ABSTRACT

INVESTIGATING THE CHARACTERISTICS ASSOCIATED WITH INDIVIDUALS ENROLLED IN CONSUMER-DIRECTED HEALTH PLANS

By

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May 2015

Consumer-directed health plans (CDHPs) are insurance options for employers offering benefits, and for individuals wanting more responsibility in their healthcare decision-making. These plans seek to control costs by shifting financial accountability from insurers to consumers. Consisting of a high-deductible health plan, a health savings account, and information tools, consumer-directed health plans attempt to promote greater value in healthcare spending. Data from the 2011-2012 California Health Interview Survey was used to identify the demographic and socioeconomic characteristics associated with individuals choosing a CDHP. As hypothesized, a Chi-square analysis determined that educational attainment was associated with choosing a CDHP ($\chi^2(9, N = 1,240) = 33.296$,

p = .000). Statistical support was not found for annual income, self-reported health, and number of doctor visits. Limitations surrounding the sample size and working definition of a high deductible may have prohibited a more complete investigation; educational attainment is a key indicator of a more cost-conscious consumer.

INVESTIGATING THE CHARACTERISTICS ASSOCIATED WITH INDIVIDUALS ENROLLED IN CONSUMER-DIRECTED HEALTH PLANS

A PROJECT REPORT

Presented to the Department of Health Care Administration

California State University, Long Beach

In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Health Care Administration

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May 2015

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LIST OF ABBREVIATIONS

CHIS	California Health Interview Survey
CDHP	Consumer-Directed Health Plan
HDHP	High-Deductible Health Plan
HRA	Health Reimbursement Account
HSA	Health Savings Account
KFF/HRET	Kaiser Family Foundation and Health Research & Educational Trust
OOP	Out-of-Pocket
PPACA	Patient Protection and Affordable Care Act

CHAPTER 1

Introduction

Consumer-directed health plans (CDHPs) have been established as a type of insurance-benefit design in order to give more power to the consumer in the wake of increasing healthcare expenses and available information, such as price transparency decision-making tools. In a report from The Synthesis Project, Dr. Kate Bundorf (2012) argued for a vision of CDHPs that utilizes the abundance of informational tools paired with the consequences of financial decisions to allow consumers to drive value-based demand in healthcare.

There are many different definitions of a CDHP, so for the purposes of this research a CDHP will be defined as having the following three features: a high-deductible health plan (HDHP), a personal savings account, and the availability of information tools for enrollees (Bundorf, 2012). All components of the CDHP are designed to enhance the cost-conscious behavior of the individual. A HDHP may create incentives to reduce the utilization of low-value insured services and the extent of risk protection

insurance provides, but with the addition of a health savings account (HSA) to fund services, CDHPs can provide enrollees with greater financial protection (Bundorf, 2012).

Based on the 2014 Kaiser Family Foundation and Health Research & Educational Trust (KFF/HRET) Annual Employer Benefits Survey (2014), 27% of all firms offering benefits in 2014 offered a CDHP showing an increasing trend over time, and among those offering a CDHP, 20% actually enrolled, up from only 4% in 2005. The rise in popularity of CDHPs has yet to be determined as a result of consumers becoming better at managing their medical costs or due to the fact that CDHPs have a lower monthly premium making them more affordable when utilization is low.

When discussing the KFF/HRET Annual Employer Benefits Survey, it is important to note that they include HDHP coupled with health reimbursement accounts (HRAs) as well HDHP associated with HSAs, so knowing the difference between an HRA and HSA is beneficial. HRAs are medical care reimbursement plans established by employers that can be used by employees to pay for healthcare (Kaiser Family Foundation and Health Research and Educational Trust, 2014). In addition, HRAs are funded solely by employers, whereas both employees and employers can contribute to an

HSA, up to the statutory cap of $3,300 for single and $6,550 for family coverage in 2014 (Kaiser Family Foundation and Health Research and Educational Trust, 2014). Lastly, unspent funds in the HRA may be carried over to the next eligible year, but employees cannot take their remaining HRA fund with them if they leave their job. Despite this, some employers may choose to make available remaining balances to former employees to pay for healthcare (Kaiser Family Foundation and Health Research and Educational Trust, 2014).

As the popularity of CDHPs continues to grow, the intended result will be a savvier consumer base that is more invested in its healthcare and its costs(Sederstrom, 2014). In addition, questions surrounding the reasonableness of having a CDHP will rise, given critics today already believe that "families that were saving money on their healthcare costs were also seeing the doctor less for necessary treatments including preventative and wellness checkups and immunizations" (Marbury, 2013, p. 27). However, the Patient Protection and Affordable Care Act mandates that these high-value preventive and wellness checkups will have to be delivered at no cost, so it will be interesting to see what the research shows about whether utilization of high-value services declines in

favor of cost savings to families. This secondary data analysis will analyze the available data and determine the various demographic and socioeconomic characteristics associated with individuals choosing a CDHP for themselves or their families.

Consumer-Directed Health Plans Deconstructed

CDHPs, featuring a HDHP and a tax-advantaged savings account to pay for services while a deductible applies, are growing rapidly as a direct result of employers' and insurers' belief that CDHPs control healthcare costs (Lo Sasso, Helmchen, & Kaestner, 2010).

High-Deductible Health Plans

As previously stated, the purpose of the high deductible, the out-of-pocket (OOP) amount that the consumer is responsible for paying before the insurance plan provides coverage, is to urge consumers to make more cost-conscious decisions for treatments that may be unnecessary and expensive (Bundorf, 2012). Consumerism in healthcare is increasingly becoming more important, and HDHPs embody this idea very well. Despite this, critics argue that patients do not have the ability to make medical judgments or effectively use information on quality and prices. Moreover, some strategies for families controlling costs encountered in focus groups in a New England health

plan were to delay or avoid what they perceived to be unneeded doctor's office or emergency department visits (Lieu et al., 2010). HDHPs require full cost sharing for most services until an annual deductible is met, and they encourage high-value care such as primary care visits and preventive services by excluding them from the deductible (Reiss et al., 2011).

Moral hazard is a concept that results from the occurrence or likelihood of poor health behaviors by an individual due to the fact that insurance will cover him or her in case of an accident or illness. Essentially, if insurance is in place, then health-conscious behaviors are not prominent in decision-making. A HDHP directly combats moral hazard with a "strong cross-sectional relationship between HDHP enrollment and lower rates of unhealthy behaviors" (Kullgren, Volpp, & Polsky, 2013, p. 2). For example, HDHP enrollment is associated with lower overall odds of being a daily smoker (Kullgren et al., 2013).

Utilization and costs have been a common theme among the critics of HDHPs. Like most traditional health plans, certain services, usually primary care visits, preventive screening and prescription drugs, are excluded from the deductible and are available for low to no cost sharing (Reddy, Ross-Degnan, Zaslavsky, Soumerai, & Wharam, 2014).

When services are exempt from the deductible, research has found that utilization rates are no different than traditional health plans, but services that are part of the deductible are reduced, indicating potential cost savings (Reddy et al., 2014). Other research suggests that primary care physician and ER visits were lower among HDHP users while specialist visits were higher, suggesting that the impact of HDHPs on utilization and costs depends on various interactions between plan and patient characteristics (Waters, Chang, Cecil, Kasteridis, & Mirvis, 2011). With respect to maternity care, research from Kozhimannil et al. (2011) found that when switching from an HMO to an HDHP, patients increased out-of-pocket costs but utilization remained stable, and there was no impact on quality of care received. Also, maternity care services are exempted from the deductible, so as to prevent patients from avoiding needed care. Other services, such as breast, cervical, and colorectal cancer screenings did not change when they were exempted from the deductible (Wharam et al., 2008). This indicates that costs are playing a role in the decision. As Sudduth (2011) points out, HDHPs will generate higher OOP expenses, but they are associated with lower premiums.

Low premiums could incentivize certain families, particularly low-socioeconomic-status (SES) enrollees. A

study by Wharam, Zhang, Landon, Soumerai, and Ross-Degnan (2013) found that low SES enrollees reduced high-severity emergency department (ED) services, which may point to limited education in knowing which services are high-value and thus, medically necessary, and which are low-value, when costs play a major role. Moreover, research by Galbraith et al. (2011) compared families who had at least one member with a chronic condition in a HDHP to families with the same criteria in traditional plans, and found that "almost half of families with chronic conditions in high-deductible plans reported healthcare-related financial burden" (p. 324). This is exactly what HDHP critics fear; lack of information and a low premium causing issues for low SES families. When considering assets and wealth of families, overwhelming evidence points towards a large gap between the financial assets of insured families versus uninsured families, and that assets are an important factor in determining affordability of insurance, especially a plan with large OOP expenses like a HDHP (Bernard, Banthin, & Encinosa, 2009; Jacobs & Claxton, 2008).

Lastly, employers offering HDHPs may bring additional insight into the question of who enrolls in these plans. Research by Lave, Men, Day, Wang, and Zhang (2011) looked for specific characteristics associated with choosing a

HDHP and found that employees were more likely to: have high self-reported health status, be White, be college educated, and have higher income. This likely concludes that vulnerable families are less likely to opt for a HDHP when given a choice. When families are not given a choice and are switched to a HDHP by the employer, vulnerable families become a high-risk population, and are generally more likely to have low incomes and lower wages compared to families who have plan choices (Galbraith et al., 2009).

Health Savings Accounts

HSAs have become a valuable tool for patients addressing their healthcare expenditures in a more cost-conscious way. HSAs, coupled with a HDHP, are the two most critical pieces to the consumer-directed healthcare puzzle. The Medicare Prescription Drug, Improvement, and Modernization Act of 2003 authorized the establishment of HSAs. These plans have certain features that make them unique to other personal spending accounts. HSAs are: tax-exempt trusts that can be funded by both employer and employee contributions, fully portable across employers, used for OOP medical expenses, insurance premiums after age 65 and nonmedical expenses (Klug & Chianese, 2010). Federal statutory limits are in place for HSAs, which are, as of 2014, $3,330 for individual and $6,550 for family

coverage. Employers' contribution to an HSA has a significant effect on the account open rate, specifically 34% when employers did not fund and 84% when employers did contribute; also, enrollees were more likely to be younger, college educated, have high self-reported health and high deductibles (Chen, Lo Sasso, & Nandam, 2013). Thus, research on HSAs concludes that people with higher SES are more likely to enroll and contribute to an account.

Literature Review

The literature on CDHPs utilizes claims data to address relationships to costs, and generally seems favorable to employers because of enrollees' relatively healthy status. Among other characteristics, research has shown that CDHP enrollees are more health-conscious, less likely to smoke, less likely to have children, more likely to have higher-income households, and generally young, although no specific age group has shown overwhelming support (Fronstin, 2012, 2013).

A study by Barry, Cullen, Galusha, Slade, and Busch (2008) examined an employer offering a CDHP in addition to its traditional plans and, found that enrollees tended to be younger, higher-wage, White, and more likely to be salaried. Medical spending heavily impacts the decision to enroll, so it is no surprise that healthy employees are

attracted to these plans. Another study found that employers offering more generous CDHPs with higher contributions attracted more enrollees and that favorable selection occurs when employees are young and healthy (McDevitt et al., 2014). Research by Reed, Graetz, Fung, Newhouse, and Hsu (2012) surveyed people in California and found that 50.2% of the respondents did not understand their plan and what services applied and were exempt from the deductible. This suggests lack of information about preventive care exemptions, which may lead patients to avoid preventive care in the future. Other studies on utilization and healthcare spending point to a decrease in physician office visits, prescriptions filled and recommended cancer screenings, and families with CDHPs spending 14% less than similar families in traditional plans (Buntin, Haviland, McDevitt, & Sood, 2011; Fronstin, Sepúlveda, & Roebuck, 2013). As stated previously, claims data and employer insurance enrollment data are the two major sources of data in the literature today, so it seems the variables tend to involve spending characteristics tied to enrollment and utilization of services. One study by Fronstin and Roebuck (2013) looked at a single large employer over a period of 5 years after implementing a CDHP. Using pharmacy and medical-claims data and

insurance-enrollment information, they found that mean healthcare spending amounts increased each year for the CDHP and control groups, but the spending for the CDHP ground was less overall in each year. In addition, those enrollees with the lowest health spending prior to the CDHP had the lowest health spending and most sustained reduction in spending after the CDHP was implemented compared to those with the highest health spending prior to adoption.

Enrollment growth, as shown in the KFF/HRET survey, is increasing in CDHPs featuring high deductibles and a personal healthcare savings account, up from 4% in 2006 to 20% in 2014, so the amount of intended savings could be very large (Kaiser Family Foundation, 2014). In fact, Haviland, Marquis, McDevitt, and Sood (2012) report that the increased market share of CDHPs has the potential to reduce annual spending by $57 billion if 50% of the market consisted of CDHPs. While 2014 enrollment currently stands at only 20% of the market share of employers offering benefits, it is not difficult to imagine the share rising to 50%, considering its rising popularity since 2005. Even so, their research also indicates that better information needs to be available to enrollees, specifically in identifying high-value care.

This research focuses on utilizing the available data in California to determine relationships between enrollment in a CDHP and certain demographic and SES related variables. As reported so far in the literature, it is likely that enrollees of CDHPs in California will share the same characteristics. Using survey data that includes family income information will be advantageous over the current method of claims data, which usually do not have that information.

CHAPTER 2

STUDY DATA AND METHODS

Data

As a secondary data analysis, this research utilized data from the California Health Interview Survey (CHIS) 2011-2012 Adult Questionnaire to resolve the characteristics associated with individuals choosing a CDHP. The CHIS, conducted by the University of California, Los Angeles Center for Health Policy Research in collaboration with the California Department of Public Health and the Department of Health Care Services, is the largest state health survey in the United States and helps give a thorough overview of the health and healthcare needs of California's diverse residents. In addition to essential health topics covered in previous years, new topics may arise according to emerging concerns consistent with policy planning and development. Employing a random-digit dial (RDD) landline and cell phone survey method, the CHIS randomly selects one adult, aged 18 or over, to interview in each household agreeing to participate. The inclusion of cell phone participants helped to capture the

growing number of individuals without a landline, and also to shield against possible selection bias. Overall, the CHIS engaged a stratified sample of 56 geographic regions representing 44,559 households, including 42,935 adults, 2,799 adolescents and 7,334 children. Reaching special subgroups, major racial and ethnic groups and other populations living in California, the CHIS gives valuable data to policy makers to help make knowledgeable decisions and also to others for important health information pertinent to California. CHIS data is particularly applicable to the study of CDHPs because it may report new trends in health insurance, health behaviors, and health utilization that have the ability to impact future enrollment figures, especially when considering Covered California, the state-based insurance exchange operating in accordance with the PPACA.

Measuring Consumer-Directed Health Plans

Using the CHIS data, the research will test the following hypotheses:

1. Having a special account or fund for medical expenses is associated with having a high-deductible health plan.

2. People with higher annual household income are more likely to have a CDHP.

3. People with higher educational attainment are more likely to have a CDHP.

4. People with higher self-reported health are more likely to have a CDHP.

5. People who have fewer doctor visits per year are more likely to have a CDHP.

According to the literature, the definition of a CDHP is a health plan that contains high deductible and personal savings accounts for medical expenses. As a result, this research utilizes a subset of the data looking at only the individuals who responded yes to question QA11_H64 asking whether the respondent had a special account or fund used to pay for medical expenses, and any responses marked "Don't Know" or "Refused" were not included in any statistical analysis. In addition, it must be considered that the analytical sample is only comparing individuals who have a CDHP (HDHP+HSA) to individuals who have an HSA but not a HDHP. This is an important distinction and must be considered relative to the results and discussion.

Dependent Variable

In conjunction with the subset of the data looking at only the individuals who had an HSA, the dependent variable of this research, having a CDHP, corresponded to question QA11_H63: Does your health plan have a deductible for all

covered persons that is more than $4,000? (CHIS, 2014, p. 98). The coded responses were: Yes = 1 and No = 2.

Independent Variables

The independent variables included in this research are annual household income, educational attainment, self-reported health and number of doctor visits per year. Table 1 depicts the statistical analyses that will be used to test the hypotheses. More detailed description of each is as follows:

Hypothesis 1 examines whether the respondent has an HSA or not, as reported in question QA11_64, "Do you have a special account or fund you can use to pay for medical expenses?" (CHIS, 2014, p. 98). Responses were coded as: Yes = 1 and No = 2.

Hypothesis 2 looks at annual household income as reported in question QA11_K7, "What is the best estimate of your household's total annual income from all sources before taxes in 2010?" (CHIS, 2014, p. 150). Respondents were able to enter a figure up to $999,995, or could have marked "refused" or "don't know," in which case these data points would not have been included in any analysis.

Hypothesis 3 looks at educational attainment as reported in question QA11_G22, "What is the highest grade of education you have completed and received credit for?"

(CHIS, 2014, p. 63). Responses were coded as: no formal education = 30; 1st grade through 12th grade = 1-12, respectively; college = 13-15, respectively; college graduate = 16; graduate or professional school = 18; and so on.

Hypothesis 4 looks at self-reported health in question QA11_B1, "Would you say that in general your health is excellent, very good, good, fair, or poor?" (CHIS, 2014, p. 14). Responses were coded as: excellent = 1; very good = 2; good = 3; fair = 4; poor = 5.

Lastly, hypothesis 5 looks at the number of doctor visits in the last year, as reported in question QA11_J1, "During the past 12 months, how many times have you seen a medical doctor?" (CHIS, 2014, p. 139). Respondents were able to respond with a number up to 365.

Statistical Analysis

All statistical analysis will be performed using the Statistical Package for the Social Sciences (SPSS), Version 22. SPSS is a widely regarded tool used by healthcare researchers to help determine descriptive and bivariate statistics. This research will utilize SPSS to test the validity of the proposed hypotheses. Table 1 represents the statistical tests that will be executed to test the four hypotheses.

TABLE 1. Statistical Analysis Of Hypotheses

Hypothesis	Dependent Variable	Independent Variable	Statistical Test
Having a special account or fund for medical expenses is associated with having a high deductible health plan.	AH97 – Does your health plan have a deductible for all covered persons that is more than $4,000?	AH73 – Do you have a special account or fund you can use to pay for medical expenses?	Chi-Square
People with high annual household incomes are more likely to have a CDHP.	AH97	AK22 – What is the best estimate of your household's total annual income from all sources before taxes in 2010?	*t*-test
People with more educational attainment are more likely to have a CDHP.	AH97	AH47 – What is the highest grade of education you have completed and received credit for?	Chi-square
People with high self-reported health are more likely to have a CDHP.	AH97	AB1 – Would you say that in general your health is excellent, very good, good, fair, or poor?	Chi-square
People who have fewer doctor visits per year are more likely to have a CDHP.	AH97	AH5 – During the past 12 months, how many times have you seen a medical doctor?	*t*-test

CHAPTER 3

RESULTS

Descriptive Statistics

This research employed the data obtained from the CHIS 2012 Adult Questionnaire. All statistical analysis performed hypotheses testing, except hypothesis 1, utilizing a subset of the data looking at only the individuals who responded yes to question QA11_H64 asking whether the respondent had a special account or fund used to pay for medical expenses. The reasoning behind this comes from the definition of a CDHP adapted from the literature review.

According to the dataset, 3,602 (8.4%) of the total survey respondents answered question QA11_H63: "Does your health plan have a deductible for all covered persons that is more than $4,000? (CHIS, 2014, p. 98); 1,533 (42.6%) responded yes and 2,069 (57.4%) answered no. This shows that a very small portion of the 42,935 total respondents have a HDHP. Of the total survey respondents, 6,692 (15.6%) answered question QA11_H64. Of the individuals who answered, 2,031 (30.3%) responded yes and 4,661 (69.7%)

responded no. In addition, of the 1,533 respondents who answered yes to having a HDHP, 545 answered yes to having an HSA and 988 answered no. Of the 2,069 respondents who answered no to having a HDHP, 695 answered yes to having an HSA and 1,374 answered no. Figure 1 and Figure 2 illustrate this breakdown to enhance the understanding of the population this research utilized.

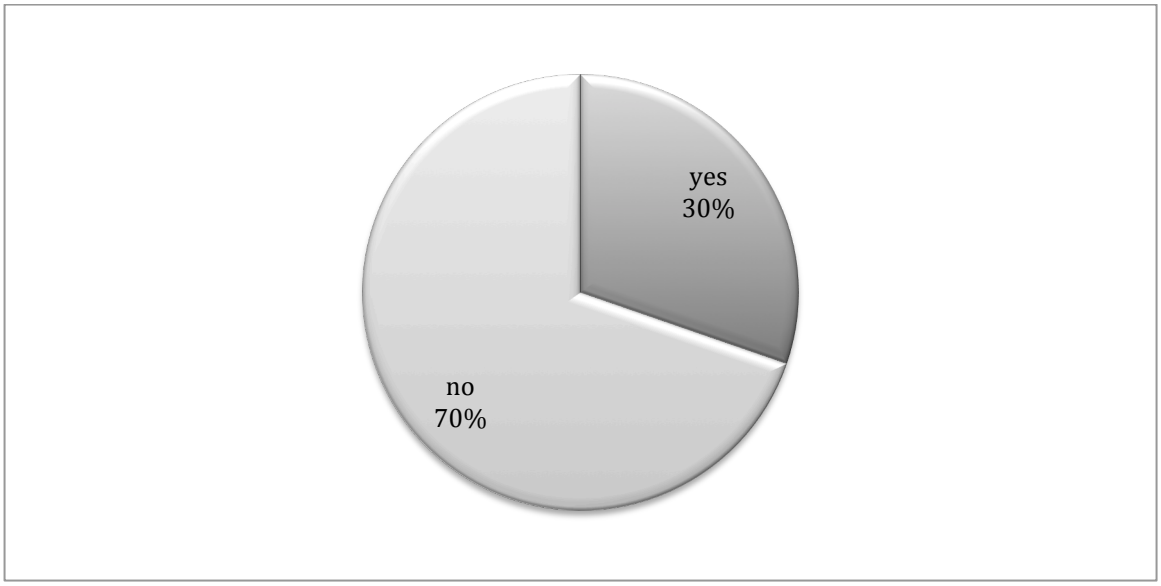

FIGURE 1. Percent of respondents with a special account or fund used to pay for medical expenses. (*N* = 6,692).

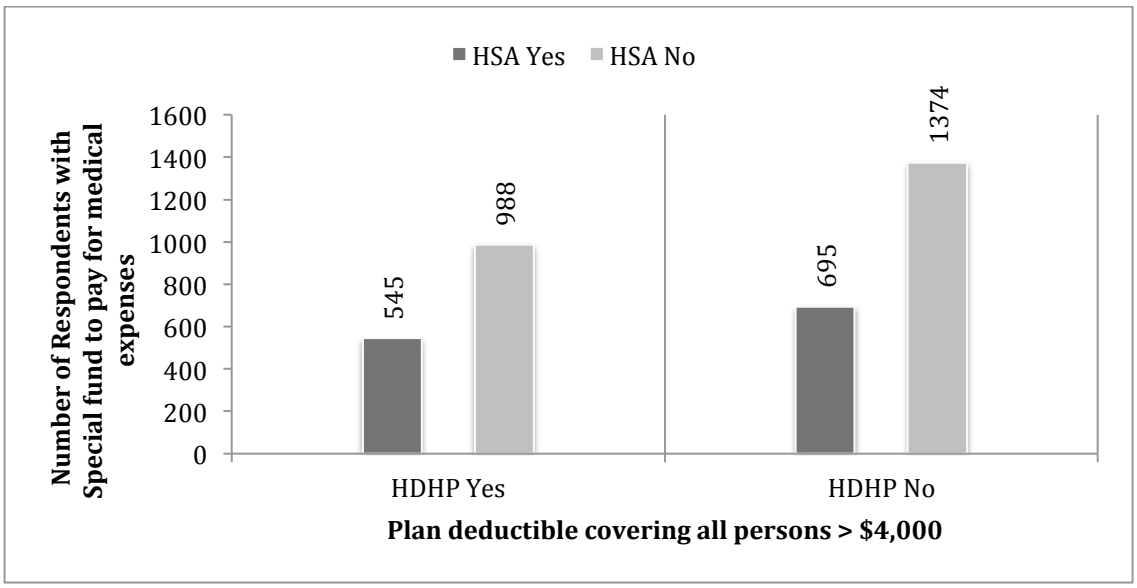

FIGURE 2. Number of respondents having a plan deductible greater than $4,000 and a special fund to pay for medical expenses. (*N* = 1,533 for Yes; 2,069 for No).

Data on the total annual household income was presented based on question QA11_K7: "What is your best estimate of your household's total annual income from all sources before taxes in 2010?" (CHIS, 2014, p. 150). The median annual income for the 2,031 applicable respondents was $100,000 and the mean annual income was $115,092.70, representing a high-income group for those individuals with an HSA regardless of whether they have a HDHP or not.

This research also considered educational attainment as a characteristic of individuals choosing CDHPs. Data for educational attainment was based on question QA11_G22,

"What is the highest grade of education you have completed and received credit for?" (CHIS, 2014, p. 63). According to the data, 31.6% of the 2,031 applicable respondents had less than a college degree, and the other 68.4% represented those with a four-year degree or higher. Figure 3 visually depicts these characteristics of the respondents.

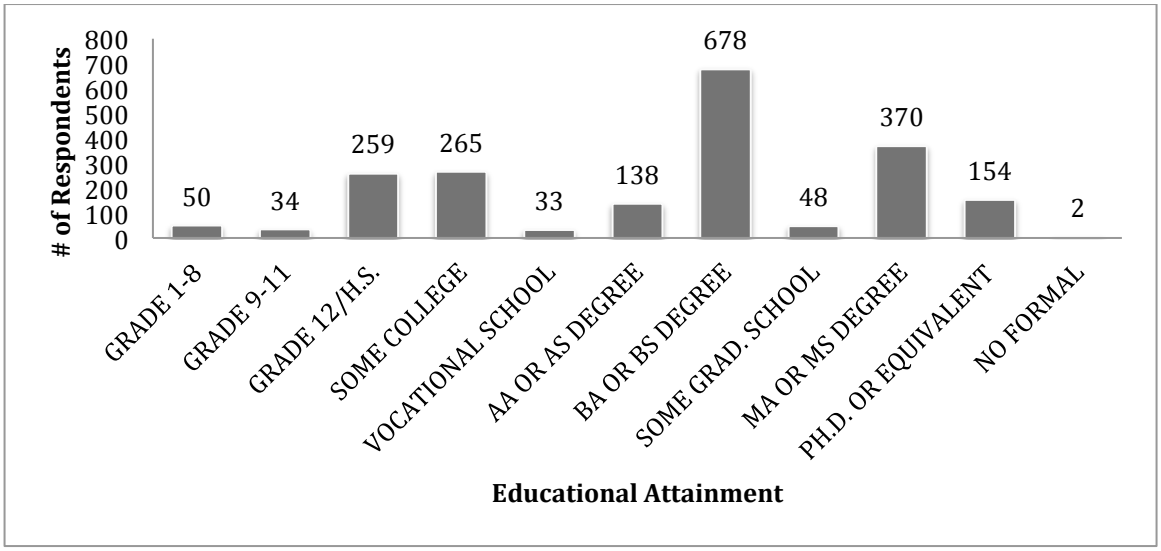

FIGURE 3. Highest level of education attained. (*N* = 2,031).

Self-reported health was the third characteristic this research used to understand consumers behavior. Based on question QA11_B1, "Would you say that in general your

health is excellent, very good, good, fair, or poor? (CHIS, 2014, p. 14), 2,031 responses were valid. As illustrated in Figure 4, 67.7% of these respondents reported either excellent or very good health, which points to an early indication that self-reported health may indicate consumer behavior involving choosing an HSA for health expenses. Of the 1,240 valid responses to hypothesis four, 545 individuals responded yes to having a plan deductible covering all persons greater than $4,000 and 695 individuals answered no, and Figure 5 visually illustrates the self-reported health indicated by these respondents.

Lastly, the number of annual doctor visits was researched. As reported in question QA11_J1, "During the past 12 months, how many times have you seen a medical doctor?" (CHIS, 2014, p. 139), 2,031 valid responses were initially reported with a mean of 4.01 visits per year and median of 2 visits per year (see Figure 6).

FIGURE 4. Self-reported general health, expressed as a percentage. (*N* = 2,031).

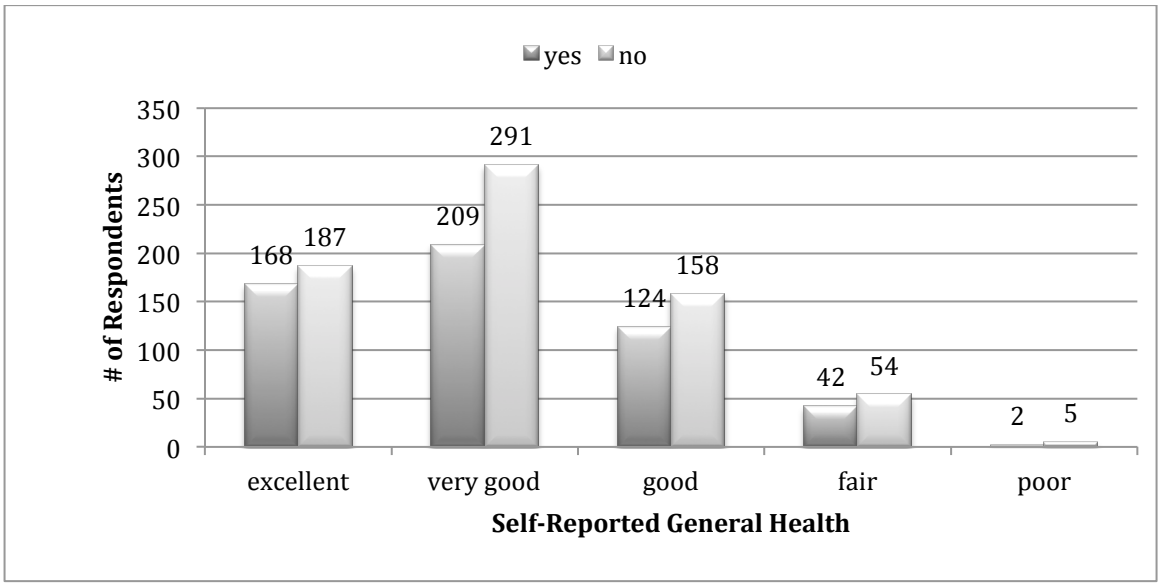

FIGURE 5. Self-reported general health of individuals who either responded yes or no to having a plan deductible greater than $4,000. (*N* = 1,240).

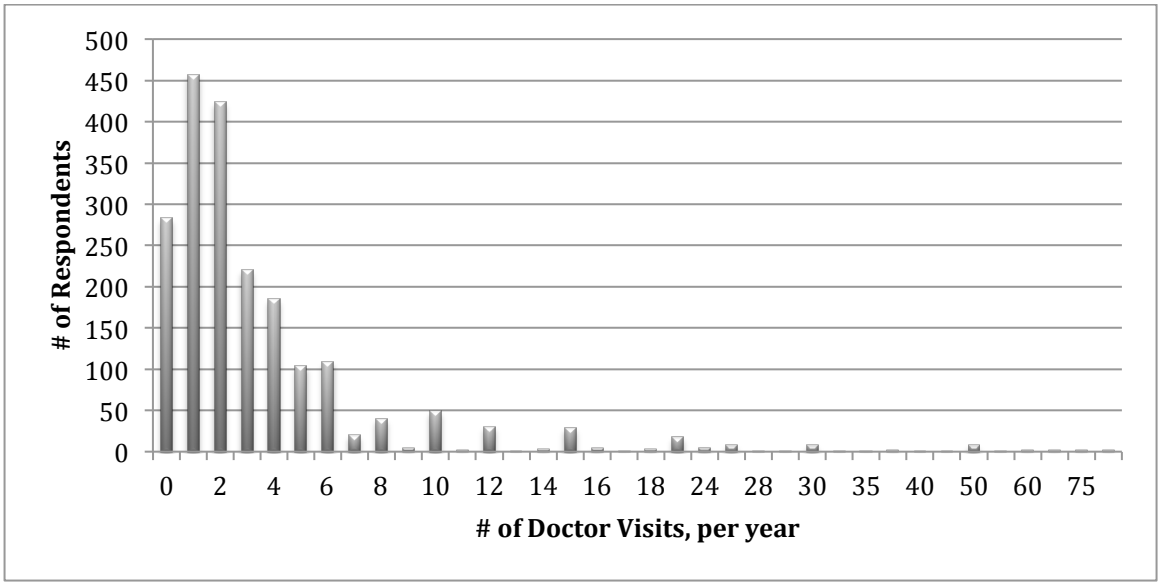

FIGURE 6. Number of doctor visits in the past 12 months. (*N* = 2,031).

Hypothesis Testing

Hypothesis 1 was focused on the relationship between having a special account or fund (HSA) for medical expenses and having a HDHP. A Chi-square was needed to perform this analysis in order to show an association or lack thereof. A special fund to pay for medical expenses was not found to be associated with choosing a plan deductible greater than $4,000 ($\chi^2(1, N = 3602) = 1.499, p = .517$). The p-value suggests that there is no statistical significance and based on this population, no association can be proven. A limitation related to the lack of support for this

hypothesis is that the sample size is very low, which may have biased the results. Also, it may be due to some employers offering HSAs and not HDHPs.

Mean annual income for those with a deductible greater than $4,000 was higher ($M$ = $122,795.62, SD = 80414.757) than those with a deductible less than $4,000 ($M$ = $118610.22, SD = 74879.81). Despite being statistically insignificant, the results do show that regardless of choosing a HDHP, the subset population choosing an HSA to pay for medical expenses has a high level of income. For total annual household income, the independent-sample t test of the difference between individuals choosing a deductible greater than $4,000 and individuals choosing a deductible between $2,000-$3,999 produced results that were not statistically significant (t(1238) = . 946, p = . 345). It can be rationally expected that individuals with high incomes are better able to save more for medical care.

Hypothesis 3 looked at educational attainment as another characteristic that may have helped indicate a consumer's behavior. A Chi-squared test was performed to determine if there was an association between educational attainment and choosing a high-deductible health plan. The association was found to be statistically significant

($\chi^2(9, N = 1240) = 33.296, p = .000$). The hypothesis is thus rejected and it can be concluded that the more education one has, the more likely it is that he or she will choose a HDHP. Despite this association, a limitation of the Chi-square analysis is that it cannot predict causation.

Hypothesis 4 considered whether self-reported health was an indicator of choosing a CDHP. A Chi-squared test was performed to determine if there was an association between self-reported health and choosing a high-deductible health plan, and was not found to be statistically significant ($\chi^2(4, N = 1{,}240) = 3.252, p = 0.517$). Thus, there was no significant difference between the self-reported health of individuals who had a HDHP and those who did not have a HDHP.

The last hypothesis looked at the number of annual doctor visits as an indicator of consumer behavior towards choosing a consumer-directed health plan. Individuals with a plan deductible covering all persons that was greater than $4,000 had fewer doctor visits ($M = 4.04$, $SD = 8.852$) than those with a deductible less than $4,000 ($M = 4.25$, $SD = 7.108$, $t(1238) = -.456$, $p = .648$). As predicted, individuals choosing the CDHP did indeed have fewer doctor visits than those without the CDHP, but it was

not a statistically significant difference. Thus, it can be concluded that in this population, the number of doctor visits did not indicate consumer behavior toward choosing the HDHP. Table 2 shows the five hypotheses, along with the statistical analysis performed and their relative p-value results obtained.

TABLE 2. Results Of Statistical Analysis Of Hypotheses

Hypothesis	Dependent Variable	Independent Variable	Statistical Test	*p*-value
Having a special account or fund for medical expenses is associated with having a high deductible health plan.	AH97 – Does your health plan have a deductible for all covered persons that is more than $4,000?	AH73 – Do you have a special account or fund you can use to pay for medical expenses?	Chi-Square	$p = 0.221$ $N = 3,602$
Annual household income is associated with having a high deductible health plan.	AH97	AK22_p – What is the best estimate of your household's total annual income from all sources before taxes in 2010?	*t*-test	$p = 0.345$ $N = 1,240$
Having a college degree is associated with choosing a high deductible health plan.	AH97	AH47 – What is the highest grade of education you have completed and received credit for?	Chi-square	$p = 0.000$ $N = 1,240$
Self-reported good health is associated with having a high deductible health plan.	AH97	AB1 – Would you say that in general your health is excellent, very good, good, fair, or poor?	Chi-square	$p = 0.517$ $N = 1,240$
There is a relationship between few doctor visits and having a HDHP.	AH97	AH5 – During the past 12 months, how many times have you seen a medical doctor?	*t*-test	$p = 0.648$ $N = 1,240$

CHAPTER 4

DISCUSSION AND CONCLUSIONS

The purpose of this research was to identify demographic and socioeconomic characteristics of individuals choosing a CDHP, so as to add to the literature and provide insightful analysis that may lead to a further understanding of the consumer's role in healthcare delivery.

My findings supported only one of the five hypotheses proposed by this research. First, HSAs were not found to be associated with choosing a HDHP. Although the definition of a CDHP includes an HSA and HDHP, the population surveyed in the CHIS did not represent this definition. The CHIS questionnaire does not differentiate between an HSA and an HRA. This makes the CDHP variable difficult to completely cover. Some reasons for this could be that individuals chose an HSA because of its tax advantages and employer contributions. Another reason could be that the individuals deductible may be less than $4,000 and still be considered high. Lastly, because only 2,031 or 4.73% of the 42,935 total CHIS respondents

answered that they had an HSA, the sample size is limited compared to other studies which utilize a larger sample size.

Second, although total annual household income was not associated with choosing a HDHP, the data still showed that the median annual income for the 2,031 applicable respondents was $100,00 and the mean was $115,092. Other studies cited income as a characteristic of individuals choosing CDHPs and while it did not get statistical support in this research, few can argue that those numbers don't reflect a high income. Since the data represents only individuals who have an HSA, it can be inferred that this group has high incomes, regardless of whether they choose a deductible greater than $4,000 or not. Moreover, because high deductibles are associated with lower premiums, perhaps the high mean income of these individuals indicates that a low premium is not incentivizing or a good selling point. In addition, many employers who offer HDHPs are the ones where the average salaries are lower, so it may be possible that some people with high-income jobs are not offered HDHPs from their employers.

Third, educational attainment was statistically supported as being associated with choosing a deductible greater than $4,000. The 68.4% of the 2,031 applicable

respondents with at least a four-year degree sheds light on prior research that suggests education leads to better healthcare decision-making. Further studies analyzing the relationship between educational attainments and enrolling in CDHPs should be done to determine whether other factors, such as high income, and thus more disposable income, are confounding the relationship.

Fourth, self-reported health was not found to be associated with choosing a HDHP. This is probably the most disappointing finding because it is a widely identified characteristic in the literature on consumer-directed health plans. For example, research has shown that CDHP enrollees are more health-conscious, less likely to smoke, and are favored by their employers when they are healthy (Fronstin, 2012, 2013; McDevitt et al., 2014). Moreover, 67.7% of the 2,031 applicable respondents reported either excellent or very good health, so again it seems appropriate to say that the majority of individuals with HSAs are reporting good health, but maybe the amount of the deductible being studied was too high and didn't capture the entire population of individuals with "high" deductible plans.

Lastly, the number of annual doctor visits was found to be no different between individuals with a $4,000

deductible and individuals with less than a $4,000 deductible. As predicted, individuals choosing the HDHP did indeed have fewer doctor visits than those without the HDHP, but it was not a statistically significant difference. Thus, it can be concluded that in this population, the number of doctor visits did not indicate consumer behavior toward choosing the HDHP. While utilization is a driver of cost, most studies suggested that CDHPs led individuals to seek more value-based care and high-value services. Despite not having an association, perhaps the similarity has to do with the fact that these individuals, regardless of choosing the deductible greater than $4,000, still had a health savings account that made their health behavior the way it was. Moreover, the HSA could have been coupled to a deductible less than $4,000, which may or may not have produced more associative results.

Limitations

The 2011-2012 California Health Interview Survey included 42,935 total adult respondents, resulting in a cross-sectional depiction of the health of California residents. In addition, because it is a cross-sectional survey, it is done at one point in the past and does not reflect causation or directionality in its results,

although with a large enough sample size, strong correlational conclusions may be drawn. Despite these limitations, it is exciting to see that CDHPs are represented in even this small population surveyed. According to the data, only 3,602 (8.4%) of the total survey respondents answered question QA11_H63: "Does your health plan have a deductible for all covered persons that is more than $4,000? (CHIS, 2014, p. 98). This research considered a HDHP as being more than $4,000 but, according to the Internal Revenue Service, a deductible is considered high if it is greater than $1,300 for individual coverage or $2,600 for family coverage. Thus, when interpreting the data and trying to employ the findings into policy or business activity, it is important to consider that a high deductible may carry a higher or lower amount to different individuals and employers offering benefits. This research may have had different results if the amount of the deductible was dropped to another amount. According to the findings of the 2014 Kaiser Family Foundation and Health Research & Educational Trust (KFF/HRET) Annual Employer Benefits Survey (2014), only 57% of HSA-qualified HDHPs had an aggregate family deductible amount greater than $4,000, and only 23% of HSA-qualified HDHPs had a single coverage deductible greater than $3,000. This is significant

insight because it shows that this research did not capture the entire population included in the dollar amount definition of high-deductible health plans.

In the Chi-square analysis of educational attainment, although the association was made between education and the likelihood of choosing a CDHP, directionality cannot be drawn from the statistically significant association, and so it cannot be stated that one caused the other.

Implications and Further Studies

Consumer-directed healthcare is quickly gaining traction in the health insurance market as seen by the tremendous growth in firms offering a CDHP and the enrollment data since 2006. The 2014 KFF/HRET Annual Employer Survey (2014) indicated that 20 percent of individuals offered a CDHP enrolled, up from only 4 percent in 2006. The findings in this research only add to the literature about CDHPs. Most research has focused on cost containment and CDHPs role in empowering the consumer with information in the hope of reducing unnecessary utilization of care. This research adds to that by providing further evidence that education plays a critical role in consumer-directed health behavior. For the employer, this knowledge gives important insight into the valuation of its employee's behavior based on his or her educational

attainment. Another insight is that the definition of consumer-directed health may not be clear. High deductibles may have different dollar amounts to different individuals based on various characteristics, so further research should consider a range of deductibles that cover the definition of high-deductible health plans. Furthermore, because this research used a cross-sectional survey, it was less advantageous than other studies that employed medical claims and employer insurance enrollment data. Future studies should attempt to use claims and enrollment data but also include a resource that provides income data to generalize a better picture of the individual who is trying to achieve consumer-directed healthcare.

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