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Examining the Association Between Social Needs and Care Gap Closure Among Older Adults Receiving Dental Care



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Introduction: The authors of this study sought to (1) describe the prevalence of social needs and (2) determine whether social needs were associated with closure of care gaps among patients aged ≥ 65 years seeking dental care.

Methods: In this retrospective cross-sectional study, the authors identified 754 Kaiser Permanente Northwest patients aged ≥ 65 years who completed an index dental visit; had at least 1 of 23 preventive care gaps (e.g., flu vaccination) or disease management care gaps (e.g., diabetes HbA1c screening test) documented in their medical record; and had completed a social needs assessment through survey evaluating financial strain, food insecurity, housing needs, social isolation, and transportation needs. The authors described the prevalence of social needs at the index visit and then used logistic regression to evaluate the association between the number of social needs (0, 1, ≥ 2) and closure of all care gaps over the following 60 days (yes versus no), adjusting for patient characteristics. Identification and closure of care gap were assessed through Kaiser Permanente Northwest's Panel Support Tool.

Results: Approximately 28% of patients reported ≥ 1 social needs. The prevalence of social needs was as follows: social isolation, 13.7%; financial strain, 11.3%; food insecurity, 7.7%; transportation needs, 5.4%; and housing needs, 3.3%. Those with 1 social need were more likely to close care gaps than those with no social needs (OR=1.82, 95% CI=1.17, 2.85). No significant association was found with care gap closure among those with ≥ 2 versus zero social needs.

Conclusions: The prevalence of social needs was nearly 30% among patients aged ≥ 65 years with dental and medical coverage. Patients with 1 social need were more likely than those with no social needs to close all care gaps after their visit.

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INTRODUCTION

An extensive body of research has found that social needs are associated with poor health outcomes and higher use of healthcare services.^{1–10} Moreover, increases in social isolation during the coronavirus disease 2019 (COVID-19) pandemic exemplify the importance of identifying and addressing social needs of critical importance among those aged ≥ 65 years.^{11–14}

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Screening for social needs in the dental setting represents a unique opportunity for older adults but has not been studied extensively. Whereas social needs screenings have not traditionally taken place in the dental setting, other health screenings have, indicating that social needs screening could be feasible in this setting. For example, previous research suggests that dental settings can be an effective venue for facilitating preventive medical services for adults at risk for chronic disease.^{15,16} Greenberg and colleagues¹⁵ found that about 20% of patients screened at an academic dental clinic had previously unidentified cardiovascular risk factors. Similarly, a recent systematic review¹⁶ found that screening for dysglycemia in dental offices effectively identified high-risk patients who may be in need of further glycemic management.

Screening for social needs among older individuals is important for 2 reasons. First, older adults have high levels of social needs. Previous research found that about 1 in 4 older U.S. adults reported social isolation and loneliness,¹¹ about 10% experienced food insecurity,¹⁷ and nearly 7% reported financial strain.¹⁸ Second, older adults are more likely than younger adults to have an ongoing need for regular preventive medical services, such as routine vaccinations, blood pressure screening, cholesterol screening, and HbA1c testing.^{19,20}

The combination of high social needs and high need for preventive medical services among older adults provides an opportunity to assess whether social needs are associated with use of preventive medical services. This area of study is important because the presence of social needs may act as a barrier to receiving timely preventive medical services or closing needed care gaps. With this background in mind, our study had 2 objectives: (1) to describe the prevalence of social needs among a population aged ≥ 65 years seeking dental care and (2) to determine whether the presence of social needs is associated with differential closure of care gaps within 60 days after receiving dental care.

METHODS

Study Population

The authors conducted a retrospective cross-sectional study of Kaiser Permanente Northwest (KPNW) medical and dental members who met the following 6 inclusion criteria: (1) had a dental visit (index visit) at a KPNW medical-dental integration (MDI) clinic between December 4, 2019 and March 31, 2022; (2) were aged ≥ 65 years at the time of the index visit; (3) had current medical (Medicare) and dental insurance; (4) reported ≥ 1 medical care gaps at the index visit; (5) had a complete social needs assessment entered in electronic health

record (EHR) between 30 days prior and 14 days after the index visit; and (6) had complete covariate information (see below). Open baseline care gaps were measured at the time of the index visit; closure of care gaps was assessed within the 60 days after the index visit.

The protocol for this study was approved by the IRB within KPNW. The need for individual consent for data use was waived.

KPNW currently serves approximately 636,173 medical members and 250,000 dental members in Oregon and Washington. The KPNW MDI program includes 3 distinct model types employed in 4 dental clinics, as described in prior work.²¹ A summary of the integration models is listed below, ranging from least integration to most integration.

Least integration (Salmon Creek). The Salmon Creek dental office is located in the same building as medical offices but with no medical staff embedded in the dental office. Within the Salmon Creek clinic, a Dental Member Assistant identifies care gaps at the time of the dental visit and coordinates closely with other medical departments in the building to close these gaps. The Dental Member Assistant also arranges for on-site follow-up with primary care staff for care coordination regarding other medical conditions when directed.

Moderate integration (Glisan). The Glisan dental office is a stand-alone dental clinic that includes embedded medical staff. A Licensed Practice Nurse (LPN) is embedded within the clinic to address care gaps. The LPN provides medical services (e.g., immunizations, HbA1c testing) directly in the dental setting. The LPN also coordinates other medical services that require off-site referrals (e.g., mammography).

Most integration (Beaverton, Cedar Hills). The Beaverton and Cedar Hills dental offices are colocated within medical buildings. In addition, these dental clinics have LPNs embedded within the dental office. Similar to the LPN at the Glisan office, these LPNs provide direct medical services within the dental setting. They also coordinate with other staff located in the same medical building if additional medical services are needed that require referrals.

KPNW dental and medical clinics use the Panel Support Tool (PST) within the EHR to identify patient care gaps, as has been described previously.²² The PST tracks care gaps and recommends follow-up care and has been in use since about 2006. The tool lists care gaps on the basis of established clinical guidelines.^{19,20,23,24} Care gaps included in the PST have been described previously and include gaps specific to preventive care (e.g., immunizations) and disease management (laboratory tests, screening tests, annual examinations, and smoking-cessation resources).²¹

Beginning in December 2019/January 2020, the 3 MDI clinics with embedded LPNs began screening for social needs among adults aged ≥ 65 years. Five social needs were assessed through paper survey: financial strain,^{25,26} food insecurity,²⁷ housing instability,²⁸ social isolation,²⁹ and transportation needs.³⁰

Once surveys were completed by patients, responses were entered into the EHR by the LPN staff. Social needs assessments ceased during the COVID-19 shutdown between March 2, 2020 and October 11, 2020. Upon the MDI clinics reopening on October 12, 2020, 2 clinics (Glisan, Cedar Hills) resumed social needs screening.

Measures

Dependent variable. The primary outcome measure was closure of all medical care gaps present at the index dental visit within 60 days of the visit. The authors selected this outcome measure because it indicates receipt of all recommended preventive and disease management services for patients eligible for these services.^{19,20,23,24}

Independent variable. The primary independent variable was the number of reported social needs as a categorical variable (0, 1, ≥ 2 needs).

Covariate measures. Five sets of covariate measures were included in the analysis: (1) demographics, (2) comorbidities and disease status, (3) prior healthcare utilization, (4) total baseline care gaps, and (5) quarter and year of index dental visits. Demographic measures included age (65.0–74.9, ≥ 75), sex (male, female), race/ethnicity (White, non-White), and the Area Deprivation Index (ADI) (scores of 1–3 [low deprivation], 4–6 [moderate deprivation], and 7–10 [highest deprivation]).³¹ Comorbidity and disease status measures include Charlson Comorbidity Score (CCI) (scores of 0–1, ≥ 2)^{32,33} and presence of systemic disease related to oral health, including any of 5 chronic conditions: diabetes mellitus, rheumatoid arthritis, cardiovascular disease, coronary artery disease, and hypertension (yes/no). Utilization measures included any emergency department (ED) utilization (yes/no) and any hospital admission (yes/no) in the year prior to the index dental visit. Total number of care gaps at baseline (continuous) were measured upon the index visit; quarter and year of index visit was measured over the course of the study period (Quarter 1 of 2019–Quarter 1 of 2020, Quarter 2 of 2020–Quarter 4 of 2020, Quarter 1 of 2021–Quarter 4 of 2021, Quarter 1 of 2022).

Statistical Analysis

Descriptive analysis. First, the authors conducted a descriptive analysis evaluating the prevalence of individual social needs, number of social needs (0, 1, or ≥ 2),

and covariate measures. They also compared social needs by number of care gaps.

Collinearity diagnostics and logistic regression model building. Collinearity diagnostics were used to assess collinearity among a number of social needs and covariate measures. Because no collinearity was found among a number of social needs and the covariate measures, all covariate measures were included in the final logistic regression model.

Using logistic regression, closure of all care gaps was regressed on the following measures: number of social needs (0 [ref group] vs 1, ≥ 2), age (65–74 [ref group] years vs ≥ 75 years), race/ethnicity (White [ref group] versus non-White), ADI (continuous), CCI (0 [ref group] vs 1, ≥ 2), any ED visit in the 12 months prior to dental visit (yes versus no [ref group]), any hospital admission in the 12 months prior to dental visit (yes versus no [ref group]), any systemic disease (yes versus no [ref group]), total baseline care gaps (continuous), and quarter/year of dental visit (Quarter 4 of 2019/Quarter 1 of 2020 [ref group] versus Quarter 4 of 2020, Quarter 1 of 2021, Quarter 2 of 2021, Quarter 3 of 2021, Quarter 4 of 2021, Quarter 1 of 2022). Two models were constructed: (1) adjusted for all covariates, excluding total baseline care gaps, and (2) adjusted for all covariates, including total baseline care gaps.

RESULTS

Figure 1 shows the population eligible for the study (as described in the Methods section) and the proportion of that population that met the inclusion criteria. Of the 3,831 patients who were eligible for the study, 754 (19.7%) met the study inclusion criteria. The proportion of patients meeting inclusion criteria was highest in the MDI clinics doing active social needs screening—Glisan, 418 of 823 (50.8%), and Cedar Hills, 152 of 416 (36.5%)—and lowest in the MDI clinics not conducting social needs screening over most of the study period: Beaverton, 78 of 891 (8.8%), and Salmon Creek, 106 of 1,701 (6.2%).

Details of the population are presented in Table 1. The majority of the population was female (65.7%), was aged between 65 and 74 years (72.2%), and was White (91.0%); 41.6% had ADI scores of 1–3. Most patients (69.2%) had a CCI of 2 or more and/or systemic disease. In the year prior to the index dental visit, about 20% had any ED utilization, whereas slightly $< 10\%$ had any hospital admissions. The average number of open care gaps was 2.0 per patient, and the timing of dental visits was evenly distributed across time periods at about 10%–15% per quarter during the study period. About

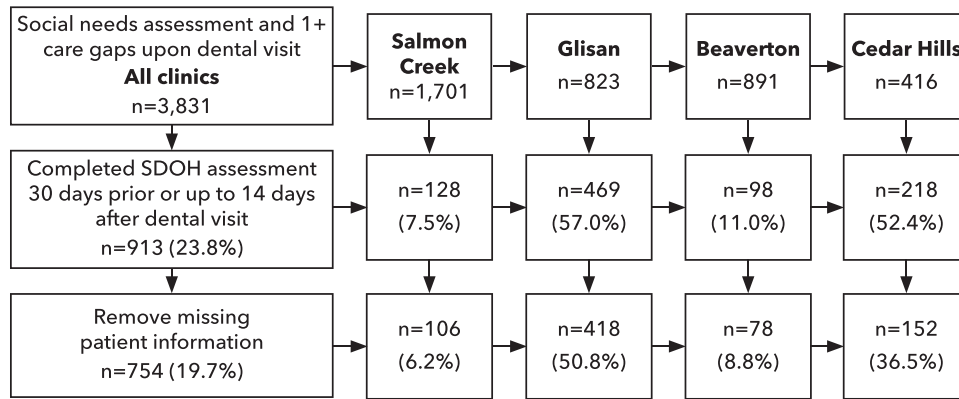


Figure 1. Process flow: study population. SDOH, social determinant of health.

30% closed all their care gaps by 60 days after the index date. Finally, about 90% of social needs screening occurred within 14 days of the dental visit (including the day of the dental visit).

A description of social needs is presented in Table 2. Nearly 30% of the study population had 1 or more social needs, with 18.8% having 1 social need and 9.0% having 2 or more social needs. The frequency of each social need (in descending order) was 13.7% for social isolation, 11.3% for financial strain, 7.7% for food insecurity, 5.4% for transportation needs, and 3.1% for housing needs. Those with 2 or more social needs had an average of 3.1 total care gaps, compared with 1.8 total care caps among those with no social needs.

Details of the association of a number of social needs with care gap closure are presented in Table 3. We found that those with 1 social need were more likely to close care gaps than those with no social needs, both before (OR=1.66, 95% CI=1.11, 2.47) and after (OR=1.82, 95% CI=1.17, 2.85) adjusting for baseline care gaps. Those with 2 or more social needs were less likely to close care gaps before adjusting for total baseline care gaps (OR=0.41, 95% CI=0.19, 0.85); however, this finding was no longer significant after adjusting for total baseline care gaps (OR=0.71, 95% CI=0.31, 1.62).

DISCUSSION

In this study of adults aged ≥ 65 years seeking dental care at KPNW, nearly 30% had ≥ 1 social needs. The most common need was social isolation (13.7%), whereas the least common need was housing (3.1%). Counterintuitively, those who reported exactly 1 social need were more likely to close all care gaps within 60 days of their visit than those with no social

needs. No association was found in care gap closure between those with 2 or more social needs and those with no social needs. The nonsignificant finding for those with 2 or more social needs appears to be driven by the fact that this group has more open care gaps upon dental visit than those with no social needs. Once the number of open care gaps is accounted for, there is no difference in closure of care gaps between those with 2 or more social needs and those with no social needs.

This is one of only a few studies that have measured social needs in the dental setting. Furthermore, this is the first study, to the authors' knowledge, that examined the association of a number of social needs with care gap closure. This complements other research on MDI. For example, previous research found that it was possible to measure cardiac risk and dysglycemia in the dental setting.^{15,16} The present study also complements a study led by Mays et al.³⁴ that measured unmet social needs within a dental school clinic.

Although the study included a comprehensive set of covariate measures, it is likely that unmeasured confounding factors could have impacted the findings. For example, the authors were unable to capture receipt of referrals for assistance for patients with social needs; receipt of this assistance could have affected care gap closure. Because the level and success of support to address unmet social needs after referrals could differ between those with 1 and ≥ 2 social needs, this could partially explain higher care gap closure among those with 1 reported social need. Future research is needed to examine whether resolution of social needs is associated with improvement in dental-related outcomes. In any case, these results show that it is feasible to measure social needs and conduct social needs research in dental settings.

Table 1. Population Characteristics

Characteristic	N=754
Demographic characteristics, n (%)	
Sex	
Female (versus male)	495 (65.7%)
Age, years	
65–74 (vs ≥75)	544 (72.2%)
Race	
White, non-Hispanic (versus Hispanic or another race)	686 (91.0%)
Area Deprivation Index	
1–3	314 (41.6%)
4–6	274 (36.3%)
7–10	166 (22.0%)
Comorbidities and disease status, n (%)	
Charlson Comorbidity Score	
≥2 (vs 0–1)	271 (35.9%)
Systemic disease	
Yes (versus no)	492 (65.3%)
Prior healthcare utilization, n (%)	
ED utilization, 12 months prior to the index date	
Any (versus none)	158 (21.0%)
Hospital admissions, 12 months prior to the index date	
Any (versus none)	64 (8.5%)
Open care gaps at baseline	
Mean±SD	2.0±1.3
All care gaps closed, n (%)	230 (30.5%)
When social needs assessments were conducted	
Between 1 and 30 days before dental visit	55 (7.3%)
Same day of dental visit or within 14 days after visit	699 (92.7%)
Q year of index dental visits, n (%)	
Q4 2019/Q1 2020	127 (16.8%)
Q4 2020	78 (10.3%)
Q1 2021	118 (15.7%)
Q2 2021	146 (19.4%)
Q3 2021	79 (10.5%)
Q4 2021	101 (13.5%)
Q1 2022	105 (13.9%)

ED, emergency department; Q, quarter.

Table 2. Descriptive Statistics: Presence of Social Needs by Care Gaps

Characteristic	N=754	Total care gaps (mean±SD)
Individual social needs, n (%)		
Financial strain	85 (11.3%)	NA
Food insecurity	58 (7.7%)	NA
Housing needs	23 (3.1%)	NA
Social isolation	103 (13.7%)	NA
Transportation needs	41 (5.4%)	NA
Any social need	210 (27.9%)	NA
Total social needs, n (%)		
0	544 (72.2%)	1.8±1.1
1	142 (18.8%)	1.9±1.3
≥2	68 (9.0%)	3.1±2.2

NA, not applicable.

Limitations

This study’s findings have several limitations. First, these findings may not be generalizable to dental settings that do not include integrated medical services or to those who do not have medical and dental insurance coverage. Second, data on social needs were collected by self-report and may be subject to recall and social desirability biases. Third, the small sample size limited our ability to examine the association of individual needs and specific types of care gaps. Fourth, there was potential for non-response bias, given that only about 20% of the eligible population had information available on social needs. Finally, the population studied was about 90% White, and findings may not generalize to more racially or ethnically diverse populations. Although the population was representative of the KPNW healthcare system, a limitation of the study is that it was not conducted in a more racially diverse population.

Table 3. Association of Number of Social Needs with Care Gap Closure

Number of social needs	Adjusting for patient characteristics, excluding care gaps ^a		Adjusting for patient characteristics and care gaps ^b	
	OR	95% CI	OR	95% CI
0 (ref group)	1.00	NA	1.00	NA
1	1.66	1.11, 2.47	1.82	1.17, 2.85
≥2	0.41	0.19, 0.85	0.71	0.31, 1.62

Note: Boldfaces indicate statistical significance (p<0.05).

^aModel adjusted for sex, age, race/ethnicity, ADI, CCI, presence of systemic disease, prior ED utilization, prior inpatient admissions, and dental visit date.

^bModel adjusted for sex, age, race/ethnicity, ADI, CCI, presence of systemic disease, prior ED utilization, prior inpatient admissions, dental visit date, and total baseline care gaps.

ADI, area deprivation index; CCI, Charlson Comorbidity Score; ED, emergency department; NA, not applicable.

CONCLUSIONS

In this study of Medicare patients seeking dental care in KPNW MDI program clinics, the authors found that nearly 30% of patients had 1 or more social needs. Those with 1 social need were more likely to close care gaps than those with no social needs. No association with care gap closure was found among patients with 2 or more social needs than among those with no social needs.

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Declaration of interest: none.

CREDIT AUTHOR STATEMENT

David M. Mosen: Conceptualization, Methodology, Writing – original draft. Matthew P. Banegas: Conceptualization, Methodology, Writing – review & editing. Daniel J. Pihlstrom: Writing – review & editing. Erin M. Keast: Methodology, Data curation, Formal analysis, Writing – review & editing. John F. Dickerson: Methodology, Writing – review & editing. Jeffrey L. Fellows: Methodology, Writing – review & editing.

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