Oral Health Status of Older Adults Attending Senior Centers and Congregate Meal Sites in New Hampshire

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Abstract

Purpose: This study assessed the oral health status of older adults in randomly selected New Hampshire senior centers and congregate meal sites for the purpose of future planning, implementation and evaluation of targeted public health programs.

Methods: A cross-sectional surveillance project was developed. Registered dental hygienists visually assessed denture use, number of natural teeth, teeth mobility, untreated caries, root fragments, gingivitis, need for care and treatment urgency among randomly selected active older adults living within New Hampshire communities.

Results: Altogether, 610 adults 60 years old and older attending 25 senior centers and congregate meal sites participated. Sixteen percent were edentulous and 42% reported having a removable upper or lower denture. Among edentulous adults, 5% had no dentures at all. Among 513 dentate participants, 22% had untreated caries, 14% had root fragments, 9% had gingivitis and 7% presented with obviously mobile teeth. Overall, 19% required early or urgent dental care. Differences were detected by sex, age group, urban versus rural location of the site and by the participation in a federal nutritional program for older adults.

Conclusion: Baseline information about oral health needs of older adults in New Hampshire was gathered. Overall needs as well as existing oral health disparities will be addressed through the collaboration of public and private partners.

Keywords: oral health, surveillance, older adults

This study supports the NDHRA priority area, **Clinical Dental Hygiene Care:** Investigate how dental hygienists identify patients who are at-risk for oral/systemic disease.

Introduction

According to the United States Census Bureau, the number of Americans age 65 and older will reach 71 million in 2030, comprising 20% of the U.S. population.[1] Similarly, within the next 15 years, the number of older adults in New Hampshire will surpass 350,000, or 21% of the state's population.[1]

With this demographic transition predicted to continue beyond the year 2030 the oral health of older adults is gaining attention.[2,3] Due to the cumulative effect, oral diseases disproportionately affect older adults more than any other age group, and impact their nutritional status, social functioning and overall well-being.[4,5] Oral inflammatory diseases have been linked to cardiovascular diseases, type 2 diabetes, respiratory diseases and cancer.[6] Selected drug therapies, prescribed to control chronic diseases that are highly prevalent among older adults, reduce salivary flow and lead to oral dryness, and problems with speech and swallowing.[7,8] Declining mental and physical abilities of older adults interfere with oral hygiene and self-care, adding to the complexity of this issue.

Simultaneously, older adults face barriers to regular dental care due to a lack of dental insurance, financial constraints, absence of perceived need and transportation issues.[9] In New Hampshire, data on the oral health of older adults are limited to estimates from the Behavioral Risk Factor Surveillance Survey, which is an ongoing population-based telephone survey of New Hampshire adult residents. In 2012, the New Hampshire Behavioral Risk Factor Surveillance Survey indicated that approximately 11.1% of adults aged 60 or older were edentulous, 70.5% had any permanent teeth extracted, and 74.7% had visited a dentist or dental clinic within the past year (New Hampshire unpublished observations). To gather evidence for targeted interventions, in 2010, the New Hampshire Oral Health Program (OHP) surveyed the self-reported oral health status, access to dental care and attitudes related to oral health among older adults in 6 senior centers and congregate meal sites.[10] In 2012, the OHP followed up with a pilot project that utilized the Basic Screening Survey (BSS) – Older Adults tool, created by the Association of State and Territorial Dental Directors

(ASTDD), to assess several oral health indicators and need for dental care among older adults attending the same 6 sites.[11,12] In 2014, building upon the 2012 pilot, the OHP used the BSS to assess the oral health of older adults and investigate possible disparities in randomly selected senior centers and congregate meal sites statewide for the purpose of future planning, program implementation and evaluation of targeted public health programs.

Methods and Materials

The assessment utilized the ASTDD BSS – Older Adults tool.[11] The ASTDD is a non-profit organization that promotes sound national oral health policy and assists states and territories with initiatives for the prevention and control of oral diseases. One of the ASTDD initiatives is to support surveillance activities that gather reliable and nationally comparable data on the oral health of selected populations. The BSS – Older Adults tool provides guidance on planning and implementation of the oral health survey among older adults.[12]

The list of all New Hampshire senior centers and congregate meal sites was obtained from the New Hampshire Bureau of Elderly and Adult Service and 25 out of 32 sites that provide services to at least 35 older adults were selected. The desired sample size of 625 older adults (25 sites, each with approximately 25 older adults screened) was determined based on the clustered study design, preferred precision and expected participation known from the previous work.[13] All older adults active at the selected sites were eligible for the oral health assessment that was advertised in advance to increase participation. Ten public health dental hygienist screeners, trained by the OHP to uniformly evaluate the oral health status of older adults, assessed the following indicators: dentures and denture use, functional posterior occlusal contact, number of natural teeth, suspicious soft tissue lesions, severe dry mouth, and need for dental care. Among dentate adults, additional indicators included: untreated caries, root fragments, obvious tooth mobility (visibly mobile tooth, or tooth that moves when a gloved finger is placed on the occlusal or incisal surface and gently wiggled), severe gingival inflammation and need for periodontal care. The need for dental care was categorized as urgent (needing treatment as soon as possible) when pain, swelling or infection was present, or as early (care needed within the next several weeks) when dental treatment was needed prior to the next routine dental visit. Brief visual examinations employed disposable dental mirrors and gauze to ease the evaluation of the oral cavity.

Dental hygienists wore appropriate personal protection equipment and adhered to all applicable infection control recommendations.[11] In addition to taking part in visual screenings, participants filled out a short self-administered questionnaire on tobacco use, dental insurance, past oral cancer screening, if they had a particular dentist or a dental clinic for usual dental care (a dental home), and whether they were receiving commodity supplemental foods. The Commodity Supplemental Food Program (CSFP) is a federally funded program for income eligible elderly people at least 60 years of age. The eligibility was set at 130% of federal poverty guidelines during 2014.[14] Utilizing the Rural Urban Commuting Area (RUCA) codes, each selected site was classified as urban or rural on the basis of its zip code.15 Sites within metropolitan areas (RUCA 1-3) were categorized as urban; those within micropolitan areas, small towns and rural areas (RUCA 4-10) were categorized as rural. Questions on dental insurance, dental home and cancer screening were adapted from the BSS manual.[11] Data were gathered on standardized forms, entered into an EpiInfoTM database, analyzed using SAS® software (version 9.3, SAS Institute, Inc., Cary, North Carolina) and the PROC SURVEYFREQ procedure. Population proportions for variables of interest, and 95% confidence intervals adjusted for a clustered design and finite population, were calculated with additional subgroup analyses by sex, age group (60 to 74 year olds, 75 year olds and older), site location, and the CSFP participation which approximated income. Those with missing or "I do not know" responses were excluded from the analyses for the particular question. The Rao-Scott chi-square test was used to test associations and p-values <0.05 were considered statistically significant. Anyone with a need for urgent care and/or a suspicious soft tissue lesion was linked with a provider in the community for free follow-up care paid for by the New Hampshire Bureau of Elderly and Adult Service using Title III funds. The New Hampshire Department of Health and Human Services (DHHS), the Division of Public Health Services determined that this surveillance activity is a public health practice, therefore not requiring the institutional review board approval.[11]

Results

Twenty-five senior centers and congregate meal sites participated in the assessments that took place between December 2013 and June 2014. The number of older adult participants per center ranged from 10 to 46 (median 24). Overall, 610 adults aged 60 years and older were screened (age range 60 to 97 years, median 75 years). In the aggregate, 70.9% were females (sex was missing for 11 participants) and 96.4% reported white race.

Approximately 65.7% of participants were screened at the sites categorized as rural, and 9.3% participated in the CSFP. Overall, 18.4% of older adults reported having some type of dental insur-

ance, 66.2% had a dental home, 13.0% of older adults had a severely dry mouth, 42.3% had either an upper or lower denture, 28.0% had no functional posterior contact assessed with dentures in place and 15.9% were edentulous. Among edentulous adults, 5.2% had neither an upper nor lower denture. Among dentate adults, 25.4% had untreated caries and/or root fragments, 8.8% had gingivitis, 7.2% had obviously mobile teeth, and 6.8% had a need for periodontal care. Number of all teeth ranged between 2 and 32, with a median of 22 teeth. Overall, 18.9% of participants required either urgent or early dental care. Detailed results are reported in Table I. Subgroup analyses indicated significant differences by sex, age, rural versus urban location of the site and substantial disparities by the CSFP participation. When comparing males with females, males were less likely to report receiving a cancer screening within the last 5 years (34.4% males compared with 47.5% females, p<0.0001), and were significantly more likely to be in need of dental care (23.6% of males compared with 16.7% of females, p=0.0138). Among dentate males, 34.7% had untreated caries and/or root fragments compared with 21.8% of females (p=0.0001). Males were also more likely (p=0.0399) to have mobile teeth (10.3%) when compared with females (6.1%). Comparisons of those 60 to 74 years old with 75 years old and older revealed that those from the older age group were significantly less likely to have dental insurance, more likely to have dentures and more likely to be edentulous (data not reported). Older adults attending rural sites were significantly less likely (p=0.0002) to have some type of dental insurance, and among dentate adults more likely to have gingivitis (p=0.0008), obviously mobile teeth (p=0.0011) and need for periodontal care (p<0.0001).

Table I: Prevalence Estimates of Oral Health Indicators among New Hampshire Older Adults

	Number of Respondents	Number; Percent (95% CI*) of Respondents with the Characteristic
Having some type of dental insurance	593	109; 18.4 (16.5 to 20.3)
Having a particular dentist/dental clinic	607	402; 66.2 (63.7 to 68.7)
Having an oral cancer check	565	246; 43.5 (40.9 to 46.2)
Having removable upper denture	610	237; 38.9 (36.2 to 41.5)
Wears upper denture while eating	236	222; 94.1 (92.4 to 95.7)
Having removable lower denture	610	150; 24.6 (22.8 to 26.4)
Wears lower denture while eating	150	134; 89.3 (86.7 to 92.0)
Has upper or lower denture	610	258; 42.3 (39.9 to 44.7)
No functional contact#	607	170; 28.0 (24.9 to 31.1)
Edentulous adults	610	97; 15.9 (13.8 to 18.0)
Edentulous - not having dentures	97	5; 5.2 (3.0 to 7.3)
Dry mouth	610	79; 13.0 (8.6 to 17.3)
Suspicious lesions	608	28; 4.6 (3.4 to 5.8)
Need for early dental care	610	95; 15.6 (13.5 to 17.6)
Need for urgent dental care	610	20; 3.3 (2.5 to 4.1)
Need for urgent or early care	610	115; 18.9 (16.7 to 21.0)
Following indicators were assessed only among those with remaining natural teeth (n=513)		
Substantial oral debris	512	74; 14.5 (11.3 to 17.6)
Gingivitis	512	45; 8.8 (6.8 to 10.8)
Untreated caries	512	113; 22.1 (18.7 to 25.4)
Root fragments	513	73; 14.2 (12.6 to 15.8)
Untreated caries or root fragments	512	130; 25.4 (22.1 to 28.6)
Obvious mobility of teeth	513	37; 7.2 (6.1 to 8.4)
Need for periodontal care	513	35; 6.8 (4.8 to 8.9)
Number of upper natural teeth (median, range)		11 (1 to 16)
Number of lower natural teeth (median, range)		11 (1 to 16)

*Confidence Interval
#Functional contact assessed with dentures in place

Though not always statistically significantly different, those attending rural sites tended to have a greater need for dental care and less favorable oral health (Table II). Adults participating in the CSFP were significantly less likely to have a particular dentist or dental clinic to provide them with usual dental care (47.3% CSFP participants compared with 68.0% nonparticipants, p=0.0043), and were more likely to be edentulous (29.1% CSFP participants compared with 14.6% nonparticipants, p=0.0008). They were also significantly more likely to be in need of dental care (32.7% CSFP participants compared with 17.6% nonparticipants, p=0.0007). Among dentate adults, those participating in the CSFP were more likely to have substantial oral debris (23.1% CSFP participants compared with 13.2% nonparticipants,

Table II: Prevalence Estimates of Oral Health Indicators among New Hampshire Older Adults, by the Urban or Rural Site Location

	Urban Percent (95%CI*)	Rural Percent (95%CI)	p-value
Having some type of dental insurance	25.0 (22.7 to 27.3)	14.9 (12.7 to 17.1)	0.0002
Having a particular dentist/dental clinic	69.2 (64.5 to 74.0)	64.7 (61.9 to 67.4)	0.4169
Has upper or lower denture	43.1 (38.9 to 47.2)	41.9 (38.9 to 44.9)	0.8254
No functional contact#	28.7 (23.3 to 34.2)	27.6 (23.9 to 31.3)	0.8745
Edentulous adults (no teeth)	15.8 (11.6 to 20.0)	16.0 (13.6 to 18.3)	0.9725
Dry mouth	8.1 (3.9 to 12.4)	15.5 (9.4 to 21.5)	0.3267
Suspicious lesions	5.7 (3.9 to 7.6)	4.0 (2.4 to 5.6)	0.4842
Need for dental care (urgent or early)	18.2 (13.9 to 22.5)	19.2 (16.9 to 21.5)	0.8425
Following indicators were assessed only among those with remaining natural teeth (n=513)			
Substantial oral debris	12.6 (8.1 to 17.0)	15.4 (11.2 to 19.7)	0.6605
Gingivitis	2.9 (1.5 to 4.3)	11.9 (9.2 to 14.5)	0.0008
Untreated caries	16.6 (11.5 to 21.6)	24.9 (20.8 to 29.1)	0.2245
Root fragments	12.5 (9.9 to 15.1)	15.1 (13.1 to 17.1)	0.4541
Untreated caries or root fragments	20.6 (16.3 to 24.8)	27.9 (23.6 to 32.2)	0.2367
Obvious mobility of teeth	3.4 (2.4 to 4.5)	9.2 (7.7 to 10.7)	0.0011
Need for periodontal care	0.6 (0.0 to 1.1)	10.1 (7.2 to 13.0)	<0.0001

*Confidence Interval
#Functional contact assessed with dentures in place

p=0.0325), gingivitis (15.4% CSFP participants compared with 7.7% nonparticipants, p=0.0470), and untreated caries and/or root fragments (56.4% CSFP participants compared with 23.0% nonparticipants, p<0.0001) (Table III).

Discussion

This statewide survey of New Hampshire older adults was conducted to obtain baseline data to utilize the findings in a needs assessment and targeted program planning. To put the data into perspective, 2 publicly available data sources have been chosen for comparison. Estimates available from the United States Census Bureau reveal that 94.2% of New Hampshire residents are Caucasian, 55.7% of those older than 65 years of age are females, and 8.8% of those 55 years and older live below 1.25 Federal Poverty Level.[16] The older adult population that was screened during this assessment is similar to Census Bureau reports with regard to race and income (approximated by the CSFP participation) while it slightly underrepresents older adult males. Gathered New Hampshire data were also compared to a similar survey conducted among seniors attending Massachusetts subsidized meal sites in 2009. Though many estimates from the Massachusetts survey are not directly comparable to the results of this assessment, those that are comparable yield similar findings. The Massachusetts statewide survey assessed 212 older adults from 20 meal sites and found that 66.5% of meal site participants had a dentist, 18.9% had dental insurance, 19.3% were edentulous, 34.5% had untreated caries and 3.5% were in need of urgent care.17

The New Hampshire assessment identified oral health disparities related to rural site locations and disparities by income approximated by participation in the CSFP. Inequalities related to oral health in rural areas of New Hampshire, although mainly among children, have been described previously.18 The findings of this study established the oral health needs among older adults. The New Hampshire DHHS has already begun to address geographic disparities with various initiatives including strategic workforce development, deployment of public health hygienists into rural areas, support of community water fluoridation and integration of dental facilities to rural Federally Qualified Health Centers.

Disparities related to income, approximated by the participation in the CSFP, will require novel approaches. As stated above, the CSFP is a federally funded program with a goal to improve the health of low-income older adults by supplementing their diets with nutritious foods.13 CSFP recipients pick up their monthly food packages at a variety of participating sites including the CSFP warehouses, senior centers,

Table III: Prevalence Estimates of Oral Health Indicators among New Hampshire Older Adults, by the CSFP Participation

	Participates in CSFP Percent (95%CI*)	Does not participate Percent (95%CI)	p-value
Having some type of dental insurance	11.3 (5.9 to 16.8)	18.4 (16.5 to 20.3)	0.3077
Having a particular dentist/dental clinic	47.3 (40.2 to 54.4)	68.0 (65.5 to 70.6)	0.0043
Has upper or lower denture	52.7 (46.0 to 59.4)	41.3 (38.8 to 43.8)	0.0873
No functional contact#	40.0 (33.1 to 46.9)	27.1 (23.7 to 30.5)	0.0733
Edentulous adults (no teeth)	29.1 (23.3 to 34.9)	14.6 (12.5 to 16.6)	0.0008
Dry mouth	12.7 (7.4 to 18.1)	13.1 (8.7 to 17.4)	0.9336
Suspicious lesions	5.6 (2.9 to 8.2)	4.7 (3.3 to 6.1)	0.7859
Need for dental care (urgent or early)	32.7 (26.9 to 38.5)	17.6 (15.5 to 19.6)	0.0007
Following indicators were assessed only among those with remaining natural teeth (n=513)			
Substantial oral debris	23.1 (16.3 to 29.9)	13.2 (10.2 to 16.2)	0.0325
Gingivitis	15.4 (10.3 to 20.5)	7.7 (5.9 to 9.5)	0.0470
Untreated caries	51.3 (43.8 to 58.7)	19.7 (16.5 to 23.0)	<0.0001
Root fragments	38.5 (32.7 to 44.2)	12.0 (10.7 to 13.4)	<0.0001
Untreated caries or root fragments	56.4 (48.9 to 63.9)	23.0 (19.9 to 26.1)	<0.0001
Obvious mobility of teeth	7.7 (3.7 to 11.7)	7.2 (6.0 to 8.5)	0.9091
Need for periodontal care	12.8 (7.5 to 18.1)	6.1 (4.2 to 8.0)	0.0840

*Confidence Interval
#Functional contact assessed with dentures in place

churches, senior housing and community buildings. In New Hampshire, CSFP distribution sites are located in every county and are also affiliated with the Women, Infants and Children (WIC) Program.19 Community-based oral health programs have been integrated into several New Hampshire WIC sites where pregnant women and young children receive oral health education and preventive services. The sustainability of oral health care delivered at the New Hampshire WIC sites is currently being evaluated and the findings will be instrumental for any future planning and program implementation.

A similar model of service delivery could be developed for New Hampshire older adults. Older adults collecting the CSFP packages could receive selected preventive and early intervention therapeutic services including prophylaxis, fluoride varnish application, interim therapeutic restorations and oral health education that could be scheduled on days when the CSFP pick-up occurs. Nationally, there are demonstration projects under way that will provide insight into sustainability and effectiveness of oral health service delivery outside of dental offices. For example, "virtual dental homes," community–based oral health delivery systems, operate in a variety of sites in California. These sites range from Head Start sites to residential care settings and nursing homes.20 In summary, licensed dental hygienist providers can work in non-traditional community settings using collaborative agreements with dentists. Dental hygienists can deliver on-site preventive oral health services to high-risk patients at a low cost, and can refer patients with urgent or early care needs to participating dental practices. Restorative treatment can be funded through collaborations with partners like the Bureau of Elderly and Adult Service that receive federal funds suitable to cover dental services for clients 60 years and older. Selected services could be delivered outside of dental offices within environments where older adults live, seek their social interactions or receive general health care.

Findings of the study are generalizable to New Hampshire older adult residents that are active and living independently within their communities. It is not known whether those that chose to participate in the screenings have better or worse oral health than non-participating older adults. Though all screeners underwent standardized training to uniformly assess and record the oral health status, the possibility of the observation bias cannot be excluded.

Conclusion

The first statewide survey of older adults' oral health in New Hampshire was conducted and its findings advanced the understanding of oral health needs in the state. The study documented an unmet need for dental care among older adults living inde-

pendently in their communities, particularly among those residing in rural areas, and those with limited incomes.

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