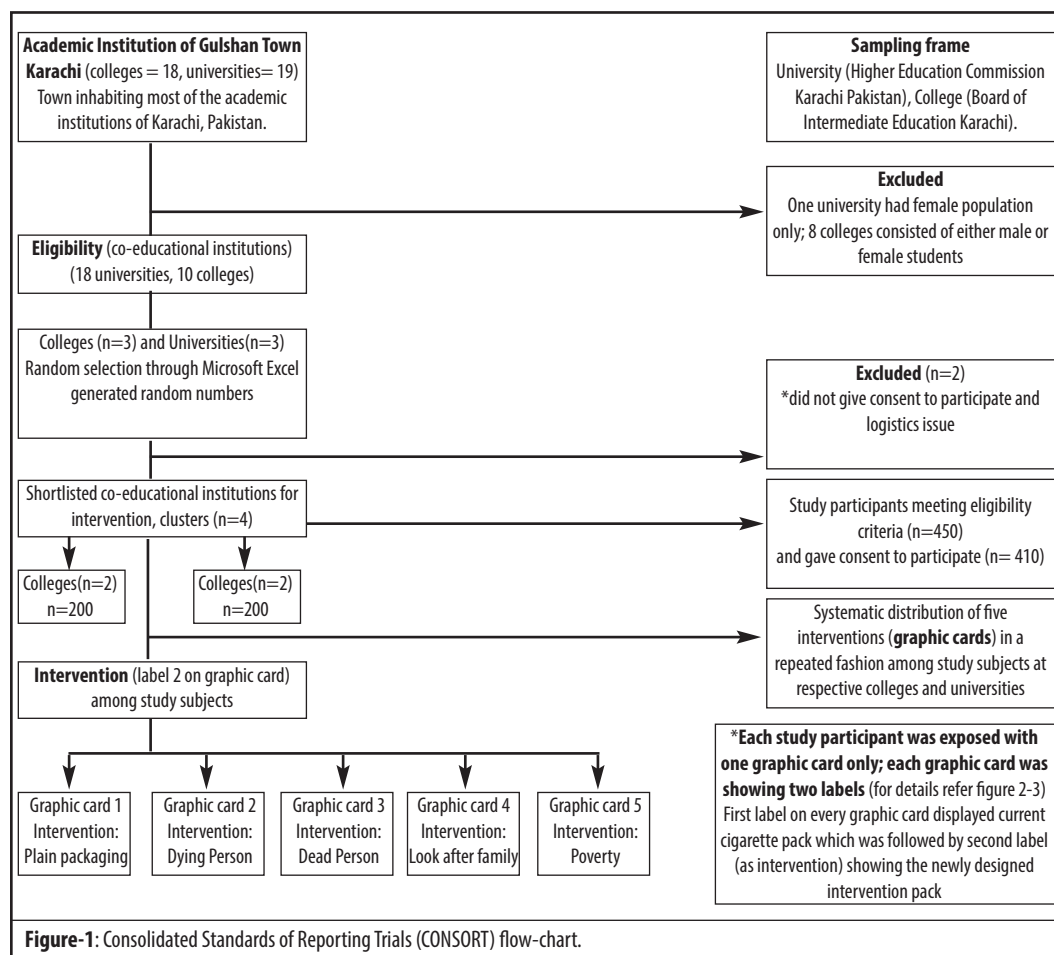
conventional approach of using a single theme warning people about health consequences of tobacco consumption. The current study was planned to evaluate the impact of introducing newly-designed warning labels.

Subjects and Methods

The quasi-experimental study was conducted at a group of co-educational academic institutions in Gulshan-e-Iqbal town of Karachi from September 2016 to October 2017. The Gulshan town is one of the major towns of the cosmopolitan city that has a diversified population comprising people from almost every socio-economic group. After approval from the ethics review committee of the Dow University of Health Sciences (DUHS), Karachi, the sample size was calculated on the basis of effect size at Cohen's $d=0.47$, 90% power and 95% level of significance reported for newly-designed graphic and text warning label.⁵ A list of co-educational institutions situated in the Gulshan town was obtained and four clusters were chosen through random numbers generated using Microsoft Excel.

The four selected institutions had on an average 850-1000 students. Therefore, a cluster size of 100 was used to recruit eligible participants who were present at the time of the study through simple random sampling.

Those included were male and female students aged 16-



24 years. Permission was obtained from the respective administration of the institutions, and their help was sought to circulate a participant information sheet among the parents/guardians concerned. After obtaining written informed consent, each participant was exposed to a randomly assigned intervention, which was a graphic card with two labels, to assess their efficacy on six parameters (Figure 1).

Altogether five graphic cards were used in the experimentation procedure. Each graphic card consisted of two labels. graphic and text warning labels (GTWLs) were images of cigarette packs created on dimensions 8.5cm x 5.5cm, and were identical to the real pack.

On each graphic card, label 1 showed the conventional (previously rotated) cigarette pack: an image of oral cancer and a text-based warning in Urdu, the local language, that was used locally at the time of the study. The coverage of this GTWL were compliant with the current practices of cigarette packaging in Pakistan i.e. it occupied 40% of the principle display, with 3.7cm x 5.5cm as the dimensions.

On the other hand, new themes were chosen for label 2

which were positioned next to label 1 as part of the experiment. Unlike the conventional pack, the coverage of GTWL on label 2 was raised to occupy 60% of the principal display i.e. the size of newer graphic and text warning was set to occupy 5cm x 5.5cm. The newer designs were made in compliance with the cigarette packaging guidelines in Article 11 of WHO-FCTC (2.3) and the uniformity of their construct was maintained across all the new designs.

After a thorough search on WHO database for health warning, three themes were identified for designing GTWLs on label 2. Only those GTWLs were shortlisted which were in close proximity with socio-cultural aspects of the

developing countries.⁶⁻¹¹ There were five new GTWL designs for label 2 consisting of following themes: One plain packaging, two GTWLs related to adverse health consequences, and two GTWLs related to adverse socio-economic consequences of tobacco use (Figure 2). The sequential arrangement of five new designs under the three specific themes was: Theme 1: Plain packaging; graphic image of oral ulcer, and The text saying, 'Refrain from tobacco and prevent cancer'; Theme 2A: Health consequences as 'Dead Person' with graphic of a dying person, and the text saying, 'Tobacco causes slow painful death'; Theme 2B: Health consequences as 'Dying person with graphic of graveyard, and the text saying, 'Tobacco is fatal (be cautious)'; Theme 3A: Socio-economic consequences as 'Family' with graphic of family impact of tobacco, and the text saying, 'If smoking kills you, what happens to your family?'; and Theme 3B: Socio-economic consequences as 'Poverty' with graphic of a beggar, and the text saying, 'Tobacco causes poverty'.

The allocation of the intervention was based on a scheme to ensure uniformity in the distribution of intervention

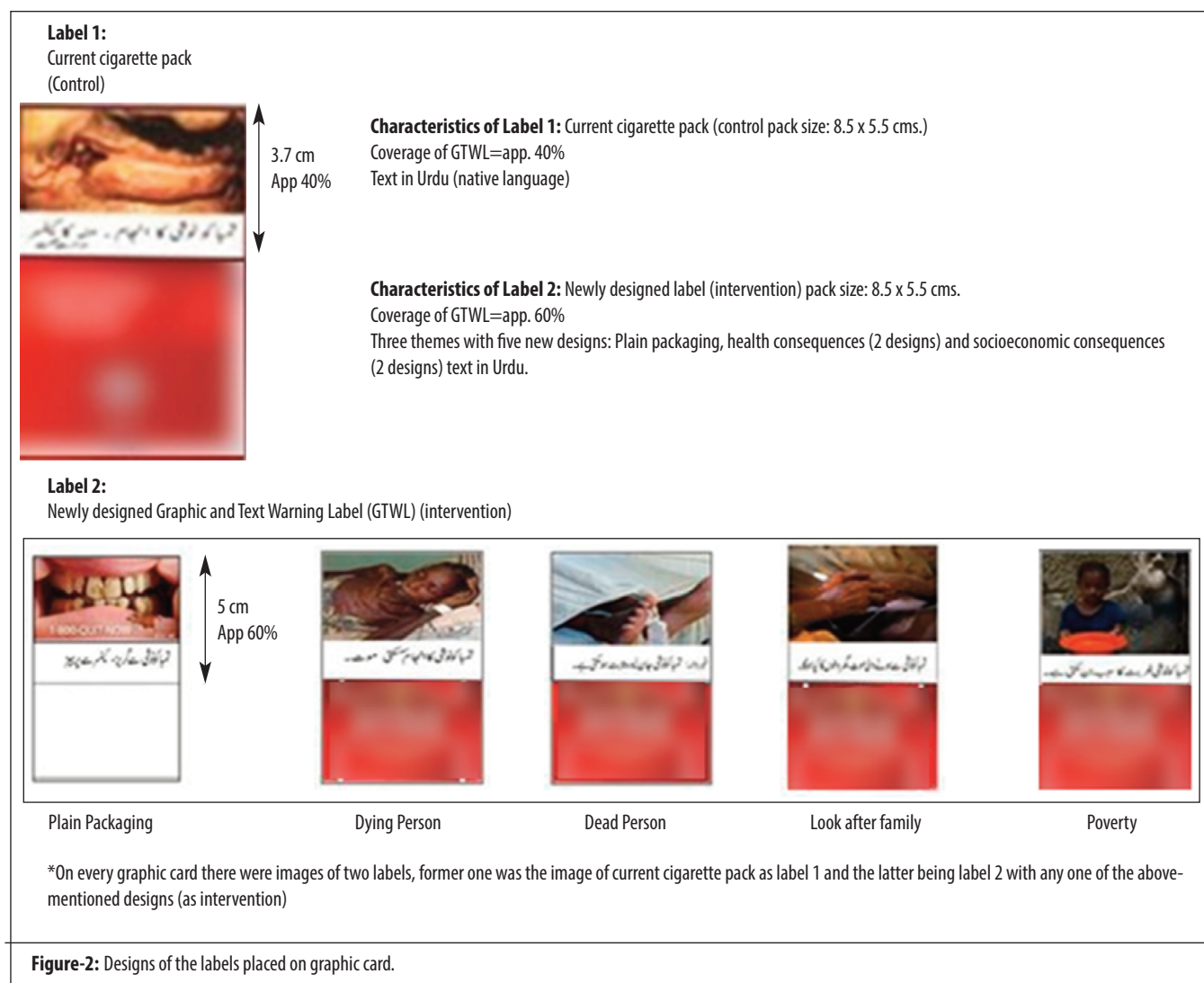


Figure-2: Designs of the labels placed on graphic card.

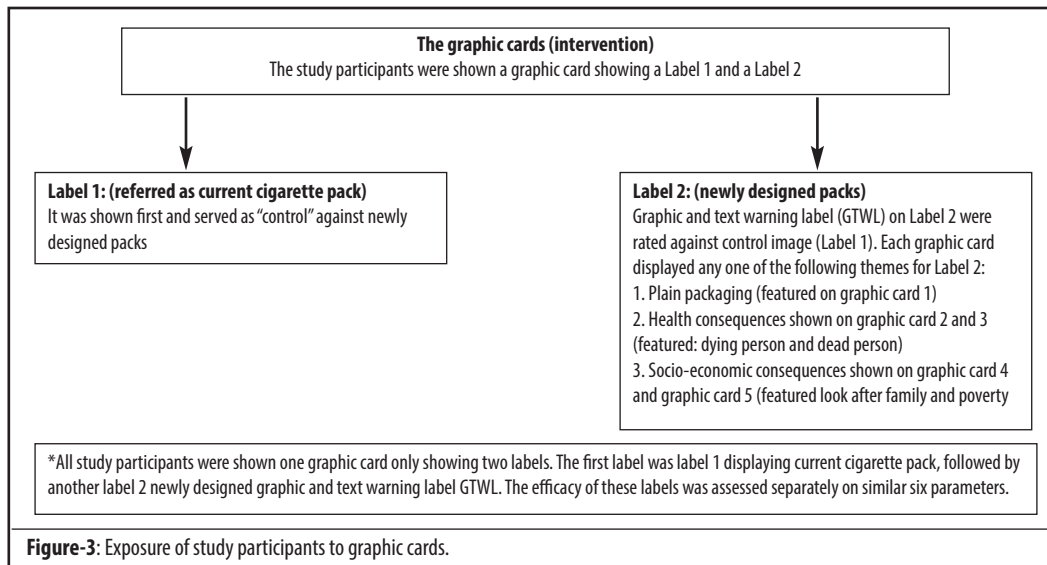
among the participants. Also, the order of the placement of the two labels on each graphic card was similar i.e. the intervention label 2 was placed after the current image of label 1.

Firstly, the graphic cards were arranged into five different sets, ranging from 1 to 5, and the order of repetition was maintained till the last graphic card. The sequence of arrangement of graphic card 1 to graphic card 5 followed the same thematic order. Each participant randomly received any one of the five graphic cards to respond over six efficacy measures (Figure 3).

The efficacy of the current and newly-designed warning labels was assessed through six efficacy measures evaluated on five-point Likert scale. These included: susceptible nature, inducing alarm, fear-arousal, worrisome, not to acquire smoking, and trigger quitting.⁵

Self-reported measures were relied upon to stratify the participants in terms of smoking status. The respondents were asked, "Have you ever smoked?" If they answered in the affirmative, they were further asked, "Have you smoked 100 or more cigarettes in your lifetime?" Never-smokers were defined as individuals who had not smoked in their lifetime or had smoked less than 100 cigarettes in lifetime.⁶

Data was cleaned and respondents with missing information on any of the outcome efficacy parameters were excluded. The data was then analysed using SPSS 24. Mean and standard deviation were reported for continuous variables, whereas frequencies and percentages were used for categorical variables. Repeated measure analysis of variance (ANOVA) was used to evaluate the impact of introducing the newly-designed warning labels in relation to the available conventional cigarette packs, thus minimising type I error. Pair-wise comparisons among old



and newly-designed cigarette pack conditions were tested for efficacy on six measures. The efficacy scores were further segregated to observe any difference recorded on the basis of smoking status and gender.

Results

Of the 400 students enrolled, 388(97%) participated in the study (Figure 3). Of them, 256(66%) were males and 132(34%) were females. The overall mean age was 18 ± 2.76 years. Also, 188(48.5%) subjects were studying in higher secondary, 179(46.1%) undergraduate and 21(5.4%) postgraduate levels. Of them, 104(26.8%) were ever-smokers and 284(73.2%) reported to be never-smokers. Among the ever-smokers, 91(91.2%) were males, and the lowest reported age for smoking initiation was 7 ± 2.86 years (Table 1).

Over all, the efficacy scores differed between the newly designed label "Poverty" and current cigarette pack on measures: Susceptible nature ($p=0.012$), inducing alarm ($p=0.038$), not to start smoking ($p=0.006$) and trigger quitting ($p=0.0297$) respectively. However, the participants rated the current cigarette pack relatively higher than the Poverty label and felt a greater susceptibility towards consequences of cigarette smoking when they looked at current cigarette pack (4.08 ± 1.24) than when poverty label was seen (3.57 ± 1.24). Likewise, the alarming nature of the warning label was perceived more for current cigarette pack (4.22 ± 1.21) than that for newly designed Poverty label (3.88 ± 1.01). Whereas not much difference was seen between the ratings of the labels (Poverty label: 2.70 ± 1.53 , current cigarette pack: 2.96 ± 1.57) in their potential to trigger quit contemplations (Table 2).

On the other hand, the efficacy of the labels was perceived

differently among male and female ever smokers (Table 3 and Table 4). Ever smoking males felt some-what susceptible towards socio economic consequences of tobacco smoking (3.7 ± 1.40) in relation to current cigarette pack, $p=0.013$. In the context of fear arousal, the newly designed label on Dead person was rated higher by never smoking males at mean score of (3.6 ± 0.92) in comparison to current cigarette pack

(3.0 ± 0.99 , $p=0.045$). Contrary to this, the fear perceptions

Table-1: Baseline characteristics of study population (n=388).

Characteristics	n (%)
Gender	
Male	256 (66)
Female	132 (34)
Age(years)	
<18	174 (44.8)
≥ 18	214 (55.2)
Education	
Higher secondary	188 (48.5)
Undergraduate	179 (46.1)
Postgraduate	21 (5.4)
Smoking Behaviours	
Smoking status	
Never smoker	284 (73.2)
Ever smoker	104 (26.8)
Ever smokers*	
Male	91 (91.2)
Female	13 (9.8)
Smoked 100 or more cigarettes	
No	302 (77.8)
Yes	57 (14.7)
Don't know	29 (7.5)
Age (years) at which smoking initiated (n=104)*	
< 13	9 (8.7)
13-17	63 (60.6)
≥ 18	32 (30.8)
Cigarette consumption per week(n=104)*	
< Once a week	13 (12.5)
Once a week	16 (15.4)
Twice a week	7 (6.73)
3 to 5 times a week	7 (6.73)
Every day or almost every day	24 (23.1)
More than once a day	15 (14.4)
Occasional	22 (20.2)

*Analysis done for 'ever smokers' only

Table-2: Mean difference in the efficacy scores of newly designed (Label 2) against current cigarette pack (Label 1).

Rating Tool	Mean difference between Label 1 and Label 2														
	Old	Plain	p-value	Old	Dying	p-value	Old	Dead	p-value	Old	Family	p-value	Old	Poverty	p-value
	Label 1	Label 2		Label1	Label 2		Label 1	Label 2		Label 1	Label 2		Label 1	Label 2	
	Mean±SD	Mean±SD		Mean±SD	Mean±SD		Mean±SD	Mean±SD		Mean±SD	Mean±SD		Mean±SD	Mean±SD	
Susceptible ¹	4.05±1.27	4.10±1.10	0.79	3.85±1.26	4.03±1.28	0.35	3.85±1.41	3.75±1.32	0.64	3.95±1.33	3.79±1.211	0.44	4.08±1.24	3.57±1.24	0.01
Inducing alarm ²	3.99±1.09	3.81±1.16	0.32	3.99±1.03	3.82±1.00	0.31	3.93±1.05	3.88±1.07	0.76	4.04±1.00	3.87±.0991	0.28	4.22±0.91	3.88±1.01	0.03
Fear arousal ³	3.18±1.27	2.87±1.18	0.12	3.06±1.24	3.19±1.21	0.51	2.90±1.31	3.30±1.40	0.06	3.03±1.36	3.25±1.128	0.27	2.95±1.16	2.76±1.10	0.31
Worrisome ⁴	2.87±1.31	2.76±1.28	0.58	2.95±1.26	3.07±1.27	0.09	3.01±1.36	2.99±1.25	0.90	3.01±1.35	3.03±1.355	0.95	2.89±1.36	2.66±1.19	0.25
Not to start smoking ⁵	3.59±1.30	3.48±1.29	0.58	3.22±1.39	3.27±1.19	0.40	3.63±1.34	3.40±1.37	0.29	3.57±1.33	3.39±1.207	0.37	3.53±1.31	2.95±1.24	0.006
Trigger to quitting ⁶	2.92±1.49	2.80±1.62	0.61	2.97±1.61	3.04±1.69	0.80	2.83±1.71	2.81±1.71	0.96	2.85±1.59	3.00±1.525	0.56	2.96±1.57	2.70±1.53	0.02

*level of significance ≤0.01, repeated measure analysis of variance (ANOVA); Label 1 Current Cigarette pack=Old label

¹Susceptible [measured on a scale of 1 to 5]; 5=very unpleasant, 4= somewhat unpleasant, 3=neither unpleasant nor pleasant, 2= somewhat pleasant, 1= very pleasant

²Inducing alarm [measured on a scale 1 to 5]; 5= very alarmed, 4=somewhat alarmed, 3=neither alarm nor calm, 2=somewhat calm, 1=very calm

³Fear arousal [measured at a scale of 1 to 5]; 5=extremely realistic, 3=somewhat realistic, 2=a little realistic, 1=not at all realistic

⁴Worrisome [measured on a scale 1 to 5]; 5=extremely worried, 4= very worried, 3=somewhat worried, 2= a little worried, 1=not at all

⁵Not to start smoking [measured on a scale 1 to 5] 5= extremely effective, 4= very effective, 3=somewhat effective, 2=a little bit effective, 1= not at all

⁶Trigger quitting [measured on a scale 1 to 5] 5= extremely effective, 4= very effective, 3=somewhat effective, 2=a little bit effective, 1= not at all.

Table-3: Gender-specific differences in the efficacy scores of the labels by ever smokers.

Rating Tool	Mean difference between Label 1 and Label 2 by ever smokers (n=104)														
	Old	Plain	p-value	Old	Dying	p-value	Old	Dead	p-value	Old	Family	p-value	Old	Poverty	p-value
	Label 1	Label 2		Label1	Label 2		Label 1	Label 2		Label 1	Label 2		Label 1	Label 2	
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD		
Susceptible¹															
Male	4.1±1.02	4.1±1.02	1	3.7±1.40	4.0±0.85	0.07	3.3±1.65	3.2±1.57	0.65	3.3±1.22	3.8±1.22	0.67	3.7±1.40	3.0±1.23	0.01*
Female	5±0.0	3.5±0.7	0.21	3.5±2.12	5.0±0.00	0.5	4.6±.57	3.0±1.00	0.2	3.5±1.29	2.5±1.915	0.42	3.6±1.414	3.5±1.23	0.59
Inducing alarm²															
Male	3.7±0.91	3.5±1.15	0.5	3.5±1.09	3.3±1.01	0.33	2.5±1.34	3.0±1.07	0.61	3.8±0.718	3.8±0.88	1	3.5±0.06	3.2±1.11	0.41
Female	4.5±0.70	4.0±0.00	0.5	4.0±0.00	4.0±0.00	~	3.6±0.57	3.0±0.00	1.84	3.2±0.500	3.0±0.00	0.39	4.0±0.86	4.0±0.86	0.18
Fear arousal³															
Male	2.5±1.22	2.6±1.15	0.75	2.6±1.30	2.9±1.52	0.58	2.1±1.31	2.8±1.30	0.06	2.3±1.25	2.6±1.07	0.43	3.2±1.30	3.2±1.20	1
Female	3.0±2.12	3.0±0.00	0.8	3.5±0.70	1.0±0.00	0.12	2.3±1.52	3.6±1.52	0.27	2.7±1.50	3.5±0.57	0.22	2.2±.97	2.6±0.86	0.38
Worrisome⁴															
Male	2.3±1.08	2.3±1.21	1	2.5±0.96	3.0±1.06	0.04*	2.1±1.31	2.8±1.30	0.42	2.6±1.40	2.1±1.04	0.25	3.0±1.22	2.5±1.27	0.41
Female	3.0±1.41	2.5±.70	0.8	2.5±2.12	2.0±0.00	0.79	2.6±1.52	2.6±1.52	~	1.5±0.577	2.5±1.29	0.25	2.3±1.55	2.2±1.20	0.73
Trigger quitting⁶															
Male	3.2±1.63	3.1±1.40	0.5	3.1±1.37	3.12±1.31	0.86	2.8±1.62	2.3±1.28	0.162	3.8±1.20	3.8±1.08	1	3.2±1.59	2.5±1.00	0.03
Female	2.5±0.7	3.5±0.7	0.5	2.5±0.70	4.0±1.41	0.20	4.6±0.577	4.0±1.00	0.423	2.2±0.95	2.2±0.95	1	3.4±1.33	2.5±1.42	0.009*

*level of significance ≤0.01, Paired sample t-test; No difference in means “~”

¹Susceptible [measure on a scale of 1 to 5]; 5=very unpleasant, 4= somewhat unpleasant, 3=neither unpleasant nor pleasant, 2= somewhat pleasant, 1= very pleasant

²Inducing alarm [measured on a scale 1 to 5]; 5= very alarmed, 4=somewhat alarmed, 3=neither alarm nor calm, 2=somewhat calm, 1=very calm

³Fear arousal [measured at a scale of 1 to 5]; 5=extremely realistic, 3=somewhat realistic, 2=a little realistic, 1=not at all realistic

⁴Worrisome [measured on a scale 1 to 5]; 5=extremely worried, 4= very worried, 3=somewhat worried, 2= a little worried, 1=not at all

⁶Trigger quitting [measured on a scale 1 to 5] 5= extremely effective, 4= very effective, 3=somewhat effective, 2=a little bit effective, 1= not at all.

of never smoking females were more inclined towards label on look after family (3.7±0.96) relative to current cigarette pack (3.1±1.14, p-value 0.029).

Discussion

The quasi-experimental study assessed short-term impact of warning labels placed on graphic cards through perceived feelings of fear arousal, worrisome, susceptibility, future abstinence, not to start smoking and trigger quitting. Although the conventional cigarette packs were rated significantly higher by young adults in comparison to the five new interventions, our findings were reversed in terms of fear appeal, and the reactionary tendency varied among participants with or without prior smoking history.

In the context of fear-arousing nature of the packs, never-smoking males were sensitised by the label of a ‘dead person’ whereas this response was more pronounced for label ‘look after family’ among the never-smoking females.

Tobacco can be a potential source of poverty which might be a reason for the higher rating of ‘poverty’ label by the young adults. As tobacco causes number of debilitating diseases that can lead to increased health expenditures, it may result in economic crisis and financial suffering. Hence, it is the health-associated financial burden which mediates the causal pathway towards poverty. However, the immediate consequence of tobacco smoking still revolves around adverse health outcome, with cancer being the gravest in our population, a reason for our young adults to

Table 4: Gender-specific differences in the efficacy scores of the labels by never smokers.

Rating Tool	Mean difference between Label 1 and Label 2 by Never smokers (n=284)														
	Old	Plain	p-value	Old	Dying	p-value	Old	Dead	p-value	Old	Family	p-value	Old	Poverty	p-value
	Label 1	Label 2		Label1	Label 2		Label 1	Label 2		Label 1	Label 2		Label 1	Label 2	
	Mean±SD	Mean±SD		Mean±SD	Mean±SD		Mean±SD	Mean±SD		Mean±SD	Mean±SD		Mean±SD	Mean±SD	
Susceptible¹															
Male	3.9±1.16	4.03±1.66	0.66	4.0±1.14	4.2±0.9	0.38	4.1±1.07	4.2±0.84	0.64	4.1±1.16	3.7±1.02	0.46	4.4±1.01	3.6±1.04	0.01
Female	4.1±1.48	4.1±1.12	0.52	3.9±1.22	3.81.32	0.54	3.8±1.43	3.8±1.32	0.72	3.8±1.58	4.0±1.21	0.37	4.1±1.20	3.8±1.30	0.23
Inducing alarm²															
Male	4.0±1.19	3.8±1.23	0.62	4.0±1.02	4.0±0.87	1	4.2±0.62	4.1±0.85	0.57	4.1±1.18	3.8±1.12	0.45	4.4±0.85	3.9±.78	0.06
Female	3.9±1.08	3.8±1.16	0.22	4.1±1.03	3.8±1.04	0.11	4.0±0.998	4.0±1.02	0.67	4.1±0.98	3.9±0.96	0.08	4.5±0.63	4.1±1.00	0.05
Fear arousal³															
Male	2.9±0.96	2.6±1.14	0.02	3.2±1.24	3.4±0.94	0.32	3.0±0.99	3.6±0.92	0.04	3.2±1.29	3.03±1.19	0.25	3.0±1.06	2.6±0.95	0.03
Female	3.6±1.07	3.2±1.21	0.18	3.1±1.24	3.2±1.14	0.48	3.0±1.43	3.2±1.43	0.53	3.1±1.14	3.7±0.96	0.02	2.8±1.86	2.6±1.19	0.31
Worrisome⁴															
Male	2.6±1.18	2.3±1.2	0.58	2.9±1.23	3.2±1.08	0.24	3.4±1.20	3.5±1.07	0.64	3.4±1.33	3.5±1.31	0.78	3.0±1.23	2.6±1.09	0.21
Female	3.2±1.18	3.4±1.17	0.18	3.1±1.28	3.5±1.16	0.12	3.2±1.27	3.0±1.04	0.35	3.0±1.24	3.1±1.37	0.66	2.9±1.51	2.8±1.23	0.76
Not to start smoking⁵															
Male	3.5±1.20	3.5±1.31	0.76	3.2±1.42	3.1±1.25	0.67	3.7±1.30	4.0±0.76	0.14	4.0±0.9	3.4±1.21	0.02	3.5±1.33	2.9±1.32	0.08
Female	3.5±1.22	3.5±1.24	0.18	3.2±1.44	3.5±1.09	0.11	3.9±1.02	3.5±1.42	0.09	3.1±1.54	3.2±1.19	0.88	3.6±1.19	3.2±1.21	0.12

*Level of significance ≤0.01, Paired sample t-test; Current Cigarette Pack as label 1=Old label

¹Susceptible [measured on a scale of 1 to 5]; 5=very unpleasant, 4= somewhat unpleasant, 3=neither unpleasant nor pleasant, 2= somewhat pleasant, 1= very pleasant

²Inducing alarm [measured on a scale 1 to 5]; 5= very alarmed, 4=somewhat alarmed, 3=neither alarm nor calm, 2=somewhat calm, 1=very calm

³Fear arousal [measured on a scale of 1 to 5]; 5=extremely realistic, 3=somewhat realistic, 2=a little realistic, 1=not at all realistic

⁴Worrisome [measured on a scale 1 to 5]; 5=extremely worried, 4= very worried, 3=somewhat worried, 2= a little worried, 1=not at all

⁵Not to start smoking [measured on a scale 1 to 5] 5= extremely effective, 4= very effective, 3=somewhat effective, 2=a little bit effective, 1= not at all

prefer an image of oral cancer for abstinence relative to the image of poverty-ridden street child. Indeed, in monetary terms, tobacco addiction would be costly at a place where the prices are skyrocketing. However, the situation in developing countries is the other way round as cigarettes are sold in loose forms and are quite affordable, which could be another reason why poverty was not linked with tobacco smoking by the participants.

The intervention images used in the study failed to manipulate future smoking intensities of the young adults. This could be due to the fact that the subjects did not have any quitting contemplations. Also, the impact of threat message is determined by the response efficacy towards the message and the self-efficacy of a person does not make sense to follow the intended course of action. These smokers might have been lacking self-efficacy to mediate a behaviour change; hence, the images did not induce abstinence-seeking thoughts in spite of their alarming nature.

The current study also used plain packaging as part of the experimentation, but those were regarded as unattractive and unpleasing, which is similar to studies done in the neighbouring countries in the recent past.^{7,8} The simplicity of plain packs used in the experiment did not deter the young adults from future cigarette experimentation which is indicative of the fact that brand characteristics might not influence the purchase of cigarettes in our people. Perhaps the reaction intensity could have been different if on the comparative side a grave dental suffering was portrayed (against the mutilated oral cancer image found on the

designs available locally).

The results of this study are consistent with findings from Gulf countries^{9,10} where new designs were interpreted differentially by non-smokers and current smokers. However, the current study further explored these perceptions across genders to investigate if a difference existed in receptivity towards thematic message. The never-smoking females in the current study were anxious about family impact of cigarette smoking. This accurately reflects the female mindset of eastern societies where welfare of the family or family concern mediates decision-making and behavioural actions. Also, females tend to have higher social cognition which can be another reason behind their increased emotional susceptibility.¹¹ This emotional reaction would have been higher if local characters or personal testimonials had been incorporated. On the other hand, never-smoking males were more afraid of slow painful death due to cigarette smoking. This further indicates the relevance of gender receptivity and context specificity to be considered while designing the future packs.

The design element of newly-designed warning labels, such as location, size, pictorials, colour of the pack to increase noticeability, message content and the language of the text in the current study was in compliance with the Article 11 of WHO-FCTC.^{2,3} Unlike researches done in the periphery,¹²⁻¹⁷ we constructed our packs in a way to reflect the actual size of the cigarette packs. Furthermore, we extended our selection to incorporate three new themes: plain packaging, tobacco-associated health consequences,

and socio-economic impact. This was done to generate five new designs at a coverage area >50% of the principal display, adopted from regions with similar socio-economic and tobacco control profiles.¹⁸⁻²⁰ Despite the fact that randomisation was not practised in the current study, every individual was required to rate the allocated newly-designed pack (intervention received) against self-rated control image (as label 1 showing conventional cigarette pack on the graphic card). Thus, an effort was made to control for potential differences in the rating of the packs at the baseline.

Though our packs were closely approximating the cigarette packaging in current rotation, they were lacking three-dimensional (3D) manufacturing effect of the real world to yield a reality-based impact in naturalistic setting. Furthermore, the exposure towards experiment condition was brief and confined to one point in time, unlike other follow-up studies following large cohort over a course of time where the factor of time and repeatability of the exposure would have mediated this effect.²¹⁻²³ This was able to prevent the wear of reactionary emotional intensity resulting from desensitization. However, an inadequacy of exposure time might have resulted in reduced cognitive recognition of the health message. Consequentially, sub-threshold response could be explained by technology induced attention deficit issue. As a result, despite the relevancy of the content and sufficient latency or dwelling time allocated for the interventions, the new images were unable to modify the perception of young adults.

It is true that effectual warning might induce fear, emotional susceptibility and abstinence for a while, but such negative emotional reaction, being short-lived, cannot predict future smoking behaviours in the long run.^{24,25} However, the aim of the current study was not to assess the long-term effect. The efficacy of our intervention was evaluated based upon transient change in perceptions, which in our case remained unchanged regarding future abstinence. The rejection of these messages may be due to neurophysiological mechanism where a defensive response is initiated against unwanted change in behaviour, leading to refusal of behaviour change.^{26,27} Moreover, chronic deep-rooted behaviours pose hindrance in the cognitive processing of the content despite the alarming nature.

The findings of the current study indicate that a single theme is not effective for every type of audience. Moreover, increasing the size of health warning label did not sensitise the ever- and never-smoking young adults on abstinence-seeking behaviours.

Despite an additional 20% coverage of GTWL, the

perceptions of the study participants were not modified which warrants further experimentation on a large scale to find out locally-sensitive themes. Yet, it mandates stringent measures to sustain the sensitisation effect through timely replacement of warning labels and collection of multiple topics with relevance to age, gender and smoking tendencies.

Conclusion

Not all anti-smoking messages are equally efficacious for every type of audience. This implies a need of both qualitative and quantitative studies to explore GTWLs among large clusters to identify the specific designs which can trigger fear of tobacco sufferings.

Disclaimer: The text is based on an academic thesis done at the Dow University of Health Sciences (DUHS), Karachi.

Conflict of interest: None.

Source of Funding: None.

References

1. World Health Organization. Tobacco: Fact sheet. [online] [2021 June 5]. Available from: URL: <http://www.who.int/mediacentre/factsheets/fs339/en/>.
2. World Health Organization. Global Progress Report on implementation of WHO framework Convention on Tobacco Control. WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland: WHO Press; 2012.
3. World Health Organization. Tobacco control country profiles, Surveillance and monitoring, Tobacco Free Initiative TFI 2017. [online] [2021 June 2]. Available from: URL: http://www.who.int/tobacco/surveillance/policy/country_profile/en/#P.
4. The Gazette of Pakistan TCC. Tobacco Control Laws in Pakistan: Tobacco Control Cell Ministry of National Health Services Regulation and Coordination, Government of Pakistan, 2017.
5. Fong GT, Hammond D, Jiang Y, Li Q, Quah AC, Driezen P, et al. Perceptions of tobacco health warnings in China compared with picture and text-only health warnings from other countries: an experimental study. *Tob Control*. 2010;69-77.
6. Yang J, Hammond D, Driezen P, Fong GT, Jiang Y. Health knowledge and perception of risks among Chinese smokers and non-smokers: findings from the Wave 1 ITC China Survey. *Tob Control*. 2010;19:18-23.
7. Mucan B, Moodie C. Young adult smokers' perceptions of plain packs, numbered packs and pack inserts in Turkey: a focus group study. *Tob Control*. 2017;tobaccocontrol-2017-053902.
8. Arora M, Tewari A, Grills N, Nazar GP, Sonrexa J, Gupta VK, et al. Exploring Perception of Indians about Plain Packaging of Tobacco Products: A Mixed Method Research. *Front Public Health*. 2013;1:35.
9. Mansour AY, Bakhsh Z. Factors Affecting the Perceived Effectiveness of Pictorial Health Warnings on Cigarette Packages in Gulf Countries: A Cross-sectional Study. *Tob Use Insights*. 2017; 10: 1179173X17698462.
10. Aktan M. Impact of gender, age and smoking habits on the effectiveness of health warning messages on cigarette packets: research on a highly educated Turkish sample. *Int J Health Promot Educ*. 2020:1-13.
11. Im HY, Adams Jr RB, Cushing CA, Boshyan J, Ward N, Kveraga K. Sex-related differences in behavioral and amygdalar responses to

- compound facial threat cues. *Hum Brain Mapping*. 2018;39:2725-41.
12. Sobani Z, Nizami S, Raza E, Khan J. Graphic tobacco health warnings: which genre to choose? *Int J Tuberc Lung Dis* 2010;14:356-61.
 13. Ahsan M, Saad M, Jawed M, Akhtar S, Haseeb A, Bilal M, et al. Impact of tobacco health warnings on smokers in Pakistan. *Age (years)*. 2016;20:375.
 14. Khan JA, Sohail AM, Arif Mian MA. Tobacco control laws in Pakistan and their implementation: A pilot study in Karachi. *J Pak Med Assoc*. 2016;66:875-9.
 15. Vanishree N, Narayan RR, Naveen N, Bullapa D, Vignesh D, NM PR. Impact of pictorial warning labels on tobacco products among patients attending outpatient department of a dental college in Bangalore city: A cross-sectional study. *Indian J Cancer*. 2017;54:461-6.
 16. Kowitz SD, Noar SM, Ranney LM, Goldstein AO. Public attitudes toward larger cigarette pack warnings: Results from a nationally representative U.S. sample. *PloS one*. 2017;12:e0171496.
 17. Javed N, Saeed S, Shah SM, Ali R, Khan TK, Iqbal SP. Impact of Graphic Warning Labels on Cigarette Packs in Changing Smokers' Views and Habits: An Opinion Survey. *Addiction & Health*. 2020;12:40.
 18. International Tobacco Control Policy and Evaluation Project. News and Highlights Ontario Canada: International Tobacco Control (ITC) Policy Evaluation Project. [online] [cited 2021 June 5]. Available from: URL:<http://www.itcproject.org/>
 19. ITC Project. ITC Kenya National Report. Findings from the Wave 1 (2012) Survey. University of Waterloo, Waterloo, Ontario Canada; Ministry of health [Kenya], Kenya Medical Research Institute, International Institute for Legislative Affairs, and university of Nairobi: Nairobi, Kenya ; 2015.
 20. World Health Organization. Tobacco Free Initiative (TFI): The Africa pictorial health warnings resource. [online] [2021 June 5]. Available from: <http://www.who.int/tobacco/healthwarningsdatabase/africa/en/>.
 21. Hall MG, Sheeran P, Noar SM, Boynton MH, Ribisl KM, Parada Jr H, et al. Negative affect, message reactance and perceived risk: how do pictorial cigarette pack warnings change quit intentions? *Tob Control*. 2017. 2018;27:e136-e142.
 22. Peters E, Shoots-Reinhard B, Evans AT, Shoben A, Klein E, Tompkins MK, et al. Pictorial warning labels and memory for cigarette health-risk information over time. *Ann Behav Med*. 2019;53:358-71.
 23. Green AE, Mays D, Falk EB, Vallone D, Gallagher N, Richardson A, et al. Young Adult Smokers' Neural Response to Graphic Cigarette Warning Labels. *Addict Behav Rep*. 2016;3:28-32.
 24. Brewer NT, Hall MG, Noar SM, Parada H, Stein-Seroussi A, Bach LE, et al. Effect of pictorial cigarette pack warnings on changes in smoking behavior: a randomized clinical trial. *JAMA Intern Med*. 2016;176:905-12.
 25. Evans AT, Peters E, Shoben AB, Meilleur LR, Klein EG, Tompkins MK, et al. Cigarette graphic warning labels are not created equal: They can increase or decrease smokers' quit intentions relative to text-only warnings. *Nicotine Tob Res*. 2016;389.
 26. Kees J, Burton S, Andrews JC, Kozup J. Understanding how graphic pictorial warnings work on cigarette packaging. *J Public Policy & Marketing*. 2010;29:265-76.
 27. Osman A, Thrasher JF, Yong H-H, Arillo-Santillán E, Hammond D. Disparagement of health warning labels on cigarette packages and cessation attempts: results from four countries. *Health Educ Research*. 2017;32:524-36.