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Significant Unmet Oral Health Needs Among the Homebound Elderly

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Abstract

Objectives—Older adults with serious illness are increasingly becoming homebound. By nature of their homebound status they lack access to basic services including dental care. We conducted a study to assess the oral health status, dental utilization and dental needs of the homebound elderly and to determine whether medical diagnoses or demographic factors influenced perceived oral health.

Design—Cross-sectional analysis

Methods—A total of 125 homebound patients received a comprehensive clinical examination in their home by a trained dental research team and completed a dental utilization and needs survey as well as the Geriatric Oral Health Assessment Index (GOHAI).

Results—Patients who reported a high level of unmet oral health needs were more likely to be non-white, although this effect was not significant in multivariate analysis. Individual medical diagnoses and the presence of multiple comorbidities were not associated with unmet oral health needs.

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Conclusions—The oral health status of the homebound elderly regardless of their medical diagnoses was poor. High unmet oral health needs combined with strong desire to receive dental care suggests there is an imperative need to improve access to dental care for this growing population. In addition to improving awareness among geriatricians and primary care providers who care for the homebound, the medical community must partner with the dental community to develop home-based programs for older adults.

Keywords

Oral health; dental; homebound; home-based primary care

INTRODUCTION

Advancements in medicine and dentistry have resulted in people living longer and retaining more of their own teeth. Similar to increased disability and morbidity associated with longer life expectancy, this extended retention of natural teeth results in an increased occurrence of oral diseases in the general geriatric population, and to an even greater extent, in functionally dependent older adults.^{1,2} Because of chronic illness and functional impairment, an increasing number of older adults are permanently homebound and unable to access routine medical or dental care.³ Because the homebound elderly typically do not see a dentist for years, if ever, the oral health of the homebound elderly deteriorates in the absence of care, resulting not only in pain and infection, but also a compromised ability to eat and socialize. This compounds their already compromised overall physiological functioning and quality of life.⁴ In addition to logistic challenges in getting to a dentist for the homebound, Medicare does not cover dental costs. Although nursing facilities must provide or arrange for the provision of dental services for residents,⁵ there is no law mandating oral health care provision for community-dwelling elderly.

While there have been a relatively large number of published dental studies documenting the oral health status and needs of institutionalized elderly (e.g.,^{6,7}), comparatively little is known about the oral health status/needs of community-dwelling homebound elderly.^{8–11} The limited studies to date all indicate that there is high unmet need in this population. One study of 51 homebound patients in a VA housecall program found that patients had not seen a dentist in 6 years and had an average of 3.4 decayed teeth.⁸ Among 50 community-dwelling, functionally-dependent elderly, 50% had not seen a dentist in 6 years, 60% reported their oral health as fair/poor and 44% were edentulous.¹⁰ Among 592 individuals receiving home-delivered meals, 41% were edentulous and the average patient had not seen a dentist for four years.⁹ A recent review indicated that there is a high prevalence of dry mouth among this population, which may significantly impact oral health as well as quality of life.¹²

In order to properly identify and assess the current dental needs of the homebound elderly to most appropriately plan oral health care services for this growing and vulnerable population, larger and current studies of the oral health status and needs of this population are needed. This includes a formal assessment of patients' oral health status as well as their self-reported oral health needs and utilization patterns. Additionally, medical diagnoses of patients should

be included in analyses to better understand the needs of homebound populations with varied medical diagnoses and multiple comorbidities. The primary purpose of this study was to assess: (1) dental and oral health status, (2) self-reported oral health problems; (3) history of dental utilization, (4) dental needs, and (5) interest in home-based professional oral/dental care among the homebound elderly. Building upon previously published work which reported on the detailed oral health findings of this study population by our group within the dental literature,¹³ we now report on the relationship between the oral health status and medical comorbidities of these homebound patients for geriatricians and other medical professionals. Specifically, we discuss what medical professionals need to understand about the oral healthcare needs of the growing elderly homebound population. Finally, we describe patient medical comorbidities and what clinical and demographic factors impact self-reported oral-health related quality of life (QOL) status using a validated questionnaire. We hypothesized that there would be a higher level of unmet needs in this sample of homebound patients compared to other community-dwelling elderly groups described in the literature, because of their inability to routinely access care and high illness burden, regardless of disease status or demographics.

METHODS

Subjects and Setting

Mount Sinai Visiting Doctors (MSVD) program is the largest academic home-based primary care program for homebound elderly in the U.S.¹⁴ Patients are at least 18 years old and meet the Medicare homebound definition - able to leave home only with great difficulty and for absences that are infrequent or of short duration. Physicians and nurse practitioners provide primary care services at home, including palliative and end-of-life care to approximately 1200 homebound NYC residents per year.

Homebound elderly were visited in their homes between November 2010 and April 2011 by a research team from the Department of Epidemiology & Health Promotion at the New York University College of Dentistry composed of one clinically-experienced, trained and calibrated dental examiner accompanied by a trained recorder and a third team member who assisted with any aspects of the home visit as needed. (No intra-examiner reliability checks were planned nor conducted at the time of the subject examination in consideration of the likely physical exhaustion limits in these homebound subjects.) Study eligibility criteria included: 1) active in MSVD for at least six months; 2) aged 50 years and older; 3) mentally competent to give informed consent; 4) no signs of moderate or severe cognitive impairment; and 4) absence of any potentially life-threatening or progressive medical illnesses that would compromise either patient safety or ability to undergo the oral examination. Finally, mental competence to give informed consent was assessed using a 'double-filter technique'. The 'first filter' was applied by the MSVD providers during initial selection of eligible patients, while a 'second filter' was applied by the dentist during the actual home-based dental visit by judging the patient's mental ability to comprehend a consent form prior to conducting the oral examination.

Measures

Previously described in detail,¹³ the oral health examination consisted of: soft tissue examination, assessment of the subject's oral hygiene; dental caries examination; periodontal examination for tooth mobility, bleeding, and inflammation, and for patients with dental prostheses, a denture assessment. Self-reported dental utilization, self-identified dental problems and needs, and the patient's level of interest in professional home-based oral/dental care were measured.

We administered the Geriatric Oral Health Assessment Index (GOHAI), a validated and widely-used 12-item questionnaire designed to measure the frequency of self-reported oral health problems in the elderly.¹⁵ A higher cumulative score indicates a better perceived oral health status (range 12–60). The GOHAI can be divided into three categories:¹⁶ physical function, psychosocial function and pain and discomfort. Physical functions included eating, speaking and swallowing; psychosocial function includes worrying about oral health and having difficulty with social contacts due to oral conditions; and pain and discomfort includes the use of medication to alleviate pain in the oral cavity.

Patient characteristics and comorbidities—We retrospectively reviewed the MSVD program electronic medical charts to abstract information on subjects' demographics, medical comorbidities and length of time in the MSVD program. Patient ethnicity was categorized as 'White', 'Latino', 'Black' or 'Other' in the medical chart. Comorbidity data at baseline were used to calculate a non-age-adjusted Charlson comorbidity index score based on a weighted score based on the presence of 16 diagnoses (acquired immunodeficiency syndrome, myocardial infarction, congestive heart failure, peripheral vascular disease, dementia, chronic obstructive pulmonary disease (COPD), connective tissue disease, peptic ulcer disease (PUD), leukemia, lymphoma, tumor without metastasis, metastatic solid tumor, moderate to severe renal disease, cerebrovascular disease, liver disease, and diabetes mellitus with or without end organ damage (retinopathy, neuropathy, nephropathy, or brittle diabetes mellitus).¹⁷ Similar to other studies,¹⁸ we categorized those patients in highest upper quartile of Charlson score (≥ 4) as having high level of comorbidities.

Analysis

Descriptive statistics were calculated for each examined item. We used two sample t-tests to determine patient characteristics associated with higher GOHAI score. Multivariate linear regression analysis was conducted using all variables with p-value $< .10$. Only variables that were not highly correlated ($r > .5$) were included. All analyses were conducted using SAS, version 9.2 (SAS Institute, Inc., Cary, NC).

The study was approved by the NYU School of Medicine and Mount Sinai School of Medicine IRB. Written informed consent was obtained from all participants.

RESULTS

Forty percent (n=131) of the 334 eligible patients agreed to participate and of these, 95.4% (n=125) participants completed the survey. A total of 115 participants (92.0%) answered all

12 questions of the GOHAI Questionnaire. The mean age of participants was 81.42 (± 12.29) years with 80% being female (See demographic and clinical characteristics reported in Table 1). Whites, Blacks and Latinos were fairly evenly distributed across the sample. Patients were enrolled with the MSVD program an average of 3.2 (± 2.58) years at the time of oral health assessment. Almost half had diabetes and one quarter had a clinical diagnosis of mild dementia. Mean Charlson score was 2.69 (SD=1.78; range =0–8).

Clinical assessment

Of the 125 subjects examined, 76.0% (n=95) were dentate and 24.0% (n=30) were completely edentulous. Within the 95 dentate subjects, the mean number of teeth present per subject was 14.3 ± 8.0 and ranged between 1 and 32 teeth with 78.9% having at least one decayed tooth, 40% needing restorative dental care (i.e., needed a filling), and 45.6% needing dental extractions (68.4% due to decay and 31.6% due to periodontal problems). While no serious soft tissue pathology (i.e., needing either immediate urgent attention or a biopsy) was found, mild tissue abnormalities were found in 52.8% of the subjects, the most common being candidiasis (13.7%), non-candidal white lesions (21.0%), and denture-related mucosal ulcerous lesions (13.7%). There was a marked absence of dentures in subjects who were edentulous in one or both arches (18.0% of subjects edentulous in one or both arches lacking an appropriate denture).

Among denture-wearers, 28.1% needed denture replacement and among the partially edentulous, 64.0% needed dentures to replace missing teeth. A significant number of patients were assessed to have poor quality dentures that required intervention. Specifically, of the 62 evaluated full- or partial-dentures, a quarter (25.8%) had damaged dentures (e.g. missing tooth, clasp, fractured, chipped or cracked denture, or denture with signs of insufficient repair), and 67.7% had compromised occlusion (at least one missing tooth or signs of excessive occlusal wear). Further details on dental assessment of patients are described elsewhere.¹³

Non-clinical assessment of dental needs

The vast majority (96.0%) of subjects stated that since they became homebound, they had never been visited by dental professionals at home. The majority of the subjects (61.0%) last visited a dentist more than three years ago, and of those subjects, over half (58.6%) recalled that their last dental office visit was between 3–40 years ago with a mean of $11.3 (\pm 8.25)$ years. One-third (33.6%) complained of current pain and/or discomfort in the oral cavity, with 15.1% specifically stating that they currently had a toothache, 27.3% had gum soreness, and 16.3% reported gum bleeding. Nearly 28.0% of the patients complained about halitosis, 50.4% had chewing limitations, and 59.4% of denture wearers were dissatisfied with their current dentures. The vast majority (93.5%) answered ‘YES’ when asked “Are you interested in home-based dental care?” Among the denture wearers, 72.2% were interested in getting new dentures and 42.6% in getting a denture repair. Among partially edentulous subjects, 87.5% of the subjects with five or fewer teeth and 55.6% with six to 10 teeth expressed an interest in getting partial dentures made.

Table 2 summarizes the responses to the 12 GOHAI items. Across all domains, there were high percentages of patients who indicated unmet needs. Almost one quarter of patients surveyed indicated that they felt nervous or uncomfortable because of problems with their teeth or did not want to eat in front of people. Less than half of patients indicated that they were able to eat comfortably always or often. The total GOHAI scores ranged from 14–60 with higher scores indicating better perceived oral health. The mean GOHAI score was 44.12 (SD=10.16).

GOHAI scores were significantly lower for non-white patients ($p<.05$) in bivariate analysis. Bivariate analysis also indicated a trend ($p<.10$) for patients who were older and did not have cancer to report poorer oral health. None of the other medical diagnoses or overall Charlson score was associated with worse perceived oral health in this population of homebound medical patients (see Table 3). Furthermore, whether patients were dentate or had any dentures were not associated with perceived oral health. In multivariate regression analysis, race was no longer significantly associated with worse perceived oral health when controlling for age and cancer status (data not shown).

DISCUSSION

Our needs assessment overwhelmingly suggests that the oral health status of the homebound elderly population in New York City is poor, that the vast majority does not have access to dental care, and that the quality of life and well-being of these individuals are negatively impacted by the lack of basic dental care. Moreover, by examining clinical characteristics of this population we found that regardless of medical diagnoses and numbers of comorbidities, these issues remain. While published research to date is limited, our study of a relatively large population of homebound patients confirms the few previous published findings that homebound elderly have poor oral health status and lack of access to dental care, and, importantly, express great interest in receiving these services in their home. The GOHAI scores we obtained, in fact, are even lower than the scores previously cited in the literature.¹¹ We have also significantly add to this literature by providing detailed clinical assessments of these homebound individuals who have multiple medical comorbidities.

While we did not find differences in oral health assessment based on patient medical characteristics, we did find that non-whites had poorer perceived oral health than whites in unadjusted models (although this was not significant in multivariate analysis). This is consistent with literature that suggests that race and SES may be associated with poorer perceived and clinician-measured oral health status.^{19–21} While we did not find differences due to Medicaid status, a marker of lower SES, this may be due to the fact that those with Medicaid have access to dental coverage in New York State.²² Additionally, we did not find a significant relationship between education and unmet oral health needs which may in part have been due to a high percentage of missing data on education.

While this is one of the largest studies to date assessing the objective and perceived oral health needs of the homebound, there are limitations to note. The study excludes patients with moderate to severe cognitive impairment; dementia affects over half of the homebound population served by MSVD and other HBPC programs and homebound subjects with

moderate to severe dementia may show worse oral health findings. Furthermore, patients with severe medical illness or debility who were unable to tolerate the full dental evaluation were also excluded. Additionally, only 40% of eligible respondents participated because of the extensive time commitment involved. For these reasons, our findings are unlikely to be generalizable to the entire homebound population served at MSVD or the homebound population at large and may under-represent the least healthy subset of the population with most advanced medical illness. Only one previous study of community-dwelling older adults included patients with dementia (22% of the sample) but this group was not analyzed separately.⁸ While comprehensive in-home oral health assessments of those homebound patients who are most medically ill, cognitively impaired or at end-of-life is likely not feasible for research purposes, surveys of family members may be possible in future research.

Our findings highlight the need to provide necessary oral health care services for the homebound elderly as a group, regardless of their diagnoses, whether it is provided by dedicated home-based dental programs, trained non-dental professionals, or provided within a medical care context. In the current landscape of patient-centered and value-based care, addressing oral health needs of populations with limited access to dentistry should be a priority to health systems striving to achieve effective medical homes and “neighborhoods.”

Oral health care should be better integrated into medical care especially as there is a high correlation between overall health and oral health.¹⁹ Homebound patients are highly impaired functionally and suffer multiple comorbidities. Self-rated oral health, especially at old age, has been found to have an effect on current and future self-rated health, and ratings of self-esteem and life satisfaction.²³ Poor perceived oral health is also associated with lower morale, more life stress, and lower levels of life satisfaction among older adults.²⁴ Furthermore, oral disease is linked to cardiovascular disease, atherosclerosis, stroke, and peripheral vascular disease.²⁵ Among older adults, interventions to improve oral health may reduce risk of illness and mortality.²⁶ The importance of oral health care for older adults with serious medical illness is similarly recognized for residents of nursing homes, where despite the presence of federally-mandated dental care and assessments being in-place for over 25 years,²⁷ virtually all studies of nursing home residents reveal poor oral health conditions.²⁸

The high perceived and actual prevalence of poor oral health, coupled with high rates of interest in accessing dental care in this population raises important implications for all health care providers working with this vulnerable population. Home-based primary care medical providers should be aware of this and consider oral health needs in their management of various medical conditions and/or geriatric syndromes including chronic pain, depression, social anxiety or withdrawal, malnutrition or failure to thrive, dysphagia, or medication non-adherence. Moreover, clinicians caring for the homebound should seek out increased training in how to screen for poor oral health to better identify when a patient may need dental care. Programs and social service agencies who serve this population should also actively advocate for and collaborate with local dental providers to enable increased access to dental care for the homebound. Pilot models are needed to provide at least recognition of need for care for the community-dwelling homebound effectively and efficiently, ideally in

collaboration with the medical care being provided in the home given their debility. Prior work has shown the feasibility of specialty consultation services embedded within a home-based primary care program.²⁹ Given the current scarcity of in-home dental care services and dental professionals going into home-based dentistry, it may be more feasible to begin a referral-based pilot of home-based dental services within an established primary care program.

Within the dental professional workforce there is a lack of expertise in geriatric oral health care as geriatric dentistry is not yet recognized as a dental specialty and the number of formal advanced education programs in geriatrics is limited.³⁰ Innovative programs designed to meet the dental needs of the homebound will be necessary to overcome this gap ranging from dental school curriculum or practical experiences in home-based dentistry to expose dental students to the field, the development of a specialized post-graduate fellowship in home-based dentistry, including the homebound population as an underserved group for which loan forgiveness may be granted, to direct clinical programs providing oral health screenings and dental treatments in patients' homes.

Partnerships between dental programs and medical providers working with the elderly homebound will become easier as dental technology becomes increasingly portable. Furthermore, it may be cost-effective to train allied dental professionals such as dental hygienists, non-dental medical professionals (NPs, RNs, PAs), or even trained non-clinical providers to administer oral health assessments and/or patient education on general oral health and hygiene, possibly with dental consultation via videoconference, as has been done with other medical specialties including geriatric medicine.^{31,32} This could effectively address the large unmet need for general oral health education for a large number of patients, to prevent further oral morbidity. Dissemination will be regionally-based, however, as individual state policies currently vary regarding whether dental hygienists may independently see patients in their homes.

Our study suggests that unmet oral health needs are high in an urban homebound population regardless of type or number of medical comorbidities. Unless steps are taken to improve the availability and access to oral health care, the oral health of this growing and vulnerable segment of the elderly population will continue to suffer from easily treatable oral health problems that range across the full spectrum from 'dentally easily treatable' to 'dentally complex to treat', all superimposed over a vast set of comorbidities, each ranging from early stage to late stage. Yet this unacceptable level of unmet dental needs continues to exist in this especially vulnerable subset of our elderly population while living in-the-midst of a U.S. population that reputedly has access to the highest level of dental care in the world. While current U.S. priority for oral health care focuses on children, there must be a balanced effort to identify ways and mechanisms for providing oral health care for an equally vulnerable set of citizens, to prevent further disability and to maximize function and quality of life in this group.

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Elements of Financial/ Personal Conflicts	KO		LD		RG		ES		JK		TS		RK		TAS	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Employment or Affiliation	X		X			X		X		X		X		X	X	
Grants/Funds		X		X		X		X		X		X		X		X
Honoraria		X		X		X		X		X		X		X		X
Speaker Forum		X		X		X		X		X		X		X		X
Consultant		X		X		X		X		X		X		X		X
Stocks		X		X		X		X		X		X		X		X
Royalties		X		X		X		X		X		X		X		X
Expert Testimony		X		X		X		X		X		X		X		X
Board Member		X		X		X		X		X		X		X		X
Patents		X		X		X		X		X		X		X		X
Personal Relationship		X		X		X		X		X		X		X		X

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For “yes”, provide a brief explanation:

KO, LD, and TAS were employees of the Mount Sinai Visiting Doctors Program at the time of this study

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Table 1

Demographic and Clinical Characteristics of the Study Sample (n=125)

Patient Background Characteristics		n	Percent
<i>Mean (SD) 81.42 (12.29)</i>			
Age	50–65	16	12.8%
	66–75	18	14.4%
	76–85	34	27.2%
	>85	57	45.6%
Gender	Male	25	20.0%
	Female	100	80.0%
Race	Black	43	34.4%
	White	41	32.8%
	Hispanic	39	31.2%
	Other	2	1.6%
Education	Less than HS	45	36%
	HS	24	19.2%
	More than HS	32	25.6%
	Missing	24	19.2%
Has Medicaid	Yes	72	57.6%
	No	52	41.6%
	Missing	1	.8%
<i>Charlson-Mean(SD) 2.7(1.8)</i>			
Clinical Characteristics ^a	Cancer	27	21.6%
	CHF	37	29.6%
	COPD	41	32.8%
	CVD	32	25.6%
	Dementia	31	24.8%
	Diabetes	58	46.4%
	Hemiplegia	12	9.6%
	MI	10	8.0%
	Bedbound	36	28.8%
	Wheelchair bound	15	12.0%

^aNote: Patients may have multiple diagnoses

Table 2

Breakdown of GOHAI* Responses for Homebound Elderly Patients at MSVD (n=115)

		Always or often N(%)
PHYSICAL FUNCTION	1. How often do you limit the kinds or amount of food you eat because of problem with your teeth or dentures?	19 (17.3)
	2. How often do you have trouble biting or chewing any kinds of food, such as firm meat or apple?	36 (32.7)
	3. How often were you able to swallow comfortably? ^a	78 (70.9)
	4. How often have your teeth or dentures prevented you from speaking the way you wanted?	16 (14.6)
PAIN/DISCOMFORT	1. How often were you able to eat anything without feeling discomfort? ^a	51 (46.4)
	2. How often did you use medication to relieve pain or discomfort from around your mouth?	18 (16.4)
	3. How often were your teeth or gums sensitive to hot, cold, or sweets?	14 (12.7)
PSYCHOSOCIAL	1. How often did you limit contacts with people because of the condition of your teeth or dentures?	12 (10.9)
	2. How often were you pleased or happy with the looks of your teeth and gums, or dentures? ^a	52 (47.3)
	3. How often were you worried or concerned about the problems with your teeth, gums, or dentures?	37 (33.6)
	4. How often did you feel nervous or self- conscious because of problems with your teeth, gums, or dentures?	25 (22.7)
	5. How often did you feel uncomfortable eating in front of people because your problems with your teeth or dentures?	25 (22.7)

^a Reverse-coded in total score

* GOHAI= Geriatric Oral Health Assessment Index

Table 3

Bivariate Association Between Patient Characteristics and Better Perceived Oral Health (Based on GOHAI Score^{***})

			Mean GOHAI score
Demographic characteristics	Race **	White	47.4
		Non-White	43.0
	Age *	Age over 85	46.2
		<=85	43.0
	Gender	Female	43.7
		Male	46.8
	Medicaid	Has Medicaid	43.5
		no Medicaid	45.5
	Education	>HS education	44.4
		<HS education	43.0
Clinical characteristics	Cancer *	yes	47.2
		no	43.5
	CHF	yes	44.8
		no	44.1
	COPD	yes	42.2
		no	45.4
	CVD	yes	44.1
		no	44.4
	Dementia	yes	46.4
		no	43.7
	Diabetes	yes	42.8
		no	45.7
	Hemiplegia	yes	42.2
		no	44.6
	Liver disease	yes	42.0
		no	44.4
	MI	yes	44.2
		no	44.4
	Comorbidity index	Charlson>=4	44.1
		Charlson <4	44.5
Dental characteristics	Dentate	Yes	44.4
		No	44.2
	Has any dentures	Yes	45.0
		No	43.7

GOHAI= Geriatric Oral Health Assessment Index (range 12–60 with 60 being maximum score)

*
p<.10

**
p<.05

mean GOHAI score for population = 44.12

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