Prevention in Translation: Tobacco Use Prevention in India
Cheryl L. Perry, Melissa H. Stigler, Monika Arora and K. Srinath Reddy

Health Promot Pract 2008 9: 378
DOI: 10.1177/1524839906289222

The online version of this article can be found at:
http://hpp.sagepub.com/content/9/4/378
Prevention in Translation: Tobacco Use Prevention in India

Cheryl L. Perry, PhD
Melissa H. Stigler, PhD
Monika Arora, MSc
K. Srinath Reddy, MD

Mobilising Youth for Tobacco-Related Initiatives in India (Project MYTRI) is a randomized community trial to prevent tobacco use among students in Grades 6 through 9 in 32 private and government schools in Delhi and Chennai, India (N = 12,484). The project is a partnership between researchers and practitioners in the United States and India. This article describes the steps that were carried out to ensure that prior effective programs are appropriate and applicable to India. These steps involve (a) developing a conceptual behavioral intervention model, (b) ensuring the appropriateness of the model for urban India, (c) developing intervention strategies that modify factors in the model, (d) implementing the MYTRI program with more than 5,000 students, and (e) evaluating the process and outcomes of the intervention. Data to date suggest that this process has been successful, including high participation rates, teacher perceptions of appropriateness, and agreements for further implementation.

Keywords: tobacco use; prevention; smoking; India; process; translation; adaptation

Tobacco use is a growing worldwide epidemic, with young people targeted globally by tobacco industry marketing, and with addiction to nicotine for most people occurring prior to adulthood (Reddy & Gupta, 2004; U.S. Department of Health and Human Services [USDHHS], 1994). As a result, the impetus to prevent tobacco use among youth is even more substantiated than it was three decades ago when prevention research in this area was initiated. In addition, as a result of globalization, marketing, and economic growth, the burden of tobacco use has shifted from developed to developing countries such as India (Mackay, 1998). Thus, we need to expediently develop and implement strategies to prevent tobacco use in less developed countries to have optimal impact on the total burden of tobacco use (Peto & Lopez, 2001).

BACKGROUND

India has more than one billion people that represent about one sixth of the entire population of the planet (United Nations, 2004). With 4 times the population of the United States, India provides a large, dense, and lucrative market for the tobacco industry. In addition, India is quickly becoming Westernized, with a growing middle class and increased income, and with access to technologies and English literacy that link India with the global community. Cigarette smoking is part of a larger process of Westernization that can be appealing to young people in urban India, making youth a particularly susceptible population for marketing activities (Reddy & Gupta, 2004). Thus, it is critical to initiate prevention research in urban India to quickly find strategies that minimize or curtail a tobacco use epidemic that could cause significant morbidity and mortality in that large country.

Since the early 1980s, research in tobacco use prevention has progressed from efficacy studies to effectiveness trials to dissemination efforts, with impressive work having been or being done at all levels (Flay, 1986; Society for Prevention Research, 2004). However, several researchers have pointed to the problems of...
The Authors

Cheryl L. Perry, PhD, is a professor in the Division of Epidemiology and Community Health, School of Public Health, University of Minnesota, in Minneapolis, Minnesota.

Melissa H. Stigler, PhD, is project director for Project Mobilising Youth for Tobacco-Related Initiatives in India–Minnesota in the Division of Epidemiology and Community Health, School of Public Health, University of Minnesota, in Minneapolis, Minnesota.

Monika Arora, MSc, is project director for Project Mobilising Youth for Tobacco-Related Initiatives in India–India at the non-government organization, Health-Related Information and Dissemination among Young (HRIDAY) in Delhi, India.

K. Srinath Reddy, MD, is professor and head, Department of Cardiology, All India Institute of Medical Sciences, in New Delhi, India.

METHOD: PROJECT MOBILISING YOUTH FOR TOBACCO-RELATED INITIATIVES IN INDIA (MYTRI) GOALS AND STUDY DESIGN

The process of translational research in Project Mobilising Youth for Tobacco-Related Initiatives in India (MYTRI) is the focus of this article, and this process is addressed in this section, with particular attention to differences between the United States and Indian contexts and implications for practice. The goal of the project is to prevent the onset and reduce the prevalence of tobacco use among young people in urban schools in Delhi and Chennai, India. Our specific project objective is to reduce the prevalence of tobacco use by 20% to 30%. The research project is a collaboration between scientists and practitioners at the University of Minnesota (Minnesota) and Health-Related Information and Dissemination Among Youth (HRIDAY), a nonprofit health promotion organization in New Delhi, India. Researchers at Minnesota had performed efficacy and effectiveness trials in smoking and alcohol use prevention that included strategies that could serve as a basis for program development (Perry, Kelder, Murray, & Klepp, 1992; Perry et al., 2003; Perry et al., 2002). Researchers and practitioners from HRIDAY had implemented a cardiovascular disease prevention program and, more important, had successfully involved students in peer activism against the tobacco industry, and this also provided them with excellent experience in working with schools and the larger community (Reddy & Gupta, 2004). In addition, the two sets of researchers had completed one joint project (Reddy et al., 2002) based on the Child and Adolescent Trial for Cardiovascular Health (CATCH) trial (Luepker et al., 1996) and had prior experience collaborating on a school-based efficacy trial.

The final research design for Project MYTRI includes 32 schools in Delhi and Chennai. These schools were stratified by city, gender (boy-only, girl-only, coed), and type (government, private) and were randomized into intervention and delayed-program control groups. Because the age of onset of tobacco use in India is adolescence and young adulthood (Reddy & Gupta, 2004)—overall, across India, more than 25% have smoked or chewed tobacco by Grades 8 through 10—the 2-year primary prevention intervention is aimed at all sixth- and eighth-grade students in the 16 intervention schools. Baseline data with all eligible students were collected in summer 2004 (N = 12,484), and follow-up surveys took place when the students were in the seventh and ninth grades in summer-fall 2005, and will also take place when the students are in the eighth and tenth grades in summer-fall 2006. All intervention materials and survey instruments are in English, Hindi, and Tamil, as needed for the different cities (Delhi and Chennai) and types of schools (private and government).

The baseline response rate from the summer 2004 survey was 94.1% (11,748), with 45.3% of the students in the intervention condition, 50.6% in Delhi (vs. Chennai), 38.6% in private (vs. government) schools; 54.9% were male and 52.9% were in the sixth (vs. eighth) grade. There were no differences between conditions in baseline demographics or tobacco use rates.
When asked about ever using tobacco, 14.7% of the sample had used a tobacco product—11% had chewed tobacco, 7.5% had smoked cigarettes, and 7% had smoked bidis (hand-rolled cigarettes).

**INTERVENTION METHOD: STEPS IN TRANSLATION RESEARCH FOR PROJECT MYTRI**

The primary methods to date have included five major steps to translate our prevention science principles and programs to be appropriate for young people, schools, teachers, and parents in Delhi and Chennai, so that the program could be widely disseminated in urban India should the outcomes be positive. These translational steps have been guided by a program design process that we have used in our work during the past 20 years (Perry, 1999).

**Step 1: Developing the Conceptual Model**

The conceptual model was guided by social cognitive theory (Baranowski, Perry, & Parcel, 1996) and included intrapersonal, social-contextual, and environmental factors that were thought to be predictive of tobacco use in this urban Indian population, as well as being modifiable. There has been very little etiological research on tobacco use onset in India to guide this process. The factors that were selected were also the basis of the social influences model that has guided many of the effective smoking prevention programs in the United States (Play & Petrakis, 1994; USDHHS, 1994).

In the first meeting of investigators, the appropriateness of the U.S. social influences model in guiding our programs in India was addressed, and several changes occurred. First, the outcome behaviors in the U.S. model were seen as more appropriate for older adolescents in India rather than young adolescents. Because the prevalence of smoking among young people in Delhi and Chennai is substantially lower than use in the United States (Reddy & Gupta, 2004), other outcome behaviors needed to be added to reflect susceptibility to use and intentions to use. In addition, other forms of tobacco use (bidis, chewing tobacco) needed to be addressed in more depth. Second, the HRIDAY investigators believed that more emphasis needed to be placed on knowledge. Although in the United States, nearly all young people know the specific health consequences of tobacco use by sixth grade, this is not necessarily the case in India. In addition, the investigators wanted young people to know the current laws concerning tobacco use by youth and in public places, especially given the recent legislation in India that prohibits smoking in all public places, sales of tobacco within 100 yards of schools, sales of tobacco to those younger than age 18 years, and most tobacco advertising, promotions, and sponsorships (Reddy & Gupta, 2004). Third, youth activism was seen as an essential component of reinforcing healthy norms (rather than changing unhealthy norms) around tobacco use because most young people are not yet tobacco users. India is the largest democracy in the world, and debate and activism are inherent to democratic actions in that country, in part because the nation was founded through growing, vocal, active, and nonviolent resistance to British rule. The mobilization of this energy was seen as critical to maintaining healthful norms around tobacco use. The final model to guide the MYTRI intervention is shown in Figure 1.

**Step 2: Ensuring the Appropriateness of the Conceptual Model**

To gain information on the appropriateness of the conceptual model and related intervention strategies, focus groups with students were conducted (Mishra et al., 2005). The focus group questions probed for student perceptions of each of the hypothesized predictive factors in the model as a check to see if these factors were salient and how they manifested in the lives of young people. Forty-eight focus groups were conducted with students in Grades 6 and 8 (n = 435) in government, private, girl-only, boy-only, and coed schools (in English and Hindi) in New Delhi (Mishra et al., 2005). In addition, as a pilot for a separate research project, focus groups were also held with teachers in two schools in Delhi (Sorensen et al., 2005).

Results of the focus groups confirmed the appropriateness of the modified theoretical model. Students had misinformation or incomplete information on the health consequences of tobacco use, thus confirming that this needed to be addressed in the classroom activities. There were also considerable differences in exposure to tobacco use based on gender and type of school. Boys were much more likely than girls to intend to use tobacco or to have experimented. Those in government schools (of low-middle socioeconomic status) were more likely than those in private schools (middle-upper socioeconomic status) to have role models who use tobacco, to have experimented themselves, or to intend to use. Students also saw that their role should be to help others quit tobacco use, not just refusing tobacco for themselves. Finally, the students reported that there were few efforts within schools to curb tobacco use and felt more should be done in that setting (Mishra et al., 2005).
**Step 3: Developing the Intervention Strategies**

The process of creating program components for teachers, peer leaders and students is the “heart” of the translation process (Perry, 1999). This step combines attention to the conceptual model with the actualization of that model in a way that is culturally sensitive at surface and deep levels (Resnicow, Baranowski, Ahluwalia, & Smithwaite, 1999). We began by coming to agreement on the types of intervention components, based on scientific and practical considerations. We decided to have five to seven session curricula (about 70 minutes per session) in each of the sixth, seventh, eighth, and ninth grades. The sessions include teacher-led discussions at the beginning and end, and peer-led small group activities (e.g., games, worksheets) as the main focus of each session. These curricula were based on or adapted from activities that had been implemented in prior social influence curricula, such as the Minnesota Smoking Prevention Program (Perry et al., 1992), D.A.R.E. Plus (Perry et al., 2003), and HRIDAY (Reddy et al., 2002).

The curricula activities were all peer led not only because of the success of this approach (Perry et al., 2002) but also because peer leaders were needed to manage group activities in classrooms with a large number of students. The use of peer leaders—students who were elected by their peers to serve as group leaders for the curricula—is a very novel way of conducting an educational program in India. We also agreed to develop school posters that would complement the themes of each session of the curriculum; posters are particularly well received by teachers and schools in India as a way to extend learning. Parent homework assignments and parent postcards were selected as ways to educate parents; these approaches had been effective in our prior research (Perry et al., 2003; Perry et al., 2002). Finally, peer leaders were involved in inter- and intraschool activities at the school and community levels to make changes in those environments to reinforce the messages in the classroom and home (Perry et al., 1996). Peer activism had been successfully implemented in prior research by HRIDAY and so was adapted for MYTRI (Reddy et al., 2002; Reddy & Gupta, 2004).

There are some notable cultural differences that were encountered as we worked to develop the program components. The classrooms were not only larger in class size than are generally found in the United States but also there were differences in physical size, availability of

---

**FIGURE 1** Project Mobilising Youth for Tobacco-Related Initiatives in India (MYTRI) Conceptual Model
electricity, and even the types of structures that made up a school. The Indian population also is more academically oriented than is the U.S. population. Programs in schools are taken seriously, on one hand, so there can be high levels of participation; however, extracurricular activities are less valued, and few schools teach health education. There were also concerns about doing something that was too “fun” in the classroom. These differences were resolved over time as the program components were designed and developed through substantial communication between HRIDAY and Minnesota, and with extensive pilot testing, teacher interviews, and focus group discussions on content and approach. Figure 2 shows one of the school posters in English and Hindi. An outline of the final Grades 6 and 8 curricula is shown on Table 1.

**Step 4: Implementing the MYTRI Intervention Program**

Schools were recruited by the investigators and involved multiple meetings in each school with the school administration and teachers. Schools were asked to sign a cooperative agreement that included the school’s willingness to be randomized to either an intervention or delayed-intervention control group. The agreement was very specific about what the school would receive from the MYTRI project (teacher training, peer-leader training, all curriculum materials, posters, postcards for parents) and what was expected of them (identification of students, support of the project, class time). The cooperative agreement was unusual in the Indian context where verbal agreements are more often the procedure, and so the schools were reluctant to sign the agreement without considerable thought and input. In total, 93 schools were contacted to be part of the study. Of those, meetings were arranged with 68 of the schools (73.1%), and 32 schools signed the cooperative agreement (47%). The reasons most often given for not wanting to participate included: not wanting to sign the cooperative agreement, lack of time and teaching staff to conduct extracurricular activities, apprehension that the activities would encroach on academic time (because

<table>
<thead>
<tr>
<th>Grade</th>
<th>Title</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1</td>
<td>Guess the numbers</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Understanding the toll</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>Poison puzzle: What is in tobacco?</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>How does it harm?</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Negative consequences</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>Tobacco trauma: It affects every sphere of life!</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>–</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>–</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>–</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>Build it! Model your school tobacco free</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Spin the wheel: Reasons not to use tobacco</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>–</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>–</td>
</tr>
</tbody>
</table>

TABLE 1
Classroom Curricula Sessions for Project Mobilising Youth for Tobacco-Related Initiatives in India (MYTRI), Grades 6 and 8
FIGURE 2  “We Have the Strength” School Poster in English and Hindi for Project Mobilising Youth for Tobacco-Related Initiatives in India (MYTRI)
academic training was accorded higher priority than health education), and the perception that tobacco use was not a current problem in their schools (especially among girls and in the younger age groups).

Implementation of the MYTRI programs began with staff, teacher, and peer-leader trainings. The trainings were organized to be similar to such trainings in the United States, which primarily involve an introduction to the curriculum, modeling of each session, and guided practice of key activities, but with some notable differences. The investigators spent considerable time on the topic of tobacco use and the need for school-based prevention among young people in India. Often these trainings were held on weekends as well, so as not to interrupt the school schedule. The trainings included ample time for tea and catered hot lunch and the opportunity for the staff, teachers, and peer leaders to directly interact with the researchers. The teachers, staff, and peer leaders were given very comprehensive manuals that provided the background to each session, the steps in implementation, actual scripts for classroom instruction, and all necessary teaching materials, such as posters, games, and worksheets. These materials are all available in manuals that can be used in other urban Indian schools at the end of the study. Likewise, the staff, teacher, and peer-leader trainings were designed so they could readily be replicated in future implementations. Ease of implementation was stressed by the MYTRI staff and aided in building better relationships with the teachers. For the 1st year of implementation, 10 staff, 153 teachers, and 678 peer leaders were trained to conduct the MYTRI intervention in the 16 intervention schools.

At the end of the teacher training sessions, each participant was asked to rate the appropriateness of the MYTRI intervention components for sixth- and eighth-grade classrooms and parents in Delhi and Chennai. We wanted to obtain their perceptions of how well the intervention components “fit” the needs of Indian youth and families, as a proxy to how well the conceptual model and prior programs had been adapted for this audience. Teachers were asked to rank the appropriateness of the program materials, classroom activities, parent postcards, and school posters on a scale of 1 (not appropriate) to 7 (very appropriate). The teachers overall ranked the appropriateness of the intervention components highly, with teachers from government schools (n = 67) ranking the components more highly than teachers from private schools (n = 49); the mean scores were 6.9 and 6.4, respectively. These data suggest that the translation process resulted in program materials that were rated as highly appropriate for Indian youth and families.

Key to the success of the program was the ongoing relationships between the teachers and the MYTRI staff. The teachers were asked for an implementation schedule in their classrooms for the curricula, and the staff worked around their schedules. This was important so that classroom observations could be conducted, and also to provide “booster” training to the teachers and peer leaders prior to the implementation of the sessions. These boosters provided time for the teachers and MYTRI staff to discuss all aspects of implementation. They were needed because of the emphasis on behavioral skills, participation of students, and the reliance on peer leaders for group activities. This was also a method to continue to build relationships with the teachers and to carefully distribute materials that might get misplaced to ensure greater sustainability and implementation of the program in the future. In addition, any revisions to the MYTRI program materials will be based, in part, on problems encountered during implementation. Currently, teachers in all 16 schools implemented the MYTRI program in the 2005-2006 school year.

Step 5: Evaluating the MYTRI Intervention

MYTRI is a group-randomized trial with two cohorts of students, a sample size of about 12,000 students, and 32 schools in two large urban areas in India. Evaluation consists of outcome, intermediate, and process measures that are implemented prior to, during, and following a 2-year intervention period.

The major outcomes, tobacco use and tobacco use susceptibility, are being measured with annual surveys of the students. The Institutional Review Board at the University of Minnesota and the Independent Ethics Committee (Mumbai, India) approved the study protocol. Informed consent procedures were followed. Parent permission was sought through letters delivered by the child (the usual procedure in India). Many parents were confused and alarmed about the consent procedure because any activity that is approved by the school administration generally does not seek additional parent and student approval in India. Still, 94.1% of the available students were surveyed at baseline. Of the remaining, 4.4% were absent at the time of the survey and make-up day, 1.5% did not participate because of parent or student refusal. The final sample size is 11,748.

The implementation of the 1st year of the MYTRI intervention has been completed. The seven-session curriculum has been implemented in 65 sixth-grade and 60 eighth-grade classrooms. Thirteen of the 16 intervention schools have completed all of the MYTRI activities with Grade 6 and 8 students; three schools only partially implemented the classroom activities.
The interschool activities were held in February 2005 in Delhi and Chennai with 3,569 students (67% of the sixth- and eighth-grade cohort) attending these two out-of-school events.

The large sample size of students and schools has provided opportunities to learn new methods of intervention development (such as the ways in which small group activities are implemented with groups of 10 to 15), data collection, and data entry. All surveys have removable project-created ID codes so that students are tracked annually by those codes rather than by name or school ID. Data entry is done by scanning in India, with data management and analyses coordinated and conducted both in India and the United States.

**DISCUSSION**

Project MYTRI has just completed its 3rd year, with the first 2 years devoted to the design and development phases of this large study. The process of translational research is ongoing; still, numerous lessons have already been learned concerning the implementation of an evidence-based tobacco use prevention program in India. These lessons may be of value to others as they modify, adapt, translate, or create intervention programs in communities and settings that differ from the settings of prior efficacy and effectiveness trials. The first suggestion is to spend ample time in developing and agreeing on a conceptual model of modifiable factors to guide the intervention. This proved to be very important so that all parties (including school staff and teachers) understand the goals of the project and factors that need to change to reach those goals. For example, because we placed an emphasis on increasing non-tobacco-using role models, the use of peer leaders in the classroom, on posters, and with interschool competitions was more acceptable to practitioners, even if unusual in the Indian context. The second suggestion is to provide opportunities for those involved in program implementation to review all components of the program and to verify that they are appropriate in language, context, and assumptions for the new audience. For example, role-play situations that are written for one group (such as students in urban India) will likely need to be edited for a completely different setting (such as rural India). This is important to avoid problems of misunderstanding of subtle or deep cultural values, and to ensure the appropriateness of the program content. Third, it is critical to share successes, problems, and results of the project with collaborators, implementers, and community members as a first order of business. Much of what has been learned in Project MYTRI has come about because of the nearly daily communication between team members in Minnesota and Delhi, as well as consistent communication with students, teachers, and school administrators in our schools. Each year, for example, a report is compiled for the schools (administrators, staff, teachers) so that they have the latest project results (baseline data, participation rates, outcomes) and to reiterate our thanks. These small and ongoing milestones of a project—when shared and celebrated—become an important component for future collaborations and have a larger impact than simply implementing a prevention program in a new setting.

**CONCLUSION**

The adaptation of prior tobacco use prevention programs is ongoing in Project MYTRI. To date, the translation process has been quite successful, with very high survey response rates, teacher ratings of the program’s appropriateness, program completion rates, and student participation. In addition, the steps in translation have been undertaken so that rapid dissemination in urban India will be possible. The use of an appropriate behavioral model, tailored program materials, and ongoing feedback and communication at all levels seem critical to the success of the translation process.

**REFERENCES**


focus group discussion with school students. Health Education & Behavior, 32(3), 363-379.


386 HEALTH PROMOTION PRACTICE / October 2008