

Research Article

Age and Tooth Loss in a Chronic Care Facility

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Received: January 22, 2018; Accepted: February 19, 2018; Published: February 26, 2018

Abstract

The presence or absence of teeth in a population is a primary indicator of oral health. Numerous recent surveys of essentially healthy community-based populations are revealing decreases in loss of teeth; however, the extent to which the decline in tooth loss is present among long-term care persons, many of whom are elderly, is not clear. Objective: This survey was to compare the prevalence of tooth loss in a single institution in 1982 with that in the same facility in 2015.

Methods: Data for the 2015 survey was retrieved from 464 (250 female/ 214 male) dental records at Monroe Community Hospital (MCH), a long-term care facility in Rochester, NY. The admission criteria of MCH remained essentially with same; most subjects had multiple chronic conditions characterized by ASA status 2 or 3. RESULTS included that maxillary edentulism declined from 61.3% in 1982 to 49.2% in 2015; mandibular edentulism declined from 53% to 42% during the same time interval. Statistically significant ($p < 0.05$) declines were revealed in both the maxilla and mandible in the age interval 70–79 years, the age interval 80–89 years in the maxilla, and > 90 years in the mandible.

Conclusion: This survey of one facility suggests that tooth loss may be declining as is so among community-based persons, but to a lesser extent. Additional surveys will be needed to define the extent to which this finding is generalizable.

Keywords: Geriatrics; Tooth loss; Edentulousness; Long-term care

Abbreviations

NY: New York; US: United States; MCH: Monroe Community Hospital; SNF: Skilled Nursing Facility; ASA: American Society of Anesthesiologists; NHANES: National Health and Nutrition Examination Survey; NYS: New York State

Introduction

A primary indicator of the oral health, and possibly also general health, of a population is the presence or absence of teeth. A 1978 Monroe County, NY study reported that 63% of nursing home residents had no teeth [1]. Other studies completed near this time also reported rates of edentulousness in long-term care facilities from 50–77% [2–4]. A 1982 survey in a large Rochester nursing home found that that 64% of those age 60 years and above had no teeth [5].

Over the almost 35 years since that time, the number of missing teeth in the community-based population has decreased. For example, in 1973, 60% of those over age 80 in the U.S. were edentulous [6]. In 2015, only 26% of those age 75 and over had no teeth [7]. The extent to which a decrease in tooth loss is being seen in special populations, such as nursing home residents, however, is not clear. This nursing home population is increasingly important as our population is aging; New York State has 637 nursing homes which provide care for 117,000 residents [8]. As noted above, early studies of oral health in New York State nursing homes found levels of edentulousness at 50% and above. A few more recent surveys of nursing home oral health, mostly completed elsewhere, have found mixed results. For example, a 2007 survey of 321 elderly long-term hospital patients in France found edentulousness to be 27% [9]. In 31 nursing homes in Victoria,

Australia, the prevalence of edentulousness was 46% [10]. Among 1369 older residents of all the “service houses” in Helsinki and Espoo, Finland, in 2014, edentulousness was 52% [11]. Hopefully nursing home oral health would be improving everywhere; however, a 2013 New York Times article was titled, “In Nursing Homes, an Epidemic of Poor Dental Hygiene” [12]. The article included the observation that “There are no current national assessments of oral health in nursing homes.” The authors of this paper were unable to locate either local or national current studies of this issue. The purpose of this study was to begin to gather data that could, along with much broader future surveys, describe the current oral health of New York nursing home residents.

Materials and Methods

Monroe Community Hospital (MCH) is a county-supported facility for the chronically ill and aging (nursing home) in Rochester, NY.

This study consisted of a retrospective evaluation of the dental records of the 464 patients (250 female / 214 male) present during the calendar year 2015. The examinations were performed by the dental director and dental residents working under his direct supervision. Ambulatory patients were examined in the dental chair and using the operatory light; a headlight was used for no ambulatory persons in wheelchairs or stretchers. This examination protocol essentially replicated the protocol of a similar study in the same facility in 1982 [5].

Data was recorded from dental records to a computerized Excel spreadsheet for later summary and analyses. Because the

Table 1: Distribution of population by gender and age.

Gender		Age Group						Missing	Total
		<50	50 – 59	60 – 69	70 – 79	80 – 89	≥90		
Women	1982	23	27	49	79	87	40		305
	2015	19	30	42	48	51	56	4	250
Men	1982	24	28	61	74	53	20		260
	2015	33	20	56	39	50	14	2	214
Total	1982	47	55	110	153	140	60		565
	2015	52	50	98	87	101	70	6	464

Table 2: Percent of teeth present by tooth group in the maxillary arch for all subjects (dentate and edentulous).

	Anteriors			Premolars			Molars		
	1982	2015	p	1982	2015	p	1982	2015	P
<50	82	86	0.79	71	83	0.16	76	77	0.82
50-59	78	66	0.28	60	57	0.69	53	61	0.55
60-69	79	60	0.004	58	50	0.33	45	46	0.89
70-79	59	50	0.18	40	43	0.78	38	38	1
80-89	58	32	<0.0001	41	25	0.01	39	24	0.02
≥90	61	45	0.08	42	33	0.36	19	29	0.22

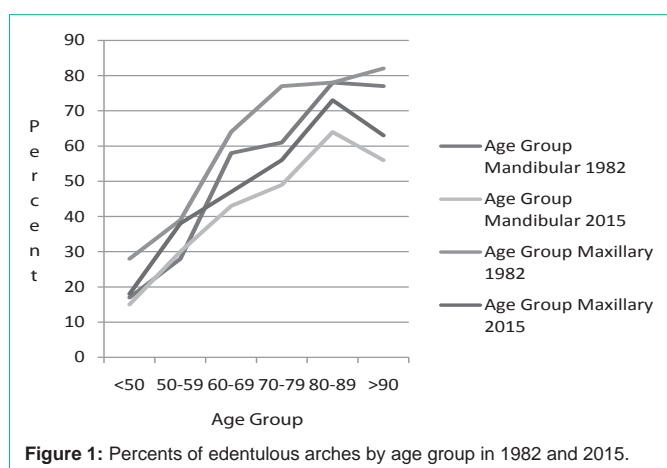


Figure 1: Percents of edentulous arches by age group in 1982 and 2015.

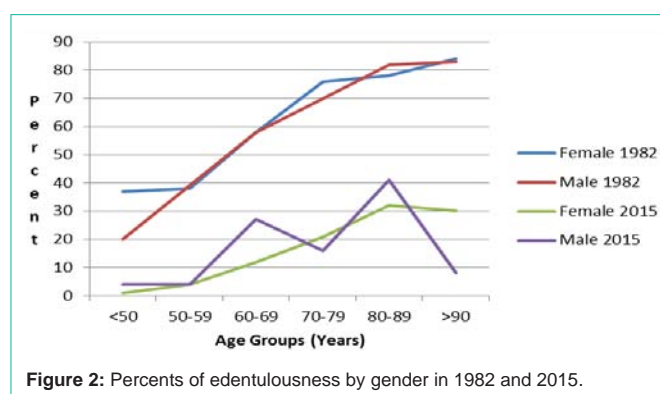


Figure 2: Percents of edentulousness by gender in 1982 and 2015.

data were largely in nominal form, tables of cross tabulations with accompanying nonparametric statistics were generated for analysis. Pearson’s chi-square test or Fisher’s exact test were used to evaluate the existence and strength of relationships between age and tooth loss.

Results and Discussion

Results

Table 1 displays the distribution of the populations by gender and age in 1982 and 2015. The decrease in size of the overall population during this interval was due to the closing of two patient care units since 1982. The ratio of women to men (1.2 /1.0) was the same at the two time points.

For the tables and figures displaying presence of teeth they were grouped by tooth type (molar, premolar, and anterior teeth). This grouping was based on preliminary statistical analysis which demonstrated that the frequency of retention for the teeth in each grouping was not statistically different. For the analysis, there were

a total of six anterior teeth, four premolars, and four molars; third molars were not included. The presence of teeth in the tables and figures here is presented as a percent of those possible in that group; for example, in Table 2, for the year 1982 for the 70-79 year age group, the percentage (59%) indicates that 59% of the 6 possible anterior teeth were present.

Table 2 displays the percents of teeth present in the maxillary arch for all patients, both dentate and edentulous, for both 1982 and 2015. No consistent pattern was apparent in the presence of teeth between the two times periods. For anteriors in the age group 60-69 and for all tooth types for subjects aged 80-89, retention of fewer teeth in 2015 than 1982 was significant.

Table 3 displays similar data for the mandibular arch. The results were similar, but with significantly fewer teeth in 2015 appearing in the age groups 60-69 and 80-89 for premolars and molars.

Tables 4 and 5 present data for the maxillary arch and mandibular arches, respectively, for dentate persons. Here, for both arches for all age groups, significantly more teeth were present in 2015 than in 1982.

Table 3: Percent of teeth present by tooth group in the mandibular arch by age for all subjects (dentate and edentulous).

Age	Anteriors			Premolars			Molars		
	1982	2015	p*	1982	2015	p*	1982	2015	p*
<50	93	89	0.74	79	86	0.6	72	79	0.36
50 – 59	89	84	0.78	73	71	0.83	41	48	0.44
60 – 69	91	69	<0.0001	72	59	0.04	41	39	0.78
70 – 79	70	63	0.25	48	53	0.5	26	31	0.54
80 – 89	72	47	0.0001	57	37	0.003	27	20	0.28
≥90	57	55	0.86	58	44	0.16	24	29	0.55

Table 4: Percent of teeth present by tooth group in the maxillary arch for persons with at least one tooth (dentate).

Age	Anteriors			Premolars			Molars		
	1982	2015	p*	1982	2015	p*	1982	2015	p*
<50	62	97	<0.0001	52	83	0.001	53	88	0.0002
50 – 59	40	86	<0.0001	30	57	0.006	36	80	<0.0001
60 – 69	30	88	<0.0001	17	50	<0.0001	17	67	<0.0001
70 – 79	17	82	<0.0001	7	43	<0.0001	8	62	<0.0001
80 – 89	15	77	<0.0001	5	25	<0.0001	7	57	<0.0001
≥90	10	87	<0.0001	2	33	<0.0001	4	57	<0.0001

Table 5: Percent of teeth present by tooth group in the mandibular arch for persons with at least one tooth (dentate).

Age	Anteriors			Premolars			Molars		
	1982	2015	p*	1982	2015	p*	1982	2015	p*
<50	77	94	0.05	60	91	0.0004	47	84	0.0003
50 – 59	60	93	0.0002	43	79	0.0003	23	53	0.002
60 – 69	38	91	<0.0001	23	78	<0.0001	17	52	<0.0001
70 – 79	22	87	<0.0001	18	73	<0.0001	15	43	<0.0001
80 – 89	19	85	<0.0001	15	67	<0.0001	14	35	0.0001
≥90	18	89	<0.0001	13	72	<0.0001	8	48	<0.0001

Figure 1 displays the percents of edentulous arches in 1982 and 2015 (Figure 1). The slopes of three of the lines are similar; however, the slope for mandibular teeth in 1982 trended upwards instead of downward past age 70, different from the situation for the other curves. There were significantly fewer edentulous maxillary arches for the age groups 70-79 and 80-89; significantly fewer mandibular arches were found for groups 70-79 and > 90.

Figure 2 displays the percents of the two edentulous arches by gender for 1982 and 2015. For both genders edentulousness was significantly less in 2015 for all age groups over age 50 (Figure 2).

Discussion

Monroe Community Hospital (MCH) has provided care for nursing home residents of Monroe County, NY since 1935. Except for a 50-bed acute hospital, the majority of its 560 beds are for Skilled Nursing Facility (SNF), or nursing home, patients. Its mission as a nursing home and also the admission criteria for its residents has remained essentially consistent over time except for minor adjustments due to changing State health codes and accrediting agencies. Patients typically have multiple chronic medical, physical, and mental health diagnoses such as diabetes, congestive heart failure, hypertension, arthritis, and dementia. Most would be classified

according the American Society of Anesthesiologists’ (ASA) criteria as level 2 or 3.

Edentulousness: The percent of those ages 65-74 with no remaining teeth in this study population was approximately 45%. As expected this proportion is lower than that of the 1982, which suggests that oral health, as assessed by tooth loss, has improved. It is much higher than the data from the most recent National Health and Nutrition Examination Survey (NHANES) survey of community-based elderly, performed 2011-12 [13]. In that survey 13% were edentulous. For all subjects, however, the mean number of remaining teeth for those 65-74 was 19.3. In the current survey, the mean number was 14.1. The lower levels of edentulousness at all ages over 50 in this 2015 population compared to that of 1982 were significant.

Greater tooth loss in nursing homes than in community-based populations likely has multiple compound causes notably including poor personal preventive oral care, inadequate daily care by nursing personnel who may not have sufficient training, and lack of access to trained dental health professionals with proper equipment. Still, the lower level of tooth loss at MCH seen here, compared to that of 1982, is clearly an improvement.

The trend toward less tooth loss in the recent past has been

documented in various populations worldwide. In Finland, the mean number of missing teeth was 7.8 in 1977-78 but had decreased to 4.7 only a few years later (1989) [11]. Among women in Goteberg, the number of edentate individuals decreased significantly during the 24-year period 1968-92 [14]. A literature review of 60 studies of populations in Europe documented the decline of edentulousness and the overall trend toward decreasing incidence of tooth loss [9].

Multiple potential reasons for the generally improved rates of tooth retention have been postulated by the American Dental Association and include community water fluoridation, increased emphasis on prevention in dental practices, use of sealants, and more widespread availability of a variety of personal preventive care products [15].

It should be noted, however, that the decline in tooth loss among older adults is not universal. In 2016 in southern Brazil the prevalence of edentulism among 1451 persons, aged 60 years and above, was 39.3% [16]. Also in a recent study in Uruguay, among those 65-74 years of age, the mean number of teeth present was only 9.7 [17]. The earlier survey (1982) on which the current study is based reported edentulousness to be 64% among those age 65 and older [5].

A 2007 survey of 321 elderly long-term hospital patients in France found edentulousness to be 27% [18]. In 31 nursing homes in Victoria, Australia, the prevalence of edentulousness was 46% [10]. Among 1369 older residents of all the "service houses" in Helsinki and Espoo, Finland, in 2014, edentulousness was 52% [11].

Although not fully consistent for all populations, the general trend toward less edentulousness, as especially noted in older adults, appears supported by results of this survey. These results also provide at least initial and limited evidence that current oral health in nursing homes may not be allowing as much loss of teeth as was so previously.

Teeth present: Among all persons surveyed, the mean number of teeth present was 14.1. This is considerably lower than the mean number (21.1) discovered in the NHANES survey of the general U.S population in 1988-91 [18]. The mean number of teeth for dentate individuals in the current study was 19.3, while the comparative number in the general population was 23.5. While the NHANES information is dated, the greater loss of teeth in this current nursing home population compared to community-based populations is consistent with other studies in nursing homes.

Tooth Type: Few reports of the presence of teeth identify the remaining teeth by type (anterior, premolars, or molars). The pattern of retention of teeth by type in this study was similar to that of the population present in this institution in 1982; that is, mandibular teeth were retained longer than maxillary teeth, and anterior teeth were retained longer than premolars and molars.

This same pattern was discovered in the NHANES study of oral health of the U.S. community-based population of 1988 [19]. Having similar patterns present in both nursing home and community-residing populations suggests that tooth loss is due to similar factors, but to a greater extent among nursing home residents. Longer retention of the front teeth may relate to the comparative ease of access and exposure for means of prevention and also both patients' and dentists' reluctance to remove these teeth with the greatest

adverse impact on esthetics.

Root Remnants: Root remnants were counted as "teeth present" in this study. They are of interest in evaluating nursing home populations because, while little information detailing comparisons to community populations is available, it is likely that they are more common in nursing homes. They are of clinical interest because of they act as sites of debris collection, potential acute infection, and discomfort. In the current population, 14% of subjects had at least one root remnant.

Limitation

An obvious limitation of the information presented here is that it describes only one nursing home. New York State (NYS) has 637 nursing homes and, clearly, findings from just one cannot be representative and generalizable to others. The nursing home surveyed for this study was larger than most, was in an urban location, and was not-for-profit; all of these variables of size, location, and financial support, could have affected the outcomes.

While these variables exist, however, admission criteria for residents are similar to those of other NYS nursing homes and so the potential effects of differences are possibly marginal. Also, because a very similar study was undertaken in this same institution in 1982, a unique opportunity to make a comparison to data collected in 2015 appeared worthwhile and relevant to evaluating possible changes in oral health since that earlier time.

Conclusion

The oral health of the nursing population surveyed, as assessed by the presence of teeth, has improved since early surveys of this facility and others. Surveys in other New York State nursing homes and others across the country are indicated in order to compare to these results and to clarify whether oral health in nursing homes generally is improving.

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