Is the Accuracy of Self-Reported Colorectal Cancer Screening Associated with Social Desirability?

Sally W. Vernon1, Peter N. Abotchie1, Amy McQueen3, Arica White4, Jan M. Eberth2, and Sharon P. Coan1

Abstract

Background: Self-reported cancer screening behaviors are often overreported and may lead to biased estimates of prevalence and of subgroup differences in screening. We examined whether the tendency to give socially desirable responses was associated with concordance between self-reported colorectal cancer (CRC) screening behaviors and medical records.

Methods: Primary care patients (n = 857) age 50 to 74 years completed a mail, face-to-face, or telephone survey that assessed CRC screening and social desirability measured by a short version of the Marlowe–Crowne scale. We used medical records to verify self-reports of fecal occult blood testing (FOBT), sigmoidoscopy, colonoscopy, and barium enema.

Results: Social desirability scores were lower for whites versus African Americans, college graduates, and patients reporting no prior screening tests; they were higher for telephone versus mail or face-to-face survey respondents. In univariable logistic regression analysis, social desirability scores were not associated with concordance for FOBT (OR = 1.03, 95% CI = 0.94–1.13), sigmoidoscopy (OR = 0.95, 95% CI = 0.86–1.04), or colonoscopy (OR = 0.99, 95% CI = 0.88–1.11); however, lower social desirability scores were associated with increased concordance for barium enema (OR = 0.87, 95% CI = 0.77–0.99). In multivariable analyses, no associations were statistically significant.

Conclusion: Social desirability as measured by the Marlowe–Crowne scale was not associated with accuracy of self-reported CRC tests in our sample, suggesting that other explanations for overreporting need to be explored.

Impact: By understanding sources of response bias, we can improve the accuracy of self-report measures.

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Introduction

Population-based screening for breast, cervical, and colorectal (CRC) cancers has been shown to reduce morbidity and mortality (1). To assess whether efforts to promote cancer screening are successful, we need to measure adherence to screening guidelines. Two national surveys (2, 3) monitor screening rates at the population level, and both rely on self-reports. Likewise, many health promotion intervention trials, particularly those that are community or population based, use self-report to measure intervention outcomes. Thus, accurate self-report measures are needed to monitor progress toward increasing adherence to cancer screening guidelines.

Studies of the accuracy of self-report compared with medical record or administrative databases have found that cancer screening behaviors, including mammography, Pap tests, fecal occult blood tests (FOBT), and endoscopy, are overreported (4–8). Overreporting not only leads to inflated estimates of screening prevalence but also may differ systematically by population subgroups in ways that cause subgroup differences to be over- or underestimated (6). There also is some evidence that overreporting may differ by intervention group status such that those receiving an intervention are more likely to overreport mammography (9) and CRC screening behaviors (8) compared with a control group, thus inflating the estimate of intervention effectiveness.

A potential source of bias that has been hypothesized as a cause of overreporting in studies of cancer screening is social desirability (6, 10–12). Social desirability has been defined as the tendency to respond to questions in socially or culturally sanctioned ways (13). Measures of social desirability have been shown to be associated with underreporting total caloric intake in women (14) and...
overreporting measures of physical activity (15). The
construct of social desirability has been less studied in
relation to self-reported cancer screening behaviors, and
the few studies that did examine its effects did not directly
measure social desirability (10, 12). We sought to address
this gap in the literature by answering the following ques-
tions: (i) Does social desirability vary by sociodemographic characteristics (age, gender, ethnicity, education,
and marital status) or other study variables (number of
prior CRC screening tests, family history of CRC, and
survey mode)? (ii) Is social desirability associated with
concordance between medical records and self-reported
CRC screening with FOBT, sigmoidoscopy, colonoscopy,
or barium enema? (iii) Does adjusting for covariates
change the association between social desirability and
concordance?

Methods

Background

We conducted a secondary analysis of data from a
randomized controlled trial designed to assess the reli-
ability and validity of a self-report questionnaire of CRC
screening behaviors developed by a National Cancer
Institute (NCI) workgroup (16). The trial was funded by
the Centers for Disease Control and Prevention to assess
whether mode of survey administration (mail, telephone,
or face-to-face) affected reliability or validity (7).

Trial participants were men and women 51 to 74 years
of age who were primary care patients for at least 5 years at
a large multispecialty group practice in Houston, Texas.
Persons with a prior history of CRC were excluded. Of the
1,004 enrolled patients who were randomized to mail,
telephone, or face-to-face mode of survey administration,
857 completed a baseline survey in 2005–2006. These 857
patients constituted the sample for this study. Self-
reported CRC screening with FOBT, sigmoidoscopy, and
colonoscopy was found to meet acceptable standards of
test–test reliability, concordance, sensitivity, and spec-
ificity for all survey modes; however, all were overre-
ported as measured by the report-to-records ratio. Barium
enema was underreported and showed only fair sensi-
tivity. Additional details about the trial are reported
elsewhere (7).

Measures

For this article, our primary outcome measure was
concordance defined as agreement between self-report
and the medical record, considered to be the “gold” stan-
standard. As described in Vernon and colleagues (7), respond-
ents were classified as adherent or nonadherent for each
test according to American Cancer Society screening
guidelines in effect at the time of the study (17): FOBT
within the past year or sigmoidoscopy, colonoscopy, or
barium enema within the past 5 years. We used a 5-year
interval for colonoscopy, rather than 10 as recommended
by guidelines, because of the difficulty in identifying a
sufficient number of patients who had received care at the
clinic for 10 or more years. Patients could report multiple
tests that occurred during the study period.

Social desirability was the primary independent vari-
able of interest and was measured with a 10-item version
of the Marlowe–Crowne Social Desirability Scale (18).
Items are rated true or false and are summed to obtain
a score ranging from zero to 10 (Appendix). Higher scores
reflect a greater tendency to give socially desirable
responses. Validated 10-item short versions of the Mar-
lowe–Crowne instrument have shown internal consisten-
cy reliability scores ranging from 0.49 to 0.70 in samples of
undergraduate students (18, 19). In our sample, coefficient
alpha was 0.60.

Covariates included age in years (continuous), gender
(male/female), race/ethnicity (white/African Ameri-
can/other), education (≥ college/some college/≤ high
school), marital status (married/single), family history of
CRC (yes/no), number of CRC tests during the 5-year
study period (0/1/2+/), and mode of survey administra-
tion (face-to-face/mail/telephone).

Statistical analysis

One-way ANOVA was used to examine mean differ-
ences in social desirability scores by covariates (question
i). Covariates that were statistically significant (P < 0.05) in
univariable analyses were included in multivariable anal-
yses using logistic regression to examine the association
between social desirability and concordance, before and
after adjusting for covariates (questions ii and iii). Patients
with multiple tests within guidelines were included in the
analyses for each test they had, that is, FOBT, colonoscopy,
sigmoidoscopy, and barium enema. STATA 11 (StataCorp
LP) was used to conduct the analyses.

Results

Description of the sample

The mean age of the sample was 59.2 years old (SD =
5.9). Approximately 59% were White and 26% were Afri-
can American. Sixty-six percent were female, 74% were
married, more than 50% had at least a college degree, and
11% had a CRC family history. Nineteen percent reported
having 2 or more tests during the study period. According
to medical records, 16% were screened with FOBT, 27%
with colonoscopy, 26% with sigmoidoscopy, and 12%
with barium enema. Concordance between medical record
and self-reported CRC screening was 85% for
FOBT, 91% for colonoscopy, 85% for sigmoidoscopy, and
92% for barium enema.

Mean differences in social desirability scores by
covariates

Pairwise comparisons showed that whites had statisti-
cally significantly lower social desirability scores than
African Americans and those categorized as “other”
race/ethnicity (Table 1). Respondents with 4 or more
years of college education had lower social desirability
scores than those with less than 4 years of college. Patients
who reported that they had no prior CRC screening
tests had lower social desirability scores compared
with those who reported 1 or more screening tests. Tele-
phone respondents had statistically significantly higher
social desirability scores than either mail or face-to-face
respondents; there was no difference between mail and
face-to-face respondents.

Association between social desirability scores and
concordance
In univariable logistic regression analysis, social desir-
ability was not associated with concordance for FOBT (OR
¼ 1.03, 95% CI = 0.94–1.13), sigmoidoscopy (OR = 0.95,
95% CI = 0.86–1.04), or colonoscopy (OR = 0.99, 95% CI =
0.88–1.11). Lower social desirability scores were associat-
ed with increased concordance for barium enema in uni-
variable analysis (OR = 0.87, 95% CI = 0.77–0.99). The
association between social desirability and concordance
was not statistically significant for any CRC screening test
in multivariable analyses. We also modeled the false
positive rate; univariable results were generally similar to
those for concordance. ORs were 0.98 (95% CI = 0.89–1.15) for colonoscopy, and 1.10 (95% CI =
0.89–1.34) for barium enema. Adjustment for covariates did
not change these associations.

Discussion

Validity estimates such as concordance, sensitivity, and
specificity provide useful information on the agreement
between self-report and medical records, but they tell us
little about factors that influence accuracy. We found that
although several factors were associated with social desir-
ability scores, social desirability was not associated with
concordance for any of the CRC screening tests. Our
findings were similar to those of Matthews and colleagues
(11) who found that although social desirability was
associated with race ethnicity, it was not associated with
the accuracy of self-reported CRC screening. These find-
ings are consistent with the view that overreporting of
CRC screening may not be attributable to a tendency
among survey respondents to present themselves in a
favorable manner relative to perceived social norms.

Although social desirability was not measured directly,
2 studies evaluated strategies to reduce the influence of

### Table 1. Mean differences in social desirability scores by study variables

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<th>N</th>
<th>Mean</th>
<th>SD</th>
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<th>DF</th>
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<td>1.96</td>
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Note: Higher scores on the 10-item Marlowe–Crowne (18) scale indicate more socially desirable responses.
social desirability on self-reported cancer screening behaviors (10, 12). Although not statistically significant, Johnson and colleagues (12) found self-reports of mammography and Pap testing were more accurate (i.e., in agreement with medical records) when an intention question preceded questions about screening. Beebe and colleagues (10) also examined the effect of social desirability on self-reported CRC screening by asking a question about intention to get screened before or after asking about past screening behavior. They found that asking about intention before asking about screening resulted in lower reports of screening; however, self-reports were not validated against medical records. These findings indirectly support the view that social desirability influences responses to questions about cancer screening behaviors.

Although social desirability was not associated with the accuracy of self-reported CRC screening in our study, it is notable that higher social desirability scores were observed for some subgroups. Telephone survey respondents compared with mail or face-to-face respondents reported higher social desirability scores, suggesting that different modes of data collection may create different demand characteristics among respondents, a finding that deserves further investigation in future studies, particularly as new communication technologies, such as the Internet and smart phones, are used to collect survey data.

Limitations of our study are that the results may not generalize to other populations because study participants were a self-selected sample of relatively educated patients from one medical practice in a large urban area. Given our findings of subgroup differences in social desirability scores by race and education in this relatively homogeneously population, future studies should examine the effect of social desirability on the accuracy of self-reported CRC and other screening behaviors in more diverse populations. Despite general agreement that social desirability may influence the accuracy of self-reports, there is no consensus about how to measure it. Future studies should explore alternative ways to measure this construct. Nevertheless, social desirability, as measured by the Marlowe–Crowne scale, was not associated with accuracy of self-reported CRC tests in our sample, suggesting that other explanations for overreporting need to be explored. For example, telescoping, a cognitive memory error that occurs when an event is recalled as occurring more recently or more distally than it did in fact occur, also may lead to overreporting (20).

Our findings extend prior research by measuring social desirability using a validated scale and by assessing its association with sociodemographic and other variables and with the accuracy of self-reported CRC screening behaviors. Our findings also provide support for the use of survey measures, such as the one used in this study, to monitor the prevalence of screening and to evaluate intervention effects when medical records are unavailable.

Appendix

Social desirability scale (18)

1. I never hesitate to go out of my way to help someone in trouble. (True)
2. I have never intensely disliked anyone. (True)
3. When I don’t know something I don’t at all mind admitting it. (True)
4. I am always courteous, even to people who are disagreeable. (True)
5. I would never think of letting someone else be punished for my wrong doings. (True)
6. I sometimes feel resentful when I don’t get my way. (False)
7. There have been times when I felt like rebelling against people in authority even though I knew they were right. (False)
8. I can remember “playing sick” to get out of something. (False)
9. There have been times when I was quite jealous of the good fortune of others. (False)
10. I am sometimes irritated by people who ask favors of me. (False)

Disclosure of Potential Conflicts of Interest

The content is solely the responsibility of the authors and does not necessarily represent the official views of the Centers for Disease Control and Prevention.

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