EFFECT OF INTERVIEWER AND RESPONDENT CHARACTERISTICS ON REPORTING OF CHRONIC CONDITIONS

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KEY WORDS: Interviewer effects, chronic condition reporting.

1. Introduction

A sizable body of research literature examines the effects of interviewer characteristics and the interaction of interviewer and respondent characteristics on survey responses. The bulk of this literature explores the effects on attitudinal data, particularly with regard to the race of interviewers and respondents. Many of the studies examine the contribution of interviewer variance to total variance using the intraclass correlation coefficient, as described by Kish (1962). Schuman and Converse (1971), for example, found that race of interviewer explained one percent or more of variance in 37 percent of racial attitude questions and in 43 percent of "racial fact" questions.

Conventional wisdom in face-to-face surveys, particularly those involving asking about race-related attitudes or behaviors, has been to match the race of interviewer and respondent whenever possible. Groves (1989) questions the validity of this practice, noting that most of the studies of race-of-interviewer effects did not validate responses. Anderson, Silver, and Abramson (1988) found in a review of National Election Study data over several years that black respondents were more likely to report falsely that they voted, and that the before-and-after survey design indicated an effect on actual voting behavior -- that black respondents interviewed by blacks were more likely to vote than black respondents interviewed by whites.

Interviewer gender has also been demonstrated to affect responses in several studies. These effects sometimes are attributable to interviewer-respondent gender interaction, sometimes to interviewer gender alone. As reviewed by Groves (1989), Nealon (1983) found in a survey of farm women that male interviewers "obtained lower average reports of farm value, reports of more involvement in the work of the farm, and reports of greater satisfaction with farm programs" than did female interviewers. Groves and Fultz (1985) found that male interviewers obtained more positive responses on a variety of economic outlook indicators than female interviewers.

Sudman and Bradburn (1974) reviewed a number of studies with validating data and coded response effects. They found relatively larger response effects for younger (24 and younger) interviewers, interviewers of higher social status, and interviewers with less experience. They cite a study by Katz (1942) that showed large differences given by both union and non-union respondents to "working class" versus other interviewers. Other than the previously cited Schuman and Converse (1971) study, Sudman and Bradburn found little convincing evidence for age, race, or gender interaction effects.

In recent work, Ballou (1993) in an analysis of New Jersey pre-election polling found that women were more likely to say they would vote for Clinton and less likely to say they would vote for Bush when interviewed by a male. Verification data showed the responses given to women to be more accurate. Phillips and Schuldt (1993) found that interviewer gender was associated with respondent preference for the male candidate in a Senate race, but not for a female candidate.

Studies of the effects of interviewer characteristics and interviewer-respondent characteristic interactions in in-person interviews are difficult to carry out because of the expense and practical problems associated with randomized assignment. Initial interviewer assignments are most often made geographically, with racial and perhaps SES matching of interviewers and areas. Reassignments for refusal and other nonresponse conversion are often made on the basis of other respondent characteristics, such as age and gender, when they are known. Since the conventional wisdom for such matching is pervasive and most studies do not have methodological research as their primary objective, this lack of randomization is understandable.

2. Methods

The Health Interview Evaluation Study (HIES) was conducted for the National Center for Health Statistics (NCHS) by Westat, Inc., with the Project HOPE Center for Health Affairs participating in design and analysis. The purposes of the HIES were (1) to evaluate the reporting of chronic conditions using the National Health Interview Survey (NHIS) protocol and (2) to evaluate the reporting of doctor visits and hospital stays within the NHIS reference periods for these events. Interviews were conducted with and medical records data obtained for a total of 1,005 persons selected from the membership of a Washington, D.C., area HMO. The interview period was June through November, 1990. The sample was stratified by age and gender, with oversamples of older persons and persons with recent medical utilization.

The interview comprised a modified NHIS core questionnaire protocol, including a checklist of some 26 chronic condition categories -- a selection of the most prevalent conditions from the six randomly assigned lists used in the NHIS. Persons could report chronic conditions in response to the checklist, or as being associated with limitations of activity, disability, or medical utilization. Like the NHIS, the HIES was conducted as a household interview, with the list sample person acting as respondent. Other adult household members present for the interview were also encouraged to respond for themselves. Some 239 such household members responded for themselves and had medical records obtained for the evaluation. Thus, the sample for this paper comprises 1,244 self-respondents in 1,005 interviews. Other household members under 17 years of age, not present for the interview, or for whom medical records were not obtained are not included in this analysis.

All reported medical conditions for each person from both the interview and medical record were coded according the NHIS modifications to the Ninth Revision of the International Classification of Diseases (ICD-9). Conditions were recoded according to NHIS rules for classification of chronic conditions (Recode C). Impairments (orthopedic, hearing, and vision) were further aggregated into three categories. For each person, a match code was determined for each of the 26 chronic condition categories included in the interview. Three conditions yielded virtually no reports, and are excluded from this analysis. The match follows the typology of Marquis (1984):

Table 1. Marquis' (1984) basic record-check matrix for a binary variable with no missing data

		Survey		
		Yes	No	Total
Record	Yes	A	C	A+C
	No	B	D	
	Total	A+B		A+B+C+D

The dependent variables for the analysis presented here include: **percent under-report** [C/(A+C)]; and **difference in prevalence estimates** from the two sources [(B-C)/(A+C)].

"Percent over-report" is another possible dependent variable; however, for many conditions (e.g., constipation, dermatitis, heart murmur) the absence of a report in three years' medical records should not be taken as definitive evidence that a person does not have the condition. On the other hand, we may consider that under-reports are generally response errors for the conditions included in the HIES. The reasons for under-report may vary: some respondents may be unaware of the condition or may call it by a different name, others may intentionally under-report because of embarrassment about the condition or a desire to appear healthy. The difference in prevalence estimates for the sample derived from interview as opposed to medical record reports gives an indication of the net effects of omissions in both the interview and medical record, as well as of erroneous positive reports in the interview. Because both sources contain error, the magnitude and direction of the difference does not necessarily support conclusions about the quality of reporting in either source.

All interviews were conducted in person in the greater Washington, D.C., area. The sample was selected so as to have approximately equal representation of males and females, with stratification by age (18-44, 45-64, 65-74, and 75 or older) and oversampling of older persons to allow separate analyses by age categories. Race of the HMO members was unknown at the time

of sample selection, but the sample was selected from medical centers serving a population at least 50 percent black. The breakdown of the analytic sample and of the interviewers by age and gender is presented in Table 2. The sample turned out to be about two-thirds black, and more heavily female than expected because of differential nonresponse by gender and the difficulty of finding eligible males in the oldest age category.

Table 2. Characteristics of respondents and interviewers

	Respondents	Interviewers
Black	837 (67%)	10
Other	407 (33%)	14
Female	707 (57%)	16
Male	537 (43%)	8
Total	1244	24

Some 24 interviewers completed one or more household interviews. The interviewer population included a smaller proportion of black persons and men than the respondent population.

The sample was largely unclustered, except that all sample persons were members of one of the two HMO medical centers. Interviewer assignments were not deliberately randomized; assignments were made geographically, with some areas being largely covered by black interviewers and other areas largely by white interviewers. Tables 3 and 4, respectively, show the gender and racial matches among the analytic sample.

Table 3. Gender of respondent by gender of interviewer

	Interviewer: Female	Male
Respondent:		
Female	486 (69%)	221 (31%)
Male	367 (68%)	170 (32%)
Total	853 (69%)	391 (31%)

The distribution of respondents by gender among the interviewers matches exactly the expected distribution (given the marginal totals) under random assignment. The racial distribution is far from the expected random distribution, however (Chi-square=76.53, df=1, $p<.001$).

Table 4. Race of respondent by race of interviewer

	Interviewer: Black	Other
Respondent:		
Black	406 (49%)	431 (51%)
Other	92 (23%)	315 (77%)
Total	498 (40%)	746 (60%)

3. Results

Table 5 presents the percent under-report and difference in prevalence estimates between interview and medical record reports for all 23 chronic conditions by race of interviewer and respondent.

Table 5. Percent under-report and percent difference in estimates by interviewer and respondent race across 23 conditions

Respondent	Interviewer	Percent Under-report	Diff. in Estimates
Black	Black	42.7	36.0
	Other	46.0	18.7
Other	Other	50.7	6.0
	Black	53.3	27.1
Black Respondents		44.4*	27.3
Other Respondents		51.3*	10.8

When the race of interviewer and respondent matched, under-reporting was somewhat lower (42.7 percent and 50.7 percent) than when the race was not matched (46.0 percent and 53.3 percent), but the difference was not statistically significant. Black respondents were less likely to under-report (44.4 percent) than non-black respondents (51.3 percent), regardless of the race of the interviewer, a finding that is statistically significant for the sample ($z=2.29$, $p<.05$). Black respondents also showed a greater difference in prevalence estimates (interview estimate 27.3 percent higher than medical record estimate) than did non-black

respondents (interview estimate 10.8 percent higher).

Because there was great variation in reporting by condition and great difference in sample prevalence across conditions, the differences by respondent characteristics might have been due to correlation between respondent characteristics and prevalence of certain conditions. Table 6 presents the same statistics as Table 5, but just for hypertension, a very well reported condition and one that is more prevalent among black persons than among those of other races.

Table 6. Percent under-report and percent difference in estimates by interviewer and respondent race for hypertension

Respondent	Interviewer	Percent Under-report	Diff. in Estimates
Black	Black	18.7	-1.6
	Other	15.7	-1.6
Other	Other	23.1	-7.7
	Black	28.6	-14.3
Black Respondents		17.2+	-1.6
Other Respondents		24.2+	-9.1

The pattern of differences between black respondents and other respondents seen in Table 5 for all conditions is repeated in Table 6 for hypertension. Black respondents under-reported less (17.2 percent) than other respondents (24.2), a marginally significant difference ($z=1.77$, $p<.10$), and black respondent showed more reporting (1.7 percent lower prevalence in the interview than from the medical record) when comparing the difference in estimates by sources than other respondents (9.1 percent lower interview rate). For hypertension, which requires a physicians' diagnosis and would certainly be in a person's medical record if detected, these comparisons both indicate better reporting by black respondents.

Table 7 presents the same statistics as Table 5, but by gender of interviewer and respondent. Male interviewers obtained fewer under-reports than did female interviewers for both female respondents (44.0 percent vs. 47.1) and for male respondents (41.8 percent vs. 50.6 percent), with the difference for male respondents and overall (43.6 percent vs. 48.6 percent) significant at the .10 level ($z=1.90$ for male respondents, $z=1.64$ overall). Looking at the difference in prevalence estimates by source, male respondents reporting to female interviewers had a much lower difference (6.5 percent higher prevalence by interview) than the other three groups.

Table 7. Percent under-report and percent difference in estimates by interviewer and respondent gender across 23 conditions

Respondent	Interviewer	Percent Under-report	Diff. in Estimates
Female	Female	47.1	27.4
	Male	44.0	24.9
Male	Male	41.8+	28.4
	Female	50.6+	6.5
Female Interviewers		48.6+	18.4
Male Interviewers		43.6+	26.4

The differences in under-reporting to female and male interviewers seen in Table 7 for all conditions are echoed in Table 8 for hypertension.

Table 8. Percent under-report and percent difference in estimates by interviewer and respondent gender for hypertension

Respondent	Interviewer	Percent Under-report	Diff. in Estimates
Female	Female	21.5*	-7.0
	Male	10.5*	1.1
Male	Male	16.0	-1.3
	Female	23.0	-3.4
Female Interviewers		22.2*	-5.4
Male Interviewers		12.9*	0.0

Overall, male interviewers obtained a lower rate of under-reporting of hypertension (12.9 percent) than did female interviewers (22.2 percent). This difference and the difference for female respondents (10.5 percent vs. 21.5 percent) are both significant for the sample at the .05 level

(z=2.49 overall and z=2.28 for female respondents).

4. Discussion

The results presented here from the Health Interview Evaluation Survey indicate that there are some apparent differences in reporting of chronic conditions by interviewer and respondent characteristics, and present some evidence that matching of interviewers and respondents by race may lead to better reporting of chronic conditions.

Black respondents under-reported less than respondents of other races (mostly white), a finding that held across conditions (in data not presented here), including hypertension. Matching the race of interviewer and respondent resulted in less under-reporting overall. Although this finding was not statistically significant, it was consistent across conditions for black interviewers, and across income and education categories of black respondents (again, in data not presented here).

Male interviewers obtained fewer under-reports than female interviewers in general, a finding that holds across conditions (in data not presented here) for male respondents, but not for female respondents. Two possible explanations for this phenomenon seem reasonable: (1) male respondents may be more sensitive to the interviewer's gender than females; and (2) male interviewers may seem more "doctor-like" than female interviewers.

Given the large differences between interview and medical record reports and in agreement between the two sources across conditions reported in the NCHS Series 2 report from this data (in press), the differences shown here resulting from interviewer and respondent race and gender are relatively small. However, in examining differences in prevalence by race and gender from interview reports of given conditions, analysts would do well to consider the possibility of interviewer effects. In particular, since interviewers are most often female, observed gender differences in prevalence may be attributable in part to a gender-of-interviewer effect.

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