Measuring the Effect of a Tobacco Media Campaign Among Nonsmoking Children and Adolescents

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Introduction

Tobacco use is the single most preventable cause of death in the United States, accounting for approximately 430,000 deaths annually, or one in every five (US Department of Health and Human Services [DHHS], 1999a). Despite a reduction in smoking prevalence among adults in the US from 42.4% in 1965 to 24.7% in 1997 (DHHS, 1999b), cigarette smoking among adolescents increased significantly from 1991 to 1997 in each grade from 9-12 (DHHS, 1999a). Data from the 1999 Youth Risk Behavior Survey revealed that 34.8% of high school students smoked cigarettes on one or more of the 30 days preceding the survey and were considered current smokers (DHHS, 2000a).

Developing and implementing effective interventions to prevent and control tobacco use among children and adolescents is important in at least two ways. The first relates to the aforementioned data suggesting that cigarette smoking is a growing problem among children and adolescents. The second relates to increased funding for tobacco prevention and control. This includes the 1998 Attorneys General Master Settlement Agreement with the tobacco industry and subsequent awards to all states through the Centers for Disease Control and Prevention’s (CDC) National Tobacco Control Grant. As with most public health initiatives, increased funding usually translates to increased attention, scrutiny, and accountability.

CDC (DHHS, 1999c) recommended that states develop comprehensive tobacco prevention and control programs composed of nine components. One of these components, counter-marketing, focuses on a wide range of efforts, including paid television, radio, billboard, and print counter-advertising. A number of studies suggest that tobacco media campaigns, when implemented as part of a broader tobacco prevention and control program, can be effective in reducing tobacco use (Biener, 1999; Burns, 1994; Cummings & Clark, 1998; Flay, 1987; Flynn, Worden, Secker-Walker, 1992; Glantz, 1998; DHHS, 1999c; Worden, Flynn, Solomon, & Secker-Walker, 1996). Accordingly, many states, including Arizona, California, Florida, Massachusetts, Minnesota, Mississippi, and Utah, are using tobacco related funding for media campaigns (DHHS, 1999c).

The purpose of this study is to report the effects of a modestly funded media campaign ($500,000) in preventing nonsmoking children and adolescents from using tobacco products. This paper focuses on the effect of the campaign on nonsmoking children and adolescents and reports attitudinal and behavioral impacts of the campaign, as well as exposure and recall related to specific campaign components.

Targeting nonsmokers with a media campaign is important for several reasons. First, 88% of youth in Utah and 65% of youth in the United States are nonsmokers (DHHS, 2000a). This represents an important target audience for prevention since every day in the United States, more than 6,000 persons younger than 18 try their first cigarette, and more than 3,000 become regular smokers (DHHS 1999c). In addition, Healthy People 2010 includes specific objectives that relate to increasing the average time of first use of tobacco by non-tobacco-using adolescents and increasing the proportion of young people in grades 9-12 who have never smoked (DHHS, 2000b). These objectives require assessment of the impact of interventions specifically among nonsmokers. While most evaluations have focused on smoking behavior impacts, few have examined the protective benefits of media on decisions to remain smoke-free. Finally, anti-smoking messages directed at nonsmokers that provide negative visual images associated with smoking serve to help nonsmokers remain smoke-free and positively influence smoking habits of their adolescent peers (Jones & Carroll, 1998). Portraying smokers as "lacking independence, emotionally vulnerable, low in social skills, and relatively naive," are successful characteristics of anti-smoking messages (Jones & Carroll).

Procedures

Media Campaign

In an effort to maximize funding, 35 television and radio anti-smoking advertisements (hereafter referred to as advertisements) were collected from five states. Theater tests were conducted among 285 youth ages 11-18 to identify ten advertisements most likely, in part, to appeal to youth, prevent smoking, and promote retention of smoke-free status among nonsmokers. Eight focus groups were then conducted throughout Utah to collect detailed information about the selected advertisements, including messages portrayed, audience for prevention since every day in the United States, more than 6,000 persons younger than 18 try their first cigarette, and more than 3,000 become regular smokers (DHHS 1999c). In addition, Healthy People 2010 includes specific objectives that relate to increasing the average time of first use of tobacco by non-tobacco-using adolescents and increasing the proportion of young people in grades 9-12 who have never smoked (DHHS, 2000b). These objectives require assessment of the impact of interventions specifically among nonsmokers. While most evaluations have focused on smoking behavior impacts, few have examined the protective benefits of media on decisions to remain smoke-free. Finally, anti-smoking messages directed at nonsmokers that provide negative visual images associated with smoking serve to help nonsmokers remain smoke-free and positively influence smoking habits of their adolescent peers (Jones & Carroll, 1998). Portraying smokers as "lacking independence, emotionally vulnerable, low in social skills, and relatively naive," are successful characteristics of anti-smoking messages (Jones & Carroll).

Television and radio advertisements were rotated on a monthly basis throughout the campaign. During the first six months of the campaign, one television and one radio advertisement were used exclusively each month before being rotated. After the first six months of the campaign, two television and two radio advertisements...
were rotated each month throughout the remainder of the evaluation period.

Supporting materials were distributed throughout Utah schools to reinforce messages conveyed in the television and radio advertisements. These materials included lesson plans, inserts for school newspapers, posters, and instructions for a television and radio counter-advertising contest.

A local public opinion and marketing research firm was commissioned to perform pretest and posttest telephone surveys. Baseline data were collected two weeks prior to the implementation of the media campaign. The posttest was conducted 16 months later while the media campaign was still in progress.

Subjects

A total of 596 nonsmokers aged 9-18 were interviewed by telephone at baseline. A nonsmoker was defined as one who had not smoked cigarettes in the last 30 days. The sample consisted of 49.9% males and 50.1% females. The most frequently represented age was 15 (13.4%) while the least represented age was 9 (7.6%). Respondents were selected using random-digit dialing, maintaining proportionality according to population distributions in Utah. The posttest consisted of 306 nonsmokers randomly selected from and linked with pretest responses. Sample size calculations indicated that 306 respondents were sufficient to detect a significant change. The posttest was also conducted by telephone.

Instrument

A 61-item questionnaire was used for the pretest survey. Items were drawn from a questionnaire used by the state of Massachusetts to assess a variety of attitudes, beliefs, and behaviors related to tobacco use, as well as exposure to elements related to the tobacco media campaign. The following variables were included in the pretest survey: demographics, exposure to advertisements against smoking, knowledge of risks and short-term effects associated with tobacco use, and awareness of available programs and resources to assist in tobacco reduction (school-based activities, a hotline number, nicotine gum, and nicotine patches, etc.).

The posttest consisted of 68 questions including 21 items drawn from the pretest questionnaire for comparison and analysis. Remaining items were taken from a questionnaire developed by the Arizona Cancer Center to assess specific outcome variables related to the media campaign. Several pretest questions addressing issues not directly related to the media campaign were dropped from the posttest. While these questionnaires have been tested and modified for age appropriateness, validity and reliability measures have not been reported.

Of all matched questions at pretest and posttest, 13 provided meaningful comparisons (i.e., exposure of advertisements in general and changes in attitudes and behaviors). Additionally, nine questions at posttest provided useful information on recall and perceived impacts of the campaign on decisions to remain smoke-free. While other questions provided interesting information, they were not considered direct measures of the campaign’s effect and were not included in the pretest-to-posttest analysis or reported in this paper.

Analysis

Conventional nonparametric statistical methods were used in the analysis since data were derived from either nominal or ordinal scales. Tests of significance were based on the 0.05 level.

Results

Table 1 displays differences between pretest and posttest in the percentage of respondents who saw or heard advertisements related to the campaign. Significant increases were noted on all nine pretest-to-posttest comparisons. These differences were most notable for advertisements on television at both home and school, and on the radio. Specifically, a significant increase in the proportion of respondents reported they saw or heard advertising on television at home (from 40% to 73%). Respondents also saw or heard significantly more advertising on television educational channels at school from pretest to posttest. Other non-television advertising at school was also reported to have been seen or heard significantly more between pretest and posttest assessments. Specifically, 49% of respondents had seen advertisements on television in school, while 57% of respondents reported seeing or hearing non-televised advertisements at school. Respondents reported hearing advertisements on radio significantly more often at posttest than pretest (25% to 47%).

Changes in awareness of available resources (i.e., recognizing the existence of a hotline number and recognizing other services or programs at school) are noteworthy. Significant increases in awareness of advertisements in newspapers or magazines, billboards or large road signs, and in "other channels" were also reported. Although less than 50% of respondents reported they heard or saw advertisements on the radio, on billboards, or in magazines and newspapers, pretest-to-posttest increases were all statistically significant.
Table 1 displays differences from pretest to posttest in attitudinal and behavioral measures stratified by respondents who saw or heard the campaign. All four paired items related to attitudinal and behavioral measures were significantly higher at posttest. Specifically, respondents were less likely to start smoking in the next six months as a result of the campaign, even though the pretest measurement was high with 97% of respondents reporting they would not smoke. Respondents also reported significantly more discussion with parents (or guardians) on the dangers of smoking, and significantly more encouragement was offered by respondents within the last month to help someone quit smoking. Respondents also reported that their friends thought smoking was less acceptable.

Table 2 displays differences from pretest to posttest in attitudinal and behavioral measures stratified by respondents who saw or heard the campaign. All four paired items related to attitudinal and behavioral measures were significantly higher at posttest. Specifically, respondents were less likely to start smoking in the next six months as a result of the campaign, even though the pretest measurement was high with 97% of respondents reporting they would not smoke. Respondents also reported significantly more discussion with parents (or guardians) on the dangers of smoking, and significantly more encouragement was offered by respondents within the last month to help someone quit smoking. Respondents also reported that their friends thought smoking was less acceptable.

Table 2. Differences Between Pretest and Posttest Among Respondents Who Saw or Heard the Campaign: Behavioral and Attitudinal Measures (N = 284)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pretest – Posttest**</th>
<th>Chi-Square</th>
<th>P – Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>How likely to not start smoking in next 6 months</td>
<td>97% - 100%1</td>
<td>25.24</td>
<td>0.001*</td>
</tr>
</tbody>
</table>
Table 3 relates to aided recall and displays the percent of respondents who saw specific television advertisements and the likelihood these advertisements would affect their decision to remain smoke-free. The most recognizable advertisement had a positive tone and focused on reasons teenagers do not smoke. The next two most recognizable advertisements used traditional fear tones (i.e., a woman who smokes through a hole in her pharynx and another woman who contracted emphysema). The most recognizable advertisements on both television and radio were produced locally, used teenagers or prominent young adults from Utah, and showed familiar landmarks (i.e., Great Salt Lake). The advertisement that was most likely to affect a decision to remain smoke-free used a fear tone (smoking through a hole in the pharynx) followed by an advertisement of teenagers giving their reasons for not smoking.

Although there were only three radio advertisements, compared to six television advertisements, similar patterns were observed. Table 4 displays that the most recognizable advertisement had a positive tone and pertained to teenagers describing reasons they did not smoke. Forty-eight percent of respondents had heard this radio spot. Likewise, the next most recognizable radio advertisement used a fear tone. Forty-six percent of respondents recalled having heard this radio advertisement that described the feelings of a teenager whose mother was dying from the effects of second hand smoke.

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Table 3. Aided Recall of Television Advertisements and Perceived Impact on Decisions to Not Use Tobacco (N = 232)a

<table>
<thead>
<tr>
<th>Television Advertisement</th>
<th>Percent Recognition</th>
<th>Percent Impactedb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features a 26 year old female with emphysema (one lung removed) who started smoking at age 10. The ad shows pictures of her before her medical problems, and ends with her stating, &quot;I started smoking to look older, and I'm sorry to say, it worked.&quot;</td>
<td>67</td>
<td>8</td>
</tr>
<tr>
<td>Features a female cancer victim who used to be a top model in cigarette ads and lost her vocal cords due to smoking. She says tobacco companies insist tobacco is not addictive, but that many smokers with cancer cannot quit.</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>Features the brother of an actor/model who appeared as a cowboy in tobacco ads. He tells how his brother died of lung cancer. He points out the irony of his brother appearing in ads that promoted independence, when in real life his brother was dependent on hospital tubes and machines.</td>
<td>57</td>
<td>7</td>
</tr>
<tr>
<td>Features a female in her 40s who began smoking at age 13. She developed cancer of the...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Other descriptive posttest data reveal that a total of 68% of respondents reported they had specifically seen or heard the name of the campaign (The Truth About Tobacco). In addition, because of the advertisements they had heard or seen, 90% of respondents had thought more about the negative health effects of smoking, and 89% of respondents felt the tobacco industry was targeting young people to use tobacco.

Discussion

As reported earlier (Biener, 1999; Burns, 1994; Cummings & Clark, 1998; Flay, 1987; Flynn, Worden, Secker-Walker, 1992; Glantz, 1998; DHHS, 1999c; Worden, Flynn, Solomon, & Secker-Walker, 1996), it is generally agreed that tobacco media campaigns are more successful when implemented as part of a comprehensive tobacco prevention and control strategy. While all nine items pertaining to the campaign's exposure were
significantly increased from pretest to posttest, only three were directly related to television and radio advertisements (Table 1). These three had large changes of practical significance (i.e., large percent increases). Three other items (advertising in school, but not on television; advertising in newspapers or magazines; and awareness of school programs) were supporting components implemented as specific media campaign strategies. Percent changes statistically increased for each of these three supporting items, although the change in percentages was relatively small, between 4% and 6%.

The final three items (advertising on television at school, advertising on billboards or large road signs, and advertising seen or heard "elsewhere"), though statistically significant, were not specifically implemented as part of the media campaign. For example, schools, including their PTAs and student advocacy groups, were free at any time, to air anti-smoking messages on television at school. In addition, community organizations, voluntary organizations (i.e., American Cancer Society, American Lung Association, American Heart Association, etc.), or other advocacy groups were at liberty to advertise anti-tobacco messages on billboard or large road signs. While these are considered on-going tobacco prevention and control activities in the state, they were not controlled or measured in this study.

Although impossible to control for all external influences in population-based interventions, the large increase in percentages of respondents having seen on television or heard on radio a tobacco advertisement between pretest and posttest is likely real and of practical importance. Other percent increases were less pronounced and possibly significant because of the large sample size. However, the change in percentages for each of the other items was in a direction consistent with the media intervention having a positive impact. Despite baseline percentages already being high among respondents, the campaign statistically increased the percentage of nonsmokers committed to not start smoking, who discussed with their parents consequences of smoking, who discussed with friends who smoked that they should quit, and who recognized that their friends think smoking is unacceptable. Whether a change in percentage from 97% to 100% in the case of resolve to not start smoking in the next 6 months is of practical significance may be a matter of debate. Yet, for those items where the percentages had room to increase, they tended to have a large practical increase (e.g., from 39% to 52% in the case of encouraging someone to quit smoking in the past month.

While this paper focuses on the measurement of the campaign’s impact on nonsmokers, many tobacco media campaigns target both nonsmokers and smokers. An important, though somewhat obvious implication for practitioners is that television and radio advertisements tailored specifically to nonsmokers may have a more significant effect. Results of this study suggest it may be an appropriate and effective prevention strategy to target nonsmokers.

This raises a question of efficacy. Is it more cost-effective to target a smaller percentage of youth who smoke with the more difficult proposition to quit or reduce smoking, or is it more cost-effective to target the larger percentage of youth who do not smoke with an easier proposition of helping them remain smoke-free? While both audiences deserve attention, it may be important to consider this question strategically.

With respect to recall of television and radio advertisements, it was observed that advertisements produced locally with familiar personalities and landmarks were most recognizable. The most recognizable television advertisement portrayed local teenagers discussing reasons they did not smoke, and the most recognizable radio advertisement involved teenagers discussing reasons they started smoking. The other locally-produced advertisements were also associated with relatively high recall. It was further observed that fear tones (a woman smoking through a stoma at the base of her neck, a girl describing her nonsmoking mother dying of exposure to second hand smoke, etc.) were moderately well recognized. These advertisements were also most likely to affect decisions to not smoke. This suggests there is a difference between message recall and a message’s potential to affect change. While locally produced messages on both television and radio were associated with higher recall, messages with fear tones were more likely to influence change in perception or behavior. Therefore, those who develop or select messages for anti-tobacco campaigns might consider potential differences between appeal for recall and appeal related to behavioral outcomes.

Theater tests and focus group data revealed that children and adolescents were most interested in the truth related to smoking cigarettes. In fact, this influenced the name of the campaign being called The Truth About Tobacco. Research with the target audience suggested that youth behavioral intentions to not smoke are positively affected by the portrayal of the true consequences of smoking (Murphy, 2000). Therefore, the impact of messages associated with fear tones, may have less to do with fear, and more to do with portraying the truth about tobacco.

Results of the study suggest that targeting nonsmoking youth in media campaigns may represent an appropriate and useful prevention strategy. Furthermore, involvement with the target audience appears to aid in the development of messages that are consistent with the values, intentions, and behaviors of the audience. These findings provide some rationale for media campaigns to target nonsmoking youth as independent target audiences. In turn, this may increase average age of first use of tobacco and increase the proportion of young people who remain smoke-free.

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