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Beneficiaries' Perspectives on Improved Oral Health and its Mediators after Medicaid Expansion in Michigan: A Mixed Methods Study

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INTRODUCTION

Poor oral health, including dental caries, missing teeth and periodontal disease, is a major health problem for low-income adults.(1–4) Tooth loss is almost exclusively concentrated among low-income individuals, and this problem disproportionately affects African Americans.(5) The prevalence of moderate to severe periodontitis is three times higher in the lowest compared to the highest income quartiles.(3) Poor oral health may lead to infection, ulcerations and abscesses; pain that restricts normal activities and sleep; and tooth loss that limits food choices and affects chewing efficiency, nutritional adequacy, speech, social interaction, physical appearance and self-esteem.(2) Poor oral health also influences the ability to seek, obtain and maintain employment.(6,7) A 2015 national survey found that 19% of low-income adults reported their mouth and teeth were in poor condition, and 29% reported the appearance of their mouth and teeth affects their ability to interview for a job.(6)

Oral health services are effective in preventing and controlling most oral health problems, including tooth loss.(2) Periodontal therapy can reduce medical costs and hospitalizations.(8) Yet, fewer than a third of adults with incomes below 200% of the federal poverty level (FPL) had a dental visit during the past year, in any year between 2006 and 2015.(9) There are persistent disparities in dentist visits for Black and Hispanic adults relative to non-Hispanic white adults.(5)

Medicaid is the primary source of dental coverage for low-income adults, although not all state programs provide “extensive” dental benefits.(4,10–13) Research indicates that when Medicaid covers adult dental care, dentists treat more publicly insured patients.(14) A 2012 study found that Medicaid dental coverage increased the probability of a dental visit, decreased the probability of forgoing oral health services, and improved oral health indicators such as untreated caries and broken or missing teeth.(12) Medicaid expansion under the Affordable

Care Act (ACA) held the potential to **reduce** barriers to oral health care for millions of new adult beneficiaries.(4,10–12) Studies of the dental-related impact of Medicaid expansion have used national survey data to analyze differences in rates of dental visits in expansion and non-expansion states.(10,13,15–17) Some studies found greater use of adult dental services in Medicaid expansion states with at least "limited" adult Medicaid dental coverage.(13,16) Other studies found little change in dental visits.(10,17) A recent study of post-expansion outcomes reported a small increase in complete tooth loss associated with Medicaid expansion and suggested that this may be an indicator of increased access to care.(17)

Michigan expanded Medicaid with a Section 1115 waiver establishing the "Healthy Michigan Plan" (HMP), in April 2014.(18) In December 2020, 853,211 non-elderly adults were enrolled in HMP.(19) HMP health care coverage includes a "limited" dental benefit covering dental checkups, teeth cleaning, x-rays, fillings, tooth extractions and dentures, but does not cover root canals and crowns, for example.(19) At enrollment, HMP beneficiaries have fee-for-service coverage, including dental benefits. Within a few months, most enroll in, or are auto-assigned to Medicaid managed care plans. These plans manage or contract for management of the dental benefit.

There is a dearth of research on the individual-level experiences and impact of dental coverage available to Medicaid expansion beneficiaries on their oral health and functioning, including employment. Using data from Michigan's required waiver evaluation, the primary aim of this study is to examine beneficiaries' perspectives on the impact of HMP on their oral health. In secondary analyses, we explore mediators of improved oral health, including awareness of the HMP dental benefit, perceived access to dental services and use of dental services. We also assess the association of improved oral health with daily functioning and employability.

METHODS

Study Design

Data for this mixed-methods study, which was conducted by the University of Michigan Institute for Healthcare Policy and Innovation, came from three sources: (1) qualitative telephone interviews conducted between April and August 2015 with a convenience sample of HMP beneficiaries; (2) a telephone survey conducted in 2016 with a stratified random sample of individuals enrolled in HMP managed care; and (3) dental claims data from Michigan's state data warehouse. This federally mandated evaluation was deemed exempt by the University of Michigan and the Michigan Department of Health and Human Services (MDHHS) institutional review boards.

Qualitative Sample and Interviews

The qualitative one-hour interviews were conducted in English or Spanish with 67 HMP beneficiaries from around the state who were enrolled in HMP for at least 6 months and had used a least one HMP-covered service. Purposive sampling selected interviewees reflecting diversity in gender, age, race/ethnicity, income, health conditions and urban/rural residence. The interview guide included open-ended questions and probes, including a set that explored oral health care experiences: "Have you used your [HMP PLAN] insurance to get dental care?" (elicit examples: dental exams, teeth cleaning, extractions, other dental care?) If YES: "Would you say [HMP PLAN] has changed your ability to get dental care when you needed to? If YES: "How has it changed?" (elicit stories). In other open-ended questions, beneficiaries were asked to discuss how having HMP has affected their health, how they take care of their health, their ability to work and other experiences They could interpret and describe these as they chose, including oral health and care.

Qualitative Data Analysis

Qualitative interviews were audio-recorded and transcribed verbatim. Using an inductive approach to analysis, data were coded iteratively using standard qualitative analysis techniques and Dedoose software (https://www.dedoose.com).(20) An initial codebook was developed through review of the transcripts. Trained research assistants independently applied the codes and then collaboratively, along with the lead author, reviewed them while refining codes and generating additional codes that arose from the data. Any discrepancies were resolved by consensus. Saturation was determined when no new themes were emerging from the data. For this study, coded transcript excerpts involving oral health status and needs, awareness of HMP dental coverage, access to and use of dental care, daily functioning and employment, were reviewed to derive themes and sample quotations.

Survey Sample, Administration and Response Rate

A stratified random sample of HMP beneficiaries was drawn monthly between January and October 2016. Stratification by state geographic region and percentage of the FPL (0-35%, 36-99% and 100-133%) was allocated proportionately according to overall HMP enrollment. Eligibility criteria at the time of sampling were ages 19-64 years; enrolled in HMP for ≥12 months, with ≥9 months in a Medicaid managed care plan; language preference of English, Spanish or Arabic; and a complete Michigan address and telephone number in the state data warehouse. The analysis was conducted with the 4,090 respondents with complete survey data, for a weighted response rate of 53.7%. Further details of survey administration and participation have been previously published.(21,22)

Quantitative Measures

The primary outcome, self-reported oral health improvement, was assessed with one survey question: “Thinking about your dental health, since you enrolled in the Healthy Michigan Plan,

has the health of your teeth and gums gotten better, stayed the same, or gotten worse?" While "don't know" was not a survey response option, if a respondent indicated to the interviewer that they "didn't know", this was coded as "don't know". We combined "stayed the same, gotten worse and don't know" and compared that grouping to "gotten better". Secondary outcomes were measured with the following survey questions. Awareness of HMP dental coverage and perceptions of dental care access were assessed using these two survey items: "My Healthy Michigan Plan covers routine dental visits (Yes, No, Don't know)"; and "Would you say that your ability to get dental care through the Healthy Michigan Plan is better, worse or about the same, compared to before." Three survey items assessed job outcomes: Out-of-work respondents who strongly agreed or agreed that "Having health insurance through the Healthy Michigan Plan has made me better able to look for a job."; employed respondents who responded "Yes" to "Has getting health insurance through the Healthy Michigan Plan helped you do a better job at work?"; and respondents with a recent job change who strongly agreed or agreed that "Having health insurance through the Healthy Michigan Plan helped me get a better job." Standard demographic characteristics were drawn from the state data warehouse (gender, age, income) and the survey (race/ethnicity, health literacy, health insurance status prior to enrollment in HMP and employment status). Medicaid administrative claims documentation of one or more dental visit during HMP enrollment was drawn from the state data warehouse. A more detailed description of survey measures is located in the online appendix.

Quantitative Data Analysis

Descriptive statistics and Chi-squared tests were used to examine the unadjusted bivariate associations between: 1) demographic variables **and the primary outcome of self-reported improved oral health, with secondary outcomes of** awareness of dental coverage, **self-reported** dental care access and dental visits; 2) awareness of dental coverage and **self-**

reported dental care access with **self-reported** improved oral health; and 3) **self-reported** improved oral health with job seeking and job performance. We conducted multivariate logistic regression analysis to examine independent variables associated with the primary outcome of reporting oral health improvement. These independent variables included having any dental visit, sociodemographic characteristics, employment status and prior health insurance. All analyses were conducted using Stata version 14.

RESULTS

Survey Respondent and Interviewee Characteristics

Among the 4090 survey respondents, 51.6% were women; 40.0% were under age 35; 26.0% were over age 50 (Table 1). Most respondents (61.2%) were non-Hispanic white and 26.1% were African American. Almost half (48.8%) were employed or self-employed. Three-fifths (59.6%) were uninsured for all 12 months prior to HMP enrollment; 80.2% had incomes below 100% of the FPL. Help reading health-related materials was needed by 16.8% of respondents. Among the 67 qualitative interview participants, 65.6% were women, 25.4% were below age 35, 50.7% were non-Hispanic white, 35.8% were African-American, and 61.2% had incomes below 100% FPL (Table 2).

Awareness of HMP Dental Coverage

Roughly three-quarters of respondents (77.2%) were aware that HMP covers basic dental services (Table 1). Women were more likely to be aware of this dental coverage than men (80.8% vs. 73.2%; $p<0.001$). No other demographic characteristics were associated with awareness of HMP dental coverage. Among interviewed beneficiaries, most were aware of their HMP dental coverage, and some actively sought HMP coverage for the dental benefit**.**

> *"I could go to the VA for like some things. They don't cover dental and none of that type of stuff …So one reason I was trying to get on that [HMP] is to get my teeth fixed*

because my teeth are very bad, and I found out that I have a tumor in my mouth." (Male, 55-64, 100%-133% FPL)

Some interviewees were unaware of their HMP dental coverage, or thought dental care was not an eligible service covered under HMP, based on experiences with other Medicaid programs.

"I thought since I was over 21, I didn't have it [HMP dental coverage]." (Female, 35-44,100%-133% FPL)

Access to Dental Care

Among survey respondents, 46.1% reported improved access to dental care with HMP coverage (Table 1). Those who reported having no health insurance in the 12 months prior to HMP enrollment were more likely to report improved access to dental care (53.5%) than those insured all 12 months (32.6%) ($p<0.001$). Employed respondents were slightly more likely than unemployed respondents to report improved access to dental care since HMP enrollment (48.2% vs. 44.0%; $p=0.03$).

Most interviewees described access barriers that led to unmet oral health needs prior to obtaining HMP coverage.

"So my teeth really didn't get any real care while I was on Adult Benefits Waiver [pre-HMP program for adults 19-64 ≤35% FPL]…The most I could get was an antibiotic to keep the infection at bay." (Female, 55-64, <100% FPL)

Some described previously relying on emergency rooms for care of dental infections and pain control.

"…the [dental] infection got so bad that it virtually threatened my life. That wouldn't have happened [with HMP]...I called a buddy and I said, 'hey, I've got to get some

antibiotics.'… So he took me to the ER...They admitted me immediately…you couldn't see where my chin ended and my chest started..." (Male, 55-64, <100% FPL)

Some described making difficult choices between paying for needed dental care and other life needs.

"Before, I mean, I had to choose between paying rent or getting a tooth fixed…the main thing about it [HMP coverage] is most people can afford to get help now." (Male, 35-44, <100% FPL)

Interviewees described how HMP dental coverage had improved their access to oral health care. Several reported that, prior to HMP enrollment, their only available option was having some or all their teeth pulled.

"We couldn't get it on the Medicaid before. We could get a tooth pulled, but as far as dentures went, they wouldn't provide them. So I had lousy teeth for, I don't know, how many years. But since they switched over [to HMP], I was approved, and…I got my dentures on the way." (Male, 45-54, 100%-133% FPL)

Several described experiencing continued access barriers after HMP enrollment, including a lack of dentists accepting HMP coverage.

"There's not a whole lot of dentists around us that accept the [health plan]… for adults anyway…the only one that I know of is closed." (Female, 19-24, <100% FPL)

The experiences of some interviewees highlight a limitation of the basic dental benefits provided by HMP.

"The first visit, of course, was the cleaning and the x-rays. She found a few cavities. She said, 'I'd like for you to come back.' So I did. They fixed my cavities. She said I need a new crown. My crown is cracked, but she said the crown is not covered under your plan. So I'm gambling. I'm just hoping that, you know, it doesn't fall apart. But that would be $1,000 to fix my crown." (Female, 55-64, 100-133% FPL)

Dental Visits

Among survey respondents, 59.5% had at least one claim for a dental visit during their HMP enrollment (Table 1). Women were more likely to have had a dental visit (62.9%) than men (55.9%) ($p<0.001$). Beneficiaries who had health insurance for some of the year prior to HMP enrollment were more likely to have a dental visit during HMP enrollment (68.7%) than those who were either uninsured (58.2%) or insured (59.0%) in all 12 months prior to HMP enrollment ($p<0.05$).

Many interviewees described their use of dental services since HMP enrollment, receiving treatment for infections, dentures, fillings, and preventive dental care.

"Without it [HMP dental coverage], I wouldn't go [get dental care]. I've had, I think, three fillings and one cleaning and it's helped a lot because if I don't take care of that stuff, then it's just probably going to get worse. Having the insurance, you know, really helps keep my oral hygiene up." (Male, 19-24, <100% FPL)

The interviews shed light on why some beneficiaries did not use dental care, pointing to factors not directly affected by dental coverage, such as a general fear of dental care.

"I haven't been to the dentist yet, but I keep them brushed regularly. I'm scared of dentists….They like giving you shots in your face. I don't like that. I don't have any cavities, you know. No visual cavities." (Male, 45-54, <100% FPL)

Other non-utilizers did not perceive an immediate need for dental care, especially those with dentures or few or no teeth.

> *"I have dentures…I really should [go to the dentist] you know, because they can find out, you know, mouth cancer and all that…I lost all my teeth when I was like 32." (Female, 45-54, <100% FPL)*

Improved Oral Health and Functioning

Among survey respondents, 39.5% reported improved oral health since HMP enrollment. Respondents who were aware of their HMP dental coverage were more likely to report improved oral health since HMP enrollment than those who were unaware (47.3% vs. 13.3%; p<0.001) (Table 3). Those who reported better access to dental care under HMP were more likely to report improved oral health since HMP enrollment compared to those who did not (67.9% vs. 15.4%; p<0.001). Respondents who had at least one dental visit during their HMP enrollment were more likely than those with no dental visits to report improved oral health since HMP enrollment (56.5% vs. 14.4%; p<0.001).

In multivariate regression analyses of factors associated with reported improved oral health, respondents who had at least one dental visit were much more likely to report improved oral health following HMP enrollment (OR 8.25 [6.65-10.24]; p<0.001) (Table 3). After adjusting for dental visits and respondent characteristics, African Americans (OR 1.61 [1.28-2.03]; p<0.001) and those who were uninsured all 12 months before enrollment (OR 1.96 [1.58-2.43]; p<0.001) were more likely to report improved oral health (Table 3, model 2).

Figure 1 depicts the bivariate associations between reported improvement in oral health and reported employment-related outcomes because of having HMP health insurance, among survey respondents. Unemployed respondents who reported improved oral health were more

likely to report that they were better able to look for a job because of having health insurance through HMP than those who reported no oral health improvement (59.9% vs. 51.1%; p=0.04). Employed respondents who reported improved oral health were more likely to report that having health insurance through HMP helped them to do a better job at work (76.1% vs. 65.0%; p<0.001). Among the subset of employed respondents with a recent job change (n=433), the association between reporting improved oral health and reporting that HMP coverage helped them to get a better job was not statistically significant (43.2% vs. 33.0%; p=0.11).

Interviewees often discussed their improved oral health and functioning after obtaining dental care with their HMP coverage. Several described how getting dentures had improved their ability to eat.

> *"I didn't have no dental with Adult Benefits Waiver. My teeth were in really bad shape. Finally, with the Healthy Michigan Plan, I was able to get a full upper denture and lower partial. It's a lot easier for me to eat now." (Female, age 55-64, <100% FPL)*

Many described how obtaining dentures through HMP had improved their appearance, self-confidence and sense of physical and mental well-being, which enhanced their ability to look for a job and to do a better job at work.

> *My teeth were pretty bad…and they fixed it up fine, and now…I feel better when I am looking for a job…I feel better because my appearance has changed a lot. That has helped me a lot, physically and mentally." (Male, age 45-54, <100% FPL)*

> *"It's funny because my boss said, 'you need to smile.' It's like, 'I'm trying.' He said, 'No, you're not. You're still putting your hand over your mouth. Put your hand down and smile.' That takes a lot to get used to when you're used to doing something for 15*

years…My two front teeth were knocked down…I didn't have a very pretty smile…I mean, it's priceless that I can smile now." (Female, 45-54, <100% FPL)

DISCUSSION

This mixed-methods study of Medicaid expansion in Michigan fills an important gap in the literature by describing and analyzing the predictors of self-reported improved oral health in Medicaid expansion enrollees and the association of improved oral health with employment-related outcomes among these low-income adults. Interviewees described how dental care and dentures obtained through their HMP coverage improved their oral health, functioning and appearance, and their confidence seeking and maintaining employment.

The study found that improved oral health was associated with having a dental visit during HMP enrollment, being African American and having been uninsured for the entire year prior to enrolling in HMP. This finding suggests that the Medicaid dental coverage may be an important mechanism to help address the wide and persistent disparities in both oral health and dental care visits between black and non-Hispanic white Americans.(5) We also identified continued unmet oral health care needs in the Medicaid population, resulting from ongoing barriers to care.(2,4,6,10,11,16,17,23) Some interviewees discussed their inability to afford recommended root canal and crown procedures not covered under HMP's "limited" Medicaid dental coverage.(10,11,15,23) Some described lack of access to providers who accept Medicaid.(10) Other barriers included fear of dental care and the perception that people with no teeth do not need dental care. Some survey respondents were unaware that HMP covers dental care, suggesting an ongoing need for outreach and education to HMP beneficiaries about their dental coverage and the importance of preventive oral health care for maintaining oral and overall health.

The bidirectional relationship between oral health and other health-related conditions makes prevention and treatment of oral health disorders vitally important for reducing the risk of developing other health disorders and improving overall health, functioning and employment in individuals and populations.(2,13,24) Medicaid coverage supports opportunities in primary care and dental care settings to identify those at risk for oral disease, provide primary prevention to reduce risks, and offer needed treatment so that identified conditions are resolved or do not worsen.(2) Medicaid beneficiaries in Michigan and Oregon described how, prior to obtaining their Medicaid dental coverage, they had relied on emergency departments for infection and pain control that did not resolve the underlying problem, because they could not afford dental care.(25) Future research should examine the impact of Medicaid dental coverage in Medicaid expansion states on preventable oral health-related emergency department use, with implications for reducing exposure to pain medications and cost savings.(25,26)

This study has several limitations and strengths. Study data are cross-sectional; thus, our analyses provide associations rather than causal inferences. We are not able to disaggregate beneficiaries' perceptions of the specific benefits of dental coverage versus other aspects of their HMP health care coverage. Additionally, we do not have information on whether HMP beneficiaries had dental coverage prior to enrolling in HMP. Dental care is listed as provided by the beneficiary's health plan in HMP materials. Interviewees who were aware of their dental coverage generally discussed dental coverage as integral to HMP. The survey response rate of 53.7% creates the possibility of non-response bias, but is high relative to other studies of low-income and Medicaid populations.(27) Survey and interview data were based on self-report. To reduce social desirability bias, the team emphasized its independent evaluator role, and the confidentiality of responses.(21) Perceived oral health and dental care needs may influence dental care-seeking behavior.(28) Beneficiaries with few or no teeth, including some with

dentures, and those with good perceived oral health may not think they need dental care (23,28). Conversely, an oral health visit may reveal previously undiagnosed oral health problems and worsen perceived oral health. These beliefs may have affected perceived improvements in dental care access and oral health. The lack of alternative data sets that resolve this limitation has been noted elsewhere.(23)

This study also has several strengths. The existing literature on the impact of Medicaid expansion has focused largely on cross-state comparisons of dental care utilization.(10,13,15–17). Our mixed-methods study uses survey and in-depth interview data and claims data to provide an enriched picture of the impact of Medicaid expansion dental coverage on oral health, from the perspectives of individual beneficiaries. To our knowledge, this study contributes a distinctive exploration of the association between reported improved oral health and reported job outcomes related to expanded Medicaid coverage. In qualitative interview data, HMP beneficiaries described *how and why* their improved oral health improved their job seeking and performance. Finally, our use of administrative claims data to measure dental care visits avoids potential social desirability bias and recall bias that could result in overestimation or underestimation of self-reported dental visits.(29)

In summary, this study found that Michigan's Medicaid expansion contributed to perceived improved oral health for beneficiaries, with implications for improved daily functioning, including employment. Our findings suggest the importance of Medicaid dental coverage for reducing racial/ethnic and gender disparities in oral health care use and oral health among low-income adults. Dental care is an optional service for adults under Medicaid. As policymakers consider changes to the scope of, and eligibility for, Medicaid services, it is important to consider the impact of dental coverage on access to dental care and oral health for low-income individuals and communities. Polices that reduce, restrict or eliminate Medicaid dental coverage may

reverse demonstrated and potential improvements in oral health care use, oral and general health and functioning, and employability among low-income people.(30) Improved oral health is an important contributor to the health, social and economic well-being of Medicaid beneficiaries and their communities.

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Beneficiaries' Perspectives on Improved Oral Health and its Mediators after Medicaid Expansion in Michigan: A Mixed Methods Study

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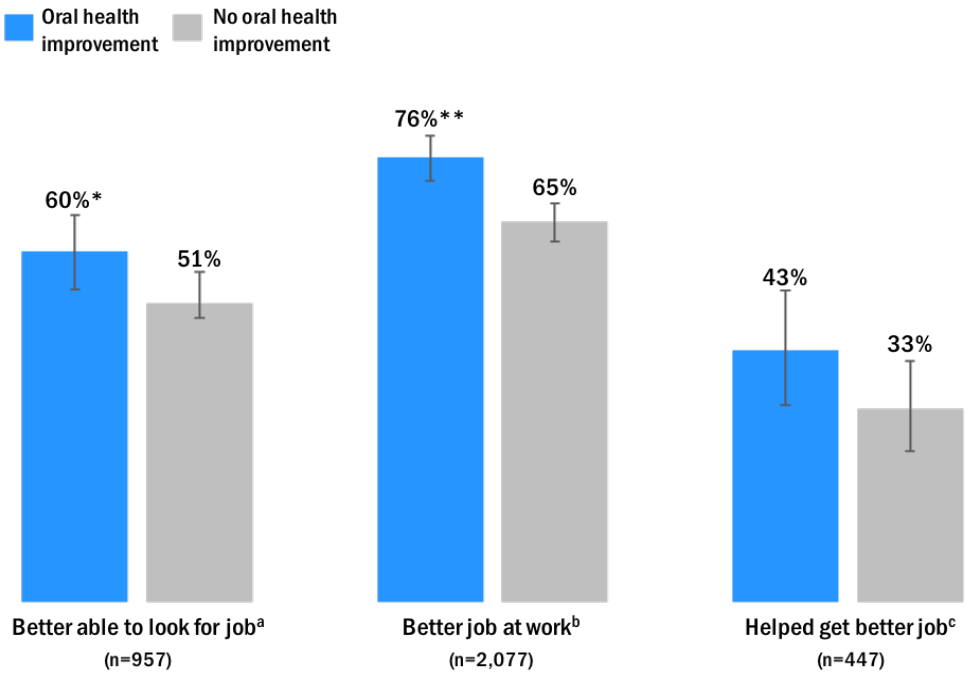
Figure 1. Associations between reported improved oral health and reported employment-related outcomes because of having HMP health insurance, among Healthy Michigan Voices survey respondents



*p<0.05 **p<0.001

SOURCE: Authors' analysis of 2016 Healthy Michigan Voices Survey data. NOTES: N indicates the total number of respondents who answered the question. [a]Out of work respondents who strongly agreed or agreed that "Having health insurance through the Healthy Michigan Plan has made me better able to look for a job." (Overall proportion = 54.5%) [b]Employed respondents who responded "Yes" to the question, "Has getting health insurance through the Healthy Michigan Plan helped you do a better job at work?" (Overall proportion = 69.4%) [c]Respondents with a recent job change who strongly agreed or agreed that "Having health insurance through the Healthy Michigan Plan helped me get a better job." (Overall proportion = 36.9%)

Abstract

Objective: To investigate self-reported improved oral health and its mediators, and job-related outcomes, of Medicaid expansion beneficiaries in Michigan.

Methods: This cross-sectional mixed-methods study of adult "Healthy Michigan Plan (HMP) Medicaid expansion beneficiaries included qualitative interviews with a convenience sample of 67 beneficiaries enrolled for ≥6 months, a stratified random sample survey of 4,090 beneficiaries enrolled for ≥12 months; and Medicaid claims data. We examined unadjusted associations between demographic variables and awareness of dental coverage, self-reported dental care access, dental visits and self-reported oral health; and between improved oral health and job seeking and job performance. Multivariate analysis examined factors associated with self-reported oral health improvement, adjusting for sociodemographic characteristics, prior health insurance and having at least one dental visit claim.

Results: Among surveyed beneficiaries, 60% received ≥1 dental visit and 40% reported improved oral health. Adjusted odds ratios (aOR) for improved oral health were higher for African-American beneficiaries (aOR=1.61; CI=1.28-2.03) and those previously uninsured for ≥12 months (aOR=1.96; CI=1.58-2.43). Beneficiaries reporting improved oral health were more likely to report improved job seeking (59.9% vs 51%; p=0.04) and job performance (76.1% vs 65.0%; p<0.001) due to HMP. Interviewees described previously unmet oral health needs and treatments that improved oral health, functioning, appearance, confidence and employability.

Conclusion: Michigan's Medicaid expansion contributed to self-reported improved oral health, which was associated with improved job outcomes. Policymakers should consider the importance of Medicaid dental coverage in reducing oral health disparities and improving the health and socioeconomic well-being of low-income adults and communities when considering this optional benefit.

Key words: Dental Care; Oral health; Medicaid; Health Care Reform; Public Health

Table 2. Characteristics of Healthy Michigan Plan beneficiary[a] interviewees

	N	%
Beneficiary Characteristics[b]		
Required Monthly Premium Contributions		
Yes (Income 100%-138% FPL)[c]	22	33
No (Income <100% FPL)[d]	41	61
Unknown %FPL	4	6
Race/Ethnicity		
African American	24	36
White, non-Latino/a	34	51
Latino/a	4	6
Native American	5	8
Gender		
Male	23	34
Female	44	66
Age group (years)		
19-24	2	3
25-34	15	22
35-44	9	13
45-54	20	30
55-64	19	28
65[d]	2	3
Urban/Rural[e]		
Urban	53	79
Rural	14	21

SOURCE: Authors' interviews with Healthy Michigan Plan (HMP) beneficiaries. NOTE: FPL is Federal Poverty Level. Percentages within categories may not add up to 100% due to rounding. [a]HMP beneficiaries who had been enrolled in HMP for at least 6 months were interviewed between April and August 2015 (n=67). [b]Beneficiary characteristics are based on self-report at the time of the interview unless otherwise indicated. [c]The Michigan Department of Health and Human Services Data Warehouse (MDHHS) confirmed income, HMP enrollment, and HMP required contributions or not). [d]Two interviewees who turned 65 within 2 months of study recruitment were interviewed. [e]Zip codes and county codes were linked to the U.S. Department of Agriculture Economic Research Service 2013 Influence Codes to classify regions into urban (codes 1-2), suburban (codes 3-7) and rural (codes 8-12) designations.

Table 1. Bivariate associations of Healthy Michigan Voices Survey respondent characteristics with awareness of HMP dental coverage, perceived access to dental care, and dental care use

	All Enrollees (Total N = 4,090) N (Weighted %)	Aware that HMP covers dental care[a] (Row %)	Improved access to dental care[b] (Row %)	Any dental care visit[c] (Row %)
All Enrollees		**77.2**	**46.1**	**59.5**
Gender				
Female	2,409 (51.6)	80.8***	47.6	62.9***
Male	1,681 (48.4)	73.2	44.4	55.9
Age				
19-34	1,303 (40.0)	76.9	44.4	58.0
35-50	1,301 (34.0)	76.7	47.7	61.0
51-64	1,486 (26.0)	78.2	46.4	59.9
Race				
White	2,714 (59.3)	77.2	46.4	61.1
Black or African American	800 (25.9)	79.7	46.5	56.8
Hispanic/Latino	78 (2.1)	70.5	47.8	55.2
Other	448 (12.8)	73.5	44.9	57.7
Employment status				
Employed/self-employed	2,079 (48.8)	77.9	48.2*	59.7
Not employed	2,011 (51.1)	76.5	44.0	59.3
Insurance duration prior to HMP				
All year	1,235 (30.9)	77.7	32.6***	59.0*
Some of the year	374 (9.5)	82.0	48.0	68.7
None of the year	2,374 (59.6)	76.9	53.5	58.2
Help reading health materials				
Sometimes/Often/Always	641 (16.8)	73.5	42.6	60.5
Never/Rarely	3,444 (83.2)	77.9	46.7	59.3
Income, % of federal poverty level				
0-35%	1,600 (51.8)	77.1	46.8	59.2
36-99%	1,450 (28.4)	78.5	46.3	59.9
≥ 100%	1,040 (19.8)	75.3	43.6	59.8

*p < 0.05 **p < 0.01 ***p < 0.001 Indicates a significant association for the categorical variable based on Pearson's Chi-2 test.

SOURCE: Authors' analysis of 2016 Healthy Michigan Voices Survey and Medicaid claims data. NOTES: Associations are tested using Pearson chi-square analysis. HMP is Healthy Michigan Plan. [a]Self-reported awareness of HMP coverage of dental services. [b]Self-reported improved access to dental care after enrollment compared to no change/worse. [c]Dental care use based on Medicaid claims data.

Table 3. Unadjusted and adjusted associations of Healthy Michigan Voices Survey respondent characteristics and dental care visits with improved oral health

	Improved oral health[a] (N= 3,930)					
	Bivariate association			**Logistic regression**		
Independent variables	Percent	95% CI	P-value	aOR	95% CI	*P*-value
Any dental visit[b]						
No	14.4	[12.4, 16.8]	<0.001	Reference		
Yes	56.5	[54.0, 59.0]		8.25	[6.65, 10.24]	<0.001
Gender						
Male	37.7	[34.8, 40.7]	0.073	Reference		
Female	41.2	[38.8, 43.7]		1.12	[0.92, 1.35]	0.249
Age						
19-34	38.8	[35.6, 42.1]	0.824	Reference		
35-50	39.9	[36.6, 43.3]		0.90	[0.72, 1.13]	0.381
51-64	40.1	[37.1, 43.3]		0.99	[0.79, 1.23]	0.905
Race						
White	37.6	[35.3, 39.9]	0.004	Reference		
Black or African American	45.4	[41.1, 49.8]		1.61	[1.28, 2.03]	<0.001
Hispanic/Latino	30.6	[20.3, 43.3]		0.65	[0.35, 1.22]	0.179
Other	37.4	[32.1, 43.0]		1.09	[0.81, 1.46]	0.565
Income, % of federal poverty level						
0-35%	40.0	[37.0, 43.1]	0.245	Reference		
36-99%	40.7	[37.7, 43.8]		1.11	[0.89, 1.38]	0.349
≥ 100%	36.6	[33.3, 40.0]		0.90	[0.711, 1.15]	0.405
Employment status						
Employed/self-employed	40.1	[37.4, 42.8]	0.587	Reference		
Not employed	39.0	[36.3, 41.8]		0.93	[0.76, 1.13]	0.483
Insurance duration prior to HMP						
All of the year	31.7	[28.5, 35.0]	<0.001	Reference		
Some of the year	40.7	[34.5, 47.2]		1.28	[0.92, 1.78]	0.137
None of the year	44.1	[41.5, 46.7]		1.96	[1.58, 2.43]	<0.001
Aware that HMP covers dental care				Not included in multivariable model		
Yes	47.3	[45.1, 49.5]	<0.001			
No/don't know	13.3	[10.8, 16.2]				
Improved access to dental care						
Yes	67.9	[65.2, 70.6]	<0.001			

No	15.4	[13.5, 16.8]		

SOURCE: Authors' analyses of 2016 Healthy Michigan Voices Survey and Medicaid claims data.

NOTES: aOR is adjusted odds ratio; CI is confidence interval. Logistic regression model is adjusted for age, gender, race, income, employment status, and insurance duration in the 12 months before HMP enrollment. [a]Self-reported improved health of teeth and gums since enrollment in HMP, self-reported, compared to worse/same/don't know. [b]Dental visits based on Medicaid claims data.