



Short communication

Intentions to quit tobacco smoking in 14 low- and middle-income countries based on the transtheoretical model*

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ABSTRACT

Introduction: Over 80% of the world's one billion tobacco smokers reside in low- and middle-income countries (LMICs); therefore, it is important to understand factors that promote intention to quit smoking in these countries. This study evaluated factors associated with three stages of intention to quit tobacco smoking among adults in LMICs.

Methods: Data from 43,540 participants of the Global Adult Tobacco Survey in 14 LMICs were analyzed. Intentions to quit smoking were categorized into precontemplation (referent category), contemplation, and preparation stages based on the transtheoretical model. A multinomial logit model was used to estimate odds ratios (OR) and 95% confidence intervals (CI).

Results: Approximately 82%, 14%, and 4% of the smokers were in precontemplation, contemplation, and preparation stages, respectively. Rural residents had increased odds of being in contemplation stage (OR = 1.41, 95% CI = 1.09–1.83) compared to urban residents. Compared to homes where smoking was allowed, smoke-free homes were associated with increased odds of contemplation (OR = 1.77, 95% CI = 1.41–2.23) and preparation (OR = 2.18, 95% CI = 1.78–2.66). Exposure to anti-smoking messages in more than one media channel was associated with increased odds of contemplation (OR = 1.60, 95% CI = 1.33–1.92) and preparation (OR = 1.73, 95% CI = 1.28–2.33) compared to no exposure to anti-smoking messages.

Conclusion: The results suggest that anti-smoking media campaigns and smoke-free policies may promote intention to quit smoking in LMICs. While these suggest the need for implementation of comprehensive anti-smoking campaigns and smoke-free policies, longitudinal studies are required to confirm these findings and to evaluate how intention to quit translates into quit attempts in LMICs.

1. Introduction

Approximately 80% of the over one billion worldwide tobacco smokers reside in low- and middle-income countries (LMICs) (U.S. NCI and WHO, 2016). However, the development of tobacco control policies and programs to address this public health threat in LMICs is very slow (WHO, 2016, 2012, 2010, 2009). Additionally, tobacco control research to inform policy and advocacy initiatives in LMICs is sparse (Baris et al., 2000; Lando et al., 2005; McRobbie et al., 2013). To address this paucity of research, the Global Adult Tobacco Survey (GATS), a component of the Global Tobacco Surveillance System (GTSS), has been conducted in selected countries. The GATS monitors tobacco use cessation as one of the key tobacco control indicators. The intention to quit smoking forms an integral part of the cessation process (Glanz and Rimer, 2008) and has been found to be significantly associated with

quit attempts (West and Sohal, 2006). Therefore, understanding factors that promote the intention to quit smoking is important for intervention and policy planning.

The intention to quit smoking has been characterized in national and subnational studies in some LMICs (Dhumal et al., 2014; Islam et al., 2014; Siahpush et al., 2008). However, there is a paucity of literature on cross-country estimates of factors associated with readiness to quit smoking. Given that differences in intentions may predict quit attempts and cessation (DiClemente et al., 1991), it is important to understand the characteristics of adults in different stages of the cessation process for stage-specific intervention planning. Thus, this study's aim was to use the transtheoretical model (TTM) of health behavior change (DiClemente et al., 1991) to classify adult smokers from LMICs into the first three stages of the smoking cessation process (precontemplation, contemplation, and preparation) and identify

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factors associated with these stages. The study will provide comprehensive information on intentions to quit tobacco smoking in adult smokers in select LMICs, who represent more than half of the global adult smokers and will serve as the baseline for future studies in LMICs.

2. Methods

2.1. Data

Publicly available GATS data from 17 LMICs from 2009 to 2012 were retrieved for this study. Our aim was to analyze the data to inform policy in each country, as well as global health governance to control tobacco use, as espoused in the WHO Framework Convention on Tobacco Control (WHO FCTC), the first international treaty for global tobacco control (WHO, 2003). As such, we included 14 out of the 17 countries classified as LMICs at the time of the survey and excluded three countries [Argentina, Mexico, and Romania] because of incomplete information. Details of the GATS design, implementation, and data collection have been published elsewhere (GATS Collaborative Group, 2010; Warren et al., 2009). Briefly, GATS is a nationally representative survey of civilian noninstitutionalized adults aged 15 years or older. The survey uses multi-stage clustered probability sampling techniques to obtain nationally representative sample of respondents to answer survey questions. It employs standard protocols on questionnaire development, sampling, data collection and management procedures that allow for cross-country comparisons. This study included current users of combustible tobacco products at the time of the interviews. Smoking status was determined with the question: ‘Do you currently smoke tobacco on a daily basis, less than daily, or not at all?’ Those who answered ‘daily basis’ or ‘less than daily basis’ were included in this study.

2.2. Variables

2.2.1. Dependent Variable

Guided by the TTM, the intentions to quit tobacco smoking were categorized into precontemplation, contemplation, and preparation stages. The TTM indicates that tobacco smoking cessation progresses through stages (DiClemente et al., 1991). The precontemplation stage is where there is no intention to quit within the next six months. The contemplation stage is defined by intention to quit smoking within the next six months, and the preparation stage is when a person intends to quit within the next 30 days and has already taken some practical behavioral steps in this direction (DiClemente et al., 1991). Because GATS protocol used 12 months for intention to quit smoking, adults who had no intention to quit smoking within 12 months were classified as being in the precontemplation stage (Mbulo et al., 2015). All those planning to quit smoking within 12 months were classified as being in the contemplation stage. Lastly, respondents who planned to quit in the next month and had attempted to quit (stopped smoking for at least one day) in the past 12 months were classified as being in the preparation stage (Mbulo et al., 2015).

2.2.2. Independent Variables

Based on the literature (Abdullah and Yam, 2005; CDC, 2013; Islam et al., 2014; Lund, 2015; Macy et al., 2012; Sansone et al., 2012; Schoretsaniti et al., 2014; Siahpush et al., 2008) and available data, independent variables included in the analysis were age (categorized into 15–24, 25–44, 45–64 and 65+ years), sex (male/female), exposure to anti-smoking media messages [newspapers or magazines, television, radio, and billboards], exposure to health warning labels (yes/no), knowledge of smoking harm (yes/no), home smoking rules, employment status (employed/unemployed), educational level (below high school, high school, and above high school), and place of residence (rural/urban). Exposure to anti-smoking media messages was categorized into ‘no exposure’, ‘exposure in only one media channel’, and

‘exposure in more than one media channel’ (CDC, 2013). Home smoking rules were categorized into ‘smoking allowed’ (no rules or smoking allowed), ‘smoking restrictions’ (smoking generally not allowed but with exception); and ‘smoke-free’ (smoking never allowed). Quartiles of the gross domestic product (GDP) per capita of the countries in the years of survey were used to categorize countries into four income groups: 1st quartile [Bangladesh (2009), India (2010), Philippines (2009) and Vietnam (2010)], 2nd quartile [Egypt (2009), Nigeria (2012) and Ukraine (2010)], 3rd quartile [China (2010), Indonesia (2011) and Thailand (2011)], and 4th quartile [Malaysia (2011), Russian Federation (2009), Turkey (2012) and Uruguay (2009)].

For additional details on the dependent and independent variables, see Appendix A online.

2.3. Statistical analysis

SAS version 9.4 (SAS Institute, Cary, NC, USA) was used to conduct data management and statistical analyses. All estimates and 95% confidence intervals (CI) were derived from weighted data, and variance estimations accounted for the stratified and clustered sampling design. In all analyses, a country of survey dummy variable was included in the model to control for countries’ sociocultural, environmental, and population differences. Chi-square tests examined differences in the prevalence of the stages of intention to quit smoking in the categories of each independent variable. A multinomial logit model (MNL) was fit to delineate factors associated with intentions to quit smoking in the pooled data from the 14 LMICs. The precontemplation stage was used as the referent category for the MNL. Odds ratios (OR) and 95% confidence intervals (CI) were reported. Statistical significance was set a priori at $p < 0.05$.

3. Results

Table 1 describes the sample and prevalence of intentions to quit smoking. The analytic sample comprised 43,540 current tobacco smokers. Less than a quarter of the participants in each country were females, except for Russian Federation (29.7%) and Uruguay (42.3%). Approximately 81.7%, 14.2%, and 4.1% of adult smokers were in precontemplation, contemplation, and preparation stages, respectively. The proportions of smokers in the three stages in individual countries are shown in Appendix B online.

Table 2 shows the results of the MNL. Compared to homes where smoking was allowed, having home smoking restrictions and smoke-free homes were associated with increased odds of contemplation [OR = 1.49, 95% CI = 1.20–1.85 and OR = 1.77, 95% CI = 1.41–2.23, respectively] and preparation stages [OR = 1.76, 95% CI = 1.38–2.24 and OR = 2.18, 95% CI = 1.78–2.66, respectively]. Compared to participants who were not exposed to anti-smoking media messages, those who were exposed to anti-smoking messages in one media channel had increased odds of contemplation (OR = 1.37, 95% CI = 1.10–1.71) and those exposed to the messages in more than one channel showed increased odds of being in both contemplation (OR = 1.60, 95% CI = 1.33–1.92) and preparation stages (OR = 1.73, 95% CI = 1.28–2.33). Compared to participants from the countries in the 1st quartile of GDP per capita, those from the countries in the 2nd and 3rd quartiles were less likely to be in contemplation and preparation stages. All other variables, except exposure to health warning labels and employment status, were associated with intentions to quit smoking (Table 2).

4. Discussion

Research on promoting tobacco cessation is a priority area in LMICs (McRobbie et al., 2013); therefore, we evaluated intentions to quit smoking based on the TTM. Consistent with the literature, we found

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