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# Lessons learned from The Black Cosmetologists Promoting Health Program: A randomized controlled trial testing a diabetes education program

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## Abstract

**Purpose:** Diabetes is reaching epidemic proportions in the United States and African Americans are at greater risk than most. Disparities in the incidence of diabetes place African American women at a much higher risk than their white counterparts. As such, the purpose of this study was to evaluate a community-based educational intervention program aimed at changing diabetes attitudes, knowledge, and screening behaviors of African American women via cosmetologists trained as community health educators.

**Methods:** Twenty African American cosmetologists joined the Black Cosmetologist Promoting Health Program. Their salons were randomized to disseminate diabetes or breast cancer information and given educational materials to display in their salons and give to their clients. Their clients ( $n = 984$  women) consented to help evaluate the program, completing a baseline and 6-month follow-up survey regarding their knowledge, attitudes, and behaviors related to diabetes and breast cancer.

**Results:** At the 6-month follow-up, self-reported knowledge about diabetes increased across both groups. However, despite similar programmatic structure offered to the two groups, there were no significant differences in diabetes knowledge, attitudes, and screening at follow-up.

**Conclusion:** This non-significant outcome contrasted with the positive outcomes achieved by the parallel breast cancer program. Gladwell's Tipping Point theory could explain the different outcomes. The programs differed in message content, messaging tone, and the environment in which

the messages were delivered. The diabetes program lacked a clear, memorable, and upbeat call-to-action and an environment that socially and financially supported the uptake of the recommended actions.

**Keywords:** African Americans, Community-based communication, Early detection, Education, Breast cancer, Diabetes (used as a qualifier), Prevention, Women

The incidence of diabetes mellitus in the United States of America has been increasing in the last decade, and especially so within the African American community, where diabetes is reaching epidemic proportions.<sup>1</sup> The prevalence of diabetes in non-Hispanic blacks is 1.8 times higher than non-Hispanic whites and the risk for diabetes is 77% higher for blacks compared to whites.<sup>2</sup> Another concern is that over one-third of the total diabetes cases go undiagnosed. While multiple individual and contextual factors can increase African Americans' risk, incidence, and severity of diabetes, there is convincing evidence that both quality and quantity of life can be improved with early diagnosis and optimal disease management.

Current studies estimate that in those aged 20 years or more, over 3.2 million African Americans or 12.6% of all non-Hispanic blacks have been diagnosed with diabetes, compared to 7.1% of whites.<sup>3</sup> Furthermore, middle-aged black women are at substantially higher risk for type 2 diabetes than their white counterparts. According to 2010 estimates,

the percentage of African American women with diabetes has reached 9.5%, compared to 5.4% in white women.<sup>4</sup>

Multiple individual and contextual factors increase African American women's risk, incidence, and severity of diabetes. Obesity<sup>1,5-7</sup> and a sedentary lifestyle<sup>8-13</sup> are the most commonly cited risk factors for contributing to black women's diabetes morbidity and mortality.<sup>14</sup> Socioeconomic factors such as income and education<sup>15</sup> affect access to health care services<sup>16-20</sup> and quality of care.<sup>21,22</sup> In fact, economic disadvantage is more strongly correlated with the prevalence of diabetes among black women than any other socioeconomic variable.<sup>23</sup> Having family members with diabetes is recognized as a risk factor because of shared environmental, cultural, and other contributing factors, such as genetics. While the exact role that genetics play in the onset and progression of diabetes remains under investigation, there is a growing body of scientific evidence supporting the presence of a relationship.<sup>24-30</sup>

This paper reports additional results from the *Black Cosmetologists Promoting Health Program*, a community-based educational intervention that was to be evaluated via a randomized controlled trial. The breast cancer intervention program was specifically designed with the hope that it would increase breast cancer screening behaviors.<sup>31-33</sup> In this study, beauty salons and their cosmetologists in the experimental (breast cancer) group were trained as breast cancer community health educators for their clients. Cosmetologists in the control group needed to be engaged in a comparable, but different educational program. Given the disproportionate rates of diabetes-linked morbidity and mortality reported within the African American community, the control group beauty salons and their cosmetologists were identically trained to deliver a comparable diabetes education intervention, which was anticipated to increase diabetes knowledge, constructively change diabetes attitudes, and increase diabetes screening behaviors among African American women. The experimental (breast cancer) and control (diabetes) education programs were comparable in all but the educational content.<sup>34-38</sup> This paper reports on the findings from the diabetes education intervention program.

## Methods

The Health Belief Model served as the theoretical framework on which this education program was grounded. Given the cosmetologists' long-standing relationship with most of their clients, they had a

solid working knowledge of how best to convey their diabetes or breast cancer information, so it would be viewed as being of personal importance to their individual clients. Using the constructs of the Health Belief Model, the cosmetologists were trained in the key information for the health topic to which they were assigned and given additional training materials to use to educate their clients on the topic. An African American ancestral storyteller worked with each of the cosmetologists to give them storytelling techniques that would increase their clients' retention of their disseminated information.

African American clergy and African American lay church leaders throughout San Diego County were asked to help recruit the cosmetologists to this randomized controlled trial testing the *Black Cosmetologists Promoting Health Program*. The church leaders were asked to identify cosmetologists who were known for their compassionate acts and commitment to improving their community's well being. Once the cosmetologists were identified, the leaders were asked to contact the cosmetologists personally to briefly explain the *Black Cosmetologists Promoting Health Program* and ask if the research study's leader could meet with them to explain the program in more detail. The principal investigator (PI) then met with the first 24 stylists referred, of which 20 were eligible and agreed to enroll their salons in the study. Each participating cosmetologist was taken through the Institutional Review Board consenting process.

Two methods were used to recruit the salons' clients: through an undergraduate African American research assistant (RA) or via the stylists. As a minimum goal, the RA needed to recruit at least 30 women per salon for the large salons (those with three or more stylists) and at least 15 women per salon for the smaller salons. Stylists needed to recruit the same number. Once consented, the clients completed a baseline survey. These methods are detailed in the project's earlier papers.<sup>31,32,36,38,39</sup>

Working in the salons on a variety of days and at various times, the RA sequentially invited clients to join the IRB-approved study. This assured methodological consistency among the salons, and gave a reliable estimate of the refusal rate (13.3% (71 of 530 women who were directly invited to join the study by the RA)). As an incentive to participate, women who completed the baseline survey were entered into a drawing for a large, attractively packaged basket of beauty supplies that was displayed next to the self-administered subject recruitment materials in each salon. When women declined participation, the RA asked them to complete an

anonymous, four-question survey on their age, education level, occupation, and whether the salon was their regular salon.

The 8-min baseline survey consisted of open-ended and multiple choice questions to assess: the participants' level of awareness of diabetes as a personal health threat; their understanding of the measures that might be taken to reduce their personal risk of developing diabetes and its side effects; and their diabetes-related screening behaviors. Although the American Diabetes Association recommends that asymptomatic persons at average risk for developing type 2 diabetes should be screened every 3 years, the baseline survey asked about screening in the previous year to ensure a more accurate recall than screening done in the last 3 years. While being overweight is a significant risk factor for diabetes, the pilot study<sup>36,39</sup> demonstrated that many women were personally offended by a question about the woman's weight and height, as demonstrated by either their refusal to answer it or providing clearly inaccurate responses. Thus, it was determined that asking these weight-related questions was counterproductive.

Once the sample of women was accrued and baseline surveys completed for each salon ( $n = 60$  and  $30$  as determined by salon size), the salon was randomly assigned to receive either the diabetes or breast cancer education intervention. Each arm, therefore, served as the control arm for the alternate intervention.<sup>38</sup> Six months following the start of the intervention, study participants were contacted by phone for a follow-up survey. Up to 10 attempts were made to reach each woman by phone. If there was no success with these attempts, the survey was mailed to the women with a cover letter.

#### *Diabetes education intervention*

The stylists were trained on how to deliver the educational intervention via a one-to-one training program and provided with the educational materials to facilitate the dissemination of information to their clients, such as a three-ring binder of information in protective plastic sleeves, messages to be displayed on the stylists' mirrors, posters for the salon, and 'display holders' for a variety of educational brochures. The stylists received on-going training from the PI and unannounced visits from the PI and research team, and were invited to participate in biannual luncheon training programs where they received additional training and shared their common goals of improving the health of their clients. The stylists also received training from a nationally respected African American ancestral storyteller to enhance

the 'stickiness factor' of their messages and thereby increase the chance that they could achieve a tipping point with their messages.<sup>40</sup> In addition, the PI was available via cellphone at all times to address any problems that the cosmetologists felt were beyond their ability to handle. The stylists were compensated \$50 a month in recognition that the PI and staff would cause interruptions in their work schedule for the client recruitment, baseline data collection, and the on-going training components of the study.

#### *Hypothesis*

Clients of cosmetologists who were randomized to the diabetes intervention arm were hypothesized to have: (1) higher 6-month rates of screening adherence (routine annual exam, diabetes screening in the past year, and routine eye exam) than at their baseline rates and (2) changes in diabetes-related knowledge and attitudes favorable to increased diabetes-related screening and health promotion practices compared to the breast cancer control training group.

#### *Outcome measures*

The main outcome measures were a self-reported diabetes screening test in the past year, annual physical exam, and annual eye exam. Secondary outcome measures were questions related to knowledge and attitudes about diabetes. A total knowledge score was calculated by summing the items that queried ways to reduce risk of developing diabetes and side effects of diabetes.

#### *Statistical analyses*

Chi-square analyses and Wilcoxon signed ranks tests were used to test the differences between baseline and follow-up levels of knowledge, skills, and abilities for both the intervention and control arms. SPSS version 17.0 was used to conduct all analyses and a family-wise  $P$ -value of less than 0.05 was considered statistically significant.

## **Results**

#### *Sample description*

Of the 1055 women who participated in the baseline assessment, 71 were not included in this analysis (for 5 the study arm randomization could not be determined, 54 had missing ages, and 12 were under 20 years old), bringing the final sample count to 984 women. Of the total number of women who participated in the baseline survey, there was a 42% retention rate for those in the diabetes arm and a 46% retention rate for those in the

breast cancer arm. The retention rates in the two arms between baseline and follow-up were not significantly different (Fig. 1).

All participants were from San Diego. Their ages ranged from 20 to 88 years, with a mean of 41 years (SD = 13). About half of the women (514) completed some college or post-high school education, 34% (332) completed college or beyond, and 12% (115) had less than or equal to a high school education. Of the entire sample, 78% (764) reported that they worked outside their home. The most commonly reported job categories were office/desk job (13%), customer service (12%), nursing/medical (10%), education (9%), and government/armed forces (7%). Sociodemographic and recruitment information are presented in Table 1.

When the brief sociodemographic data gathered from those women who opted not to participate were compared with those who did participate, Chi-square tests revealed that there was no significant difference in education levels between the women who declined to participate and those who participated. However, women who declined to participate were significantly ( $P < 0.05$ ) older than those who agreed to participate. Correlation analyses were run to determine if affiliation with a particular salon was associated with women's responses. For almost all of the questions analyzed (13 of 15), there were no correlations between the women's answers and the salon they attended. The two questions that highly correlated with salon membership asked about previously diagnosed diabetes and about how to reduce the side effects of diabetes ( $P < 0.05$ ).<sup>41</sup>

Comparability of breast cancer and diabetes group participants at baseline was examined.

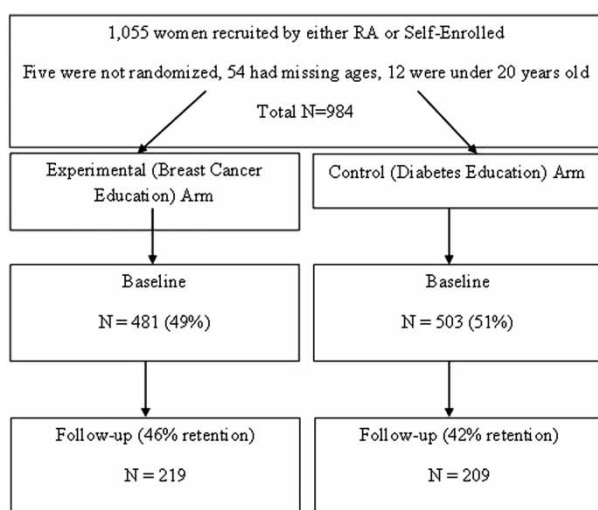


Figure 1: Participant retention within the randomized control education trial.

There were no differences in age. However, more women in the breast cancer group (61%) reported recruitment through the display compared to the diabetes group (50%,  $\chi^2 = 12$ ,  $P < 0.05$ ). More women in the diabetes group (36%) were clients of participating cosmetologists compared to those in the breast cancer group (17%,  $\chi^2 = 46.7$ ,  $P < 0.05$ ). A significantly higher percentage of women who completed the follow-up survey had been recruited through the display method (61%) rather than through RA recruitment (39%,  $\chi^2 = 9.7$ ,  $P < 0.05$ ). This increased retention rate among those who self-selected into the study was consistent with earlier findings.<sup>42</sup> There was no significant difference in age, education level, or any of the main outcome measures (eye, routine, and diabetes screening tests).

Women who had already been diagnosed with diabetes or had gestational diabetes were categorized as 'at higher risk for developing diabetes'. In addition, since being of African American descent was already considered to be a factor that increased a woman's risk of developing diabetes, those with one or more additional predisposing factors for developing the disease were also categorized as being 'at higher risk for developing diabetes'. These additional risk factors were: being at least 40 years old, having a family history of diabetes, or having a personal experience with type I, II, or gestational diabetes. Of the 984 women, 71% (700) fell into this higher than average risk category. Since accurate height and weight data were not obtained, the participants' body mass index (BMI) could not be evaluated as a risk factor.

*Primary outcomes: diabetes, routine, and eye exam screening rates*

There were no significant differences in rates of diabetes screening, routine annual screening, and eye exams from baseline to follow-up and between the two arms at follow-up.

*Secondary outcomes: knowledge, perceptions, and beliefs and attitudes*

**Knowledge**

To assess diabetes knowledge, women were asked to list perceived ways of reducing their risk of developing diabetes and perceived early warning signs of diabetes (more details were provided in Sadler et al.<sup>36</sup>). Since these were open-ended questions, each correct response was awarded a point, for a potential cumulative score of eight points for both baseline and follow-up. For the diabetes group, their baseline diabetes knowledge ( $M = 2.95$ ;  $SD = 1.13$ ) was similar to the breast cancer group, ( $M =$

Table 1: Sociodemographic and recruitment method information (total sample = 984 women).

	Baseline			Follow-up		
	Breast cancer <i>N</i> = 481, % ( <i>N</i> )	Diabetes <i>N</i> = 503, % ( <i>N</i> )	Total <i>N</i> = 984, % ( <i>N</i> )	Breast cancer <i>N</i> = 219, % ( <i>N</i> )	Diabetes <i>N</i> = 209, % ( <i>N</i> )	Total <i>N</i> = 428, % ( <i>N</i> )
Age range	20–81	20–88	20–88	21–88	20–81	20–88
Mean age (SD)	40.5 (13)	40.8 (14)	40.6 (13)	41.8 (13)	43.2 (14)	42.5 (14)
Education						
< To high school	11 (57)	11 (58)	12 (115)	9 (19)	11 (24)	10 (43)
Some college	63 (250)	61 (258)	62 (614)	49 (107)	64 (112)	61 (220)
Completed college	32 (155)	35 (177)	34 (332)	40 (67)	33 (70)	37 (157)
Missing value	3 (13)	2 (10)	3 (23)	3 (6)	1 (3)	2 (9)
Work outside home	79 (378)	99 (386)	78 (764)	79 (173)	99 (161)	77 (332)
Hx of breast cancer	2 (8)	1 (4)	1 (12)	2 (4)	1 (2)	1 (6)
Recruitment						
Display method	61 (291)	49 (249)	55 (540)	68 (150)	52 (109)	61 (260)
RA method	39 (190)	51 (254)	45 (444)	32 (69)	48 (100)	39 (109)
Same cosmetologist	17 (82)	36 (183)	27 (265)	69 (27)	27 (56)	27 (116)

2.99; SD = 1.07). At follow-up, both groups increased significantly from baseline in their overall diabetes knowledge: diabetes arm ( $M = 4.47$ ; SD = 1.67) and breast cancer arm ( $M = 4.61$ ; SD = 1.54),  $P < 0.05$ . However, there were no significant differences in overall diabetes knowledge between groups at follow-up.

We examined the high risk group's knowledge. They had higher baseline ( $M = 3.03$ ; SD = 1.09) and follow-up ( $M = 4.62$ ; SD = 1.57) diabetes knowledge scores than the low risk group's baseline ( $M = 2.76$ ; SD = 1.13) and follow-up scores ( $M = 4.30$ ; SD = 1.67), which was expected since a proportion of these individuals were presumably managing their pre-diabetes or diabetes diagnoses.

### Perceptions of diabetes as a serious health problem for black women

According to the Health Belief Model<sup>43</sup>, perceptions of a disease are predictors of uptake and adherence to health promoting behaviors. At baseline, participants of the study were asked the open-ended question, 'What do you think are the most serious health problems facing Black women?' to solicit top-of-mind problems and were given the opportunity to list four responses. Responses were evaluated to determine whether diabetes was included among the top four. At baseline, women in the diabetes arm listed diabetes with the same frequency as women in the breast cancer arm. At follow-up 6

months later, there was a significant ( $P < 0.05$ ) decrease in the number of women in both the diabetes and breast cancer arms who listed diabetes as a serious health problem among any of the four responses. In addition, at follow-up, the women in the breast cancer arm reported diabetes as a serious health problem significantly more often ( $P < 0.05$ ) than the women in the diabetes arm ( $X^2 = 4.45$ ,  $P < 0.05$ ).

The research team also hypothesized before the study that when participants responded to the question about what is the most serious health threat to black women, the problem with the greatest concern would presumably be placed in the first response line. There was no significant change over time in the number of responses of diabetes listed as a first response for either arm.

When women's self-reported adequacy of their diabetes knowledge was compared with their demonstrated knowledge scores, there were significant differences between women's self-report and demonstrated knowledge scores at baseline and follow-up on the diabetes knowledge questions within both the diabetes and breast cancer arms (Table 2). The well-informed group had significantly higher baseline and follow-up diabetes knowledge scores in both arms. Thus, reported perception of personal diabetes knowledge is related to their demonstrative knowledge. However, there were no significant differences over time by intervention

Table 2: Does reported perception of participants' adequacy of their diabetes knowledge predict actual knowledge scores?

How well informed are you about diabetes?	Diabetes arm		Breast cancer arm	
	Baseline knowledge score	Follow-up knowledge score	Baseline knowledge score	Follow-up knowledge score
Well informed	3.37	4.83	3.62	5.09
Moderately well informed	3.19	4.79	3.15	4.94
Not well informed	–	–	–	–
Significance	2.44	3.94	2.32	3.82
	0.001*	0.001*	0.001*	0.001*

\*Significant between group differences, ANOVA,  $P < 0.05$ .

Note: Responses ranged from 0 to 8, higher numbers equal more knowledge.

arm in their perception of knowledge regarding diabetes. In other words, diabetes knowledge increased at the same rate across both groups.

### Beliefs and attitudes

There were no significant changes in items reflecting beliefs and attitudes between the diabetes and breast cancer arm. Some examples of diabetes-specific belief items are: 'There are things I can do to prevent or control diabetes' and 'Early detection for diabetes doesn't make much difference.' Items on general attitudes about health such as, 'The more I know about a disease, the more control I have', were also queried. There were no significant changes between the arms in those items as well.

### Programmatic findings of the intervention

The total absence of significant changes in the primary and secondary outcomes was in stark contrast to the changes observed in the previously reported breast cancer arm of this randomized controlled trial.<sup>38</sup> This unexpectedly different set of outcomes sent the research team in search of possible explanations. Given that both arms were comparably set up, this raised the question of whether they were comparably delivered in the salons. To answer this question, the participants' responses to other questions in the follow-up survey were examined.

When participants were asked whether they attended a salon where health education was being offered, 80% (120/151) of the women in the breast cancer arm and 75% (104/140) of women in the diabetes arm responded affirmatively. When participants were asked whether their cosmetologists made health information available to them, 65% (104/161) in the diabetes arm and 68% (138/204) in the breast cancer arm reported that they were. There were no significant differences between the two groups for both questions.

To assess the relevance of the diabetes education program to the women in the diabetes arm, they

were asked whether they had shared the health information they received at the salons with their family and friends. Statistically comparable numbers of women in both arms said that they shared the information with others: 41% (87/165) in the diabetes arm and 47% (109/206) in the breast cancer arm.

Since the breast cancer arm of the pilot study had generated considerable national media attention following its presentation at a scientific conference, it was also possible that there was contamination by the inclusion of breast cancer content in the diabetes arm. Of the women in the diabetes arm, 37% (27/73) of the women reported that cosmetologists talked about cancer with them, while a statistically comparable 26% (18/70) of women in the breast cancer arm said that their cosmetologist talked about diabetes with them.

It was also possible that the clients of the cosmetologists in the diabetes group might have viewed their cosmetologists' ability to deliver information about diabetes differently than the clients in the breast cancer group. When asked in the follow-up survey about their cosmetologists' ability to be a health educator and effectively pass along the health-related information, there was no significant difference, with 92% (152/166) of women in the diabetes arm agreeing and 96% (207/216) of women in the breast cancer arm.

The summary findings from these inquiries was that while the diabetes program was not effective when judged by the originally established outcomes, from the responses related to the women's perspective, the intervention should have been equally as effective as the breast cancer arm's intervention.

## Discussion

Having tested two virtually identical health education programs, the question arises of how to explain the differences in outcomes. In Malcolm Gladwell's book, *The Tipping Point: How Little*

*Things Can Make a Big Difference*, he theorizes that a collection of factors need to interact to trigger a social epidemic. He used the breast cancer arm of the *Black Cosmetologists Promoting Health Program* as a seminal example of how positive social epidemics can be achieved. In the breast cancer education program he identified the multiple elements he believed were essential to creating a social tipping point: mavens (the wise person), connectors (the person who knows many people who can effectively spread the message to many other people), salespersons (the person who can effectively convince another person to heed the message), a sticky message that can be easily remembered and passed along to others ('A mammogram can save your life'), and social and environmental changes that would make the audience more receptive to the message and/or capable of heeding the delivered messages.

For the diabetes intervention program, several of these key elements were missing. For example, in contrast to the simple, upbeat, and easy to remember breast cancer messages, the messages for diabetes were complex. The diabetes participants had to first discern whether they were at elevated risk status for diabetes by assessing their relationship to a variety of risk factors. This ranged from knowing their family members' health history, to knowing whether they had experienced gestational diabetes themselves, to being willing to admit to themselves that they were overweight and/or not getting the recommended exercise. Once these factors were evaluated, they then had to know whether they had been screened for diabetes, remember the date when they had last been screened for diabetes, which could range from 1 day to 3 years ago according to screening guidelines, and from there calculate the appropriate future screening date. In addition, there were different screening recommendations based on their risk status, and the screening messages were always qualified.

Other relevant messaging was also quite different. For breast cancer, women were offered very positive messaging, such as, 'Early detection means more treatment options and less disfigurement', 'Remove the cancer early, when it's small and your life resumes unchanged', 'With early detection, you have an excellent chance of not dying of breast cancer', and 'With early detection, you can beat breast cancer'. For diabetes, the messaging was negative, such as, 'Find diabetes early, so you can make the significant lifestyle changes that will allow you to live with your diabetes for the rest of your life', and 'If you lose a significant amount of

weight, follow a diet severely restricted in carbohydrates and fats, and significantly increase your level of daily exercise, you can delay the onset of the (inevitable and terrible) consequences of your diabetes'. In addition, breast cancer was viewed as a threat that unified women against it, while diabetes was not gender-linked, potentially further diluting and complicating the messaging.

The environment related to diabetes was also far less supportive of taking screening actions. For breast cancer, California had recently enacted free breast cancer screening and treatment for women aged 40 and older who were within 200% of the Federal poverty level, effectively removing all financial barriers to breast cancer control for low-income women. The messages conveyed in the breast cancer program were amplified by the national movement to increase awareness of breast cancer. Social consciousness raising activities were starting to happen, such as American Cancer Society and Komen-for-the-Cure Foundation events to raise funds for breast cancer control activities and national breast cancer awareness month. The symbolic pink ribbon became an iconic and ubiquitous reminder of the fight to end breast cancer. There were no comparable nationwide programs for increasing diabetes awareness or promotion of relevant healthy lifestyles. Had First Lady, Michelle Obama, been conducting her nutrition and exercise campaign while the diabetes program was underway, this likely would have helped create a sticky message that could have added to the program's impact locally and personalized it for African American women and their families.

One of the unexpected findings of this program was the equivalent increase in post-intervention diabetes knowledge that was observed in both study arms, when only the diabetes arm would have been hypothesized to have significantly higher scores. One possible hypothesis was that the baseline questions about diabetes that were asked of study participants in both arms served to raise women's curiosity/awareness related to diabetes and hence, their pursuit of knowledge. Further research is warranted to test such a hypothesis, since an affirmative discovery could benefit the design of future diabetes awareness programs.

There were several limitations to the study. The study used a convenience sample drawn from San Diego County. While this is a large county, it may not be representative of African American women from other regions of the country. Hence, it would be appropriate to replicate this study in other parts of the country to determine whether comparable outcomes can be achieved. Women's height and



weight data were not collected, information which would have provided important additional information related to participants' BMI and serve as an additional predictor of diabetes risk status. However, given the poor quality of the data collected in the pilot study, the project's community advisors had recommended that collecting these data would unnecessarily discourage participation, without providing reliable data. Another limitation of the study was that in the interest of keeping subject burden and invasiveness of the study to a minimum, additional validated psychosocial instruments (e.g., the Multidimensional Health Locus of Control or the Powe Fatalism Inventory<sup>44,45</sup>) and biometric measures (e.g., urine, blood sugar levels) were not used as measures of diabetes risk or among the study's outcomes. The use of such standardized psychosocial instruments in future studies could enrich the findings. It is also possible that other behavioral changes that could have been influenced by the program, such as diet or physical activity knowledge/behaviors changes were not captured. In future studies data collection could be expanded to include such information to enrich the studies' findings. Most importantly, the findings from this study suggest that diabetes educators may have additional challenges when striving to create behavioral changes related to reducing the risk of diabetes morbidity and mortality. Future programs could be created and tested that incorporate the elements of the Tipping Point model that were missing in the diabetes education program. Finding better ways to educate people about how to reduce their risk of diabetes morbidity and mortality will be facilitated by the public's increased access to health care following the implementation of the Affordable Care Act.

## Conclusion

This study offered a unique opportunity to examine the various elements of Malcolm Gladwell's theoretical Tipping Point model. Two public health programs were introduced to nearly identical cohorts of African American women, delivered by virtually identical community-based health educators who were trained by the same researcher, taught to use the identical training format and dissemination strategies, monitored and offered on-going training on the same schedule throughout the program, and tested with the same research methods. All elements of Gladwell's theoretical Tipping Point model were fully present for the breast cancer education program, while some were missing or less intense for the diabetes education program. The

missing elements were of sufficient magnitude to potentially account for the very different outcomes in the study's two program arms. In planning future public health programs, educators now have preliminary evidence that all elements of the Tipping Point model make essential contributions necessary for programmatic success.

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## Disclaimer statements

### Contributors

Dr Sadler is the Principal Investigator for this study and participated in all aspects of the study and preparation of the manuscript. Dr Ko was Dr Sadler's graduate student working on this study and also participated on all aspects of the conduct of the study and manuscript preparation. Drs Wu and Ngai participated in the data analysis and preparation of this manuscript. This project was approved by the University of California San Diego's Human Research Protection Program, #990717. Databases we used to create bibliography: The *Black Cosmetologists Promoting Health* study database. This is not a publically accessible database.

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### Conflicts of interest

None.

### Ethics approval

This study was approved by the UCSD Institutional Review Board prior to its implementation and continues in good standing with its IRB approval.

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