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Health Status and Attitudes Towards Health in Medical Expenditure Panel Survey (MEPS) Sample Population

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ABSTRACT

BACKGROUND: Studies have shown that lack of health insurance is associated with important clinical characteristics, including using fewer health care services, delaying seeking medical care and forgoing necessary care for potentially serious symptoms. **OBJECTIVE:** To examine associations between health status and attitude about health in sample Medical Expenditure Panel Survey population (MEPS). **DESIGN:** The Household Component (HC) public use file from the 2005 MEPS data, a nationally representative survey of the noninstitutionalized US population was used. Health attitudes and health status were measured using the Self-Administered Questionnaire (SAQ) data collected within MEPS. **ANALYSIS:** Data were analyzed using SAS® 9.1.3. Descriptive statistics were obtained using PROC UNIVARIATE. PROC CANCORR in SAS® was used to measure canonical correlation between set of attitude about health variables and set of health status variables. **RESULTS:** The mean age of sample population was 46.33 years (Standard deviation: 17.69). Majority of them were female 60.6% and white 77.2%. The first canonical correlation was 0.32 (11% overlapping variance); the second was 0.08 (0.6% overlapping variance). All four pairs of canonical variates accounted for the significant relationships between the two sets of variables. Canonical Redundancy Analysis obtained using PROC CANCORR in SAS® found first health status variate accounting 4% of the variance in the attitude about health variable set. **CONCLUSION:** Persons health status and their attitude about health are moderately related. Further studies need to be conducted with more measures of attitude about health to determine exact relationship between health status and attitude about health.

Keywords: BASE STAT FUNCTIONS, PROC CANCORR.

INTRODUCTION

Lack of health insurance is more common among many US citizens, unlike citizens of most other developed countries. (1,2) There was a brief decline from 1997 to 1999 in the number of uninsured, but by the year 2003 it had reached a new high 43.6 million, or 17.3% of the individuals under age 65 years. (3) Prior studies have shown that lack of health insurance is associated with important clinical characteristics, (4-6) including using fewer health care services, (7-9) delaying seeking medical care (10) and forgoing necessary care for potentially serious symptoms (11). The uninsured also encounter greater barriers to access medical services (12) and treatment of chronic illness and receive less than optimal end of life care, than the insured. A number of studies have also examined the clinical effects of lack of insurance.

Health insurance helps individuals receive timely access to medical care and protects them against the risk of expensive and unanticipated medical events. In addition to the socioeconomic profiles that distinguish individuals with coverage from those who are uninsured, attitudes regarding the need for and value of health insurance coverage may also impact on coverage decisions. Given the potential for these health care preferences to influence health behaviors, it is important to measure the population's attitudes towards health insurance coverage and to examine the persistence of these attitudes over time.

Some authors have suggested the possibility of reverse causality between health status and health insurance. They suggest that, compounding the problems caused by health insurance's effect on health status, consumers with poor health status also find it difficult to purchase health insurance in the current market and find it more expensive than do consumers with better health. This makes it difficult to investigate and interpret relationships between health insurance and health status using simple statistical models. Further relationship between health status and attitude about health is unexplored. This study examined associations between health status and attitude about health, using data from the 2005 Medical Expenditure Panel Survey.

OBJECTIVE

The objective of this study was to evaluate the relationship between health status and attitude about health in a sample MEPS population. There were three specific aims: determine health status in sample population, determine the level of attitude about health in sample population, and finally determine the relationship between health status and attitude about health in the sample population.

METHOD

DATA SOURCE

Data from the Household Component (HC) public use file from the 2005 MEPS database were analyzed in the study. The MEPS was designated to provide nationally representative estimates of expenditure, health services utilization, insurance coverage, insurance type, and sources of payment for the current US civilian non-institutionalized population. (13) The survey is conducted approximately every 10 years by the Agency of Healthcare Research and Quality (AHRQ). The HC File collects detailed data on approximately 10,000 families and 24,000 individuals across the nation on demographic characteristics, health status, health conditions, use of medical services, charges and payments, income, employment status, and health insurance coverage. A stratified multistage area probability design was used in the survey. In addition, ethnic minorities and low-income families were oversampled. This was done because of the policy interests of the Agency for Healthcare Research and Quality.

MEASURES

The survey was fielded with interviews and questionnaires; separate instruments were used for adults and children (age 0-17 years). The 2005 Self-Administered Questionnaire (SAQ) was a paper-and-pencil questionnaire, designed to collect a variety of health status and health care quality measures of adults.

The SAQ contained three measures of health status, the Short-Form 12 Version 2 (SF-12v2), the Kessler Index (K6) of non-specific psychological distress, and the Patient Health Questionnaire (PHQ-2). (14, 15, 16)

Short-Form 12 Version 2 (SF-12v2): SF-12v2 is made up of 12 items and has good psychometric properties. It is made up of underlying conception that overall health is composed of a physical component and a mental component. A scoring algorithm is used to obtain Physical Component Summary (PCS) and Mental Component Summary (MCS) score. Higher scores indicate better functioning. Both PCS and MCS scores were used in this study.

Kessler Index (K6): This questionnaire is made up of 6 items, which measure non-specific, rather than disorder specific, psychological distress. The summary of 6 items provides the index score. Higher values of K6 index indicates greater tendency towards mental disability. K6 index score were used in this study.

Patient Health Questionnaire (PHQ-2): PHQ-2 is made up of 2 items which assess frequency of person's depressed mood and decreased interest in usual activities. Scores range from 0 through 6; higher scores indicates greater tendency towards depression. PHQ-2 scores were used in this study.

SAQ includes four questions that measure attitude about health. The first 2 items deal with attitudes towards health insurance, while the remaining 2 items deal with attitudes that might influence decisions to purchase health insurance or to use health services. Responses are obtained on a 5 point Likert scale; 1 for disagree to 5 for strongly agree. Responses to these 4 items were used in this study.

STUDY POPULATION

Household Component public use file for the year 2005 included 33,960 observations. Adults aged 18 years and older (N=6452 observations) were selected for the present study. Variables measuring socio-demographics, health status and attitude about health were selected for analysis.

STATISTICAL ANALYSIS

Data were analyzed using SAS® 9.1.3. Descriptive statistics were obtained using PROC UNIVARIATE. PROC CANCORR in SAS® was used to measure canonical correlation between set of attitude about health variables and set of health status variables. Dataset was checked for missing data. Assumptions of linearity and homoscedasticity were checked using scatter plot of individual canonical variate pairs. Assumption of normality was checked. PROC UNIVARIATE was used to find univariate outliers. Leverage values were obtained for each set of variables by 2 multiple regressions; set of variables were entered as independent variables. Using a critical leverage value of 0.0425 for 4 variables; multivariate outliers were determined. Tolerance (sing) value was specified in PROC CANCORR to protect against multicollinearity and singularity. (17)

The following is the source code for analysis:

```
/* Code for Canonical Correlation between latent variables measured by variables  
ADINSA42 ADINSB42 ADRISK42 ADOVER42 & PCS42 MCS42 K6SUM42 PHQ242 */
```

```
PROC CANCORR DATA=Library.FileName1  
OUT=Library.FileName2
```

```

SING=1E-8;
VAR ADINSA42 ADINSB42 ADRISK42 ADOVER42;
With PCS42 MCS42 K6SUM42 PHQ242;
Run;

/* Code to plot pair wise scatter plot of each canonical variate */

PROC PLOT data=Library.Filename2;
plot w1*v1;
plot w2*v2;
plot w3*v3;
plot w4*v4;
run;

```

RESULTS

The mean age of sample population was 46.33 years (Standard deviation: 17.69). Majority of them were female 60.6% and white 77.2%. The mean years of education was 11.86 years (Standard deviation: 3.34).

Canonical correlation was performed between a set of attitude about health variables and a set of health status variables using PROC CANCORR. The attitude about health set included two variables measuring attitude towards health insurance (ADINSA42 & ADINSB42) and two variables measuring attitude that might influence decisions to purchase health insurance or to use health service (ADRISK42 & ADOVER42). The health status set measured physical health status (PCS42), mental health status (MCS42), non-specific psychological distress (K6SUM42) and a person's tendency towards depression (PHQ242). Increasingly large numbers reflected more conservative attitudes towards health insurance, decision to purchase health insurance or to use health service, better physical health status, better mental health status, poor mental disability and greater tendency towards depression.

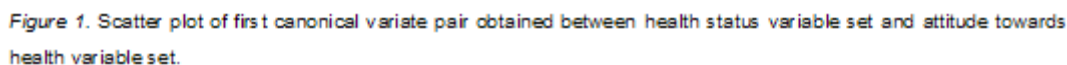
There were no missing data in the selected sample population. Assumptions regarding within-set multicollinearity were met by setting the tolerance level in PROC CONCORR. Assumptions regarding normality and homoscedasticity were checked by plotting pair wise scatter plot of each canonical variate. No violations of assumption of normality or homoscedasticity were observed in scatter plots (Figure 1). Assumptions of linearity were not met as variables measuring attitude towards health insurance (ADINSA42) and tendency towards depression (PHQ242) were positively skewed. Log transformation to improve linearity of relationship between variables and normality of distributions were applied to these 2 variables. However, no substantial improvements in study results were obtained with these transformations; hence for better interpretation of study results the log transformation was not carried out on these variables. No univariate outliers were identified using PROC UNIVARIATE. No within-set multivariate outliers were identified at $p < 0.001$, leaving $N=6452$.

The first canonical correlation was 0.32 (11% overlapping variance); the second was 0.08 (0.6% overlapping variance). The remaining two canonical correlations were 0.04 and 0.03 with 0.1% and 0.09% overlapping variance respectively. With all four canonical correlations included, $F(16, 19687) = 50.76$, $p < 0.001$, and with the first canonical correlation removed, $F(9, 15686) = 6.71$, $p < 0.001$. Subsequent F tests were statistically significant; though the canonical variates only accounted for 0.1% and 0.09% variance in two set of variables. All four pairs of canonical variates, therefore, accounted for the significant relationships between the two sets of variables.

Data on the four pairs of canonical variates appear in Table 1. Shown in the table are correlations between the variables and the canonical variates, standardized canonical variate coefficients, within-set variance accounted for by the canonical variates (percent of variance), redundancies, and canonical correlations. Total percent of variance and total redundancy indicate that the first pair of canonical variates was moderately related, but the second pair was only minimally related; interpretation of the second pair is questionable. Similarly the third and fourth pair of canonical variates were minimally related and their interpretation is too questionable.

With a cutoff correlation of 0.3, the variables in the health status set that were correlated with the first canonical variate were PCS42, MCS42, K6SUM42 and PHQ242. Among the attitude about health variables, ADINSA42, ADRISK42 and ADOVER42 correlated with the first canonical variate. The first pair of canonical variates indicates that those who felt they do not need health insurance (0.78), were more likely to take risk (0.31) and believed they can overcome illness without medical help (0.88), are associated with better physical health status (0.94), mental health status (0.36) less mental disability (-0.42) and less tendency towards depression (-0.46).

Third and fourth canonical variate pairs although significant accounted for only 0.1% and 0.09% of variance in both variable sets. Because of smaller overlapping variance; correlation loadings of individual variables on these variates were not interpreted.



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Table 1

Correlations, Standardized Canonical Coefficients, Canonical Correlations, Percents of Variance, and Redundancies between Health Status and Attitude about Health Variables and Their Corresponding Canonical Variates

	Canonical Variate							
	First		Second		Third		Fourth	
	Correlation	Coefficient	Correlation	Coefficient	Correlation	Coefficient	Correlation	Coefficient
Health Status set								
SF-12 PCS	0.94	0.95	0.19	0.49	-0.18	-0.18	-0.24	0.06
SF-12 MCS	0.36	0.40	-0.69	0.01	0.27	0.37	0.57	1.33
K6 Index	-0.43	0.16	0.89	0.94	0.16	1.32	0.08	0.42
PHQ-2 Score	-0.46	-0.07	0.67	0.12	-0.51	-1.30	0.28	0.80
Percent of Variance	0.35		0.44		0.10		0.12	Total = 1.01
Redundancy	0.0378		0.0029		0.0002		0.0001	Total = 0.04
Attitude about Health set								
Do not need health insurance	0.78	0.53	0.27	0.09	-0.56	-1.00	-0.06	-0.01
Health insurance not worth cost	0.28	-0.10	0.72	0.70	0.22	0.28	-0.60	-0.78
More likely to take risk	0.31	-0.03	0.67	0.66	0.22	0.18	0.64	0.83
Can overcome illness without medical help	0.88	0.70	-0.70	-0.53	0.46	0.74	-0.01	-0.04
Percent of Variance	0.39		0.26		0.16		0.19	Total = 1.00
Redundancy	0.0424		0.0017		0.0003		0.0002	Total = 0.04
Canonical correlation	0.33		0.08		0.04		0.03	

Canonical Redundancy Analysis was obtained using PROC CANCORR. The first health status variate accounted for 4% of the variance in the attitude about health variable set, and the second health status variate accounted for 0.3% of the variance. Similarly the variance accounted by third and fourth health status variates was very small; 0.02% and 0.01% respectively. Together all 4 health status variates explained 4% of variance in the attitude about health variable set. The first attitude about health variate accounted for 4% of variance in the health status set, and the second attitude about health variate accounted for 0.1% of variance. Similarly the variance accounted by third and fourth attitude about health variates was very small; 0.03% and 0.02% respectively. Together all 4 attitude about health variates explained 4% of variance in the health status variable set.

CONCLUSION

Total percent of variance and total redundancy indicates that first pair of canonical variates was moderately related. Second, third and fourth pair of variates were minimally related and although significant, their interpretation was questionable. The study results thus indicate that there exist some association between health status and attitude about health in sample population.

The first pair of canonical variates indicated that those who were risk takers, felt they do not need health insurance and believed that they can overcome illness without medical help were found to have better health status measures. This association indicates that people with good health status generally have less favorable attitude toward health and specifically health insurance. Negative attitude observed in these healthy individuals may be a result of less demand for health services.

The preliminary conclusion of this study is that persons health status and their attitude about health are moderately related on some dimension. Further studies need to be conducted with more measures of attitude about health to determine exact relationship between health status and attitude about health.

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RECOMMENDED READING

Tabachnick, B., G., & Fidell, L. S. (2001). *Using Multivariate Statistics* (4th ed.) Needham Height, MA: Ally & Bacon.

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