Article

Predictors of Quitting Attempts Among Tobacco Users in Bangladesh After a Communication Campaign to Launch Graphic Warning Labels on Packaging

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Abstract

Background. Tobacco use contributes to an estimated 14.6% of male and 5.7% of female deaths in Bangladesh. *Aims.* We examine the determinants of tobacco-related quit attempts among Bangladeshis with and without awareness of the synergized "People Behind the Packs" (PBTP) communication campaign used to support the introduction of pack-based graphic warning labels (GWLs) in 2016. *Method.* Data from 1,796 adults were collected using multistage sampling and a cross-sectional face-to-face survey. Analyses used a normalized design weight to ensure representativeness to the national population of smokers within Bangladesh. *Results.* For the overall sample, the multivariable logistic regression model revealed quit attempts were associated with having seen the pack-based GWLs, recalling ≥1 PBTP campaign message, higher levels of self-efficacy to quit, and recognizing more potential side-effects associated with using tobacco products. Conversely, the likelihood of quitting attempts were lower among dual tobacco users (relative to smokers) and those using tobacco at least daily (vs. less than daily). The hierarchical multivariable logistic regression model among those aware of ≥1 PBTP campaign message indicated quitting attempts were positively associated with recalling more of the campaign messages and discussing them with others. *Conclusion.* This national evaluation of pack-based GWLs and accompanying PBTP campaign within Bangladesh supports the efficacy of using synergized communication messages when introducing such labels. That quit attempts are more likely among those discussing PBTP campaign messages with others and recalling more PBTP campaign messages highlights the importance of ensuring message content is both memorable and engaging.

Impact Statement

This cross-sectional study addresses the limited body of field-based research examining the determinants of quitting attempts among Bangladeshi adults after the introduction of tobacco policy in the form of graphic warning labels (GWLs) on tobacco packaging and an associated synergized communication campaign, "People Behind the Packs" (PBTP). It is the first such national-level evaluation in Bangladesh and captures the likelihood of quitting attempts in terms of (a) having seen GWLs on tobacco packaging and (b) awareness of the accompanying national communication campaign.

Quitting attempts were reported by 38.1% of the overall study sample and increased to 66.5% among those aware of ≥1 PBTP communication message. Notwithstanding the limitations associated with interpreting results from cross-sectional surveys, the strong association identified within the overall study sample between quitting attempts and having seen GWLs on tobacco packaging lends support to the efficacy of implementing such low-cost policy initiatives in low- and middle-income countries (LMICs). Likewise, that being aware of at least one PBTP campaign message independently contributes to the likelihood of quitting attempts supports the efficacy of using synergized national communication campaigns in tandem with the launch of new GWLs on tobacco packaging.

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At a more granular level, findings from the hierarchical multivariable regression model indicate that among those aware of ≥1 PBTP campaign message, quit attempts are positively associated with discussing these messages with others and recalling a higher number of these messages. For this cohort at least, there is value in ensuring message content is both memorable and engaging.

Introduction

Tobacco use continues to be a leading preventable cause of mortality worldwide, particularly within LMICs (Jha et al., 2015) such as Bangladesh (Zheng et al., 2014). Indeed, it is estimated that 14.6% of male and 5.7% of female deaths in Bangladesh are tobacco related (Eriksen, Mackay, Schluger, Islami, & Drope, 2016). In 2016, the Government of Bangladesh sought to address this issue by replacing existing written text warnings covering 30% of tobacco packaging with new GWLs covering 50% of product packaging. The introduction of the GWLs was accompanied by a 6-week national communication campaign (PBTP) aimed at (a) increasing public awareness of, and engagement with, the message that tobacco use is associated with significant health conditions and (b) encouraging quit attempts.

Utilizing a social marketing value exchange approach (Bagozzi, 1975; Gordon, McDermott, Stead, & Angus, 2006), the PBTP communication campaign urged tobacco users to heed the new GWLs in order to avoid the depicted disease conditions. The four synergized PBTP messages drew on "raw and real" messaging techniques (Turk et al., 2016) involving graphic and emotional testimonials from Bangladeshi patients experiencing the tobacco-related diseases depicted in the GWLs. Each victim held the relevant GWL and urged people to "see them" and "believe them!" Two PBTP campaign messages aired on 13 national television stations and all four appeared on billboards and community health center posters across Bangladesh. An integrated social media website (http://www.packpeople.com.bd/) provided quit advice, resources, and links to PBTP campaign materials.

This cross-sectional study sought to examine the determinants of tobacco-quit attempts among sampled Bangladeshis with and without awareness of the synergized PBTP campaign messages used to support the introduction of the new GWLs. It represents the first in-field national study of GWLs and supporting communication messages within Bangladesh.

Method

Study Design and Data Collection

Drawing on an unaided recollection rate of 16% from the evaluation of the Bangladesh "Baby Alive" tobacco-related media evaluation survey (Choudhury, 2015), the sample size was calculated as follows:

$$n = \frac{z^2 pq}{d^2},$$

where p is the proportion of population having events (here, $p = 16.0\%$); q is the proportion of population having no events $(1 - p) = q$; z is the value of standard normal variate at a given level (here, 1.96); and d is the acceptable margin of error.

An initial sample size of $N = 1,147$ was computed using a prevalence estimate of 16% for Bangladeshi adults, a 3% acceptable margin of error, and a design effect of 2 due to the cluster sampling strategy. This was adjusted up to 1,784 (1,796 were actually recruited) to allow for anticipated nonresponse rates: person eligibility rate, 80% (1.20); household screening rate, 95% (1.05); household response rate, 98% (1.02); and person nonresponse rate, 10% (1.10). Respondents were drawn from urban ($N = 600$) and rural ($N = 1,200$) administrative units using a multistage, geographically clustered, and probability-based sampling approach across six of the eight major administrative regions within Bangladesh. The selected primary sampling units (PSUs) were the smallest units within each administrative region of Bangladesh (i.e., Mauza and Mahallas). Drawing on the Bangladesh Bureau of Statistics, only PSUs with >200 households were considered. Using a SPSS complex sampling survey method, 15 urban and 30 rural administrative areas were selected. In the second stage, 80 households were selected from each administrative area. Starting from the northeast corner of each area, the first household was selected at random and then every fifth household was sampled. Where a selected household had no tobacco users, the adjacent household was used as a replacement. Finally, individuals within the screened households were selected using a random selection method from a roster of eligible household members.

Trained enumerators administered the survey within 14 days of the exhaustion of the PBTP television media plan. Eligibility criteria included being aged 16 to 55 years and a current tobacco user. Individuals (or close family members) working in market research/consultancy firms, advertising/marketing agencies, tobacco-producing institutes, or as tobacco sellers were ineligible to participate. Informed consent was obtained prior to survey administration and no incentives were offered. The evaluation protocol was approved by the Department of Epidemiology and Research, National Heart Foundation Hospital & Research Institute in Bangladesh.

Measures

The survey comprised a series of self-report items designed to capture behavioral and sociocognitive responses toward the new GWLs and associated PBTP communication campaign. To minimize respondent fatigue, and given that all items would be verbally administered, only single-item measures were used. The primary outcome measure was a self-reported

attempt to quit using tobacco (i.e., smoking tobacco and/or using smokeless tobacco products) in the 2-month period after the introduction of the new GWLs and associated PBTP campaign. Responses were recorded as yes/no.

Sociodemographics. Respondents' provided their gender, date of birth (computed to give age as of last birthday), highest level of education received (binary coded as no school-based education/some level of school-based education), average monthly family income over the past year (converted to \$US post survey), and presence of child/children <18 years in family home (yes/no). Geographic location (urban/rural) was determined from the sampled administrative areas.

Tobacco Use and Recognition of Potential Harm. Respondents described the types of tobacco they used and were subsequently categorized as smoke-related (e.g., cigarette, bidi, hukka, pipe), smokeless (e.g., Sada Pata, Zarda, Gul, Khoinee Zarda, Nossi), or dual (i.e., use smoke and smokeless tobacco products) tobacco users. Frequency of tobacco use (at least daily/less than daily) was also captured. A measure of recognition of the potential side-effects of tobacco use was computed by summing respondent answers (yes/no) to questions about whether tobacco use caused the following: heart disease, stroke, damage to vital organs, lung cancer, or cancer of mouth/neck/throat, coughs, asthma, and lung disease. Scores ranged from 0 to 8.

Feelings Toward Quitting. Items included self-efficacy to quit ("I believe I have the ability to stop smoking/using tobacco"); perceived social approval to quit ("People who are important to me would approve of me stopping smoking/using tobacco"); and anticipated regret if did not quit ("I believe I would regret it if I did not stop smoking/using tobacco"). Each item used a 5-point Likert-type scale (1 = *Disagree completely*; 5 = *Agree completely*).

Awareness of PBTP Campaign Messages. Respondents were first asked if they recalled any announcements or messages about the health impacts of smoking or smokeless tobacco use in the past 2 months. Responses were recorded verbatim; those recalling ≥1 PBTP campaign message were classified as having unprompted recall. Next, those without unprompted recall were shown, one at a time, images of the four PBTP campaign messages and asked, "Do you remember seeing this message in the last 2 months? It may have appeared on media or community channels." Respondents recalling ≥1 PBTP campaign message were classified as having prompted recall. Those with either unprompted or prompted recall of ≥1 PBTP message (hereafter denoted as campaign aware) went on to answer questions about this communication campaign.

Perceptions of the PBTP Campaign Messages. A 5-point Likert-type scale (1 = *Disagree completely*; 5 = *Agree completely*)

was used to assess: message elaboration ("The messages made me stop and think"); perception of personal risk to health ("The messages made me believe that I am at high risk of getting sick from smoking or using tobacco"); concern about personal tobacco use on the family ("The messages made me feel concerned about the effects of my smoking on my family's health"); provision of new information ("The messages provided new information to me"); and perceptions of the message imagery ("I found some of the images in the messages disgusting").

Discussions About the PBTP Communication Campaign. The potential for word-of-mouth about the PBTP campaign to affect behavior was assessed using a simple yes/no response to the question, "Have you spoken or discussed the messages with others."

Awareness of GWLs on Tobacco Packaging. Finally, respondents were asked if they had seen any of the new GWLs on tobacco packaging (yes/no).

Weighting of Dataset

A raw design weight was applied to each case to broaden the representativeness of the sample to the national population of smokers within Bangladesh (see World Health Organization, 2009). The applied design weight was the *inverse* of the multiplication product of inclusion probabilities at each stage (i.e., inclusion probability of selection of PSU from all PSUs, including probability of selection of a household from the total number of households in the PSU, and inclusion probability of selecting one current tobacco user from total households of tobacco users). A relative (normalized) weight was then computed to prevent inflation of significance (see Hahs-Vaughn, 2005; Thomas & Heck, 2001) and used for all subsequent analyses.

Statistical Analysis

We employed multivariable logistic regression analysis to examine the determinants of quitting attempts after the introduction of the new GWLs and associated communication campaign messages at two levels: (a) all respondents irrespective of their PBTP campaign awareness status (see Table 2) and (b) only respondents aware of ≥1 PBTP campaign message (see Table 3). As a precursor to these multivariable analyses, bivariate logistic regression analyses were used to identify sociodemographic and psychosocial constructs associated with quitting attempts. Following Hosmer and Lemeshow (2000), only variables with *p* values <.25 at the bivariate level were included in the multivariable logistic regression analyses. All analyses were undertaken using IBM SPSS version 24 (IBM Corp, 2016).

Table 1. Characteristics of Overall Study Sample Computed Using Normalized Weights.

Variable	% or M (SD)	Unweighted n[a]
Gender		
Female	44.8	803
Male	55.2	989
Age (in years)	38.64 (9.58)	1,792
Average monthly family income (US$)	182.60 (196.40)	1,790
Median	144.88	
Educational status		
No school-based education	43.2	770
Some school-based education	56.8	1,013
Children		
Don't have children	19.9	356
≥1 child below 18 years at home	80.1	1,429
Geographic location		
Rural	62.2	1,118
Urban	37.8	678
Type of tobacco use		
Smoke tobacco only	41.2	734
Smokeless tobacco only	49.0	873
Dual users	9.8	175
Frequency of tobacco use		
Less than daily	3.6	63
At least daily	96.4	1,691
Reported quit attempt		
Yes	38.1	683
No	61.9	1,112
Sum number tobacco related side-effects recognized (range 0-8)	5.12 (2.05)	1,792
Seen GWLs on tobacco packaging		
No	16.4	248
Yes	83.6	1,263
PBTP campaign aware ≥1 message		
No	33.5	602
Yes	66.5	1,194

Note. GWL = graphic warning label; PBTP = People Behind the Packs.
[a]Variations in *n* due to missing data.

Results

Table 1 outlines the characteristics of the overall study sample. The majority were male (55.2%), had some level of school-based education (56.8%), lived with ≥1 child under the age of 18 years (80.1%), resided in rural areas (62.2%), and used tobacco-related products at least on a daily basis (96.4%). Overall, 83.6% had seen the new GWLs on tobacco packaging, 66.5% were aware of ≥1 PBTP campaign message, and 38.1% reported making a quit attempt.

Determinants of Quit Attempts Among Overall Study Sample

Among the overall study sample, sociodemographic factors significantly associated with quitting attempts in bivariate analyses included being male ($p < .001$), having some level of school-based education ($p < .05$), and recognizing a greater number of the harmful health impacts associated with tobacco use ($p < .001$; Table 2). Sociocognitive constructs significantly associated with quitting attempts included: having higher levels self-efficacy to quit, social approval to quit, and feelings of anticipated regret if did not quit ($ps < .001$; Table 2). In terms of tobacco-related variables, using tobacco at least daily (vs. less than daily) was negatively associated with quitting attempts. Relative to smokers, being a smokeless ($p < .001$) or dual ($p < .01$) tobacco user was negatively associated with quitting attempts. Other constructs associated with quitting attempts included having seen the new GWLs on tobacco packaging ($p < .001$), and recalling ≥1 PBTP communication campaign message ($p < .001$).

Subsequent to these bivariate analyses, a multivariable logistic regression was conducted to examine the independent association of 11 constructs with *p* values <.25 at the bivariate level (see Hosmer & Lemeshow, 2000). The outcome variable was self-reported quitting attempts (No = 0, Yes = 1) in the 2-month period following the introduction of the GWLs and associated PBTP campaign. The resultant final model was significant ($\chi^2[12] = 212.38, p < .001$) and explained between 13.6% (Cox and Snell R^2) and 18.3% (Nagelkerke R^2) of the variance in quitting attempts.

The likelihood of quitting attempts did not differ in terms of geographic location, gender, or educational status. However, the likelihood of quitting attempts was lower among dual tobacco users relative to those that only smoked tobacco ($p < .05$) and among those who used tobacco at least daily (vs. less than daily; $p < .001$). Conversely, quitting attempts were associated with recalling more potential side-effects from using tobacco products ($p < .001$), having higher levels of self-efficacy to quit ($p < .001$), having seen the GWLs on tobacco packaging ($p < .001$), and being aware of ≥1 PBTP campaign message ($p < .01$). No differences were noted with respect to social approval to quit or anticipated regret if did not quit.

Determinants of Quit Attempts Among PBTP Campaign Aware Only

In order to gain a more granular understanding of the potential relationships between perceptions of PBTP campaign messages and quitting attempts, we restricted the next set of analyses to those aware of ≥1 PBTP message. Bivariate analyses (see Table 3) revealed quitting attempts were positively associated with having discussed the messages with others, higher levels of message elaboration ($p < .01$), higher levels of concern about the impact of tobacco use on family health

Table 2. Summary of Bivariate and Multivariable Logistic Regressions Predicting Quitting Attempts Among Overall Study Sample (N = 1,796).

Variables	Quit versus no quit attempt	Quit versus no quit attempt
	Bivariate models, OR [95% CI]	Multivariable model, aOR [95% CI]
Sociodemographics		
Gender		
Female	Reference	Reference
Male	1.62 [1.34, 1.97]***	1.11 [0.77, 1.62]
Age (in years)	1.00 [0.99, 1.01]	—
Average monthly family income (US$)	1.00 [1.00, 1.00]	—
Educational status		
No school-based education	Reference	Reference
Some school-based education	1.28 [1.06, 1.56]*	0.94 [0.74, 1.19]
Children		
Don't have children	Reference	—
≥1 child below 18yrs at home	0.99 [0.78, 1.26]	—
Geographic location		
Rural	Reference	Reference
Urban	1.22 [1.01, 1.49]†	1.03 [0.82, 1.30]
Tobacco-related variables		
Type of tobacco use		
Smoke tobacco only	Reference	Reference
Smokeless tobacco only	0.66 [0.54, 0.81]***	1.03 [0.71, 1.50]
Dual users	0.60 [0.42, 0.85]**	0.64 [0.43, 0.94]*
Frequency of tobacco use		
Less than daily	Reference	Reference
At least daily	0.45 [0.27, 0.75]**	0.24 [0.12, 0.50]***
Sum number tobacco related side-effects recognized (range 0-8)	1.24 [1.18, 1.31]***	1.13 [1.06, 1.20]***
Thoughts about quitting		
Self-efficacy to quit	1.77 [1.58, 1.99]***	1.79 [1.55, 2.08]***
Social approval to quit	1.52 [1.29, 1.78]***	1.06 [0.86, 1.29]
Anticipated regret if didn't quit	1.35 [1.23, 1.49]***	1.03 [0.91, 1.18]
Seen GWLs on tobacco packaging		
No	Reference	Reference
Yes	1.94 [1.44, 2.62]***	2.82 [1.92, 4.13]***
PBTP campaign aware ≥1 message		
No	Reference	Reference
Yes	2.08 [1.68, 2.58]***	1.54 [1.17, 2.03]**
Sum number PBTP messages recalled (range 0-4)	1.50 [1.39, 1.62]***	

Note. OR = odds ratio; CI = confidence interval; aOR = adjusted odds ratio; GWL = graphic warning label; PBTP = People Behind the Packs.
†.05 > *p* < .25, **p* < .05, ***p* < .01, ****p* < .001. Only variables with *p* < .25 in bivariate analyses were entered into the multivariable model.

(*p* < .001), and greater perceptions of personal risk from smoking or using tobacco (*p* < .001). Recalling a higher number of PBTP campaign messages was also associated with quitting attempts (*p* < .001).

In line with the bivariate analyses for the overall study sample, quitting attempts were also associated with being male (*p* < .01), recalling a greater number of potential side-effects from using tobacco (*p* < .001), having higher levels of self-efficacy to quit (*p* < .001), social approval to quit (*p* < .01), anticipated regret if did not quit (*p* < .001), and having seen the GWLs on packaging (*p* < .001). Similarly, relative

to smokers, the odds of quitting attempts were lower among smokeless tobacco users (*p* < .01). Contrary to the findings for the overall study sample, having ≥1 child living at home below the age of 18 years was associated with lower odds of reporting a quit attempt (*p* < .05).

Following Hosmer and Lemeshow (2000), 16 constructs with *p* values <.25 at the bivariate level were entered into a two-step hierarchical multivariable logistic regression analysis where the outcome variable was self-reported quitting attempts (No = 0, Yes = 1). Eleven non-PBTP variables (i.e., sociodemographics, tobacco-related constructs,

Table 3. Summary of Bivariate and Hierarchical Multivariable Logistic Regression Models Predicting Quitting Attempts Among PBTP Campaign Aware Respondents (*N* = 1,172).

Variables	Quit versus no quit attempt	Quit versus no quit attempt
	Bivariate models, OR [95% CI]	Hierarchal multivariable model, aOR [95% CI]
Sociodemographics		
Gender		
Female	Reference	Reference
Male	1.46 [1.15, 1.85]**	0.95 [0.59, 1.53]
Age (in years)	1.00 [0.99, 1.01]	—
Average monthly family income (US$)	1.00 [1.00, 1.00]	—
Educational status		
No school-based education	Reference	Reference
Some school-based education	1.26 [1.00, 1.60]†	1.05 [0.79, 1.41]
Children living at home		
Don't have children	Reference	Reference
≥1 child below 18 years at home	0.69 [0.52, 0.93]*	0.62 [0.44, 0.87]**
Geographic location		
Rural	Reference	Reference
Urban	1.17 [0.93, 1.47]†	1.09 [0.83, 1.44]
Tobacco-related variables		
Type of tobacco use		
Smoke tobacco only	Reference	Reference
Smokeless tobacco only	0.71 [0.56, 0.91]**	0.62 [0.38, 0.99]
Dual users	0.74 [0.50, 1.10]†	0.51 [0.32, 0.82]**
Frequency of tobacco use		
Less than daily	Reference	Reference
At least daily	0.71 [0.41, 1.25] †	0.20 [0.09, 0.46]***
Sum number tobacco related side-effects recognized (range 0-8)	1.19 [1.12, 1.27]***	1.01 [0.93, 1.10]
Thoughts about quitting		
Self-efficacy to quit	1.77 [1.55, 2.03]***	1.91 [1.60, 2.28]***
Social approval to quit	1.34 [1.11, 1.63]**	0.90 [0.70, 1.16]
Anticipated regret if didn't quit	1.40 [1.25, 1.57]***	1.08 [0.91, 1.27]
Seen GWLs on tobacco packaging		
No	Reference	Reference
Yes	1.88 [1.34, 2.63]***	2.57 [1.59, 4.15]***
Perceptions of PBTP campaign messages		
Elaboration (made me stop and think)	1.20 [1.05, 1.36]**	0.81 [0.68, 0.98]*
Provided new information	1.06 [0.92, 1.23]	—
Some images were disgusting	1.00 [0.93, 1.09]	—
Personal risk to health	1.35 [1.19, 1.52]***	1.13 [0.96, 1.34]
Concern about impact on family health	1.44 [1.26, 1.63]***	1.13 [0.96, 1.34]
Discussed PBTP campaign with others		
No	Reference	Reference
Yes	2.48 [1.94, 3.17]***	1.78 [1.33, 2.40]***
Sum number PBTP messages recalled (range 0-4)	1.64 [1.46, 1.85]***	1.45 [1.25, 1.68]***

Note. PBTP = People Behind the Packs; OR = odds ratio; CI = confidence interval; aOR = adjusted odds ratio; GWL = graphic warning label.
†.05 > *p* < .25; ‡*p* = .05. *p < .05, **p < .01, ***p < .001. Only variables with *p* < .25 in bivariate analyses were entered into the multivariable model.

and awareness of GWLs) were entered into the first step of the model, and the five variables capturing perceptions of the PBTP campaign messages were entered into the second step (see Table 3). The resultant final model was significant (χ^2[17] = 231.44, *p* < .001) and explained between

19.6% (Cox and Snell R^2) and 26.1% (Nagelkerke R^2) of the variance in quitting attempts.

Output from the final model indicated two PBTP campaign-related variables were positively associated with quitting attempts; discussing (vs. not discussing) the campaign

messages with others (*p* < .001); and recalling a higher number of PBTP campaign messages (*p* < .001). Conversely, elaborating on the campaign messages was negatively associated with quitting attempts (*p* < .05). In terms of sociodemographics, the adjusted odds ratio of reporting quitting attempts was lower among those with ≥1 child below the age of 18 years living at home (*p* < .01). In terms of tobacco-related variables, quitting attempts were less likely among dual (*p* < .01) and smokeless (*p* = .05) tobacco users relative to smokers. Quitting attempts were also less likely among those using tobacco at least daily (vs. less than daily, *p* < .001). However, having higher levels of self-efficacy to quit and having seen the GWLs on tobacco packaging were both associated with an increased likelihood of quitting attempts (*p*s < .001).

Discussion

The current study drew on a field evaluation of a population-level social and behavioral change communication campaign to support the policy implementation of new GWLs on tobacco packaging and to encourage tobacco-related quitting attempts within Bangladesh. Quitting attempts were reported by 38.1% of the overall study sample. This figure rose to 66.5% among those aware of ≥1 PBTP communication message. This rise in quit attempts among PBTP campaign aware respondents aligns with findings from previous communication campaigns in LMICs (Mullin, Turk, Carroll, Murukutla, & Hamill, 2013; Turk, 2012) and lends support for the efficacy of such initiatives.

The multivariable logistic regression findings from the overall study sample provide unique insights into the determinants of quit attempts after the implementation of GWLs in Bangladesh. First, the strong association between having seen GWLs on tobacco packaging and quitting attempts extends the existing LMIC literature around the potential efficacy of such warnings (Fong et al., 2010; Mutti et al., 2016; Noar et al., 2015) by suggesting they may increase the likelihood of such behavior. Second, our finding that being aware of at least one PBTP campaign message is independently associated with the likelihood of making a quit attempt supports the efficacy of using such national communication campaigns in tandem with the launch of new GWLs on tobacco packaging. Although caution is required in over-interpreting the findings from cross-sectional surveys, our results offer promise to underresourced countries, such as Bangladesh, that this type of low-cost policy initiative may be associated with quit attempts within the general population. Third, given that self-reported quit attempts were associated with increased knowledge of potential tobacco related side-effects and self-efficacy to quit, there may be efficacy in future public health campaigns focusing on building capacity in these areas within the general population.

The second set of analyses (see Table 3) focused on providing insights into which specific elements of the national PBTP communication campaign were associated with quitting

attempts among Bangladeshis with awareness of ≥1 PBTP campaign message. The strongest association between PBTP campaign-related variables and quitting attempts identified in the hierarchical multivariable logistic regression was in relation to discussion of the PBTP campaign messages with others. One explanation for this positive association is that discussion acts as a form of confirmation bias (Nickerson, 1998), since it provides individuals with a way to elicit views that align with their own, thus bolstering existing inclinations to embark on a cessation attempt. This and other potential mediation pathways warrant future research, as does the exploration of potential boundary conditions.

The identified positive association between the number of recalled PBTP campaign messages and quit attempts among the campaign aware cohort also lends support for the efficacy of using social and behavioral change communication campaigns in this health context and aligns with prior research in LMICs (Turk et al., 2012). One potential explanation for this association is that "raw and real" message appeals may increase message salience (Murukutla et al., 2012; Turk et al., 2016). Further research is needed, however, to better explicate the mechanisms underpinning this association and to examine whether using multiple synergized campaign messages has a multiplier effect, such that the testimonials of the deleterious effects of tobacco use become more memorable as more campaign messages are recalled, thus serving as a catalyst for enacting a quit attempt.

That the adjusted odds of making a quit attempt were lower for those using tobacco at least daily (vs. less than daily) is not unexpected, since more frequent use can increase an individual's level of nicotine dependence (Hyland et al., 2006). As noted by others (Augustson et al., 2008; Nordstrom et al., 2000), in these contexts additional support mechanisms beyond social and behavioral change communication campaigns are typically required. Given the high uptake of mobile phones in Bangladesh (Islam, 2016), one option could involve trialing mobile phone cessation tools (Buller, Borland, Bettinghaus, Shane, & Zimmerman, 2014), which can be tailored to specific audiences. This could be particularly advantageous in terms of addressing our finding that quitting attempts were less likely among dual and smokeless tobacco users relative to smokers. Mobile phones interventions could provide a means of delivering more tailored support to these types of tobacco users.

The results for the campaign aware cohort also suggest a negative association between quit attempts and having ≥1 child living at home. One potential explanation is that the economic stressors associated with providing for children in LMICs may result in tobacco being used as a means of coping, which in turn acts as a deterrent to quit attempts. That experiencing economic difficulty has been linked to smoking rates (Rahkonen, Laaksonen, & Karvonen, 2005; Swarbrick et al., 2017) provides some support for this contention. However, this finding, along with the negative association between quit attempts and message elaboration ("message makes me stop and think") warrant further exploration.

Study Limitations

Notwithstanding our multistage sampling approach and use of a normalized design weight, there are limitations in our study design. The logistics and cost constraints of undertaking large-scale field evaluations in Bangladesh meant we captured only self-reported quit attempts at one point of time. As such, the results may be subject to social response bias. A further limitation is that self-reported quit attempts were measured in combination with a screening question that precluded current non-smokers from taking the survey. As such, data from individuals who had successfully quit using tobacco in the period between the introduction of the GWLs (and accompanying PBTP communication campaign) and launch of the survey were not included. It is therefore possible that our results may not generalize to this cohort of newly quit users and may underestimated the efficacy of the synergized campaign messages in eliciting tobacco-related cessation behaviors.

Conclusion

This cross-sectional study addresses the limited body of field-based research examining the determinants of quitting attempts post introduction of tobacco policy in the form of GWLs and an associated synergized communication campaign (PBTP). Given the significant positive association between awareness of PBTP campaign messages and quit attempts among the overall study sample, consideration should be given to using synergized "raw and real" communication campaign messages when launching new GWLs on tobacco packaging. The finding among those aware of at least one PBTP campaign message that quit attempts are positively associated with discussing the campaign messages with others and recalling a higher number of these messages emphasizes the value in ensuring campaign-related content is both memorable and engaging.

Declaration of Conflicting Interests

The authors declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: The lead author (TT) was a senior advisor to Vital Strategies and worked on the Bangladesh tobacco control program. TT is also a senior partner of Communication Partners International consulting firm, which provided the funding for the campaign evaluation fieldwork. However, TT played no role in the collection and analysis of the data or in the write-up of the results section of the article.

The other authors (FN, SC, and SI) declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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