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**Abstract:** Objectives: This study aims to understand how do the socio-demographic and personal factors impact the level of tradeoff people make in daily life in the USA due to problems in paying medical bills.

Methods: This study used the 2007 wave of Health Tracking Household Survey (HTHS) data. The unit of analysis was an individual. The dependent variable was level of tradeoff. A cumulative logit model measured the effect of independent variables on the dependent variable, which was ordinal.

Key Findings: Pre tax family income, out of pocket spending for medical care during past twelve months, perceived health status, type of family, ethnicity and age had significant impact on level of tradeoff experienced by individuals. Odds of making severe tradeoff increased significantly for people with low income, poor self-reported general health status, higher out-of pocket medical expenditure and single parents. Compared to Caucasians, African-Americans were worse affected because of problems in paying medical bills. Younger people made higher level of tradeoff compared to elderly because of medical debt.

Conclusions: Problems in paying medical bills forced people to forgo basic necessities of life, which could impact the nutritional status, access to health care and living condition of people. Higher level of tradeoff in daily life could potentially affect health of an individual in long run. Poor people were worst affected because of medical debt. This study could prompt policy makers to provide more support to indigent people, people with higher out of pocket medical expenses, poor health conditions to ensure adequate access to basic necessities of life.

**Key words:** Tradeoff; Effect of problems in paying medical bills; Poor people; Health Tracking Household Survey; USA

# 1 Introduction

During the year 2006, the USA spent approximately 16% of its gross domestic product on national health.[1] During the same year, consumers' out-of-pocket spending for healthcare amounted to $256.5 billion, which represented an increase by 3.8% compared to the year of 2005.[1] Out of pocket spending by consumers constituted a significant part of total national health expenditure in the USA. According to the Centers for Medicare and Medicaid services, in the year 2009, the out of pocket spending for healthcare accounted for 12% of the national health expenditure.[2] However the out of pocket expenditure was not evenly distributed across the population in the USA. Data from the Medical Expenditure Panel Survey (MEPS) revealed that in the year 2004, 17.7% of the nonelderly population in the USA belonged to families whose out of pocket healthcare expenditure was greater than 10% of after-tax family income.[3] Data obtained from the MEPS found the percentage of non-elderly individuals whose family spent more than 10% of their disposable income for health care as out of pocket expenses increased from 15.8% in 1996 to 19.2% in 2003.[4] Increasing out of pocket expenses for healthcare had greatest impact among those below the federal poverty line (FPL). For those with income below the FPL, the percentages of nonelderly people whose family out of pocket spending was greater than 20% of after tax family income increased by almost 6.3% from 1996 to 2003.[4]

Increasing financial burden due to health care might cause families to face other serious problem such as sacrificing necessities like food or clothing, borrowing money, taking money out of savings and filing bankruptcy in worst cases. According to the Health Tracking Household Survey (HTHS) of the USA in the year 2007, among those who faced problems paying for medical bills during past 12 months, 65% had problems paying for other necessities, 52.2% had to put off major purchases such as new home or car, 62.2% were contacted by collection agencies, 61.7% had to take money out of savings and 53.4% had to borrow money. [5] Due to the problem in paying medical bills people have to make difficult tradeoffs in daily life. Tradeoff is defined as "an exchange of one thing in return for another, especially relinquishment of one benefit or advantage for another regarded as more desirable".[6] Previous studies attempted to explore the relationship between various socio-economic and demographic variables and different problems people faced due to financial burden of medical care. Analyzing the 2003 wave of the Community Tracking Study (CTS) Household Survey, Wiltshire et al found that

people below the FPL were more likely to report being contacted by collection agencies, borrow money, face problems to pay for other necessities or use savings to pay off their medical debt.[7] They also found an inverse relation between perceived health status and financial hardship. However, there was mixed relationship between insurance status and different problems faced by families. Compared to privately insured, uninsured had less propensity of taking money out of savings to pay medical debt, whereas they were more likely to be contacted by collection agencies.[7] An analysis among persons aged 65 and younger with employer-sponsored coverage in the year of 2007 found those with poor health conditions, families with children compared to married couples, African-Americans compared to Whites and Hispanics, and those living in metropolitan areas had a higher probability of having medical bill problems.[8]

In healthcare policy analysis, no study was available to understand how the increase in financial burden due to medical care in the USA affected the amount of tradeoff people make in daily life. Utilizing data from the HTHS of 2007, the present study attempted to fill this gap by analyzing the impact of socio-demographic and personal factors on the level of tradeoff. The uniqueness of the present study was that it measured tradeoff as a combination of different problems people faced in their daily life due to medical debt. This study addressed the following research question: How do the socio-demographic and personal factors impact the level of tradeoff due to medical debt people make in daily life in the USA?

## 2 Literature Review

The underlying theme of the present study was to explore whether people who belong to different socio-economic groups are hit equally by the financial burden due to medical care. At this point a brief discussion is offered to explain why this exploration of "equally hit or not by financial burden due to medical care" is important.

The concept of equity has been a major area of concern among many social scientists, economists and philosophers. In the fifth Henry Simons lecture, Professor James Tobin argued that some specific scarce commodities should be distributed less unequally than a person's ability to pay for it. He coined this as "specific egalitarianism" and asked the question of whether there was any possibility for removing the necessities of life, such as nutrition, basic shelter, and access to medical care from the list of all

commodities in such a way that given an unequal income distribution in the society those crucial commodities would be distributed less unequally than the market would distribute those based on ability to pay.[9] In his keynote address to the Third Conference of the International Health Economics Association on "The Economics of Health: Within and Beyond Health Care" Professor Amartya Sen argued that "health is among the most important conditions of human life and a critically significant constituent of human capabilities which we have reason to value". He further argued that equity in the achievement and distribution of health was a very important constituent of understanding the broad area of social justice.[10]

Researchers over the last two centuries also documented a relationship between health and various correlates of socioeconomic status such as income, wealth, education, and social class. The relationship between health and income was referred to as a "gradient". This gradient implied that health improved with income throughout the income distribution.[11]It was also interesting to observe that there was a two-way causal relationship between income and health. Using National Longitudinal Mortality Study (NLMS) data and controlling for years of schooling, Deaton and Paxson showed that for people between 25 and 59 years of age, when income was doubled, the probability of death was reduced by 27% during the first-year of follow-up. It was also difficult for poor people to demonstrate good health behavior like conforming to complicated and time intensive treatment strategies. Harmful health behavior was negatively associated with income and education. Researchers, who had a viewpoint that health was socially produced, also argued that risky health behavior was a result of low education and income.

A wide range of literature is available that describes the relationship between income inequality and health outcomes of population. (See Macinko et. al.[12] for an excellent review of this literature). This area of research found that absolute level of income had a positive correlation with better health outcomes. Similarly, societies with equitable income distribution had a better health outcome compared to those with more unequal distribution of income. In fact, the association between change in absolute income level and changes in mortality rate over time was low.[13] This led to the development of a consensus that considering relative income is an indicator for health outcomes.

Ethnicity also played a significant role in the quality of medical care received and health outcomes generated among the population in the USA. One report by the Institute of Medicine (IOM) mentioned that "racial and ethnic disparities in healthcare exist and, because they are associated with worse outcomes in many cases, are unacceptable."[14] However, studies also demonstrated that socioeconomic conditions were a stronger determinant of health outcomes compared to ethnicity. After controlling for socioeconomic condition, the effect of race on health outcomes diminished.[15]

Citing data from the National Center for Health Statistics, James Smith mentioned that between 1979 and 1989, the average life expectancy for Caucasians in the United States with family income below $10,000 was 6.6 years lower than Caucasians with family income more than $25,000; while for the same income groups, the difference in average life expectancy was 7.4 years among African-Americans. When specific causes of deaths were estimated, it was observed that during the same period of time, families with low income had a higher death rate from chronic diseases compared to families with higher income. Across industrialized nations, health outcomes indicators such as average mortality have a strong relationship with income inequality within countries, rather than average income difference between countries.[16] In his editorial comment in the British Medical Journal, George Smith argued that whatever be the absolute material standards of living in a country, the inequality in income was bad for national health. Smith cited Wilkinson's argument based on psychological principles that "instead of direct material standards, health effects of income distribution involve social and cognitive processes".[17]

While examining the relationship between health outcomes and inequality in income in the United States, Kaplan et al found that income inequality was significantly associated with age specific mortality and other health outcomes such as low birth weight. They suggested that if economic policies like taxation, transfer payments, job creation, and differential growth decay of various sectors of economy are supportive of increasing income inequality in a society then it could be detrimental to the population health.[18]

By using income, household size, and poverty data from the 1990 United States census and mortality adjusted for age Kennedy et.al. found that income inequality was positively associated with total mortality and cause specific mortality adjusted for age. They argued that income distribution might act as an indicator for the degree of investment in human capital in a society. Those societies which tolerate a high degree of income inequality might be those with less investment in human capital like education and access to medical care. The authors further argued that income inequality could produce higher mortality by not providing sufficient access to treatable causes of mortality and policies should be designed to reduce income disparity and to create positive impact on population level health.[19]

Examining the association between income inequality and mortality in 282 metropolitan areas in the USA, Lynch et al found that depending on the measure of inequality of income the mortality for area with high income disparity was more by 64.7 to 95.8 deaths per 100,000 compared to areas with low income inequality. They also found that for areas with low average income and high income inequality the mortality was more by 139.8 deaths per 100,000 compared to areas with low income inequality and high average income. They suggested that public and private sector initiatives should be taken to reduce the prevailing income inequality in the USA, which might reduce the high burden of mortality.[20]

The level of education people achieve has also been reported to affect their health. In a direct way, educational attainment affects the potential earning opportunity of a person and her opportunity to have access to material resources like healthcare, food, housing, which influenced health. Education also helps a person to develop her cognitive ability to understand and value health outcomes. Using the NLMS data for 1979 till 1985, Elo and Preston showed that college graduates in the United States tend to have a lower mortality than high school graduates and educational attainment had a significant effect on adult mortality in different age groups across male and females.[21]

Though a wide range of literature explored the relationship between various socio-demographic, personal factors and health outcomes, no study was available which looked at the relationship between socio-economic factors and level of tradeoff people made due to financial stress from medical care. This is the primary motivation behind the present study.

## 3 Methods

This study used the public use data from the 2007 wave of HTHS, which was conducted by the Center for Studying Health System Change (HSC).[22] Using a computer assisted telephone interview, the HTHS collected information about health insurance coverage, access to care, health status, health expenses, socio-demographic information, unmet needs and many other topics from 17,797 individuals representing the civilian, non-institutionalized population of the USA. The survey was conducted between April 2007 and January 2008. The overall response rate of the survey was 43.5%.[23]

The survey asked a respondent whether the person or his/her family had any problems paying medical bills during last 12 months. The survey further asked respondents that because of problems paying medical bills whether the person or his/her family encountered other issues such as: a) problems in paying for other necessities, b) put off major purchases such as a new home or car, c) had to take money out of savings, d) had to borrow. Responses to those questions were coded as yes or no. The measure of level of tradeoff, which was the dependent variable in this study, was constructed by combining the responses to above mentioned four items. If a respondent answered "no" to all those four items, it was considered that the person made no tradeoff. If a respondent answered "yes" to only one of those four items and "no" to rest three of those items then that person made a little tradeoff. Similarly if a person answered "yes" to all four of those questions, he/she was considered to make maximum level of tradeoff. The level of tradeoff was considered as an ordinal variable with five levels (0, 1, 2, 3 and 4) in the analysis.

This study considered respondents' gender, age (four categories: less than 18 years old, 18 to less than 40 years old, 40 to less than 65 years old, at least equal to 65 years old), income, ethnicity (four categories: White only non-Hispanic, African American only non-Hispanic, Hispanic and All other non-Hispanic), self-reported general health status (three categories: excellent or very good, good, fair or poor), educational attainment, total out-of-pocket medical costs for the family in previous twelve months, insurance status, family type (five categories: single person, married couple with no kids, married with kids, single with kids, non-nuclear family), region of living (four categories: northeast, midwest, west and south) and area of living (three

categories: large metro with population over 200 thousand, small metro with population less than 200 thousand, non-metropolitan area) as independent variables in the analysis. The educational attainment was measured as a categorical variable with three categories: a) those who did not complete a high school diploma, b) those who completed at least a high school but did not have a Bachelor's degree, and c) those who completed at least a Bachelor's degree. The total pre tax annual income of a census family was divided by the USA Census Bureau poverty level to represent income as a percentage of the federal poverty level (FPL). According to the National Healthcare Disparities Report, the study sample was divided into four income groups: a) poor people with income below FPL, b) near poor group refers to income between 100% and less than 200% of the FPL, c) middle income refers to those between 200% and 400% of the FPL, d) high income group with income level equal to 400% or more of the FPL. The total out of pocket medical costs was divided in three categories: a) less than $500, b) between $500 and $2000, and c) equal to or more than $2000. Insurance status was considered as a binary variable: a) insured and b) uninsured.

This study considered an individual as the unit of analysis. The study included 2867 individuals who mentioned having a problem in paying medical bills during last twelve months. Among them 15 respondents were excluded from the analysis as they refused to mention or were not able to indicate the total out-of-pocket medical costs during last twelve months.

Descriptive statistical analyses were conducted to describe characteristics of the sample. As the dependent variable was ordinal in nature, a cumulative logit model was developed to measure the effect of independent variables on the dependent variable.

All statistical significance tests were conducted at a significance level of 0.05. This study was approved by the Institutional Review Board of the Chicago State University.

## 4 Results

The total sample size for the study was 2852. Most individuals lived in large metropolitan areas and were white. Most individuals were also female and had some type of health insurance. A majority of individuals finished high school but did not complete a Bachelor's degree. Almost 17.53% of individuals were below the FPL and 23.46% of

individuals belonged to high income group with income level equal to 400% or more of the FPL. Only 7.96% of individuals were elderly. Overall 43.16% of individuals were married couple with kids, whereas 19.35% of individuals belonged to a single person family. Approximately 43.69% individuals reported their general health status as excellent or very good, while 29.52% reported it as fair or poor. Almost 36.64% individuals reported their total out of pocket medical expenditure during last 12 months as equal to or greater than $2000. Approximately 20% of the sample had no insurance. Table 1 lists the socio-demographic characteristics of the sample.

Because of problems paying medical bills during past twelve months, most individuals (62.38%) had problems paying for other necessities of daily life. Almost 52.66% of individuals had to put off major purchases, such as a new home or car. Overall 64.27% of individuals had to take money out of savings and 50.84% of individuals had to borrow money because of problems paying medical bills during past twelve months. Approximately 8.17% of individuals did not have to make any tradeoff (level = 0) though they had problems paying medical bills during last 12 months. Around 16.94% of individuals made maximum amount of tradeoff (level = 4) due to problems in paying medical bills. Table 2 lists the frequency of the outcome variables used in the study.

The Likelihood ratio test indicated overall model was statistically significant ($P < 0.0001$). Table 3 lists the effects of different independent variables on the level of tradeoff. Pre tax annual income was a significant predictor of the level of tradeoff. Controlling for all other independent variables, the estimated odds for a poor person will experience more tradeoff rather than less tradeoff was 1.87 times the estimated odds for a rich person. Similarly, compared to rich people, the estimated odds of experiencing a severe tradeoff rather than less increased by 1.66 times ($P < 0.05$) and by 1.41 times ($P < 0.05$) for a person in near poor group and in middle income group respectively. The out-of-pocket spending for medical care over last twelve months significantly influenced the tradeoff. The odds of experiencing a higher level of tradeoff rather than less increased by 1.42 times ($P < 0.05$) for those with out-of-pocket spending between $500 and $2000 compared to those who spent less than $500. The estimated odds a person with out-of-pocket spending more than $2000 would experience a greater extent of tradeoff rather than less was more than double (OR = 2.24, $P < 0.05$) compared to a person who spent less than $500 over last twelve months.

The level of tradeoff experienced by an individual was significantly influenced by the self-reported general health status. Compared to those with poor or fair health status, the estimated odds of experiencing a higher level of tradeoff rather than less decreased by almost 25% ($P < 0.05$) and 22% ($P < 0.05$) for a person with good health and excellent health respectively. Ethnicity also had a significant influence on the severity of tradeoff. Compared to Caucasians, the odds of having a greater tradeoff increased by 1.51 times ($P < 0.05$) for African-Americans and by 1.29 times ($P < 0.05$) for people belong to all other non-Hispanic group. The study did not find any statistically significant difference in extent of tradeoff experienced by Hispanics compared to Caucasians. Among other explanatory variables, family type and age were significantly associated with the severity of tradeoff. The odds of experiencing a greater extent of tradeoff increased by 48% ($P < 0.05$) for single parents and decreased by 20% ($P < 0.05$) for married parents compared to a family of single person. Compared to elderly people, younger individual tend to experience a significantly higher level of tradeoff. People belong to 18 and 40 years old reported significantly higher cumulative odds (OR = 2.10, $P <0.05$) of having a tradeoff than elderly people, whereas those belong to 40 and 64 years reported an odds ratio of 1.87 ($P < 0.05$) while compared to elderly people. The estimated odds of having a greater extent of tradeoff instead of less increased by 2.7 times ($P < 0.05$) for individual belong to less than 18 years old compared to elderly people. The study did not find any statistically significant influence of insurance status, gender, highest level of educational attainment, type of area of staying and region of living on the level of tradeoff.

## 5 Discussion

The present study found that pre tax family income, out of pocket spending for medical care during past twelve months, perceived health status, type of family, ethnicity and age had significant impact on level of tradeoff experienced by individuals. Among people belong to different income groups, the poor people were worst affected due to medical debt. With decrease in income the odds of a person making a higher level of tradeoff increased. While compared to high income group, the odds of having a greater amount of tradeoff rather than less followed a descending order among the poor, near-poor and middle income group respectively. Poor people often experienced a greater extent of financial pressure because of previously accumulated large medical debts which they were unable to pay off. Poor people also tend to use a greater share of their

little income to satisfy other daily requirements of life, which left them with very little or no money to spend for medical care. A previous study based on 2007 wave of HTHS data revealed that even at a very low level (2.5% of family income) of out of pocket spending for medical care about 31.3% of people with family income less than 200% of FPL reported financial trouble due to medical bills compared to 16.2% and 8% of people with family income between 200% and 400% of the FPL and above 400% of FPL respectively.[24] Out of pocket spending for medical care during past twelve months had a significant contribution to the extent of tradeoff experienced by people in daily life. The odds of having a greater extent of tradeoff increased significantly with higher out of pocket expenditure for medical care.

Self reported general health status had significant impact on level of tradeoff. People with poor or fair health status had to make a greater level of tradeoff compared to those with good health and excellent health status. The odds of making more tradeoff compared to less followed a descending order as the self reported general health status improved. However, this study used self-reported general health status instead of actual health status of an individual in the analysis, thus representing one of the limitations of the study. The present study also found that odds of making a severe tradeoff was more pronounced for younger people compared to elderly. Elderly people had Medicare coverage, which could help them to experience a lesser extent of tradeoff. Among different types of families, single parents were the worst affected group. Compared to families of single person, the odds of making a higher level of tradeoff increased by at least 13% for single parents, while it decreased by at least 2% for married families with kids. The present study found that African-Americans were adversely affected compared to Caucasians. The African-Americans had to make significantly more tradeoff compared to Caucasians in daily life due to financial stress arising from medical care. This study did not find any significant gender difference in the level of tradeoff encountered by people. Previous studies produced conflicting evidence of association between gender and financial hardship due to medical debt. While Wiltshire et al. found that women were less likely to experience financial hardship compared to men because of healthcare related expenses, a survey by the Commonwealth Fund in 2007 had opposite findings.[7,25] This study considered health insurance status as a binary variable, because of which the extent of coverage provided by different insurance plans was not captured in the analysis. This is a probable reason behind the non-statistically significant

impact of insurance status on level of tradeoff. Further inclusion of type and amount of health insurance coverage is necessary to obtain a better picture of impact of insurance status on level of tradeoff.

## 6 Limitations

The data used in the study were self-reported by individual. This could introduce recall bias, which could potentially impact results of this study. Respondents also reported the out of pocket medical expenditure. Self – report of expenditure data could cause misclassification bias, which in turn would affect the odds ratio. The present study used self reported general health status instead of actual health status of respondents. Self reported health status does not always reflect the actual health status and different disease conditions experienced by an individual. The difference between self-reported general health status and actual health status could cause a potential problem in measuring the actual impact of health status on tradeoff. Moreover, due to data access limitations, the study could not obtain personal health information and disease profile of respondents. This limited the opportunity of analyzing the relationship between different disease profile (chronic vs. acute) and extent of tradeoff. The data used in this study were cross sectional in nature, which limited the causal interpretation. It provided a snapshot of tradeoff experienced by people at a time point. However, it did not reveal any trend in tradeoff process over time.

## 7 Conclusions

The uniqueness of the present study is in making an attempt to understand the impact of different socio-demographic and personal factors on the extent of tradeoff people make in daily life due to financial stress from medical care. Previous studies attempted to measure impact of socio-demographic and personal factors on health outcomes, but not on level of tradeoff made in daily life due to financial stress from medical care. This is the original contribution of the present study. The key finding of the study was that low income, poor self-reported general health status, higher out-of pocket medical expenditure forced people to make severe tradeoff and sacrifices in daily life. These sacrifices included not being able to pay for other necessities of life, putting off major purchases, exhaust savings and even borrowing from other sources. Inability to provide necessities of life like nutritious food, adequate housing and clothing might make the indigent population more vulnerable to poor health conditions. Individuals also

considered actions like taking money out of savings and borrow from other sources to support the needs of their daily life. When poor individuals exhaust their savings or increase their debt by borrowing they potentially make them more vulnerable to adverse conditions like poor credit history, which could limit their access to necessary medical resources in case of catastrophic illness. Single parents were worse affected compared to those who were married with kids. People who were married with kids could provide a better financial cushion in case of medical adversities. Suitable policy initiatives should be undertaken to provide more support to indigent people, people with higher out of pocket medical expenditure and single parents to ensure that people belong to these groups do not have to forgo basic necessities of life due to problems in paying medical bills.

This study also provides various opportunities for future research. In context of the USA, further research is required to understand the change in the tradeoff level over time as experienced by people in daily life due to medical debt. In context of developing countries like India, this study and the database like HTHS can initiate a new area of research. In absence of health insurance coverage, low income families in India experience severe level of financial sufferings in case of medical emergencies. The rising inflation rate and the high cost of medical care at private facilities produce severe financial strains on families belong to poor and middle economic class. It is important to understand how the poor people in India are making tradeoffs in daily life due to high cost of medical care. This could assist the policy makers to take appropriate initiatives to help the indigent population.

Table 1 Socio demographic characteristics of individuals. n = 2852

| Characteristics | Number (%) |
|---|---|
| Gender | |
| Male | 1251 (43.86%) |
| Female | 1601 (56.14%) |
| Ethnicity | |
| White only, non-Hispanic | 1916 (67.18%) |
| African American only, non-Hispanic | 490 (17.18%) |
| All other non-Hispanic | 177 (6.21%) |
| Hispanic | 269 (9.43%) |
| Age | |
| Less than 18 years | 539 (18.90%) |
| Between 18 and less than 40 years | 818 (28.68%) |
| Between 40 and less than 65 years | 1268 (44.46%) |
| At least 65 years | 227 (7.96%) |
| Income group | |
| Below FPL | 500 (17.53%) |
| Near poor | 761 (26.68%) |
| Middle income | 922 (32.33%) |
| High income | 669 (23.46%) |
| Highest level of educational attainment | |
| Did not finish high school | 886 (31.07%) |
| Finished high school but did not have a Bachelor's degree | 1523 (53.40%) |
| Had at least a Bachelor's degree | 443 (15.53%) |
| Region of living (in the USA) | |
| Northeast | 436 (15.29%) |
| Midwest | 749 (26.26%) |
| South | 1210 (42.43%) |
| West | 457 (16.02%) |
| Type of area of living | |
| Large metropolitan area (population over 200,000) | 1815 (63.64%) |
| Small metropolitan area (population under 200,000) | 233 (8.17%) |
| Non-metropolitan area | 804 (28.19%) |
| Family Type | |
| Single person | 552 (19.35%) |
| Married couple, no kids | 638 (22.37%) |
| Married couple with own/step/adopt kids only | 1231 (43.16%) |
| Single with own/step/adopt kids only | 336 (11.78%) |
| Non-nuclear family | 95 (3.33%) |
| Self reported general health status | |
| Excellent or very good | 1246 (43.69%) |
| Good | 764 (26.79%) |
| Fair or poor | 842 (29.52%) |
| Insurance status | |
| Insured | 2277 (79.84%) |
| Uninsured | 575 (20.16%) |
| Total out of pocket medical expenditure during last twelve months | |
| Less than $500 | 810 (28.40%) |
| Between $500 and less than $2000 | 997 (34.96%) |
| At least equal to $2000 | 1045 (36.64%) |

Table 2 Frequency of outcome variables. n = 2852

| Variable | Number (%) |
|---|---|
| Problems paying for necessities | |
| Yes | 1779 (62.38%) |
| No | 1073 (37.62%) |
| Put off major purchases | |
| Yes | 1502 (52.66%) |
| No | 1350 (47.34%) |
| Take money out of savings | |
| Yes | 1833 (64.27%) |
| No | 1019 (35.73%) |
| Borrowed money | |
| Yes | 1450 (50.84%) |
| No | 1402 (49.16%) |
| Tradeoff level | |
| 0 (no tradeoff) | 233 (8.17%) |
| 1 | 503 (17.64%) |
| 2 | 770 (27%) |
| 3 | 863 (30.26%) |
| 4 (maximum tradeoff) | 483 (16.94%) |

Table 3: Effects of independent variables on level of tradeoff. n = 2852

| Independent variables | Odds ratio (95% CI) |
|---|---|
| Poverty level (reference: rich) | |
| Poor | 1.87 (1.49, 2.35) |
| Near poor | 1.66 (1.36, 2.02) |
| Middle income | 1.41 (1.17, 1.69) |
| Out of pocket medical expenses (reference: expenditure <$500) | |
| Between $500 and $2000 | 1.42 (1.20, 1.69) |
| Expense > $2000 | 2.24 (1.86, 2.70) |
| Perceived health status (reference: Poor or fair health) | |
| Good health | 0.75 (0.63, 0.90) |
| Excellent health | 0.78 (0.65, 0.93) |
| Ethnicity (reference: Caucasian) | |
| African American only non-Hispanic | 1.51 (1.45, 1.56) |
| Hispanic | 0.78 (0.62, 1.01) |
| All others non-Hispanic | 1.29 (1.16, 1.44) |
| Insured (reference: Insured) | 1.03 (0.86, 1.23) |
| Family Type (reference: Single person) | |
| Single with kids | 1.48 (1.13, 1.94) |
| Married with kids | 0.80 (0.65, 0.98) |
| Married People no kids | 0.94 (0.76, 1.16) |
| Age (reference: age> =65 yrs) | |
| < 18 yrs | 2.7 (1.86, 3.91) |
| 18 to 40 | 2.10 (1.55, 2.83) |
| 40 – 64 | 1.87 (1.43, 2.44) |
| Educational (reference: Completed at least a Bachelor's degree ) | |
| Did not complete high school | 0.80 (0.61, 1.06) |
| Completed at least high school but no Bachelor's degree | 1.16 (0.95, 1.41) |
| Region of Living (in the USA) (reference : South) | |
| Northeast | 0.99 (0.81, 1.21) |
| Midwest | 1.09 (0.92, 1.29) |
| West | 1.33 (1.09, 1.63) |
| Gender (reference: Female) | 1.09 (0.95, 1.25) |
| Metropolitan area (Reference: Non Metropolitan area) | |
| Large Metro over 200,000 | 1.03 (0.88, 1.21) |
| Small Metro under 200,000 | 1.03 (0.79, 1.35) |

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**Professional Activities:** Kumar Mukherjee did his B.Pharm from Jadavpur University, Kolkata and his PGDM from TAPMI. After finishing his PGDM, he worked as an Area Sales Manager for TTK Prestige India Limited for 2 years. Then he moved to the USA to pursue higher studies. He completed a MS from the University of Toledo in the area of Pharmacy Administration. Subsequently he finished his PhD from the University of Florida in the area of Pharmaceutical Outcomes and Policy Research. Prior to joining TAPMI, he taught in the department of Pharmacy Practice at the Chicago State University for four years as an Assistant Professor. His primary areas of interest are application of quantitative techniques and microeconomic principles in healthcare management. He regularly presented research posters at the American Pharmacists Association (APhA) annual conference. He taught courses in the areas of Quantitative Techniques, Research Methods, Pharmacoepidemiology, Health Economics and Clinical Literature Evaluation.

**Research:** Understanding healthcare decision making at individual and population level, Impact of various clinical and health services on patients' well-being and quality of life (QOL), Impact of socio-economic variables on tradeoff made by consumers, Educational research in Healthcare.

**Publications:**

1. Mukherjee K, Segal R, Kenny LW, Kauf T., Effects of Change in Price of Medical Care on Daily Living of People in the United States – Published in the Journal of Pharmaceutical Health Services Research.
2. Airwodo K, Vu A, Shah A, Mukherjee K, Nobles Knight D., Community Pharmacist Services in the Patient-Centered Medical Home : A descriptive Study - Presented in the Annual Conference of American Pharmacists Association 2012.
3. Mehta P, Hardy Y, Johnson C, Mukherjee K, Assessing Hypertension Knowledge and Risk of Developing Disease Complications in a College Community – Presented as a contributed paper in the American Pharmacists Association Annual Meeting, 2011.
4. Williams S, Hardy Y, Mukherjee K, Assessment of Anticoagulation Control in an Outpatient Multi-specialty Facility – Presented as a contributed paper in the American Pharmacists Association Annual Meeting, 2011.

5. Hussein S, Mukherjee K, Nobles-Knight D, Performing a Needs Assessment to Determine the Types of Clinical Pharmacy Services to Implement at a Multisite, Multispecialty Medical Group – Presented as a contributed paper in the American Pharmacists Association Annual Meeting, 2010.
6. Mukherjee K., Black C, Johannigman M, White D, Patients' Willingness to Pay for a Proposed Pharmacy Wellness Program in a Regional Health Center in Northwest Ohio – Presented as a poster in the American Pharmacists Association Annual Meeting, 2005.
7. Patwardhan P., Mukherjee K, Lundy J, Siganga Walter D., An Assessment of Drug and Alcohol Use among University of Toledo College of Pharmacy Freshmen – Presented as a poster in the American Pharmacists Association Annual Meeting, 2004.

## Conference Presentations:

## Awards & Recognitions