

# INCREASING FASD KNOWLEDGE BY A TARGETED MEDIA CAMPAIGN: OUTCOME DETERMINED BY MESSAGE FREQUENCY

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## ABSTRACT

### Background

Despite warnings to the contrary, many women continue to drink alcohol during pregnancy, placing their infants at risk for Fetal Alcohol Spectrum Disorder (FASD). Previous studies in high-risk populations have documented knowledge deficits about the effects of alcohol drunk during pregnancy among high-risk groups. Improving knowledge about the effects of alcohol use during pregnancy and FASD may result in high-risk women abstaining during pregnancy, lowering the incidence of FASD.

### Objective

Increase FASD knowledge and awareness among African Americans in St. Louis through a targeted media campaign.

### Methods

Utilizing community input, a multidisciplinary team designed a targeted media campaign built around four FASD prevention messages. Formative research revealed significant FASD knowledge deficits among African Americans in the city of St. Louis, and agreement about the appropriateness of our materials. Distribution channels for our campaign included visual, audio, and print advertisements, direct marketing to the community, public relations/media interviews, displays at community events, and educational videos for high school students. A quasi-experimental design was conducted to assess the effectiveness of our campaign with random digit dial surveys being conducted pre- and post-intervention in St. Louis and in a control community, Kansas City.

### Results

Our media campaign ran from October 2002 until March 2004. Survey results revealed that 70.8 % of participants remembered our campaign in St. Louis with the most individuals, 22.9%, hearing our message over 20 times. The most frequent FAS prevention messages remembered were the “no safe level,” and the “no safe time” messages. The most remembered distribution channels were television and billboards in St. Louis. There was a small but statistically significant *decline* in knowledge scores comparing our post-intervention results with our pre-intervention results in St. Louis; however, we did find evidence of a dose-response relationship. Knowledge scores increased in direct proportion to the number of times respondents heard our message. It appears that our FAS prevention messages had to be heard 10 or more times in order to improve FAS prevention knowledge among African American women.

### Conclusions

Our targeted media campaign was ineffective in improving FAS knowledge among the general population of African American women in Saint Louis; however, we did document that hearing our prevention message at least ten times did produce the change in knowledge we were hoping to produce in our target population. Future targeted media campaigns directed to at-risk groups should ensure high frequency of message penetration.

**Key Words:** *Fetal Alcohol Syndrome, pregnancy, teratogen*

Despite warnings to the contrary by many professional groups, 12.3% of women continued to drink alcohol during their pregnancy in 1999, placing their infants at risk for Fetal Alcohol Syndrome (FAS) and other Fetal Alcohol Spectrum Disorders (FASD).<sup>1</sup> Although risk for FASD increases as alcohol intake increases, even low level drinking (e.g., less than one standard drink per day) places infants at risk for FASD.<sup>2-5</sup> In response to growing evidence that low level drinking is associated with FAS and FASD, the U.S. Department of Health and Human Services set a Healthy People 2010 goal (Goal 16-17) to increase the number of pregnant women who report abstinence from alcohol use during the past month from a baseline rate in 1996-97 of 86% to a 2010 target of 94%.<sup>6</sup>

The incidence of FAS and FASD is increased in certain “at-risk” populations. Using FASSNET Data, the CDC documented that FAS occurs at five times the incidence in African American populations as compared to Caucasian populations.<sup>7</sup> American Indians are another group with much higher incidence of FAS and FASD when compared to Caucasian populations.<sup>7, 8</sup> Several surveys of these populations have documented knowledge deficits regarding the specific effects of alcohol on the human fetus, the timing of those effects, and the importance of abstinence early in pregnancy and during the time a woman is at risk for pregnancy.<sup>9-11</sup> Such knowledge may improve outcomes, as shown by a study at the Brigham and Women’s Hospital in Boston evaluating a brief intervention for prenatal alcohol use.<sup>12</sup> This study showed that all chronic drinkers who knew about the relationship between FAS and alcohol use and indicated that as a reason not to drink excessively, reduced their alcohol consumption over those women who did not.

As the effects of FAS and FASD are life-long and preventable if the woman does not drink alcohol during pregnancy, most authorities recommend that women abstain totally from alcohol use during pregnancy.<sup>13-15</sup> In order to encourage abstinence, the Institute of Medicine’s Committee to Study Fetal Alcohol Syndrome recommended better-designed studies of FAS prevention using three core strategies: universal, selective, and indicative.<sup>3</sup> Our project is a test of a selective strategy targeting individuals or

subgroups who are at excessive risk of developing adverse alcohol effects in their infants. The purpose of our study was to test a selective intervention strategy, a targeted media campaign, designed to improve knowledge about alcohol use during pregnancy among the African American community in the city of St. Louis.

While FAS incidence data among the St. Louis African American community is not available, a recent study by the St. Louis City Department of Health revealed that self-reported alcohol consumption among pregnant African Americans in the city of St. Louis was on average two times higher than the rate among Caucasians.<sup>16</sup> Much higher rates of self-reported alcohol consumption were reported in the cluster of zip codes in the northern part of the city of St. Louis. In addition to higher rates of self-reported drinking, residents of north St. Louis, where most African Americans live, also have an excess of demographic and socioeconomic risk factors for alcohol use in pregnancy. Previous studies of mothers of children diagnosed with FAS, conducted in Washington and Alaska, have identified the strongest co-existing factors with alcohol use in pregnancy to be low education level, low IQ, low socioeconomic status, unmarried marital status, lack of prenatal care, history of physical or sexual abuse, and the presence of one or more mental health disorders.<sup>17, 18</sup> The poorest St. Louis residents reside in north St. Louis.<sup>19</sup> In three north St. Louis zip codes, one third or more of the households have income below the poverty level. In 72.3% of these households, a single mother is the head of the household. In one north St. Louis zip code, only 36.8% of residents over 17 have completed high school. The crude birth rate in the African American community of north St. Louis is 2 times higher than the Caucasian community, and African American women are 2.8 times more likely to have no prenatal care in the first trimester.<sup>20</sup> These data argue convincingly that African Americans living in north St. Louis represent a high-risk group in need of an intervention that will improve their knowledge about alcohol use during pregnancy and its adverse effects on the fetus in order to reduce their risk of FAS and other FASD. In addition to utilizing the selective intervention strategy advocated by the Institute of Medicine, we used

principles of social marketing in developing and delivering our prevention messages. These principles were that we focused on specific behaviors, we worked with the community, we adapted the messages to the target community and the messages focused on using social influence to change knowledge.<sup>21, 22</sup> We used focus groups to brand and design culturally authentic print and radio messages. The purpose of this study was to increase knowledge and improve attitudes in African American women of childbearing age in St. Louis regarding FASD and alcohol use during pregnancy.

## METHODS

### Sample

A random digit dial survey was conducted on a sample of African American women between the ages of 18 and 35 who were not pregnant. The sampling frame was zip codes in St. Louis and Kansas City with a population of 10% or greater African Americans.

**TABLE 1**  
**Knowledge Questions on Pre and Post-Campaign Survey**

1. Most women know when they are likely to become pregnant.
2. Most women know they are pregnant within the first month of their pregnancy.
3. If babies have health problems because their mother drank too much during pregnancy, doctors can usually take care of those problems.
4. Drinking a lot of alcohol during pregnancy is very harmful to babies.
5. It is safe for women to drink alcohol early in their pregnancy as long as they stop during the last three or four months.
6. It is safe for women to drink alcohol every now and then during their pregnancy.
7. To be really safe, pregnant women should not drink any alcohol.
8. How much alcohol a woman drinks during pregnancy has little to do with how healthy her baby will be.
9. Women who find it hard to stop drinking a lot of alcohol should not become pregnant.
10. A pregnant women's drinking alcohol causes most of the damage to her baby during the first three months of her pregnancy.

### Measures

The research team developed pre and post intervention surveys to determine both knowledge of FAS and the drinking behavior of the participants. The pre-intervention survey consisted of 29 Likert type items; there were sociodemographic questions, 10 FAS knowledge items (Table 1), items regarding drinking behavior and other at-risk behaviors such as smoking and illicit drug use. Participants received one point for each correct answer on the FAS knowledge scale, for a possible range of 0 to 10 points. The post-intervention survey including the 29 Likert items and 5 media exposure items, such as if the participant saw ads about women drinking alcohol when they were pregnant or likely to become pregnant, how many times and what type of ads.

### Procedure

We used a quasi-experimental design comparing our results in Saint Louis to a similar control community in Kansas City. Our initial random digit dial surveys were conducted between January and March of 2002, whereas our post intervention surveys were conducted April through June of 2004. Our media campaign intervention was conducted from October 2002 until the end of March 2004; 18 month in duration.

### Intervention

A multi-disciplinary team of investigators was assembled to design, implement, and evaluate our campaign. One of the principles of a social marketing campaign is to give the target audience a primary role in the process. We accomplished this through the formation of community advisory group and by performing formative research. We established a community advisory board that included 15 leaders representing diverse segments of the targeted intervention area. The community advisory board met twice a year to provide input on the campaign and our survey, reviewing all facets of the campaign prior to implementation. In addition, we hired a local minority-owned marketing firm, headed by an African-American female, to help with design and implementation of the campaign, including the focus groups that provided input into the campaign. A focus group of African American women in our target population reviewed media materials for their

cultural appropriateness and effectiveness, and to learn more from these participants about their knowledge of FAS and alcohol use during pregnancy and to learn if our prevention messages were clear, appropriate, and important.

Throughout our formative research phase, which lasted one year, we wanted to design a campaign that was culturally and gender sensitive to our target audience, childbearing age African-American women. We not only sought to use appropriate language, color, and distribution channels in our media campaign, but sought to respect basic cultural values and beliefs, including relevance of our information to their lives, empowerment and strength in terms of these women's ability to make decisions on their own, an important cultural value, humor, as having too serious a campaign was thought to detract from the importance of the message, spirituality, and a sense of collectivism, i.e., that women were not only making decisions for themselves, but for their community and their culture. Much early work was changed or eliminated, for example, showing pictures of children harmed by alcohol was felt to be a "scare tactic," inappropriate for this context. Women specifically felt our messages would be stronger if campaign materials showed social situations in which women were faced with a choice to drink or not to drink, but could still have a good time and be with friends and family. Targeted message strategies focused specifically on both positive and negative consequences.

Our campaign was built around four FAS prevention messages:

1. A description of the birth defects associated with FAS and FASD with a reiteration of the fact that these effects can occur early in pregnancy, before women know they might be pregnant and throughout pregnancy if women continue to drink after their pregnancy is known ("no safe time" message).
2. If pregnant, a woman should totally abstain from drinking alcohol as there is no "safe" level of drinking during pregnancy ("no safe level" message).
3. Sexually active women should not drink if they could become pregnant in order to reduce their risk of FASD in their infants ("no drinking if not using reliable forms of birth control" message).

4. Women who feel their alcohol use may place them at risk for delivering an infant with FASD should see their physician for an assessment and treatment recommendations as soon as possible, ("if drinking and can't stop, see a physician" message).

These messages were presented to specific market segments; media materials were branded with our logo, which contained our campaign slogan, "Alcohol hurts unborn babies." Our logo contained a picture of an African American female holding a liquor bottle that directed alcohol into the umbilical cord with her fetus stating, "None for me, Momma."

Materials were developed for the following distribution channels:

1. *Visual, audio, and print advertisements.* Materials for each of our four messages were developed for use on radio, cable T.V., and on billboards, either stationary or on buses, in our target community. Our radio messages were conveyed by "Melvin," a popular character on the nationally syndicated Tom Joyner Morning Show, listened to by many African American women in our community. Messages were conveyed when a participant asks a question about FAS which Melvin would answer, conveying one of our messages in a humorous format. "Melvin" spots ran on 3 radio stations on a daily basis 7 to 15 days out of the month. Cable T.V. spots were developed for each of our four core messages depicting African American women in a typical situation in which they might be asked to drink. These spots were typically 30 seconds in length and ran on 5 major networks approximately 50 to 80 times per month. Radio and TV spots typically played multiple times per day, depending on the cost of media. Television and radio spots were rotated, so that a new message was delivered to the community every 2 weeks. Print advertising on billboards depicted an African American woman in a decision-making situation where she made a positive decision to abstain from alcohol, based upon one of our messages. Three billboard locations were identified every month. Community bulletin boards were rotated every month. Print ads were placed in 4 local newspapers once per month. Cinema slides at a local movie theater were placed during the last 6 months of the campaign. Periodically flyers on

FAS prevention were distributed on cars outside local nightclubs.

### *2. Direct marketing to the community.*

Our direct marketing efforts were targeted at 3 groups that serve the African American community: African American churches, physicians, and, at the end of our campaign, WIC clinics. We trained lay speakers from the Committed Caring Faith Communities, a local group of predominantly African American congregations that have banded together to address the problem of substance abuse in their faith communities. Some lay speakers were in rehabilitation from substance abuse problems. A lay speakers' kit was developed and speakers were trained in how to utilize the kit, including a standard 20-minute presentation containing our prevention messages. Speakers were then scheduled to make presentations in African American churches in our community. Typically 1 to 2 presentations were made per quarter. Physicians were targeted through a direct mail campaign in which we sent posters and tear sheets that could be placed in their office. The tear sheet contained our prevention messages with a 1-800 number where participants could get further information. The staff of the St. Louis Arc operated our 1-800 number. A letter included with the kit outlined our campaign and our prevention messages. Toward the end of our campaign, the Missouri Department of Health and Senior Services, which manages Women, Infants, and Children (WIC) clinics in our local area, asked us to send materials to the St. Louis WIC clinics. We sent materials similar to those we had sent to physicians.

### *3. Public relations/media interviews.*

In order to generate attention by the local press, our campaign was kicked off by a news conference, at which our public relations kit on FAS was distributed, and we aggressively sought interviews by the local media, both newspaper and TV, to provide information on FAS and alcohol use during pregnancy. Typically 2 interviews per quarter were provided, with 10 given during the first quarter of the campaign.

### *4. Displays at community events.*

Display booths were developed and displayed at various local African American health events, including the Missouri Black Expo, the Working Women's Survival Show, the Vendeventer Citizens for a Better Community, the Greater Faith Missionary Baptist Church, and Feed the City.

### *5. Educational video for high school students.*

A 20-minute video narrated by a local radio personality who interviewed African American teens in their local neighborhood ("on the street") about FAS was developed as part of this campaign. Based on these interviews, a tape was put together of their questions with appropriate answers from health care professionals in the St. Louis area. This tape was distributed to health educators at St. Louis high schools for viewing and discussion during health education classes. A total of 671 videotapes were distributed to local schools, churches, community colleges, libraries, hospitals, the Missouri Department of Mental Health, and community groups like the March of Dimes. One-hundred and fifty videotapes were distributed specifically for use in Saint Louis city schools, and two team members met with all area high school health educators to train them in the use of the videotape in the classroom. Although we achieved wide distribution of the video in our targeted zip codes, we did not attempt to determine the specific frequency with which each tape was viewed.

## **Statistical Analysis**

### *Estimation of sample size.*

From previous surveys, we estimated that baseline knowledge on our knowledge score would be between 3 and 4. Using a baseline of 3.2, a difference in knowledge score between pre and post-campaign of 30%,  $\alpha = 0.05$ , and  $\beta = .2$ , we calculated that we needed 400 subjects via random digit dial survey in order to have a power of 80% to detect a significant difference.

### **Analysis of Data**

Descriptive statistics were used on the socioeconomic data. Inferential statistics were used to determine if the media campaign was effective in increasing knowledge. One-way Analysis of Variance was conducted to determine

if there was a difference in knowledge scores between the post-intervention survey groups in St. Louis, the group who received the campaign, and Kansas City, the control group.

## RESULTS

Sociodemographic characteristics of our pre- and post-intervention samples in St. Louis and Kansas City are shown in Table 2. In St. Louis, the majority of the sample was age 28-35, graduated from high school, did not drink, did not smoke, did not binge drink, did receive prenatal care when they were pregnant, always used birth control, did not use illicit drugs, and had an income below \$30,000. The Kansas City sample was very similar to the St. Louis sample with the exception that more subjects in Kansas City claimed to drink and fewer acknowledged always using birth control on the pre-intervention sample. In the post-intervention sample, more Kansas City participants claimed to drink, less received prenatal care when pregnant, more used illicit drugs, and fewer had an income of less than \$30,000 annually. Table 3 shows the results of our FAS knowledge questions, pre-intervention and post-intervention in St. Louis and Kansas City. The majority of women in St. Louis and Kansas City knew that alcohol was harmful to babies and disagreed with the statement that it is safe for women to drink alcohol occasionally during pregnancy. Most women in St. Louis and Kansas City agreed with the statement that to be really safe, pregnant women should not drink alcohol during pregnancy, and the majority strongly agreed with the statement that women who find it hard to stop drinking a lot of alcohol should not become pregnant. However, both in St. Louis and in Kansas City, most African American women agreed with the statement that they felt they knew when they were pregnant, and felt they knew they were pregnant within the first month of pregnancy. A significant number of women disagreed with the statement that doctors can usually get their patients to cut down on drinking and a smaller number agreed with the statement that doctors can usually fix health problems in

babies caused by their mother's drinking. In general, the results of the FAS knowledge questions indicate that African American women in St. Louis and Kansas City seem to possess a higher degree of knowledge about the harmful effects of alcohol drunk during pregnancy on babies than other similar high-risk samples in past studies,<sup>9-11</sup> although, there were still many women who possessed FAS knowledge deficits. Table 4 displays the results of our questions on reach and frequency of our campaign in St. Louis and in our control community in Kansas City. A total of 70.8% of participants remembered our campaign in St. Louis, with the most individuals, at 22.9%, hearing our message over 20 times. However, 25% of participants heard the message 5 or fewer times. Significantly, even though we did not hold a campaign in Kansas City, and from questioning key informants in Kansas City, no campaign occurred on FAS during the study period, 58.8% of participants in Kansas City remembered hearing FAS messages. The most number of participants, 16.9%, remembered hearing 20 or more messages, with 23% hearing 5 or fewer messages. Table 5 reveals the results of questions on whether participants remembered FAS prevention messages that we broadcasted during our campaign. The most frequent message remembered was the "no safe level" message followed by the "no safe time" message both in St. Louis, where our campaign was conducted, and in Kansas City, where no campaign was ongoing. However, hardly any of our participants remembered our "no unprotected sex if drinking" message, and "if can't stop drinking, see a doctor to get help" message. Thus in areas where FAS knowledge and knowledge about drinking during pregnancy were weakest, our campaign failed to have an impact. Table 6 displays the primary distribution channels remembered, with television and billboards being the most remembered in St. Louis, with television and "other" being the most remembered in Kansas City. We were surprised that radio was not remembered more often in St. Louis, since we devoted a significant amount of our resources to that distribution channel.

**TABLE 2 Sociodemographic Characteristics of our Samples**

| Characteristics                                      |                  | St. Louis   |       |              |       | Kansas City |       |              |       |
|--|------------------|-------------|-------|--------------|-------|-------------|-------|--------------|-------|
|  |                  | Pre (n=418) |       | Post (n=404) |       | Pre (n=381) |       | Post (n=402) |       |
|  |                  | Freq        | %     | Freq         | %     | Freq        | %     | Freq         | %     |
| Age  | 18-21            | 85          | 20.3% | 77           | 19.0% | 73          | 19.2% | 71           | 17.7% |
|  | 22-27            | 107         | 25.6% | 121          | 29.9% | 105         | 27.6% | 115          | 28.6% |
|  | 28-35            | 216         | 51.7% | 197          | 48.6% | 191         | 50.1% | 208          | 51.7% |
| Education  | < high           | 85          | 20.3% | 65           | 15.8% | 74          | 19.4% | 62           | 15.4% |
|  | ≥ high           | 327         | 78.2% | 338          | 83.5% | 350         | 78.7% | 333          | 82.8% |
| Drinker*   | Yes              | 129         | 29.7% | 109          | 27.0% | 144         | 36.2% | 136          | 33.8% |
|  | No               | 289         | 69.1% | 289          | 71.5% | 237         | 62.2% | 261          | 64.9% |
| Smoker   | Yes              | 121         | 20.9% | 107          | 25.2% | 133         | 34.9% | 126          | 31.1% |
|  | No               | 293         | 70.1% | 297          | 73.5% | 240         | 63.0% | 276          | 68.1% |
| Binge  | Yes              | 32          | 7.7%  | 26           | 6.4%  | 53          | 13.9% | 50           | 12.4% |
|  | No               | 368         | 88%   | 378          | 93.6% | 307         | 80.6% | 351          | 87.3% |
| Prenatal Care **                                     | Yes              | 257         | 81.5% | 248          | 85%   | 251         | 91%   | 243          | 82%   |
|  | No               | 53          | 12.7% | 45           | 15%   | 45          | 9%    | 56           | 18%   |
| Birth Control***                                     | Always           | 210         | 50.2% | 200          | 49.5% | 151         | 39.6% | 184          | 45.8% |
|  | Most of the time | 41          | 9.8%  | 52           | 12.9% | 35          | 9.2%  | 53           | 13.2% |
|  | Some of the time | 29          | 6.9%  | 26           | 6.4%  | 22          | 5.8%  | 20           | 5.0%  |
|  | Almost never     | 96          | 23%   | 98           | 24.3% | 130         | 34.1% | 108          | 26.9% |
| Illicit Drugs  | Yes              | 27          | 6.5%  | 34           | 8.4%  | 29          | 7.6%  | 40           | 10%   |
|  | No               | 381         | 91.1% | 365          | 90.3% | 341         | 89.5% | 350          | 87.1% |
| Was your last year's income above or below \$30,000? | Above            | 127         | 30.4% | 115          | 28.5% | 119         | 31.2% | 128          | 31.8% |
|  | Below            | 233         | 55.7% | 252          | 62.4% | 218         | 57.2% | 236          | 58.7% |

- \*There is a difference in the numbers of drinkers between SL and KC in the pre and post samples. In both samples, there were significantly fewer drinkers in the St. Louis samples.
- \*\*There is a significant difference in the number of women who had prenatal care between SL and KC in the post test sample with more STL city women receiving prenatal care.
- \*\*\*There is a difference in the number of women who consistently use birth control between SL and KC in the pre test sample, with more women in STL using birth control.

**TABLE 3 Results of our FAS Knowledge Question Items in our Samples**

| Characteristics   |                   | St. Louis   |       |              |       | Kansas City |       |              |       |
|---|-------------------|-------------|-------|--------------|-------|-------------|-------|--------------|-------|
|   |                   | Pre (n=418) |       | Post (n=404) |       | Pre (n=381) |       | Post (n=402) |       |
|   |                   | Freq        | %     | Freq         | %     | Freq        | %     | Freq         | %     |
| <b>Most women know when they are likely to become pregnant.</b>                             | Agree Strongly    | 171         | 40.9% | 146          | 36.1% | 124         | 32.5% | 152          | 37.8% |
|   | Agree Somewhat    | 106         | 25.4% | 94           | 23.3% | 96          | 25.2% | 82           | 20.4% |
|   | Disagree Somewhat | 81          | 19.4% | 96           | 23.8% | 99          | 26.0% | 89           | 22.1% |
|   | Disagree Strongly | 48          | 11.5% | 9.7          | 9.7%  | 49          | 12.9% | 58           | 14.4% |
| <b>Doctors can usually get their patients to cut down on drinking.</b>                      | Agree Strongly    | 80          | 19.1% | 70           | 17.3% | 81          | 21.3% | 84           | 20.9% |
|   | Agree Somewhat    | 92          | 22.0% | 98           | 24.3% | 92          | 24.1% | 99           | 24.6% |
|   | Disagree Somewhat | 108         | 25.8% | 85           | 21.0% | 87          | 22.8% | 66           | 16.4% |
|   | Disagree Strongly | 96          | 23.0% | 82           | 20.3% | 87          | 22.8% | 94           | 23.4% |
| <b>Most women know they're pregnant within the first month of pregnancy.</b>                | Agree Strongly    | 186         | 44.5% | 133          | 32.9% | 144         | 37.8% | 127          | 31.6% |
|   | Agree Somewhat    | 68          | 16.3% | 73           | 18.1% | 91          | 23.9% | 72           | 17.9% |
|   | Disagree Somewhat | 81          | 19.4% | 104          | 25.7% | 81          | 21.3% | 97           | 24.1% |
|   | Disagree Strongly | 66          | 15.8% | 55           | 13.6% | 48          | 12.6% | 79           | 19.7% |
| <b>Doctors can usually fix health problems in babies caused by their mothers' drinking.</b> | Agree Strongly    | 65          | 15.6% | 31           | 7.7%  | 37          | 9.7%  | 48           | 11.9% |
|   | Agree Somewhat    | 73          | 17.5% | 53           | 13.1% | 74          | 19.4% | 49           | 12.2% |
|   | Disagree Somewhat | 104         | 24.9% | 80           | 19.8% | 111         | 29.1% | 89           | 22.1% |
|   | Disagree Strongly | 116         | 27.8% | 130          | 32.2% | 98          | 25.7% | 141          | 35.1% |
| <b>Drinking a lot of alcohol during pregnancy is very harmful to babies.</b>                | Agree Strongly    | 393         | 94.0% | 372          | 92.1% | 335         | 87.9% | 368          | 91.5% |
|   | Agree Somewhat    | 11          | 2.6%  | 11           | 2.7%  | 30          | 7.9%  | 17           | 4.2%  |
|   | Disagree Somewhat | 4           | 1.0%  | 2            | 0.5%  | 6           | 1.6%  | 4            | 1.0%  |
|   | Disagree Strongly | 10          | 2.4%  | 14           | 3.5%  | 6           | 1.6%  | 9            | 2.2%  |
| <b>It is safe for women to drink alcohol occasionally during pregnancy.</b>                 | Agree Strongly    | 37          | 8.9%  | 32           | 7.9%  | 21          | 5.5%  | 21           | 5.2%  |
|   | Agree Somewhat    | 19          | 4.5%  | 25           | 6.2%  | 21          | 5.5%  | 39           | 9.7%  |
|   | Disagree Somewhat | 90          | 21.5% | 73           | 18.1% | 86          | 22.6% | 70           | 17.4% |
|   | Disagree Strongly | 262         | 62.7% | 260          | 64.4% | 246         | 64.6% | 263          | 65.4% |

**TABLE 3 Results of our FAS Knowledge Question Items in our Samples – Cont'd**

| Characteristics  |                   | St. Louis   |       |              |       | Kansas City |       |              |       |
|--|-------------------|-------------|-------|--------------|-------|-------------|-------|--------------|-------|
|  |                   | Pre (n=418) |       | Post (n=404) |       | Pre (n=381) |       | Post (n=402) |       |
|  |                   | Freq        | %     | Freq         | %     | Freq        | %     | Freq         | %     |
| <b>It is safe for women to drink early in pregnancy as long as they stop during the last 3-4 months.</b>         | Agree Strongly    | 15          | 3.6%  | 17           | 4.2%  | 13          | 3.4%  | 21           | 5.2%  |
|  | Agree Somewhat    | 4           | 1.0%  | 7            | 1.7%  | 7           | 1.8%  | 6            | 1.5%  |
|  | Disagree Somewhat | 78          | 18.7% | 54           | 13.4% | 65          | 17.1% | 59           | 14.7% |
|  | Disagree Strongly | 314         | 75.1% | 313          | 77.5% | 290         | 76.1% | 301          | 74.9% |
| <b>To be really safe, pregnant women should not drink alcohol.</b>   | Agree Strongly    | 397         | 95%   | 372          | 92.1% | 340         | 89.2% | 371          | 92.3% |
|  | Agree Somewhat    | 12          | 2.9%  | 13           | 3.2%  | 21          | 5.5%  | 17           | 4.2%  |
|  | Disagree Somewhat | 4           | 1.0%  | 6            | 1.5%  | 5           | 1.3%  | 4            | 1.0%  |
|  | Disagree Strongly | 5           | 1.2%  | 9            | 2.2%  | 10          | 2.6%  | 7            | 1.7%  |
| <b>How much alcohol a woman drinks during pregnancy has little to do with how healthy her baby will be.</b>      | Agree Strongly    | 59          | 14.1% | 74           | 18.3% | 41          | 10.8% | 45           | 11.2% |
|  | Agree Somewhat    | 23          | 5.5%  | 15           | 3.7%  | 32          | 8.4%  | 19           | 4.7%  |
|  | Disagree Somewhat | 75          | 17.9% | 50           | 12.4% | 66          | 17.3% | 58           | 14.4% |
|  | Disagree Strongly | 243         | 58.1% | 225          | 55.7% | 121         | 31.6% | 255          | 63.4% |
| <b>Women who find it hard to stop drinking a lot of alcohol should not become pregnant.</b>                      | Agree Strongly    | 342         | 81.8% | 612          | 77.2% | 275         | 72.2% | 312          | 77.6% |
|  | Agree Somewhat    | 33          | 7.9%  | 36           | 8.9%  | 41          | 10.8% | 29           | 7.2%  |
|  | Disagree Somewhat | 12          | 2.9%  | 23           | 5.7%  | 34          | 8.9%  | 19           | 4.7%  |
|  | Disagree Strongly | 24          | 5.7%  | 14           | 3.5%  | 13          | 3.4%  | 46           | 11.5% |
| <b>A pregnant woman's drinking causes most of the damage to her baby during the first 3 months of pregnancy.</b> | Agree Strongly    | 305         | 73%   | 275          | 68.1% | 239         | 62.7% | 292          | 72.6% |
|  | Agree Somewhat    | 42          | 10%   | 40           | 9.9%  | 75          | 19.7% | 48           | 11.9% |
|  | Disagree Somewhat | 20          | 4.8%  | 15           | 3.7%  | 14          | 3.7%  | 14           | 3.5%  |
|  | Disagree Strongly | 7           | 1.7%  | 13           | 3.2%  | 12          | 3.1%  | 11           | 2.7%  |

**TABLE 4 Post-Intervention Results: Reach and Frequency**

| Item      | Category | St. Louis % | Kansas City % |
|-----------|----------|-------------|---------------|
| Reach     | Yes      | 70.8        | 58.8          |
| Frequency | None     | 29.2        | 41.2          |
|           | 1 to 2   | 8.0         | 10.0          |
|           | 3 to 5   | 17.3        | 13.7          |
|           | 6 to 9   | 9.2         | 7.6           |
|           | 10 to 19 | 10.7        | 7.6           |
|           | > 20     | 22.9        | 16.9          |

**TABLE 5 Messages Remembered**

| Message                 | % Heard in St. Louis | % Heard in Kansas City |
|-------------------------|----------------------|------------------------|
| No safe level           | 29.7                 | 22.3                   |
| No safe time            | 14.4                 | 10.3                   |
| No unprotected sex      | .7                   | 0                      |
| Can't stop—see a doctor | 1.5                  | 2.7                    |

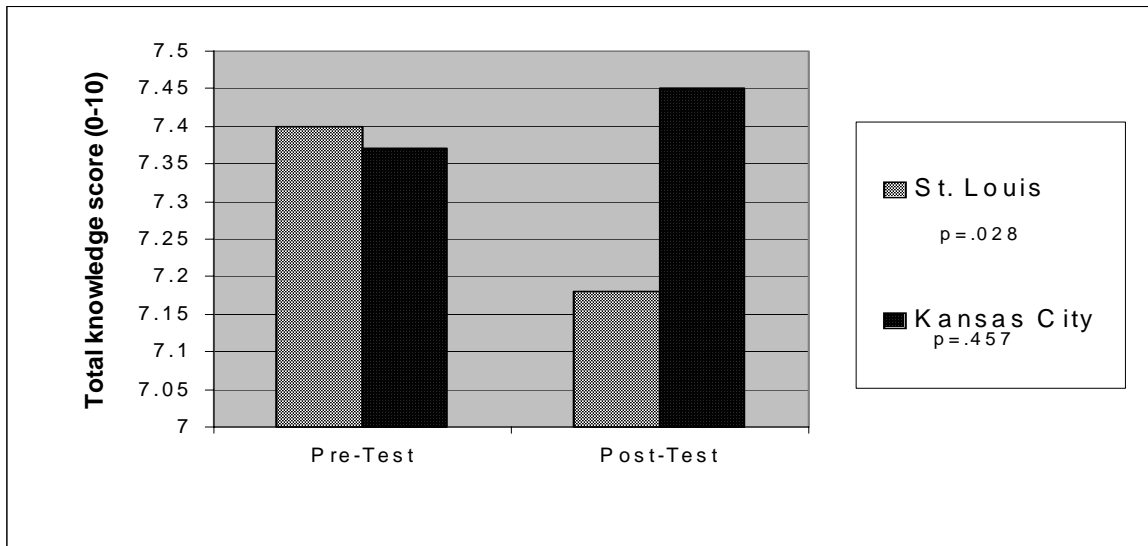
**TABLE 6 Distribution Channels Remembered**

| Channel  | St. Louis % | Kansas City % |
|--|-------------|---------------|
| Newspapers                                     | 4.6         | 8.1           |
| Radio  | 4.6         | .2            |
| Television                                     | 20.7        | 17.2          |
| Brochures/Pamphlets                            | 7.3         | 9.8           |
| Conversations with health care professionals   | 7.8         | 5.9           |
| Conversations with friends/relatives/neighbors | 3.9         | 2.9           |
| Billboards                                     | 11.2        | 2.0           |
| Video presentations                            | 1.2         | 1.0           |
| Other  | 8.8         | 11.0          |

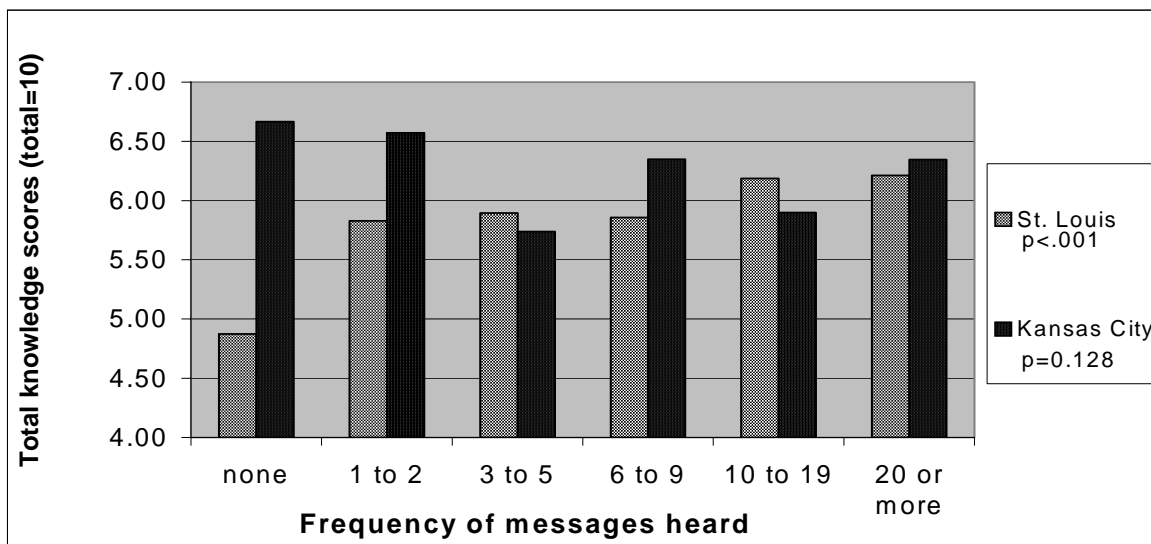
Figure 1 displays the overall results of our knowledge score in St. Louis and Kansas City pre- and post-intervention, with a greater score indicating more knowledge. In St. Louis, there was a significant decline in our ten point knowledge score, whereas in Kansas City, there was no change. Figure 2 displays the results of an analysis we performed on the post-intervention knowledge score in St.

Louis and Kansas City versus the frequency with which participants remember hearing our messages. In St. Louis, there was a significant linear relationship between knowledge score and the number of messages heard, with more knowledge associated with a greater number of times participants remembered hearing our messages. No such relationship existed in Kansas City.

**FIG. 1 Knowledge Scores: St. Louis vs. Kansas City**



**FIG. 2. Post-Intervention FAS Knowledge Scores, Relationship to Frequency**



## DISCUSSION

Although our media campaign did not increase knowledge scores in St. Louis, the more often subjects in St. Louis were exposed to our campaign (i.e., remembered hearing our messages), the greater their knowledge about FAS and alcohol use during pregnancy. In St. Louis, the effect of our media campaign was dependent on the frequency with which our FAS prevention messages were heard. We demonstrated that the more often subjects heard our FAS prevention messages, the higher their knowledge score. Our data suggest that with this population, in order to obtain a significant increase in knowledge, it was necessary to hear our FAS prevention messages 10 or more times, rather than the usual 3-5 times typical in media campaigns advertising products or services. Because we were only able to reach a small minority of our subjects on the random digit dial sample with this level of frequency, overall, our campaign did not increase knowledge among African Americans in St. Louis, and in fact there was a small but statistically significant decrease.

The reason for this decrease in knowledge following our media campaign may be related to a ceiling effect or a “regression to the mean” effect, rather than to the effect of our campaign. We demonstrated that knowledge about alcohol use and FAS was already very high on the pre-intervention survey of African Americans, both in St. Louis and Kansas City. Therefore, it may be that in our target population, that an intervention to increase knowledge may not be the most appropriate intervention to encourage women to stop drinking alcohol during pregnancy. Interventions which address risk factors and promote a context to facilitate behavioral change may be much more effective in reducing alcohol use during pregnancy in this high-risk population. Additionally, we found that two campaign messages (i.e., the “no unprotected sex if drinking” message and the “if you can’t stop drinking, see a doctor” message) had no effect on subjects in whom knowledge was low in our pre-intervention sample in St. Louis and

Kansas City. As exposure for our 4 messages was similar, it may be that African Americans women were more likely to remember messages in which their knowledge in that area was already high and less likely to remember messages in which their knowledge was low, or to which they disagreed. It also may be that our strategy for conveying the “No unprotected sex if drinking” and the “If you can’t stop drinking, see a doctor” messages was not as effective as our strategy for promoting our other two prevention messages.

Another potential reason for the failure of our media campaign to have more effect is that competing messages from alcohol beverage distributors’ advertisements and general competition from other media messages may have limited the ability of our media campaign to generate attention and to improve knowledge. Recent estimates indicate that African American adolescents hear many more “pro-alcohol” messages than “anti-alcohol” message in the media at a ratio of about 201 to 1.<sup>23</sup> Given this competition, and the higher frequency of hearing FAS prevention messages required in order to influence knowledge, the results of this study become more understandable.

Assessing the effectiveness of a media campaign using a community-based sample that has phones may be problematic as well. We found that our random digit dial sample, both pre- and post-intervention in St. Louis, was more highly educated and had lower rates of drinking and binge drinking than we expected. They were also older. As our media campaign was more directed towards zip codes with younger, low-income, single African Americans who often move frequently and use cell phones rather than land lines, it may be that our pre- and post-intervention samples in St. Louis do not represent and did not reach the people who were most exposed to our media campaign.

Assessing individuals that we know were exposed to our campaign using other methodology may have yielded different results. Frequency results do support the idea that in order to reach a “hard to reach” group with prevention messages, the frequency with

which the target audience receives those messages needs to be greatly increased compared to traditional media campaigns. It may be that such a targeted approach would work if the media campaign lasted longer, or more resources were available to utilize more expensive advertising (e.g., advertising on prime time television, and not just cable). After a television campaign in Canada, which broadcast the dangers of alcohol consumption during pregnancy, most women concluded that drinking would place their babies at risk.<sup>24</sup> Clearly, in order to compete with “pro-alcohol” messaging advertisements by alcohol beverage distributors, a much greater frequency of prevention messaging is required to reach African American women.

Caution should be exercised in adopting specific materials, distribution channels, or methods utilized in this campaign. Some may want to do that and just increase the frequency of messaging in their campaign, feeling that that would yield an effect on knowledge, which may lead to behavioral change. Given the cultural context of our campaign, it may be that in other communities our materials would be ineffective or even offensive. Thus, utilizing the principles of social marketing, not the specific methods or materials, in constructing a culturally sensitive campaign is the appropriate method for designing campaigns targeting FASD knowledge.

In our pre-intervention survey, we found a statistically significant but small relationship between drinking patterns and our FAS knowledge score.<sup>25</sup> While improving health knowledge doesn't always lead to appropriate behavioral change, it is probably a necessary step in the process and has been shown to lead to drinking reductions during pregnancy.<sup>26, 27</sup> We feel that future research on ways to increase FAS prevention knowledge among high-risk groups, such as African Americans, is critical in order to lower the incidence of this highly preventable condition. Additionally, researching ways to combine knowledge enhancement campaigns with behavioral change methodologies in high-risk women is also vital.

In conclusion, a culturally sensitive, targeted media campaign conducted to improve FAS prevention knowledge among African American women was not successful in increasing FAS prevention knowledge unless the frequency of the message was quite high. Unlike previous samples of high-risk groups, knowledge of FAS and alcohol use among African Americans in Saint Louis seems to be quite high. As FAS and FASD are entirely preventable, finding ways to improve FASD knowledge among high-risk groups and using that knowledge enhancement coupled with behavioral change strategies is critical to prevent this devastating condition in their offspring is critically important.

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