ANALYSIS OF SELF AND PROXY RESPONSES IN THE ASSESSMENT OF HEALTH STATUS

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I. Introduction

Motivation

For many years the status of an individual's health has been used in predictive models of health care utilization. However, little is known about the error properties of this measure, especially with respect to proxy reporting. The manner in which information on health status is collected may be important to its performance in analytical models. There are problems inherent in self/proxy reporting that may be exacerbated for measures of health status by the fact that those who are in poor health are less able to report for themselves. These problems, as well as the more traditional issues concerning trade-offs between cost, sampling errors and non-sampling errors, suggest that the use of proxies with respect to the health status information needs to be more fully examined.

In many national household survey designs (for example the National Health Interview Survey and the National Medical Expenditure Survey), one respondent is interviewed and is asked to provide information for both him/herself as well as for other members of the family. If unlimited resources were available, survey researchers would prefer that every individual answer every survey question for him/herself. However, the necessary resources are often not available, and so survey designers are forced to make use of proxy respondents. The general belief that any information about an individual is more accurate if obtained directly from the individual is still a widely accepted concept despite recent, but inconclusive research to the contrary (Roshwalb, 1982; Mathiowetz and Groves, 1983; Moore, 1988). With respect to an individual's health status, this belief gains additional strength. Unlike income, expenditures, and other "factual" types of data items, health status is confounded by the respondent's ability to respond for him/herself. For example, research by Adam et. al (1990) indicated that among the elderly population, survey data for those in poor health is typically collected by proxy.

This paper addresses issues related to the use of proxies for collecting health status information. Is there a difference between self and proxy responses to a global health status question? If there is a difference, is it due to response status or to differences in the characteristics of people who report for themselves or by proxy? What are the implications of a self/proxy effect in using health status as an independent variable in predictive health models? If the findings indicate a significant self/proxy effect, survey designers will need to re-evaluate the use of proxy respondents for collecting health status information.

Early Studies

An interest in the methodological aspects of self and proxy responses has been evident through the past four decades within the survey design community. In general, there are three hypotheses that surface in the self/proxy literature. The first hypothesis is based on the notion that people who report for others may lack knowledge about the events or activities of interest. Depending upon the relationship between self and proxy, the quality of the proxy data may be affected. The second hypothesis which surfaces in the literature contradicts the first. It is based on the idea that health related activities create a role within the household which one household member must fill. This person is better suited to accurately report health events than the intended respondent. For example, mothers generally possess complete and accurate knowledge concerning their children's health events and activities. There are also situations which involve embarrassing conditions or types of behavior. Berk et. al. (1986) examined the self/proxy issue with respect to the reporting of stigmatizing health conditions and states that the use of proxies does not increase misreporting. With respect to reporting physical stigmatizing conditions, proxies are preferable to self-respondents. Some researchers hypothesize that reports by proxy are of better quality than self-reports for questions involving these issues of social desirability. The last hypothesis suggest that people communicate to others close to them accurate and complete information concerning their physical and emotional well-being, thereby implying that there is no difference between the response types in terms of quality or validity.

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It is similar to the first hypothesis which suggests that the error is related to the nature of the self and proxy relationship.

Moore (1988) provides a review of the self/proxy literature and notes that despite the fact that researchers have spent many years investigating this methodological issue there is still no conclusive evidence which consistently supports any of these hypotheses. He also notes that self-reports require additional tracking and interviewer time. This extra effort needed for self-reports is cost-consuming and unnecessary for proxies. Hence, Moore states that in light of the lack of consistent evidence supporting any of the hypothesis and taking into account the costs of obtaining self-reports, researchers should have confidence that proxy responses and self-reports stand on equal ground.

One problem that arises in evaluating self/proxy differences is that the surveys are not specifically designed to evaluate self and proxy differences. For example, Adams, et. al (1990) explicitly state that due to the nature of the survey used in their analysis, interviews by proxy were limited to those impaired eligible people who were unable to respond in person. Hence for these individuals, their data were obtained via proxy and naturally were of poorer health than those who were self-reporters. Any inferences about self and proxy reporting made from the resulting analyses must remain tentative.

Health status measures have gained a great deal of attention as of late, both as a matter of public concern and interest as well as a key criterion in formulating health policy. One particular measure of interest is the global health status measure. Its recognition as being a powerful predictor of health behavior has served to increase its use in health research. A large portion of this research deals with the methods and instruments used to measure health status. Ware (1987) and Donovan, et al.,(1993) have both evaluated the pros and cons of such health status measures. Ware finds that the health status measure is a very subjective one. Donovan et al. find that the measure is subject to the interpretation of those who design the measure. Despite the criticisms, the global health status measure has been used in several areas of research.

Although both self/proxy comparisons and health status are well documented fields in their own right, there is a small body of literature that deals jointly with the two issues. However, the literature does not consistently support the use of proxies nor does it discourage its use with respect to health status information. Kovar and Wilson (1976) recognize that because perceived health status is a useful measure in predicting medical utilization and other measures of interest, then the manner in which this information is collected is a point of concern. Their research on the 1972 Health Interview Survey indicates that if the analytic goal is to measure the direction (positive or negative) on a health status continuum, the use of typical NHIS self/proxy respondent rules is adequate. Proxy reports in their study provide estimates of health status that were comparable to a self-reported estimate. However, if the goal was to determine the strength or degree between the "excellent, good, fair, poor" ratings, differences among the two response types do occur, but are not large with respect to the excellent vs. good categories. They conclude that there is no evidence to discourage the use of household respondents to report on perceived health status for other members of the household.

Mosely and Wolinsky (1986) investigated this use of proxies in health surveys. They acknowledge that methodological problems exist with the surveys being used in this field of research. The procedure commonly used in this research effort is to verify data provided by a self-report or proxy against the person's medical records. The authors note some problems with this approach and offer an alternative method of incorporating a self/proxy indicator reflecting their response type. They include self or proxy measures into predictive models of conditions, utilizations, and symptoms. They noted characteristics of the self reports and reports by proxy and concluded that "... at least for the time being, ... the use of proxies in health surveys is not problematic" (Mosely and Wolinsky, 1986, pp 509).

It is evident from the previous research that there exists some ambiguity regarding the use of proxy reports in conjunction with the collection of health status information. This paper presents findings from an investigation into the differences between self responses and responses by proxy for a global health status question. Distributional differences among various subgroups and the predictive power of health status for self/proxy responses will also be examined.

II. Methodology

The National Medical Expenditure Survey (NMES) Household Feasibility Study was conducted for the Agency for Health Care Policy and Research in 1992. It was designed to evaluate various statistical and methodological issues relating to the re-fielding of the NMES, the next cycle to occur in 1996. The 1987 NMES was designed to produce national estimates of health care utilization, medical expenditures, and health insurance coverage for the U.S. civilian non-institutionalized population. The design for the Feasibility Study (FS) was generally patterned after the

1987 NMES. Similar to the 1987 NMES design, the FS targeted the U.S. civilian non-institutionalized population. The sample design of the FS was a stratified multistage area probability selection of dwelling units Approximately 2,000 dwelling units were screened to allow selection of about 1,000 units for Round 1 of the FS with over-sampling of households whose members were black, Hispanic, poor, near poor, or over 65 years of age. The instruments used in the FS were similar to the ones used in the 1987 NMES (see Edwards and Berlin, 1989).

The FS consisted of a screener/baseline round, two full rounds of data collection, and a third round consisting of a brief interview. Once a household was selected, all civilian non-institutionalized household members became eligible respondents. The interviewer was instructed to ask each eligible adult household member about their own medical utilization and expenditures. For the cases where the respondent was unavailable or incapable of providing this information, a knowledgeable proxy was allowed to respond. In this investigation, a self respondent for the global health status question was identified as a sampled person who responded to the "How do you rate your health?" question themselves. A response by proxy was identified as the respondent to the global health status question being someone other than the sampled person.

The global health status question was asked of all sampled persons, i.e. all persons within the sampled household, during the Screener/Baseline round. The version of the global health status question that was used in the NMES FS was: "In general, would you say that (your/PERSON'S) health is excellent, good, fair, or poor?". For the multivariate analyses presented in this paper, the four response categories were collapsed into two; excellent/good and fair/poor, paralleling the analysis by Kovar and Wilson (1976).

III. Analysis/Results

There are certain groups of persons who are naturally prone to having a response by proxy, e.g. children, some elderly persons, and some persons with mental disabilities. This analysis excludes 351 children, persons under the age of 17 years. Originally there were 4,611 people in the screener/baseline. This analysis also excluded 996 people because they were either not sampled for inclusion in the later rounds of data collection or they were total nonrespondents and were adjusted for in the sampling weights. Hence, of the 4,611 persons in the Screener/baseline of the Feasibility Study, 3,264 people remained in this analysis.

Table 1 provides a distribution of response types (i.e. self and proxy reporting) for people responding to the original four category health status question. A chi square test for homogeneity indicated that there was a significant association between health status and response type. T-tests were then performed as the second phase of this analysis. Approximately 54% of the sampled adults were self-respondents as compared to 46% who had a response by proxy. Among those who reported for themselves, about 41% reported that they were in excellent health, 43% report being in good health, 12% report fair health, and about 4% said they were in poor health. Of those who had a response by proxy, 35% were in excellent health, 43% were in good health, 16% were in fair health, and 6% were in poor health. The proportion of people who responded to the global health status question as Excellent was significantly different at the .05 level across the self and proxy groups. Similar results were found for the proportion of people who responded to the global health status question as Fair.

Table 2 illustrates the characteristics of the self-respondents and those who have a response by proxy. Several significant differences ($p<.05$) were found when the proxy group was compared to the self group on several population dimensions. Of the self-respondents, only 36% were male. Of those individuals who had a response by proxy, 59% were male. Of the self-respondents, 20% were 65 years old or older; among the proxies, 12% were over 65 years of age. These differences in the proportions were also significant at the .05 level, for both marital status and functional impairment.

The data contradicts the prevailing idea that the elderly population is more likely to have a proxy response because of their poor health. A surprising result was that of the 65+ population, only 34% had a response by proxy. One possible explanation could be that these elderly individuals reside alone and therefore have no one available to act as a proxy. In this analysis approximately, 35% of the people who are over 65 years of age, live alone. Of the self-respondents who are 65 years or older, 50% live alone.

Given the significant differences in the demographic characteristics of self and proxy reports, we examine the differences in health status controlling for these characteristics. Table 3 presents the results from a weighted logistic regression analysis. Two models were run. The first was an unadjusted logistic regression model predicting responses of the global health status question (specifically to predict the fair/poor category) using the self/proxy indicator (1=Self) as the only independent variable. In order to determine whether the self/proxy effect truly impacts on the responses to the health status question, a second model was run using the same variables while

controlling for person characteristics that could attribute to the health status responses. Included in the regression model were: age race, sex, marital status, functional impairment, and income. As indicated by Table 3, the self/proxy indicator is significant ($p<.01$) in the unadjusted model. However, after including a variety of demographic characteristics, the effect of self report vs. a response by proxy is no longer significant. Thereby suggesting that the type of respondent does not significantly affect the health status rating for a given sampled person.

The last goal of this paper is to examine the predictive power of the global health status variable while controlling for self and proxy response. Two multivariate models were each run separately for those who had a response by proxy and those who reported for themselves to predict two types of medical utilization. The first multivariate model used the global health status variable to predict ambulatory visits. Due to the fact that ambulatory visits are a fairly common occurrence, the variable was used in its continuous state to take advantage of its greater explanatory power. The second multivariate model used the same independent variables to predict hospital stays. Hospital stays are a much less common occurrence than ambulatory visits. Therefore, this variable was dichotomized to reflect either at least one hospital stay or no hospital stays at all. Using these variables, a linear regression was run to predict ambulatory visits and a logistic regression was run to predict hospital stays. Each model was run twice; once for persons who responded for themselves and a second time for persons who had a response by proxy. This phase of the analysis was based on people who had data for the full observation period. The results are shown in Tables 4 and 5. By examining the beta coefficients and testing whether the coefficients of the global health status variable are significantly different for the two groups (using Z-scores), we can determine whether the response type affects the predictive power of this variable.

The linear regression that was run to predict ambulatory visits (Table 4) resulted in the calculation of Z-scores for comparison of the beta coefficients of the health status variable in both the self and proxy groups. The beta coefficients for the self group was -1.548 and -1.215 for the proxy group. The Z-score was calculated to be 0.53 indicating that there is no significant difference at alpha=0.05. A Chow test was performed indicating that there is no significant difference at the 0.05 level. The R^2 and adjusted R^2 are within 0.03 of each other; indicating that the models across both response groups explain roughly the same percentage of variation.

As previously indicated, a logistic regression was run to predict hospital stays (Table 5). Here the beta coefficients were -1.02. and -0.67 respectively. The resulting Z-score was 0.73; also not significant at the 0.05 level.

IV. Conclusion

In evaluating the current literature available on self/proxy issues in relation to health status measures, it is evident that a consensus has yet to be reached on this issue. In looking at the analysis presented in this paper, there appears to be some evidence in favor of using proxy respondents to answer the global health status question. The regression models presented here reveal no significant differences between proxy and self reports with respect to the global health status question when controlling for a variety of demographic characteristics. The debate over the use of self vs. proxy respondents will undoubtably go on. After controlling for a variety of person-level characteristics, there is no significant difference between self and proxy responses to the global health status question. This may not necessarily hold true for other health related data items. Hence, further investigation with regard to these other areas is warranted.

In addition, the results from the logistic and linear models predicting utilization reveal no significant difference for health status responses between proxy and self-reporting. In looking at the Z-scores and R^2 presented above, there is also no significant differences between the health status beta coefficients for the self and proxy models. Hence, there appears to be no evidence to support the use of one response type over the other. This further supports previous results as well; that obtaining responses by proxy for global health status is a satisfactory survey tool.

Although this analysis indicates that there is no significant difference between self and proxy respondents in the context of the general health status question, the limitations of this analyses need to be considered before any conclusions can be made. There are several important concepts that are not represented in the models run. For example, education, health insurance, and measures of cognitive impairment are absent from the list of variables included in this analyses. These missing items are key pieces of information, which if included in the analyses could further solidify the results found here. Unfortunately, the Feasibility Study database, on which this investigation is based, did not have such information available for use in this analysis. In addition, no conclusion can be reached due to the fact that this survey is not of a completely randomized design. Therefore, inferences from this analyses remain

tentative. As a result, additional research is needed to further clarify this issue and should be done so using appropriate survey designs.

For a complete set of the tables, please contact the author.

Table 2 Selected Characteristics of Self and Proxy Respondents

Population	Response Type	
	Self (N=1747)	Proxy (N=1517)
Male	*36.4	58.8
Female	*63.6	41.2
<65	*79.7	88.0
65+	*20.3	12.0
White/not Hispanic	80.4	79.8
Black/not Hispanic	12.9	10.9
Hispanic	3.4	3.5
Other	3.3	5.9
Married	*56.2	65.6
Divorced	*13.1	3.9
Widowed	*11.8	3.1
Separated	*3.9	1.1
Never Married	*15.0	26.2
Functionally Impaired	*5.2	2.7
Not Functionally Impaired	*94.8	97.3
Low Income	12.5	9.4
Middle Income	9.0	7.5
High Income	78.4	83.1

Source: Agency for Health Care Policy and Research, Department of Health and Human Services. National Medical Expenditure Survey - Household Feasibility Study

* Proportion of Self respondents differs significantly from the proportion of Proxy respondents at alpha=0.05.

Table 3 Logistic Regression Model to Predict Fair/Poor Health Status

Independent Variables	Beta Coefficients	P Value	Standard Errors
Intercept	-3.72	0.00	0.22
Self/Proxy Indicator	0.15	0.14	0.09
Male	0.10	0.21	0.07
Age	0.61	0.00	0.06
Race			
Black/Not Hispanic	-0.16	0.43	0.19
White/Not Hispanic	-0.81	0.00	0.19
Hispanic	-0.18	0.55	0.29
Marital Status			
Married	0.25	0.32	0.24
Separated	0.39	0.56	0.63
Divorced	0.30	0.26	0.25
Widow	0.04	0.87	0.24
Functionally Impaired	2.80	0.00	0.18
Income Levels			
Low income	1.11	0.19	0.00
Middle income	0.92	0.24	0.00

Source: Agency for Health Care Policy and Research, Department of Health and Human Services. National Medical Expenditure Survey - Household Feasibility Study

Table 4: Linear Regression Models to Predict Ambulatory Visits

Dependent Variable: Ambulatory Visits

	SELF		PROXY	
Independent Variables	Beta	S.E.	Beta	S.E.
Intercept	2.006	0.748	1.081	0.520
Health Status	-1.548	0.489	-1.215	0.394
Male	-0.604	0.233	-0.592	0.182
Age	0.182	0.081	0.203	0.075
Race				
Black/Not Hispanic				
White/Not Hispanic	0.048	1.091	0.488	0.280
Hispanic	-0.015	0.899	0.443	0.204
	2.796	1.464	1.433	0.874
Marital Status				
Divorced/Separated	0.254	0.260	0.074	0.409
Married	0.274	0.249	0.140	0.136
Widowed	0.848	0.290	-0.112	0.398
Functionally Impaired	3.779	1.284	0.380	0.955
Income Levels				
Low income	1.807	0.639	0.813	0.503
Middle income	0.460	0.423	0.664	0.318
R2	0.108	0.081		
Adjusted R2	0.102	0.074		

Source: Agency for Health Care Policy and Research, Department of Health and Human Services. National Medical Expenditure Survey - Household Feasibility Study

Table 5: Logistic Regression Models to Predict Hospital Stays

Dependent Variable: Hospital Stays (0 = 0 Stays, 1 = At Least 1 Stay)

Independent Variables	Self	S.E.	Proxy	S.E.
Intercept	-4.03	1.08	-3.47	0.70
Health Status	-1.02	0.36	-0.67	0.32
Male	-0.13	0.36	-0.34	0.24
Age	0.18	0.04	0.32	0.12
Race				
Black/Not Hispanic	1.18	0.83	-0.04	0.75
White/Not Hispanic	0.40	0.84	-0.15	0.56
Hispanic	0.88	1.24	0.67	0.67
Marital Status				
Divorced/Separated	-0.36	0.48	-1.22	0.59
Married	-0.24	0.58	-0.96	0.31
Widowed	-0.42	0.36	-1.05	0.84
Functionally Impaired	0.73	0.30	0.91	0.70
Income Levels				
Low income	1.16	0.32	1.12	0.54
Middle Income	0.62	0.33	1.35	0.37

Source: Agency for Health Care Policy and Research, Department of Health and Human Services. National Medical Expenditure Survey - Household Feasibility Study

References: For a complete list of references please contact the author.