

Original Research

## Dental Services Utilization by over 65 Years Old in Israel in 2020

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### Abstract

To understand dental service utilization in the over-65 age group and to identify the main patterns and barriers to uptake of dental care after the 2019 expansion under the National Health Insurance Law to include dental benefits for the over-75 age group. Phone interviews with a random sample of 512 people over the age of 65 were conducted between February and April 2020. About half had visited a dentist during the previous year (an average of 2.9 visits) while 17% reported they had never visited one. Dental service utilization was lower among those living in the periphery, non-Jews and those who had difficulties covering their monthly expenses. Treatment cost was the main barrier to dental treatment, especially for those with difficulties in covering their monthly expenses. Despite the inclusion of dental treatment for people over the age of 75 in February 2019, the majority of respondents were unaware of this reform, thus the potential of the over-75 age group in lowering the cost barrier has not fully materialized.

### Keywords

Older adults; 65+; dental service utilization



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## 1. Introduction

Quality of life and quality of nutrition are heavily influenced by the oral health of the adult population [1, 2]. Aging is associated with chronic illnesses and physiological changes that may damage the teeth and gingiva and cause masticatory problems. This in turn influences the consumption of protein, fibers, and vegetables, which may lead to a deterioration of physical health. Meanwhile, oral health also markedly affects social involvement and self-esteem.

According to a national nutrition survey, the health status of 17% of older adults in Israel was influenced by their oral health [3]. Statistically significant differences were found in energy, protein, nutritional fibers, and vegetable consumption according to oral health. Older adults with dentures consumed fewer dental services compared to those with natural teeth [4].

The oral health of Israel's older adults is worse than their counterparts in many developed countries [5], partly due to barriers in dental service utilization of older adults [6]. Dental services were historically not been included in the basket of services provided by the 4 HMO's (Kupot Holim) according to the National Health Insurance Law (NHIL) and apparently, only a small percentage of the population over 65 years of age held private or supplemental insurance that covered dental treatments.

According to research performed 16 years ago by the Ministry of Health [7], almost 40% of people over the age of 65 had visited a dentist in the past 6 months. A nationally representative study performed 22 years ago by Berg et al. [8] showed that 40% of people over the age of 65 had visited a dentist in the previous year, compared with 65.6% in the United States [9], with an average of 2.8 visits. The inability to fund treatment was the main reason for the untreated and unmet need for dental care in Israel and United States [8, 10].

Research performed in the United States and Germany [9, 11, 12] showed that the variables predicting a higher service utilization were: income and education (higher vs. lower), race (white vs. Latino and blacks), age (65-74 vs. over 85 years), and dental status (dentulous vs. edentulous). Other variables that influence dental service utilization were health insurance including dental treatment, attitudes toward oral health, having a regular practitioner, and availability and accessibility of the service [10, 13]. Research in Ohio found that women over the age of 65 visited a dental clinic more than men, as did women who had insurance and were married [14]. Half of the 65+ age group have a regular practitioner. About a fifth of those insured by Medicare did not visit a dentist in the last 5 years, mainly because of the cost of treatment. Less than a third of the 65+ age group in the United States have insurance that covers dental treatments [9]. The positive influence of visiting dentists on oral health has been extensively reported [13, 15]. Obviously, people who visit a dentist have fewer untreated diseases.

A national survey in 2001 [8], found that about a fifth of Israeli older adults visited the dentist for regular check-ups, compared to 37% of younger people. An article [6] based on that survey showed that in the age group over 65 years, this percentage was only 2% in the bottom income tertile, compared to 33% in the top income tertile. Furthermore, they found that 70% of the older adults had a family dental practitioner and that dental visits were more frequent in the high-income group (44% visited during the year before the interview vs. 29% in the bottom-income tertile). Regarding the dental treatments provided, the most prevalent were prosthetics (70%), followed by extractions (15%), periodontal treatment (6%), restorations (5%), root canal treatment and others (4%) [4]. These treatments were not included in the National Health Insurance Law (NHIL) basket of services

until 2019 and were paid out-of-pocket. About a third of people over the age of 65 foregone dental treatment, often due to the cost of treatment (46% of the bottom income tertile and 13% of the top income tertile) [6]. According to the Central Bureau of Statistics (CBS) [16], 43% of people over the age of 65 gave up dental treatment, because of the cost in 2013. Research to assess the project 'Smile Again' conducted by the Ministry of Health from 2008 to 2011 which provided dental treatment to low-income older adults, found that 65% of those examined did not complete dental treatment due to cost and 88% thought that prices of dental treatments are generally high. 51% did not go to dental clinics at all because of the cost [17]. Besides, lack of knowledge and awareness were also found as important barriers.

Studies conducted in Israel [6, 8, 17] have emphasized the economic barriers and the importance of including preventive, restorative and reconstructive treatments in the NHIL service basket.

The reform started in 2010 with the inclusion of dental treatments for children in the basket of services provided by the NHIL [18]. This part was completed in 2019, and the long-needed reform for the elderly started: since February 2019, preventive and restorative treatments (procedures to repair and restore damaged teeth) have been included in the NHIL basket of services for those over 75 years of age, and since October 2019 reconstructive treatments (procedures to replace missing teeth, repair damaged teeth and faulty bites) also have been included for those over 80 years of age.

In 2022, the eligibility age drops to 72. The 4 public HMOs provide treatments for their members at their dental clinics or contracted private clinics. Patients are required to cover co-pays for dental services.

The research [5] was initiated by the Myers-Joint-Brookdale Institute in collaboration with the Division of Dental Health of the Ministry of Health to provide accurate data for policymakers to further fine-tune the reform and also to highlight disparities in service utilization by socio-economic groups and geographical location (central vs. periphery). We bring here the results regarding dental service utilization by the population over 65 years of age.

### **1.1 Aims and Objectives**

To understand dental services utilization in Israel's older adult populations (both the current reformed 75+ age group and the 65-74 age group planned for inclusion in the next step) and to identify the main barriers to dental services for these groups immediately after the expansion of NHIL covered dental services.

## **2. Materials and Methods**

The study population included about 1 million people over the age of 65 living in the community.

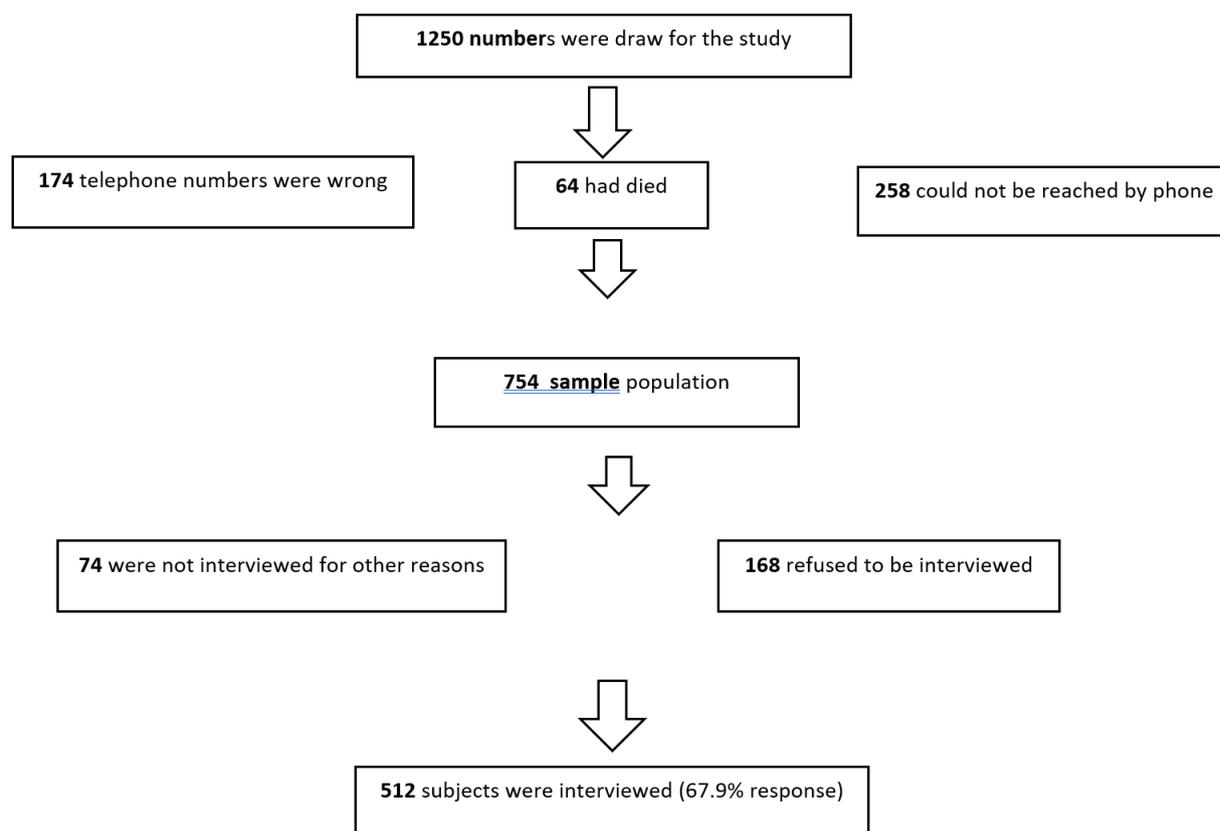
A random sample was drawn from the digital telephone directory of all people over the age of 65 using a random number generator function.

### **2.1 Sampling and Study Population**

The sampling method was described elsewhere [5]. Using a random sample of 1250 people over the age of 65, we found that 64 subjects had died, 174 had the wrong telephone number, and 258

subjects could not be reached by phone over several weeks. The remaining 754 subjects comprised the study population. The recruitment procedure for participants is shown in Figure 1.

The interviews were conducted between February and April 2020. If older adults could not be interviewed for health or cognitive reasons, their next of kin were interviewed. 34 relatives were interviewed and asked objective questions about older adults, such as visits to dental clinics.



**Figure 1** Participant recruitment flow-chart.

## 2.2 The Questionnaire

The questionnaire was constructed using validated questions from the International Collaborative Study (ICS) I [19] and ICS II [20] of the World Health Organization (WHO) and a survey of the National Institute of Dental Research in 1988 [21]. The questionnaire was translated from English to Hebrew and was validated by back translation. The questionnaire included 50 closed-ended questions regarding dental service utilization and satisfaction, barriers to utilization, dental health, knowledge, and attitudes towards the importance of healthy teeth, awareness about the dental health reform as well as socio-demographic questions. It was translated into Arabic and Russian to include the main non-Hebrew-speaking groups. It was initially piloted on 15 interviewees and since only minor changes were needed, they were subsequently added to the study. The interviews were conducted by experienced interviewers who received specific guidelines from the researchers.

### 2.3 Statistical Analysis

Weighting was performed to improve the representativeness of the sample. Weights were calculated according to the percentage of the population by age and ethnic groups using data from CBS.

Data distribution was stratified by age group, economic status {ability to meet monthly expenses: managing without any difficulties, managing with difficulties (including those who don't succeed)}, residential region (center or periphery) and ethnic origin. The comparisons were performed using the  $\chi^2$  test. The number of visits was compared by unpaired t-test.

Based on Andersen's behavioral model of health service use [22] which found associations between background characteristics, attitudes, knowledge, health behavior, place of living, medical need and health system characteristics, we performed a multivariate regression analysis to explain the factors influencing dental services utilization and the power of these associations.

Logistic regression analysis was used to explain dental visits in the last year as a proxy for dental service utilization by background characteristics, place of residence, knowledge and attitudes toward oral health. A p-value <0.05 was regarded as statistically significant.

The research was approved by the Helsinki committee of the Ministry of Health (16/2019 from 11/7/2019) and by the Ethical Review Board of the Myers-Joint-Brookdale Institute from 23/7/2019.

The interviewers asked for consent from participants after explaining the research program and its aims. The interviews were conducted with consent.

### 3. Results

#### 3.1 Demographics:

Of the 754 study participants, 168 refused to be interviewed and 74 were not interviewed for other reasons (such as language barriers or communication problems). Hence, 512 actual study participants were interviewed (67.9% response rate) (Figure 1).

Slightly more than half of the interviewees (52%) were women, with an average age of 75.6 years (SD = 2.1). The over-85 age group had a higher proportion of women, widows and primary school educated compared with the 65-74 age group. Understandably, the percentage of employed participants was lower in the 85+ group (3.5%) than in the 65-74 group (33.2%). 92.9% of the 65+ age group live in central (urban) localities.

The demographic characteristics of the sample are presented in Table 1. 92.9% of the 65+ age group lived in central (urban) localities not appeared in the table.

**Table 1** Demographic characteristics by age group.

	Age group			Total in the study	65+ in the population <sup>^</sup>
	65-74	75-84	85+		
n in sample	255	197	60	512	1,056,315
% in sample	49.80%	38.50%	11.70%	100.00%	
% weighted (in population)	59.20%	28.60%	12.10%		100.00%
% Women	48.50%	55.80%	58.70%	52.00%	55.50%

Age (average ± SD)	70.8 ± 2.1	79.2 ± 2.9	87.5 ± 1.6	75.6 ± 6.4	
% Jews	87.50%	90.30%	93.70%	89.10%	90.90%
% Employed***	33.20%	14.80%	3.50%	24.50%	22.40%
Ability to cover monthly expenses					
Without difficulties	10.30%	11.40%	3.40%	9.80%	21.40%
Able to manage	71.80%	62.10%	74.60%	69.50%	53.60%
With difficulties or unable to manage	17.90%	26.50%	22.10%	20.70%	25.00%

\*\*\*p < 0.0001

^Shnoor and Cohen, The 65+ Population in Israel: Statistical Abstract 2020

### 3.2 Health Knowledge and Behavior

69.4% of the respondents brushed their teeth at least twice a day, 23.2% brushed once a day, 4% brushed infrequently and 3.4% didn't brush at all.

Most respondents were aware of the damaging effect of sugar on oral health. "Consuming sugar between meals is harmful to oral health" to a great extent according to 44.8% of the respondents, 17.2% to a moderate extent, 9.8% to a small extent, while the remaining 28.2% of the respondents answered that sugar is not harmful or they don't know whether it is harmful to oral health.

### 3.3 Visits to Dental Clinics

More than half (57%) of the 65-74 age group visited a dental clinic in the last year, compared to only 36.7% of the 85+ age group. A fifth of the respondents last visited more than two years ago, while 16.9% replied that they had never seen a dentist, 13.6% of Jews compared to 43.6% of non-Jews (p < 0.001). The average number of dental visits in the previous year was 2.9 (Table 2).

**Table 2** Dental visits by age group (n = 512).

	Age group			Total
	65-74	75-84	85+	
No. of visits (SD) *	3.2 (3.5)	2.3 (1.9)	2.6 (3.4)	2.9 (3.1)
Date of last visit *				
Visited last year	57.0%	52.0%	36.7%	53.2%
Visited 1-2 years ago	12.0%	13.4%	21.7%	13.5%
More than 2 years ago	20.9%	19.0%	18.3%	20.1%
Never visited	13.0%	22.5%	23.3%	16.9%
Don't remember	2.3%	2.8%	5.0%	2.8%

\*p < 0.05

Dentate subjects (60.7%) visited twice as often as edentulous subjects (28.8%) during the last year (p < 0.001).

Regarding the reasons for the last visit, 27.7% were preventive check-ups initiated by patients, 24.9% were urgent treatments, 4.6% were preventive check-ups initiated by a dentist, 1.5% were initiated by hygienists and the rest (41.4%) were other reasons. The most prevalent of 'other

reasons' was prosthetic treatment (65.4%), followed by 19.9% for extraction, 10.5% for restoration, 5% for root canal treatment and 2% for periodontal treatment. The reasons for the visits are detailed in Table 3.

**Table 3** Reason for the last visit by age group (n = 512).

	Age group			
	65-74	75-84	85+	All
Reason for last visit*				
Urgent treatment	25.1%	23.9%	26.2%	24.9%
Self-initiated regular check-up	27.5%	28.6%	26.2%	27.7%
Dentist-initiated regular check-up	2.8%	6.7%	9.5%	4.6%
Regular treatment initiated by the hygienist	2.0%	1.0%	0.0%	1.5%
Others	42.8%	40.0%	38.1%	41.4%
of these:				
Prosthetic treatment	63.4%	69.8%	66.7%	65.4%
Extraction	19.8%	20.9%	17.6%	19.9%
Restoration	13.7%	4.7%	5.9%	10.5%

\*p < 0.05

People with difficulties covering monthly expenses (36.7%) visited the dentist less frequently than those without difficulties (57.0%). They also differed in the reasons for visiting the clinic: they reported a lower percentage of self-initiated preventive checkups (12.3%) compared with their better-off counterparts (34.9%). The proportion of visits for urgent treatment was similar in both groups (23.3% vs. 28.4%). The time since the last visit by the ability to cover monthly expenses is detailed in Table 4. The reason for the last visit is detailed in Table 5.

**Table 4** Time since last dental clinic visit by the ability to cover monthly expenses (n = 482).

	Ability to cover monthly expenses			
	No difficulty	Manage	Some difficulty	All^
Last visit to dentist*				
Last year	57.0%	52.1%	36.7%	53.2%
1-2 years ago	13.0%	13.7%	14.0%	13.5%
More than 2 years ago	19.6%	15.5%	29.0%	20.1%
Never visited	8.7%	18.5%	19.0%	16.9%
Don't remember	0.0%	3.0%	3.0%	2.8%

\*p < 0.05

^Including 30 interviewees who did not answer the question about their ability to cover monthly expenses.

**Table 5** Reason for last visits by the ability to cover expenses (n = 482).

Reason for last visit*	Age group			All
	65-74	75-84	85+	
Urgent treatment	25.1%	23.9%	26.2%	24.9%
Self-initiated Regular check-up	27.5%	28.6%	26.2%	27.7%
Dentist initiated Regular check-up	2.8%	6.7%	9.5%	4.6%
Hygienist initiated Regular treatment	2.0%	1.0%	0.0%	1.5%
Other	42.8%	40.0%	38.1%	41.4%
of these:	100.2%	100.2%	100.0%	100.1%
Prosthetic treatment	63.4%	69.8%	66.7%	65.4%
Extraction	19.8%	20.9%	17.6%	19.9%
Restoration	13.7%	4.7%	5.9%	10.5%
	96.9%	95.4%	90.2%	95.8%

There was a statistically non-significant difference in the frequency of visits between males and females ( $p = 0.778$ ), and no difference was found between residents in the center (57.3%) or periphery (48.4%) ( $p = 0.246$ ). More than half (55%) of the Jewish interviewees had visited a dental clinic during the last year compared with 37% of non-Jewish interviewees ( $p = 0.009$ ).

Using multivariate logistic regression analysis to explain past-year dental visits as a proxy for dental service utilization (visited = 1, not visited = 0), it was possible to find the predicting factors.

The logistic regression model detailed in Table 6 indicated that background factors, knowledge and health behavior all influence service utilization. The variables with the greatest influence were advanced age (85+ tended to visit less than younger adults), knowledge (sweets damage teeth), ethnic group (Jews were 2.3 times greater than non-Jews) and economic status (more wealthy people visited more) ( $R^2 = 0.095$ ). Geographical location, type of clinic (private vs. public) and oral health status had a small influence on the date of the last dental visit and were therefore not included in the regression analysis.

**Table 6** Logistic regression coefficients to explain dentist visits.

	B	SD	Odds Ratio	p
Age (85+ vs. < 85)	-0.686	0.299	0.50	0.022
Knowledge	0.586	0.199	1.80	0.003
Ethnic group (Jewish vs. non-Jewish)	0.825	0.317	2.28	0.009
Economic status (Cover expenses vs. having difficulties or being unable to cover monthly expenses)	0.617	0.241	1.85	0.010
Brushing teeth (twice a day vs. less)	0.393	0.208	1.48	0.059
Gender (female vs. male)	-0.149	0.197	0.86	0.451
Constant	-1.253	0.450	0.29	0.005

Less than half (43%) of the 65-74 age group were familiar with the dental reform of 2019. In the over-75 age group (those eligible for treatment under the NHIL), 49% of the 75-84 age group were aware of the reform, but in the 85+ age group only 28% were aware of the reform.

#### **4. Discussion**

The findings portray a general view of dental service utilization by older among Israelis over the age of 65 at the beginning of 2020. More than half, 53.2% visited a dentist in the previous year, up from the 40% reported 22 years ago [8], although lower than the 65.6% reported in the United States [8]. The tendency to visit was higher in the following groups: 65-84 age group, Jews, those who could afford the monthly expenses, and those with some natural teeth (compared to edentulous). The average number of yearly visits was 2.9 and the most prevalent treatment was prosthodontic (nearly a third). These findings are consistent with research in the United States that showed that low-income, ethnic minority, advanced age (above 85) and accessibility and availability problems predict low utilization of dental services [9-11].

Gender differences in dental service utilization are equivocal. Some studies showed differences while others did not. Consistent with the results of Kramarow [9], we didn't find gender differences in utilization, whereas Lee et al. [14] found that women and those with insurance visited the dentist more often. It is worth noting that in a study conducted 22 years ago in Israel, similarly no gender differences were found [8].

According to the current study, 77% of older adults have a family dental practitioner, higher than 22 years ago (70%) [8]. The cost of treatment, which used to be a barrier for older adults, is today a barrier mainly for those who are less well-off. 22 years ago, 55% of older adults did not complete treatment because of cost, and now it has dropped to 38%. Cost is the main barrier for those who have difficulties covering monthly expenses, however, this constitutes two-thirds (67%) of this age group.

As in 1998, about three-quarters of people visited private dental practices. The percentage of visits to HMO clinics did not change and was about a fifth of the 65+ age group. The reform of 2019 should have lowered the barriers to dental services utilization at HMO clinics (as the government-funded treatment is only available at these clinics), but most people in the 75+ age group were unaware of this.

#### **5. Limitations**

The limitations of the study are recall bias, memory reliance and selection bias due to the under-representation of the high socioeconomic group compared to the general population. The high percentage of non-Jews who reported never seeing a dentist might be attributed to several reasons (confounders) such as accessibility problems, lack of awareness, and assessment of oral health situation.

#### **6. Conclusions**

Despite the improvement in dental health behaviors of older Israelis over the age of 65 in the past two decades, there are still barriers to dental services utilization and a lack of awareness of their importance, especially among those who have difficulties covering monthly expenses and

among non-Jews. The reform to include dental treatments for the elderly in the basket of services of NHIL will lower cost barriers, nevertheless, further measures should be taken to improve access and utilization, such as widely disseminating information regarding the reform and dental benefits and the importance of dental care for people over 72 years of age. Utilization of dental services and the types of services used should be monitored, as well as the reasons for under-utilization such as general health conditions.

### **Author Contributions**

All authors designed the research, B-WA coordinated it, planned the sampling, done the statistics with KSI, all authors analyzed the data; B-W and SPZ led the writing, LN crystalized the conclusions.

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### **Competing Interests**

The authors have declared that no competing interests exist.

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