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The role of negative affect and message credibility in perceived effectiveness of smokeless tobacco health warning labels in Navi Mumbai, India and Dhaka, Bangladesh: A moderated-mediation analysis

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ABSTRACT

Objective: There is strong evidence showing that pictorial health warnings are more effective than text-only warnings. However, much of this evidence comes from high-income countries and is limited to cigarette packaging. Moreover, few studies have identified mechanisms that might explain the impact of warnings.
Methods: The current study examined the potential mediating role of negative affect and the moderating influence of message credibility in perceived effectiveness of smokeless tobacco warnings in two low- and middle-income countries (LMICs). Field interviews were conducted in India and Bangladesh, with adult (19 + years) smokeless tobacco users (n = 1053), and youth (16–18 years) users (n = 304) and non-users (n = 687). Respondents were randomly assigned to view warnings in one of four conditions: (1) Text-only, (2) pictorial with symbolic imagery, (3) pictorial with graphic images of health effects, or (4) pictorial with personalized graphic images plus a personal testimonial.
Results: The findings provide support for the mediating influence of negative affect in perceived effectiveness, for adult and youth smokeless tobacco users who viewed pictorial warnings (vs. text-only), and graphic health warnings (vs. personal testimonials). Among adults, message credibility moderated the indirect effect; the association was stronger when credibility was high and weaker when it was low. Among youth users and non-users, message credibility did not moderate the indirect effect.
Conclusions: Consistent with research from high-income countries, these findings highlight the importance of selecting imagery that will elicit negative emotional reactions and be perceived as credible. Differential effects among adults and youth highlight the importance of pre-testing images.

1. Introduction

Globally, smokeless tobacco use is disproportionately concentrated in India and Bangladesh. These two countries account for about 80% of the approximately 300 million smokeless tobacco users worldwide (National Cancer Institute, 2014). Despite considerable evidence linking smokeless tobacco use with oral cancer and other adverse health outcomes (International Agency for Research on Cancer, 2007) knowledge of the health risks of smokeless tobacco use remains low in the Indian subcontinent, as well as in migrant South Asian communities worldwide (Gupta & Ray, 2003; Kakde, Bhopal, & Jones, 2012; Khawaja et al., 2006; Rahman et al., 2012; Messina et al., 2013). Indeed, India

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has one of the highest incidences of oral cancer in the world (Khan, 2012).

Health warnings on product packaging are one example of a cost-effective, population-wide strategy to inform populations about the health risks associated with tobacco use (Hammond, 2011). The World Health Organization's Framework Convention on Tobacco Control (WHO FCTC) established international standards for packaging and health warnings: FCTC Article 11 Guidelines call for pictorial warnings covering at least 50% or more of the pack (World Health Organization, 2008). India and Bangladesh, both signatory countries to the FCTC, differ with respect to their tobacco control environments. Despite numerous delays in implementation (Arora, Tewari, Nazar, Gupta, & Shrivastav, 2012; Oswal, Raute, Pednekar, & Gupta, 2011), in 2009, India became the first country in the world to require pictorial health warnings (a symbolic image of a scorpion) on smokeless tobacco packages. In 2011, the symbolic image of a scorpion was replaced with four different graphic images, but recent longitudinal evidence indicated that this change from a symbolic warning in 2009, to graphic warnings in 2011, did not result in significant increases in effectiveness (Gravely et al., 2016). However, India has committed to increasing warning size from the current 40% of the front surface to 85% of the principal display area (i.e., front and back). As of March 2016, Bangladesh has implemented pictorial health warnings covering 50% on smokeless tobacco packages.[2]

In terms of message content, there is strong evidence supporting the superiority of pictorial health warnings over text-only warnings in promoting smoking cessation, and increasing health knowledge and perceptions of risk (Hammond, 2011; Noar et al., 2015). Pictorial warnings often contain graphic, fear-arousing images that elicit negative emotion. Empirical research suggests that strong, fear-arousing messages are most likely to alter beliefs about health risks, as well as appeal and general acceptability of tobacco products (Emery, Romer, Sheerin, Jamieson, & Peters, 2014; Evans et al., 2015; Hammond, 2011; Netemeyer, Burton, Andrews, & Kees, 2016; Noar et al., 2015). Alongside gruesome images of disease caused by tobacco use, graphic health warnings may also include narratives, such as personal “testimonials” from tobacco users. However, findings are mixed with respect to the efficacy of testimonials on health warnings (Hammond et al., 2012; Thrasher et al., 2012).

With few exceptions, much of this research has been conducted in high-income countries and is almost entirely based on cigarette package warnings. To our knowledge, only three studies (one from the US, one from Canada, and one based on the current dataset), have experimentally tested attributes of health warnings for smokeless tobacco (Adkison, Bansal-Travers, Smith, O'Connor, & Hyland, 2014; Callery, Hammond, O'Connor, & Fong, 2011; Mutti et al., 2015). The current study is a follow-up analysis to an experimental study conducted by Mutti et al. (2015), which examined the perceived effectiveness of health warning labels with different message content for smokeless tobacco packages in India and Bangladesh. The previous analysis found that text-only messages were rated as less effective than all of the styles of warnings tested, including warnings with symbolic imagery, graphic health effects, and personal testimonials. Further, among the pictorial style warnings, graphic health warnings were rated as more effective than symbolic and personal testimonial warnings. Overall, the findings from this and other studies on smokeless tobacco health warnings support previous findings based on health warnings for cigarette packaging; pictorial warnings are more effective than text-only warnings, and warnings including graphic images may be most effective overall.

Despite these promising findings, to date, no studies have explicitly examined the role of negative emotion or other factors that might determine the effectiveness of smokeless tobacco warnings in developing countries. Thus, while the central question of whether graphic images of health effects are the best approach for smokeless tobacco warnings is starting to be addressed, the secondary question of whether this effect is mediated or moderated by other underlying factors has yet to be examined in the context of LMICs. Overall, the evidence from studies based on cigarette health warnings indicates that cognitive and affective mediators underlie the effectiveness of health warnings. These studies have consistently found that compared to text-only warnings, warnings with graphic images elicited greater fear arousal, which in turn increased intentions to quit (Kees, Burton, Andrews, & Kozup, 2010), perceived risk (Emery et al., 2014), as well as perceived and actual effectiveness (Byrne, Katz, Mathios, & Niederdeppe, 2015).

According to the Extended Parallel Process Model (Witte, 1992), it is possible that a high level of fear arousal could result in message rejection. In addition, dual-process theories of attitude change such as the Elaboration Likelihood Model (Petty & Cacioppo, 1986) underscore the importance of engaging not only affective pathways, but also cognitive pathways by ensuring that warnings are credible and believable (Strahan et al., 2002). Thus, it is possible that a highly credible message could enhance warning label effectiveness, as well as diffuse heightened emotional responses that might otherwise lead to message rejection. To our knowledge, only one experimental study examined the role of message credibility as a moderator of warning label impact (Emery et al., 2014). Based on a sample of smokers, Emery et al. found that message credibility interacted with affect in predicting a positive attitude towards quitting. Additional studies have examined message credibility as an outcome (Thrasher et al., 2012) and as a mediator (Evans et al., 2015). Overall, negative affect and message credibility appear important in understanding how cigarette warnings work, and are likely to apply to smokeless tobacco package health warnings as well.

The primary aim of the current study was to extend the analysis conducted by Mutti et al. (2015) by examining potential affective and cognitive factors that may influence the warnings' effectiveness. Based on the fear appeal literature, as well as previous findings, it was hypothesized that negative affect would mediate the association between health warning type and ratings of perceived effectiveness; warnings which elicit higher levels of negative affect would elicit higher perceived effectiveness ratings. Therefore, based on the original study (Mutti et al., 2015), it was expected that all of the pictorial styles (symbolic, graphic, and personal testimonial) would elicit greater levels of negative affect compared to text-only warnings. Furthermore, it was expected that graphic health warnings would elicit greater negative affect compared to warnings with personal testimonials (H1). It was also hypothesized that the association between negative affect and perceived effectiveness would vary as a function of message credibility; the association would be stronger when message credibility was high, and weaker when it was low (H2).

2. Methods

An experimental study was conducted in India (n = 1002) and Bangladesh (n = 1081), with adult (19 + years) smokeless tobacco users, and youth (16 to 18 years) users and non-users. Adults and youth represent critical sub-groups in which to evaluate perceptions of health warnings, given that warnings may have differential effects with respect to promoting cessation among current smokeless tobacco users and discouraging uptake of smokeless tobacco use among youth. Ethical clearance was received from the University of Waterloo Office of Research Ethics, the Healis-Sekhsaria Institute for Public Health and the Bangladesh Medical Research Council. Equal proportions of male and female respondents were recruited; no quota limits were placed on users and non-users. Respondents were recruited using the intercept technique (Sudman, 1980), whereby a physical landmark was selected, and every other person to pass it was approached in Navi Mumbai,

[2] These changes occurred after data collection for the current study (April to August 2012).