INCOME AND ORAL HEALTH: THE RELATIONSHIP AMONG MEDICAID RECIPIENTS

by

Kaleigh Oswald

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By

Kaleigh Oswald

Greenville, NC

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Approved by:

Molly Jacobs, PhD

Department of Health Information & Services Management, College of Allied Health Sciences

Abstract

Medicaid provides health insurance coverage for 97 million low-income Americans over the course of a year. Each state operates its own Medicaid program within broad federal guidelines leading to significant variability between state programs. Much of this variability can be attributed to the "optional" inclusion of adult dental benefits. This study exploits differences in Medicaid programs by examining the relationship between oral health utilization and income among low-income adults in the United States. Good oral health can help prevent oral diseases and improve quality of life. Furthermore, maintaining a pain-free mouth will support good nutritional, sleep, and work habits. Using data from the 2017 Medical Expenditure Panel Data survey (MEPS), a regression analysis tests the relationship between having at least one dental visit in the last year and income, controlling for environmental and demographic characteristics. Results show that receiving oral health services is correlated to thirteen percent higher income. This study highlights the need for state Medicaid programs to include dental services as a benefit. Widespread oral health coverage through Medicaid will improve oral health of beneficiaries and could likely have additional externalities for well-being and satisfaction.

I. Introduction

Medicaid administers health insurance coverage to low-income, children, pregnant women, and disabled people (USFG, 2019). Medicaid provides a broad level of health insurance coverage, including doctor visits, hospital expenses, nursing home care, home health care, nursing care, and at-home care. However, Medicaid does not nationally provide dental coverage as a benefit; dental coverage is decided on a state-by-state basis. Some states provide full dental coverage, while others only cover emergency services such as pain management. Among those states where Medicaid covers basic oral health care, Medicaid provides more dental care than any other program (Sweet, Damiano, Rivera, Kuthy, Heller 2005).

After the passage of the Affordable Care Act, Medicaid was expanded to include adults with incomes up to 138% of the federal poverty level. While federal guidelines increased the pool of eligible recipients, only 15 states increased benefits. Twenty-four states left benefits unchanged and eleven which decreased coverage (Nasseh, Vujicic 2014). The main goal of the Medicaid expansion was not to increase benefits but to increase eligibility for coverage. Through the expansion, it can be determined that there was a slight increase in access to care and therefore utilization. There have also been notable increases in quality of care and Medicaid spending (Mazurenko, Balio, Agarwal, Carroll, & Menachemi, 2018). In 2014, only twenty-six of the states and the District of Columbia chose to take part in the Medicaid expansion. In comparison to those states that chose not to expand Medicaid eligibility, the expansion states saw an increase in health insurance coverage and had reports of better coverage. The expansion states also reported increases with visits to general practice physicians, overnight hospital stays, and rates of diabetes diagnosis (Wherry & Miller, 2016).

With the lack of dental services covered by Medicaid, this means that the population is suffering from a lack of care. A study in 2017 determined that those who receive dental benefits beyond emergency care are more likely to have an appointment than those without such benefits (Singhal, Damiano, Sabik 2017). In 2009, a study looked at healthcare expenditures and determined that those with Medicaid utilized office-based medical care and dental care, less than those with private insurance (Ku 2009). A study done in 2015 found that those with higher incomes have better oral health than those with low incomes (Bailit, Lim & Ismail, 2015). In 2019, a meta-analysis showed that low-income is associated with oral cancer, tooth loss, and poor oral health-related quality of life (Singh, Peres & Watt, 2019). There needs to be more information on dental care utilization and the effect on income, because policies may need to be changed in the future.

Throat and mouth cancers, as well as other health problems, are often easily detected in routine visits to the dentist. Dental care needs to be included in Medicaid benefits because of the preventative nature of the care. Having dental care for underserved populations would help the population have better overall health. One study shows that with dental services covered by Medicaid that there is a 12.9 percentage points increase in dental care utilization (Decker & Lipton, 2015). This shows that if given the chance to receive dental care, it will be utilized. This same study also reported that Medicaid beneficiaries are less likely to report not going to the dentist due to cost, showing that dental utilization increased because of the reduced financial burden (Decker & Lipton, 2015). The advantage of having oral health care for the low-income population is that they will see an overall increase in oral health and quality of life.

This paper proceeds in the following way, different demographics must be looked at to determine where the disconnect is between income and dental service utilization. The

relationship between things such as age, marital status, and education level, and income will be inspected. Through a statistical analysis of medical expenditure data, this study will seek to link income to what demographics affect it the most. This statistical analysis will determine if there is a significant connection between income and the independent variables, and how much of an effect the variables have on income. Furthermore, specifically the relationship between dental visits and income will be investigated during the discussion portion of the paper. The discussion portion will focus on how this study compares to previous findings. But in order to do that, first the data needs to be compiled and restricted to what this study is focusing on.

II. Methods

This study used data from the 2017 Medical Expenditures Panel Survey (MEPS). MEPS is a large-scale set of surveys that asks the noninstitutionalized United States population questions about insurance coverage, spending, and health care use. It also asks basic demographic questions such as age, race, and gender. The survey is collected through a series of interviews over the course of two years. All the data is collected through the interviews and the data is compiled for the Department of Health and Human Services to determine areas that need change or assistance (Survey Background, 2019).

From the full set of MEPS data, the sample was restricted in several ways. First, in order to focus on Medicaid recipients, the sample was restricted to those who answered affirmatively to being covered by Medicaid. Second, the sample included only adults, so only those 18 years and older were included. Third, only respondents who were currently employed, reported by earning an income. Those with zero personal income were excluded from this study. Restrictions left 414 subjects that met all the criteria.

Analysis utilized linear regression. Marital status was captured through two dichotomous variables: divorced and never married. Citizenship, smoking, and dental visits are also captured using dummy variables with one representing the given condition. Age and education do not need a dummy variable because they are continuous. A logarithm of income was taken to re-scale the data for easier interpretability. This transformation is used to turn the highly skewed data into a normalized function. Using a logarithm transforms the distribution into a normal bell curve. The null hypothesis states that sex, race, marital status, age, region, education, native born status, Medicaid coverage, smoking status, and dental visits will not have a statistically significant relationship with income. The alternative hypothesis is that income will be significantly influenced by the independent variables.

Mean values for all demographic characteristics are listed in Table I. The sample age ranges from 34 to 85, with an average of 63. The average income is $16,500. The sample was 71 percent female, and had an average education level of high school graduate. The sample is about 20 percent Hispanic and 29 percent Black. Thirty-seven percent of the sample population lives in the South. Thirty-two percent have never been married, and 26 percent are divorced. Eighty-three percent of the sample population was born in the United States, and 32 percent are current smokers. Twenty-four percent of the population had at least one or more dental visit during the year.

III. Results

Regression results indicate a significance F-value suggesting a statistically significant model (alpha=0.05) represents the model's overall significance. R_2 is roughly 0.3 which means that the model explains about 30 percent of the variation in income. The adjusted R_2 shows that 25 percent of the variation is explained by the models when accounting for all the independent

variables. Equation 1 shows the magnitude of the regression coefficients. Regression results are listed in Tables II.

(Equation 1) Income = 3.533 - 0.1013(South) + 0.009297(Age) - 0.2311(Female) - 0.1302(Hispanic) + 0.04969(Black) + 0.001917(Education) + 0.09248(Never Married) - 0.1951(Divorced) + 0.1356(Born In US) + 0.04061(Current Smoker) + 0.1234(1 or more dental visit)

If one were to reside in the South, their income would be ten percent less than those living in other regions of the United States, all else held constant. Females make 23 percent less than males. Hispanics earn 13 percent less than other races and African Americans make five percent more than other races all else held constant. Those who have never been married make nine percent more than other groups, while divorcees make 20 percent less. Native born workers earn 14 percent more than those not native born. Current smokers make four percent more than non-smokers. As age increases, income increases by one percent. As education level increases, income increases by less than one percent. The difference between going to the dentist at least once a year versus none is twelve percent more income.

The model ran with a 95 percent confidence interval, but six variables that fell below the level: living in the South, never being married, being divorced, and receiving at least one dental visit were all statistically significant. The most significant variables are being female and age. All of these variables are significantly associated with income. While it is possible that smoking habits, gender, and dental visit do impact one's income, that is outside the scope of this analysis. Regression results indicate the magnitude and direction of relationships, but do not imply causality.

IV. Discussion

Consistent with previous literature, this study shows that income is positively related to dental visits. Having visited the dentist in the past year has a positive effect on income. Previous studies have determined this is due to the fact that individuals with more income are more likely to have private health insurance and are able to afford regular dental services (Sweet 2005). However, this study only looked at Medicaid recipients. While it is possible that these individuals had separate dental insurance that data was not available for this analysis. Given the level of income required to qualify for Medicaid, it highly unlikely that they purchased separate dental insurance policies from a private vendor. Medicaid recipients who received oral health services likely pay out of pocket for a private dentist or receive reduced-cost services from a dental school, community clinic, or charitable organization.

The average cost per dental visit was $685 in 2013 and the majority of people viewed dental services as secondary compared to hospital services (Wall & Guay, 2016). Therefore, they are more price-sensitive to the out-of-pocket costs (Wall & Guay, 2016). A study done in 2017 looked at how different demographic groups utilize dental care, and they determined that women and those unmarried used dental services more often (Singhal, 2017). This is consistent with the current study which shows that females and divorced/never married persons have a significant impact on income. These findings may be due to the fact that women care more about their appearance (Hayes & Ross 1987), therefore they would go to the dentist for aesthetic reasons. The motivation for those who have never been married to utilize dental services more, could be related to their lower average age, employment status, or absence of children or household activities.

The significant relationship between age and income can easily be explained by the fact that the younger someone is, the less time they have to accrue workforce tenure and increase

income. Someone entering the workforce at age 20 will earn less than someone who is 50 with significant job tenure. Women earn 23 percent less than men which could be explained by the fact that women tend to work in lower paying sectors of the economy such as teaching, customer service, or childcare. Interestingly, smokers make four percent more than nonsmokers. This could indicate that smokers have higher paying, more stressful jobs and choose smoking as a means of alleviating job-related stress. Those who are divorced make about 20 percent less than other marital statuses. This could be related to the legal expenses associated with divorce ($11,300) or the need to assume lower paying employment when one is in a single-earner household and must also take care of household and childcare duties (The Cost and Duration of Divorce, 2020). There are several causes for speculations as to why certain demographics have different incomes, but the varying rates of dental care utilization, earnings variation and individuals lifestyle appear to be consistent with previous literature that supports empirical results presented.

V. Conclusion

Dental care is much more than flossing and brushing twice a day, it affects everyday well-being (Lee & Somerman, 2018). Regression analysis showed that income is related to many different things particularly living in the South, age, being female, never married, divorced, and dental care. While results showed a significant relationship between income and having had at least one dental visit in the last year, the most significant determinant was age.

As dental services become a more prevalent part of healthcare, previous studies have examined how various income earning sectors utilize oral health services. However, no comprehensive analysis explicitly examines the disparate rate of low-income and high-income dental services use relative effect on earnings. Dental services are not regularly covered by

insurance and low-income areas often suffer from a shortage of oral health providers. The low-income population that is covered by Medicaid, receive little or no benefits unless they are residents of one of the few states that provide oral health in standard Medicaid. If dental care coverage increases, access would consequently be improved. Further research is required to illustrate the potential benefits of increased insurance provision, reimbursement and general health outcomes.

The solution to the gap between income and dental care utilization can be solved through political action. Increasing access to dental services in low-income areas through expansion of Medicaid benefits could increase dental utilization. Not only would this attract more dentists to underserved areas, but it would also increase access to dental care for vulnerable populations. However, Medicaid expansion is not enough on its own. Only 38 percent of dentists treat Medicaid patients (Dental Benefits and Medicaid, 2020). Dentists must also accept Medicaid reimbursement—which would be unlikely without broad oral health policy change (Beetstra et al., 2008). By expanding dental care coverage to those covered by Medicaid and increasing the financial reimbursement dentists receive for treating Medicaid patients, there will be an increase in utilization, access to providers and reduced financial burden from oral health services (Nasseh, 2017). State Medicaid programs should consider expanding Medicaid to include dental coverage as a regular benefit. Coverage of dental services could increase general health, well-being and potentially lead to an increase in income. By expanding Medicaid benefits, the income and dental utilization gap could narrow. In summary, these steps would help to correct the disparity in dental health and dental healthcare utilization among those with low income.

VI. References

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Table 1. Descriptive Statistics

	South	Age	Female	Hispanic	Black	Education
Mean	0.372	62.836	0.708	0.198	0.290	12.210
Standard Error	0.024	0.587	0.022	0.020	0.022	0.139
Median	0	64	1	0	0	12
Mode	0	66	1	0	0	12
Standard Deviation	0.484	11.950	0.455	0.399	0.454	2.821
Sample Variation	0.234	142.811	0.207	0.159	0.206	7.958
Kurtosis	-1.726	0.212	-1.165	0.314	-1.141	1.843
Skewness	0.532	-0.455	-0.917	1.521	0.930	-1.129
Range	1	51	1	1	1	14
Minimum	0	34	0	0	0	3
Maximum	1	85	1	1	1	17
Sum	154	26014	293	82	120	5055
Count	414	414	414	414	414	414
	Never Married	**Divorced**	**Born In US**	**Current Smoker**	**≥ 1 Visits**	**Log of Income**
Mean	0.324	0.261	0.831	0.321	0.244	4.064
Standard Error	0.023	0.022	0.018	0.023	0.021	0.018
Median	0	0	1	0	0	4.055
Mode	0	0	1	0	0	3.954
Standard Deviation	0.468	0.440	0.375	0.468	0.430	0.375
Sample Variation	0.219	0.193	0.141	0.219	0.185	0.140
Kurtosis	-1.435	-0.809	1.146	-1.417	-0.571	2.981
Skewness	0.756	1.093	-1.772	0.768	1.197	-0.641
Range	1	1	1	1	1	2.206
Minimum	0	0	0	0	0	2.817
Maximum	1	1	1	1	1	5.023
Sum	134	108	344	133	101	1682.41
Count	414	414	414	414	414	414

Table 2. Regression Output

Multiple R	0.520790		
R Square	0.271222		
Adjusted R Square	0.251281		
Standard Error	0.324167		
Significance F	0.000		
Variable	**Coefficient**	**Standard Error**	**P-Value**
Intercept	3.53380	0.17783	0.000
South	-0.10132	0.03595	0.00507
Age	0.00930	0.00152	0.000
Female	-0.23111	0.04287	0.000
Hispanic	-0.13017	0.07883	0.09947
Black	0.04969	0.04711	0.29217
Education	0.00192	0.00721	0.79044
Never Married	0.09248	0.04570	0.04364
Divorced	-0.19511	0.04511	0.000
Born in US	0.13578	0.08001	0.09046
Current Smoker	0.04061	0.04420	0.35873
≥1 Dental Visits	0.12343	0.04165	0.00322
Dependent Variable: log of income			
Significance Level: 95%			

Highlighted are significant values.