WEB-BASED DATA COLLECTION: AN EFFECTIVE STRATEGY FOR INCREASING AFRICAN AMERICANS’ PARTICIPATION IN HEALTH-RELATED RESEARCH

Pamela E. Scott-Johnson, PhD; Susan M. Gross, PhD, MPH, RD; Dorothy C. Browne, MSW, MPH, DrPH

INTRODUCTION

The inclusion and participation of ethnic minorities and women in health-related research is imperative to eliminating disparities in health. Wendler, Kington, Madans\(^1\) demonstrated that minorities were as willing to participate in studies as non-minorities, contradicting other research findings that demonstrated low willingness and participation.\(^2\) Barriers, such as mistrust in researchers conducting studies on minority populations, access to study facilities, income and job status which decrease opportunities for participation in research studies, persist and must be addressed.\(^5\) Corbie-Smith\(^4\) reported that the socioeconomic status of minorities is a major impediment to participation. Low-income minority participants lack readily available access to transportation to get to research sites and may lose wages as a result of taking time from work to participate in studies. Mistrust and apprehension toward medical personnel and researchers, as well as suspicion of mistreatment and alternative motives, are acknowledged impediments that discourage minority participation.\(^2\) Adams-Campbell and her colleagues\(^3\) indicated that one major barrier to participation was the criteria used to determine participant eligibility for clinical trials. Thus, this aspect of the research design inhibited participation of African Americans and other ethnic minorities.

The Internet has been shown to be a powerful data collection tool.\(^8,9\) Using the Internet as a tool for recruiting and assessing the health status of minorities offers new opportunities for behavioral researchers for both cross-sectional and longitudinal investigation.\(^10\) When compared to other research response modes (eg, postal mail services, fax, or e-mail), the Internet produced an increased response rate,\(^9\) reduced costs in participant recruitment and retention,\(^11\)\(^12\) and the ability to maintain higher data quality and analysis, since the data collection is automated and accurate.\(^9,13,14\)

Of particular interest are the studies that compare response modes in assessing health and wellness of college students or young adults. For example, Pealer and her colleagues\(^15\) examined the feasibility of a web-based method when collecting high-risk health-related information from college students. After comparing web-based and mailed responses, these researchers reported that participants in the web-based response mode answered more sensitive items than did their mail-based counterparts. Moore and her colleagues\(^16\) compared web-based and postal mail methods in assessing the effectiveness of a college-based binge drinking intervention. The authors reported more web-based responses (83%) than print-based responses (75.4%) to the process evaluation. Morrell and her colleagues\(^17\) used a web-based methodology to examine smoking behaviors among college students. This methodology allowed them to examine tobacco use among 21,000 university students. Sixty-eight percent of the males reported smoking at least once; 21% reported having used smokeless tobacco compared to 9% of females.

The purpose of this article is to explore response mode (via web-based vs paper survey) to the follow-up health survey, as well as examine respondent health indicators and related behaviors.

METHODS

The College Health and Wellness Study was an investigation of health-
promoting practices and psychological determinants of health in a graduating class of seniors in spring 2003 from a historically Black university located in the mid-Atlantic region. For the one-year follow-up study, only baseline participants who had graduated in 2003 and provided accurate contact information (N=357) were recruited. 192 of those who participated in the 2003 baseline survey responded to a one-year follow-up.

Recruitment and Data Collection

In 2003, participants completed a paper and pencil survey measuring their health status. In 2004, one year later, these same individuals were asked to complete a similar survey in order to determine potential changes in health status. However, for the follow-up, participants were given the choice between responding online or by paper. In March 2004, all participants from the baseline survey were sent a letter inviting them to participate in the follow-up survey. Each participant was informed of the survey’s purpose and was offered a $25 gift card to a national chain retail store or video rental store as an incentive for completing the survey. The first 100 respondents were also entered in a raffle for a concert and dinner worth $500.

Respondents were given the choice of completing the survey via Internet or by mailed paper survey (participants were instructed to contact the study coordinator by telephone in order to receive a paper survey with a postage paid return-addressed envelope included). The contact letter provided the website for the follow-up survey and the respondent’s unique identification code, which would serve as their password to access the survey.

Participants were given three months to respond using the online methods. Those who did not complete the online survey within one month were sent a reminder postcard, and three additional attempts were made to contact them by telephone (one attempt before noon, one attempt after 5:00 pm., and one attempt on a weekend day). Finally, after three months, all baseline participants who did not complete the survey were sent a paper survey with a self-addressed stamped envelope.

Figure 1 presents the flow diagram of the data collection process and the responses received at each time point.

Measures

Responses from the follow-up surveys were received and categorized by response modes as either web-based survey or paper survey. Baseline data collection acquired personal demographic information, such as age, academic major study area, race and US citizenship. The follow-up data collection process included items on an individual’s marital status, number of children, income and employment status.

In order to determine the general health status of participants, each respondent was asked to rate his/her general health as excellent, very good, good, fair, or poor in both baseline and follow-up surveys.

Body mass index (BMI) was calculated in kg/m$^2$ using self-reported height and weight. Participants were
categorized according to NIH guidelines: underweight ≤18, acceptable 19–24, overweight 25–29, obese 30–34, or extreme obesity (obesity II) ≥35–39 at both baseline and follow-up surveys.

Respondents were asked about the frequency, duration, and intensity of leisure-time physical activities during the preceding 30 days. Level of physical activity was assessed using a continuous score expressed as metabolic equivalent (MET)-minutes per week. Activity level was assigned using the International Physical Activity Questionnaire guidelines for scoring: inactive is 0 to 599 MET-minutes per week, minimally active is 600 to 2999 MET-minutes per week, and Health Enhancing Physical Activities (HEPA) were activities of at least 3000 MET-minutes per week. Respondents’ answers were dichotomized into “inactive” or “any activity” at both baseline and follow-up measures.

Dietary intake was assessed using the Eating Behaviors Patterns Questionnaire, which is a 51-item scale that was designed to be a behavioral assessment of eating that is predictive of fat intake in African American women.

Symptoms of depression at baseline and one-year follow up were assessed using the Revised Center for Epidemiologic Studies Depression Scale (CESDR scale). The CESDR includes 35 items that measure mood, somatic complaints, interactions with others and motor functions.

At baseline, respondents were asked to report on their exposure (age of opportunity to use) and experience (age of first use and use within past 30 days) with illicit drugs and alcohol. At follow-up respondents were also asked to indicate the appropriate exposure category for cigarette smoking and hard liquor use since graduation.

Statistical Analysis

Response mode, sociodemographic, health status, weight-related, depression and substance use variables were summarized using means and frequencies. Chi-square tests and t tests were performed to assess the association between response mode and sociodemographic, health status, weight-related behaviors and attitudes, symptoms of depression and substance use variables. A comparison of health status and related behaviors by response modes from those who completed the follow-up survey was conducted. We also compared baseline responses and follow-up responses according to the mode in which participants completed the follow-up. Data were analyzed using SPSS (Version 9.0, 1999 SPSS Inc., Chicago, IL) with statistical significance at the $P<.05$.

RESULTS

Three hundred fifty-seven participants from the original study were invited to take part in the follow-up study. Of the 192 follow-up participants, and regardless of the response mode, survey participants included more females than males (52.3% vs. 35.0%, $\chi^2=10.34$, df=1). Most respondents chose the web-based format (59%) and the rest completed the paper form. At baseline, the mean age was 23.7±5.4 years, 70% reported an annual income of less than $20,000, and 91.5% reported their health status as good, very good or excellent. Approximately, 36% were liberal arts majors, 27% were business and management majors, 16% were computer science majors, 12% were education majors and 9% were engineering majors. At follow-up the majority of respondents (83%) reported being employed full-time or part-time.

More participants ($n=113$) responded during the first three months using an Internet response mode than did those who responded using paper. The majority of the paper survey responses ($n=79$) were received during the last three months of data collection.

![Fig 2. Participants chose to respond by Internet more immediately and in greater numbers than those by paper. The Internet responses ($n=113$) were received during the first three months of data collection and the majority of the paper survey responses ($n=79$) were received during the last three months of data collection](image)
were not significant. In terms of academic disciplines, the highest percentage of responses in the study came from individuals majoring in the liberal arts. There were no statistically significant differences by academic discipline and response mode ($\chi^2 = .98$, df = 4). Most of the Internet participants were employed full-time (67%) and earned between $20,000 and $40,000 per year. No difference was found by income and response mode. (Table 1)

In addition to comparing demographic information by response mode, the study sought to compare the health status and related health behaviors from graduation (baseline) to one-year follow-up (Table 2). Weight status was the only health indicator that did not significantly differ from baseline; there were no differences in health status or related behaviors by response mode. From baseline to follow-up, we observed some trends in health status and related health behaviors: increased reporting of very good health status (39.5% vs 46.8%), higher BMI (25.7 \pm 6.3 \text{ kg/m}^2 vs 26.2 \pm 7.0 \text{ kg/m}^2), less physical activity (33.7% vs 21.0% with any activity) and more symptoms of depression (15.3 \pm 10.5 vs 18.0 \pm 10.5). The symptoms of depression were not significant. Dietary intake and cigarette smoking remained relatively stable from baseline to follow-up. These trends in health status and related health behaviors did not vary by mode of response at baseline or at follow-up.

At baseline, 42% of follow-up Internet respondents and 33.3% of follow-up paper respondents reported having very good health; and at follow-up, 49.5% Internet respondents and 42.5% of paper respondents reported having very good health.

**DISCUSSION**

The purpose of the study was to explore differences in response mode for those completing a one-year follow-up survey. Additionally, the study examined and compared the baseline and follow-up health indicators of a cohort of college graduates by response mode at follow-up. Based on the literature, \textsuperscript{16,21,22} we anticipated that differences in response modes by sex, income and employment status would be statistically significant. The data do not show these differences. These findings may suggest that given college students’ widespread use of the Internet, web surveys are the method of choice.\textsuperscript{23} Carini et al\textsuperscript{13} report that college students have higher online usage for communication compared to the general population. Our research findings indicate that while there were observable differences, there were no statistically significant differences by response mode in any of the variables that were examined. Overall, the 60% follow-up response rate and the lack of differences in response mode support the Internet as a viable means of assessing health information in an African American population.

In this study, a web-based response mode was not a barrier to participation by African Americans and may have facilitated responding. This contradicts the idea that minorities are less likely to use the Internet or to respond to online health surveys.\textsuperscript{8,13,21} Thus, the assertion reported earlier in this paper that African Americans do not respond favorably to web surveys is not applicable. Furthermore, the broader use and comfort with the use of web-based surveys with this population implies that Internet utilization for data collection on college campuses is beneficial. Moreover, most HBCUs have access to this technology and can utilize this method of data collection.

**Implications**

As our research indicates, acceptance and comfort with the Internet, at least within this population, transcends the demographic and socioeconomic barriers associated with the mode of completion. Health educators and practitioners who are committed to increasing

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**Table 1. Participant characteristics by response mode**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Internet % ($n=113$)</th>
<th>Paper % ($n=79$)</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>23.6 ± 4.2</td>
<td>23.6 ± 6.3</td>
<td></td>
<td></td>
<td>.98</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>33.6</td>
<td>21.5</td>
<td>3.58</td>
<td>1</td>
<td>.06</td>
</tr>
<tr>
<td>Female</td>
<td>66.4</td>
<td>78.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of liberal arts</td>
<td>34.5</td>
<td>35.4</td>
<td>0.98</td>
<td>4</td>
<td>.91</td>
</tr>
<tr>
<td>School of business and management</td>
<td>24.8</td>
<td>30.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of computer, mathematical and natural science</td>
<td>15.9</td>
<td>13.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of education and urban studies</td>
<td>14.2</td>
<td>11.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of engineering</td>
<td>10.6</td>
<td>8.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>15.5</td>
<td>17.9</td>
<td>0.42</td>
<td>2</td>
<td>.81</td>
</tr>
<tr>
<td>Part-time</td>
<td>17.2</td>
<td>12.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>67.2</td>
<td>69.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$20,000 per year</td>
<td>25.2</td>
<td>29.5</td>
<td>1.32</td>
<td>2</td>
<td>.52</td>
</tr>
<tr>
<td>$20,000 to $40,000 per year</td>
<td>56.1</td>
<td>48.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;$40,000 per year</td>
<td>18.7</td>
<td>21.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No statistically significant differences by age, sex, academic major, employment and income.
the participation of ethnic minorities,
and African Americans in particular,
from diverse academic, income, and
employment backgrounds should con-
sider using an online means of data
collection, which is viable, cost-effective,
convenient, accessible, and acceptable.

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risk behavior data from college students. Health

and efficacy of a binge drinking prevention
intervention for college students via internet

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Table 2. Baseline responses and follow-up responses

<table>
<thead>
<tr>
<th>Health status</th>
<th>Baseline %</th>
<th>Follow-up %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>15.8</td>
<td>10.5</td>
</tr>
<tr>
<td>Very good</td>
<td>39.5</td>
<td>46.8</td>
</tr>
<tr>
<td>Good</td>
<td>35.8</td>
<td>32.6</td>
</tr>
<tr>
<td>Fair/poor</td>
<td>9.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>

\[ \chi^2 (13) = 125.6, P < .01, df = 3 \]

<table>
<thead>
<tr>
<th>Weight status</th>
<th>Baseline %</th>
<th>Follow-up %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>4.7</td>
<td>6.4</td>
</tr>
<tr>
<td>Optimal weight</td>
<td>48.3</td>
<td>47.7</td>
</tr>
<tr>
<td>Overweight</td>
<td>27.9</td>
<td>32.6</td>
</tr>
<tr>
<td>Obese</td>
<td>19.2</td>
<td>13.4</td>
</tr>
</tbody>
</table>

\[ t_{(171)} = -1.91, P < .06, df = 3 \]

<table>
<thead>
<tr>
<th>Physical activity (baseline)</th>
<th>Baseline %</th>
<th>Follow-up %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactive</td>
<td>66.3</td>
<td>79.0</td>
</tr>
<tr>
<td>Any activity</td>
<td>33.7</td>
<td>21.0</td>
</tr>
</tbody>
</table>

Average total MET minutes per week, Mean (sd) 4138.0 (12907) 1901.5 (6693)

\[ t_{(177)} = -1.99, P < .05 \]

<table>
<thead>
<tr>
<th>Dietary intake</th>
<th>Baseline %</th>
<th>Follow-up %</th>
</tr>
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<tbody>
<tr>
<td>Low fat Diet</td>
<td>48.1</td>
<td>49.2</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Cigarette smoking (ever used)</th>
<th>Baseline %</th>
<th>Follow-up %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever used/since graduation</td>
<td>21.8</td>
<td>17.6</td>
</tr>
<tr>
<td>No, never</td>
<td>78.2</td>
<td>82.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hard liquor (ever used)</th>
<th>Baseline %</th>
<th>Follow-up %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever used/since graduation</td>
<td>36.0</td>
<td>56.5</td>
</tr>
<tr>
<td>No, never</td>
<td>64.0</td>
<td>43.5</td>
</tr>
</tbody>
</table>

\[ \chi^2 (1) = 4.42, P < .05, df = 1 \]

<table>
<thead>
<tr>
<th>Depression (follow-up)</th>
<th>Baseline %</th>
<th>Follow-up %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any symptoms</td>
<td>78.5</td>
<td>66.3</td>
</tr>
<tr>
<td>No symptoms</td>
<td>21.5</td>
<td>33.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CESD Score mean (sd)</th>
<th>Baseline %</th>
<th>Follow-up %</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.3 (10.5)</td>
<td>18.0(10.5)</td>
<td></td>
</tr>
</tbody>
</table>

\[ t_{(177)} = -2.48, P < .05 \]


