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Original Article

A Study on Oral Symptoms, Dental Care Behaviors, and Awareness of Oral Health Management for Well-Aging in Single-Person Households

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ABSTRACT

Objectives: This study examined oral symptoms, dental care behaviors, awareness and experience of government-supported dental treatment, and awareness of oral health management among 409 single-person households from a well-aging perspective. **Methods:** Data were analyzed using frequencies, percentages, and chi-square tests. **Results:** Overall, 74.3% of participants reported low levels of social and leisure activity participation. The most commonly reported oral symptoms were tooth sensitivity (25.7%), bad breath (21.0%), darkened tooth color (21.0%), dental caries (20.8%), and dry mouth (20.3%), whereas 27.9% reported no current oral symptoms. Age-group differences were not significant for immediate dental treatment when toothache occurred or for regular dental check-ups within 6-12 months. However, significant age-group differences were found in the experience of preventive dental treatment ($\chi^2 = 10.359$, $p = 0.035$), awareness of government-supported implant, denture, or scaling treatment ($\chi^2 = 24.241$, $p < 0.001$), and experience of such treatment ($\chi^2 = 12.804$, $p = 0.012$). Awareness of oral health management methods did not significantly differ according to gender, age, residential area, education level, or duration of single-person household, but differed significantly according to social and leisure activity participation ($\chi^2 = 11.386$, $p = 0.003$). **Conclusions:** Participants with higher levels of social and leisure activity participation were more likely to report being aware of oral health management methods and less likely to report being unaware. These findings suggest that oral health in single-person households is associated not only with current symptoms but also with preventive dental utilization, policy awareness, and social connectedness. Community-based strategies for well-aging should therefore strengthen early symptom management, age-tailored preventive dental services, and practical oral health education for single-person households.

Keywords: Awareness of oral health management, Dental care behaviors, Oral symptoms, Single-person households, Well-aging

1. Introduction

Single-person households have become a common household type across the life course rather than an exceptional form limited to a specific stage of life. Their continued increase reflects both individual choice and broader social structural changes, and this shift has important implications for health management and experiences of aging [1,2]. A key characteristic of single-person households is that responsibility for health-related decision-making and self-care is concentrated on the individual [3]. In contrast to family households, in which informal support such as meal preparation, assistance with healthcare use, and emotional support may be available in daily life, individuals living alone may have limited access to such resources [4,5]. As a result, they may be more vulner-

able in terms of continuity of care and early response to health problems [5,6].

Oral health is a major component of well-aging. It is closely associated not only with the condition of the teeth and gums, but also with chewing, swallowing, nutritional intake, speech, social interaction, and quality of life [7,8]. Because the present study targeted general single-person households aged 19 to 69 years, well-aging in this study should be understood from a life-course perspective rather than being confined mainly to older adulthood. Across adulthood, common oral symptoms such as tooth sensitivity, bad breath, darkened tooth color, dental caries, and dry mouth may influence daily comfort, self-care, social interaction, and timely use of dental services [7-10]. These symptoms may be particularly important in single-person households, in which symptom recognition, care-seeking decisions, and health management are largely handled by the individual.

Previous studies have suggested that people living alone may experience difficulties in health management because of limited social support, fewer opportunities for health information exchange, and reduced continuity of preventive care [3-6]. Accordingly, oral health in general single-person households should be examined not only in relation to severe oral functional decline, but also in relation to common daily oral symptoms, dental care behaviors, and awareness of oral health management. Although swallowing-related problems are clinically important, they do not appear to fully represent the major oral health concerns of general single-person households. However, relatively few studies have comprehensively examined current oral symptoms, dental care behaviors, awareness and experience of government-supported dental treatment, and awareness of oral health management among general single-person households.

Therefore, this study aimed to identify current oral symptoms among general single-person households, examine age-related differences in dental care behaviors and awareness and experience of government-supported dental treatment, and analyze differences in awareness of oral health management according to general characteristics. Through this, the study sought to provide basic data for the development of oral health promotion strategies to support well-aging among single-person households.

2. Materials and Methods

2.1. Study Design

This study was a cross-sectional survey conducted to examine oral symptoms, dental care behaviors, and awareness of oral health management among general single-person households. Primary data were collected using a structured questionnaire developed by the research team.

2.2. Participants

The participants were 409 general single-person households aged 19 to 69 years. A general single-person household was defined as a household in which an individual lives alone, maintains daily life independently, and manages overall health on their own. Individuals requiring constant care due to severe illness or disability, as well as those living in institutional care settings, were excluded.

The sample size was calculated using G*Power 3.1.9. Based on a chi-square test with an effect size of .20, a significance level of .05, and a statistical power of .80, the minimum required sample size was 393. Allowing for attrition and invalid responses, the target sample size was set at 410.

Participants were selected using proportional quota sampling based on sex, age, and residential area, according to the 2023 Population Census of Statistics Korea [2]. Eligible respondents were recruited from an online survey panel, and data from 409 participants were included in the final analysis.

The study variables included general characteristics, oral symptoms, dental care behaviors, and awareness of oral health management. Social and leisure activity participation was recategorized as low (1-2 points) or moderate or higher (3-5 points). Awareness of oral health management was classified as unaware, neutral, or aware based on a 5-point scale.

2.3. Data Collection and Analysis

This study was approved by the Institutional Review Board of K University (KYU 2025-06-037-001). Data were collected in September 2025 through an online survey administered by Hankook Research. All participants provided informed consent before participation.

Data were analyzed using SPSS Statistics 25. General characteristics and oral symptoms were summarized using frequencies and percentages. Chi-square tests were performed to examine age-related differences in dental care behaviors and government-supported dental treatment variables, as well as differences in awareness of oral health management according to general characteristics. Experience of government-supported implant, denture, or scaling treatment was analyzed only among respondents who were aware of such treatment.

3. Results

3.1. General Characteristics of the Participants

A total of 409 general single-person households were included in the study. Of these, 230 (56.2%) were men and 179 (43.8%) were women. Regarding age, 94 (23.0%) were aged 19-29 years, 90 (22.0%) were aged 30-39 years, 63 (15.4%) were aged 40-49 years, 76 (18.6%) were aged 50-59 years, and 86 (21.0%) were aged 60-69 years. In terms of residential area, 210 (51.3%) lived in metropolitan cities, 155 (37.9%) in small- or medium-sized cities, and 44 (10.8%) in rural areas. Regarding education level, 116 (28.4%) had a high school education or lower, 252 (61.6%) were university graduates, and 41 (10.0%) had completed graduate school. Social and leisure activity participation was low in 304 (74.3%) and moderate or higher in 105 (25.7%). The most common duration of living alone was 10 to less than 20 years, reported by 122 (29.8%) participants.

Table 1. General Characteristics (n = 409)

Characteristics		n	%
Gender			
	Male	230	56.2
	Female	179	43.8
Age			
	19-29 years	94	23.0
	30-39 years	90	22.0
	40-49 years	63	15.4
	50-59 years	76	18.6
	60-69 years	86	21.0
Residential area			
	Metropolitan city	210	51.3
	Small-medium city	155	37.9
	Rural area	44	10.8
Education level			
	High school graduate or lower	116	28.4
	University graduate	252	61.6
	Graduate school graduate	41	10.0
Social/leisure activity participation*			
	Low	304	74.3
	Moderate or higher	105	25.7
Duration of single-person household			
	Less than 5 years	112	27.4
	5 to less than 10 years	112	27.4
	10 to less than 20 years	122	29.8
	20 years or more	63	15.4

* Measured on a 5-point scale and recategorized into 'Low' (1-2 points) and 'Moderate or higher' (3-5 points)

3.2. Current Oral Symptoms

The most frequently reported current oral symptom was tooth sensitivity, reported by 105 (25.7%) participants. This was followed by bad breath and darkened tooth color, each reported by 86 (21.0%), dental caries by 85 (20.8%), and dry mouth by 83 (20.3%). Exposed tooth roots were reported by 55 (13.4%), gum disease by 54 (13.2%), temporomandibular joint pain by 45 (11.0%), and mouth ulcers by 41 (10.0%). Reduced sense of taste was reported by 19 (4.6%), swallowing difficulty by 2 (0.5%), and other symptoms by 5 (1.2%). A total of 114 (27.9%) reported having no oral symptoms. Thus, 295 (72.1%) participants experienced at least one oral discomfort.

Table 2. Current oral symptoms experienced among participants (n = 409)

Variable	Category	n	%
Tooth sensitivity	Yes	105	25.7
	No	304	74.3
Bad breath	Yes	86	21.0
	No	323	79.0
Darkened tooth color	Yes	86	21.0
	No	323	79.0
Dental caries	Yes	85	20.8
	No	324	79.2
Dry mouth	Yes	83	20.3
	No	326	79.7
Exposed tooth roots	Yes	55	13.4
	No	354	86.6
Gum disease	Yes	54	13.2
	No	355	86.8
Temporomandibular joint pain	Yes	45	11.0
	No	364	89.0
Mouth ulcers	Yes	41	10.0
	No	368	90.0
Reduced sense of taste	Yes	19	4.6
	No	390	95.4
Swallowing difficulty	Yes	2	0.5
	No	407	99.5
Other	Yes	5	1.2
	No	404	98.8

3.3. Age-Related Differences in Dental Care Behaviors and Awareness/Experience of Government-Supported Dental Treatment

No significant age-group difference was found in immediate dental treatment when toothache occurred ($\chi^2 = 5.769$, $p = 0.217$). Likewise, no significant difference was observed in regular dental check-ups within the previous 6 or 12 months ($\chi^2 = 5.231$, $p = 0.264$).

However, experience of preventive dental treatment differed significantly by age group ($\chi^2 = 10.359$, $p = 0.035$). The proportion of participants reporting preventive dental treatment experience was 45 (47.9%) among those aged 19-29 years, 46 (51.1%) among those aged 30-39 years, 25 (39.7%) among those aged 40-49 years, 22 (28.9%) among those aged 50-59 years, and 41 (47.7%) among those aged

60-69 years, with the lowest proportion observed in the 50-59-year age group.

Awareness of government-supported scaling, implant, and denture treatment also differed significantly by age group (χ^2 = 24.241, p < 0.001). Awareness rates were 40 (42.6%) for those aged 19-29 years, 43 (47.8%) for those aged 30-39 years, 39 (61.9%) for those aged 40-49 years, 46 (60.5%) for those aged 50-59 years, and 65 (75.6%) for those aged 60-69 years, showing a general increase with age. Among respondents who were aware of such treatment, actual treatment experience also differed significantly by age group (χ^2 = 12.804, p = 0.012). The experience rates were 31 (77.5%) for those aged 19-29 years, 28 (65.1%) for those aged 30-39 years, 23 (59.0%) for those aged 40-49 years, 21 (45.7%) for those aged 50-59 years, and 31 (47.7%) for those aged 60-69 years.

3.4. Awareness of Oral Health Management According to General Characteristics

Awareness of oral health management did not differ significantly according to sex (χ^2 = 1.046, p = 0.593), age (χ^2 = 7.775, p = 0.456), residential area (χ^2 = 4.432, p = 0.351), education level (χ^2 = 8.738, p = 0.068), or duration of living

Table 3. Age-group differences in dental care behaviors and awareness/experience of government-supported dental treatment (n = 409)

Variable	19-29 years n (%)	30-39 years n (%)	40-49 years n (%)	50-59 years n (%)	60-69 years n (%)	χ^2	p
Immediate dental treatment when toothache occurs	51 (54.3)	52 (57.8)	35 (55.6)	42 (55.3)	60 (69.8)	5.769	.217
Regular dental check-ups within 6-12 month	49 (52.1)	47 (52.2)	29 (46.0)	29 (38.2)	46 (53.5)	5.231	.264
Experience of preventive dental treatment	45 (47.9)	46 (51.1)	25 (39.7)	22 (28.9)	41 (47.7)	10.359	.035
Awareness of government-supported implant, denture, or scaling treatment	40 (42.6)	43 (47.8)	39 (61.9)	46 (60.5)	65 (75.6)	24.241	.001
Experience of government-supported implant, denture, or scaling treatment†	31 (77.5)	28 (65.1)	23 (59.0)	21 (45.7)	31 (47.7)	12.804	.012

p-value calculated by chi-square test.
† This analysis was restricted to respondents who were aware of the government-supported implant, denture, or scaling treatment.

Table 4. Awareness of oral health management methods according to general characteristics (n = 409)

Categories		Unaware n (%)	Neutral n (%)	Aware n (%)	χ^2	p
Gender					1.046	.593
	Male	63 (27.4)	109 (47.4)	58 (25.2)		
	Female	42 (23.5)	93 (52.0)	44 (24.6)		
Age					7.775	.456
	19-29 years	20 (21.3)	44 (46.8)	30 (31.9)		
	30-39 years	24 (26.7)	44 (48.9)	22 (24.4)		
	40-49 years	19 (30.2)	31 (49.2)	13 (20.6)		
	50-59 years	25 (32.9)	36 (47.4)	15 (19.7)		
	60-69 years	17 (19.8)	47 (54.7)	22 (25.6)		
Residential area					4.432	.351
	Metropolitan city	59 (28.1)	99 (47.1)	52 (24.8)		
	Small-medium city	39 (25.2)	81 (52.3)	35 (22.6)		
	Rural area	7 (15.9)	22 (50.0)	15 (34.1)		
Education level					8.738	.068
	High school graduate or lower	35 (30.2)	55 (47.4)	26 (22.4)		
	University graduate	55 (21.8)	134 (53.2)	63 (25.0)		
	Graduate school graduate	15 (36.6)	13 (31.7)	13 (31.7)		
Social/leisure activity participation*					11.386	.003
	Low	87 (28.6)	153 (50.3)	64 (21.1)		
	Moderate or higher	18 (17.1)	49 (46.7)	38 (36.2)		
Duration of single-person household					2.518	.866
	Less than 5 years	25 (22.3)	57 (50.9)	30 (26.8)		
	5 to less than 10 years	26 (23.2)	59 (52.7)	27 (24.1)		
	10 to less than 20 years	36 (29.5)	56 (45.9)	30 (24.6)		
	20 years or more	18 (28.6)	30 (47.6)	15 (23.8)		

p-value calculated by chi-square test.
* Measured on a 5-point scale and recategorized into 'Low' (1-2 points) and 'Moderate or higher' (3-5 points)

alone ($\chi^2 = 2.518$, $p = 0.866$). However, a significant difference was observed according to social and leisure activity participation ($\chi^2 = 11.386$, $p = 0.003$). Among those with low social and leisure activity participation, 87 (28.6%) were unaware, 153 (50.3%) were neutral, and 64 (21.1%) were aware. Among those with moderate or higher participation, 18 (17.1%) were unaware, 49 (46.7%) were neutral, and 38 (36.2%) were aware.

4. Discussion

This study examined oral symptoms, dental care behaviors, awareness and experience of government-supported dental treatment, and awareness of oral health management among general single-person households. The findings showed that 295 (72.1%) participants experienced at least one oral symptom, with tooth sensitivity, bad breath, darkened tooth color, dental caries, and dry mouth being the most commonly reported. These results suggest that oral health problems are common among single-person households and may affect daily functioning and quality of life, consistent with previous studies on oral health in older adults [7-10].

Although only 2 (0.5%) participants directly reported swallowing difficulty, related symptoms such as dry mouth, reduced sense of taste, and mouth ulcers were also observed. Given that swallowing function may decline with age and may be underrecognized in community-dwelling adults, the low self-reported prevalence in this study should be interpreted with caution [10-15]. Future studies should therefore include both self-reported symptoms and objective screening of swallowing and oral function.

Significant age-related differences were found in preventive dental treatment experience and in awareness and experience of government-supported dental treatment. Preventive dental treatment experience was lowest among those aged 50-59 years, whereas awareness of government-supported treatment generally increased with age. This pattern may reflect the combined influence of economic burden, time constraints related to work and daily responsibilities, and a tendency to place lower priority on preventive dental care until symptoms become more noticeable. These findings suggest that oral health needs, service use, and access to information may differ across the life course [4,5]. Accordingly, oral health policies and educational programs for single-person households should be tailored to age-specific needs and service patterns.

Another key finding was that awareness of oral health management differed significantly only according to social and leisure activity participation. Participants with higher levels of social and leisure activity participation were more likely to report being aware of oral health management methods, whereas those with lower participation were more likely to be unaware. This suggests that oral health knowledge may be shaped not only by individual characteristics but also by social connectedness and opportunities for information exchange [4-6]. Therefore, oral health promotion strategies for single-person households should go beyond individual education and incorporate community-based approaches linked to social participation.

This study has several limitations. First, the findings were based on self-reported data and may differ from objective clinical findings. Second, the cross-sectional design does not allow causal interpretation. Third, some methodological details should be interpreted in light of the original study protocol. Despite these limitations, this study is meaningful in that it provides an integrated understanding of oral symptoms, preventive dental utilization, policy awareness, and oral health management awareness among general single-person households.

5. Conclusions

This study found that oral symptoms were common among general single-person households, that preventive dental utilization and awareness and experience of government-supported dental treatment differed by age, and that social and leisure activity participation was significantly associated with awareness of oral health management. These findings suggest that oral health strategies for well-aging in single-person households should extend beyond individual education and include early symptom management, age-tailored preventive dental services, improved access to oral health information, and community-based support linked to social participation. Overall, the findings provide useful evidence for developing practical oral health promotion programs for single-person households.

Author Contribution

Conceptualization: Kang KH; Formal analysis: Kang KH; Writing-original draft: Kang KH; Supervision: Kang KH; Methodology: Lim HN; Validation: Lim HN; Writing-review & editing: Lim HN, Kim KH; Data curation: Kim KH; Software: Kim KH; Visualization: Kim KH

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Conflicts of Interest

The author declares no conflict of interest.

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