JTS

The Journal of Transdisciplinary Studies, 7(1): 117-128, 2023
https://doi.org/10.22685/JTS.2023.7.1.117

An Analysis of the Relevance Between the Number of Natural and Implant Teeth and the Oral Health Quality of Life of the Elderly

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ARTICLE INFO

Article history:
Received 24 November 2022
Revised 16 December 2022
Accepted 25 December 2022

Keywords:
Elderly,
Number of Teeth,
Oral Health,
Quality of Life

ABSTRACT

The number of teeth is a very important factor not only for the physical and oral health but also the mental area, and hence, it affects the quality of life. This study sought to find out the relationship between the number of teeth and oral health quality of life, and among them, the difference between the number of natural teeth and the number of implant teeth was analyzed. The data were collected through an aging research panel survey in 2018, and a total of 6,922 elderly people aged 55 years or older were analyzed using the chi-square test, multiple sample design, and the multiple linear regression analysis. As a result of the multiple linear regression analysis performed on the number of natural teeth, implant teeth, and oral health quality of life, as the number of natural teeth increased by one unit, the quality of oral health life increased by 0.004 points. In the case of the number of implant teeth, an increase of one unit increased the oral health quality of life by 0.005 points. In this study, the positive correlation between the number of natural and implant teeth and oral health quality of life was confirmed. Based on which, to effectively improve the oral health quality of life of the elderly, the number of implant teeth when it is difficult to maintain, preserve, or prevent natural teeth, increasing the number of implant teeth is suggested as one way. To this end, it may be predicted that by expanding support for implant teeth, it will ultimately help improve the oral health of the elderly, resulting in the improved overall quality of life.

1. Introduction

Korea began to be classified as an aged society with the aged population ratio reaching 14.3% in 2018, and the aged population ratio has been steadily increasing until 2021. (Statistics Office, 2021, Aged Population Statistics) According to the National Statistical Office, by 2025, the elderly

population will account for 20.6%, exceeding the standard for a super-aged society of 20%. (Statistics Office, 2021, 2020 life table) Many statistics show that the elderly population will continue to increase. As the proportion of the elderly population increases, interest in the welfare and health of the elderly is also increasing. As the society invests a lot of resources and pays attention to improving the quality of life of the elderly, it is natural that the importance of health, which greatly affects the quality of life, is increasing. Among which, the oral health needs to be dealt with more importantly because it is a health topic that the elderly population is most interested in. According to a survey by the Korea Institute for Health and Social Affairs in 2000 (Lee & Kim, 2016), the percentage of respondents who said oral health was the most important was 19.8% in their 20s, 31.3% in their 30s, 41.7% in their 40s, 57.6% in their 50s, and 64.5% in their age of 60 years or older, and hence, it may be seen that the awareness of the importance of oral health increases as the age increases.

The most prominent problem facing the oral health is the loss of teeth. The loss of teeth leads directly to a decline in the chewing ability. This means that the range of foods to choose from is narrowed and the quantity and quality of meals are reduced. If a sufficient diet is not achieved, it is not only difficult to maintain health due to lack of nutrition, but also increases the risk of getting sick due to a decrease in immunity. Many studies demonstrate a connection between periodontal disease and specific diseases such as diabetes, heart disease, and stroke, and prove that oral health has a high correlation with systemic health (Hong, 2017). In addition to the physical health, oral health can cause a decrease in self-esteem and confidence in mental health. When the loss of teeth causes changes in the pronunciation and appearance, self-confidence naturally declines, making active social activities difficult and even affecting interpersonal relationships. It may be seen that the number of teeth is not only meaningful as oral health, but also has a greater meaning as it is connected to many other factors.

In a study that systematically reviewed the literature on the number of teeth and quality of life in connection with the loss of teeth, a total of 11 studies were analyzed. The result was that the higher the number of teeth, the higher the quality of life. While it is difficult to say that the quality of life of the elderly increases in direct proportion to the number of teeth, most studies show that there is a consistency between the decrease in the number of teeth and the decrease in the quality of life in the elderly (Lee, Choi, & Kim, 2020). A study that analyzed elderly people in some rural areas also demonstrated a significant difference in the OHIP-Total score in the group with 9 or more missing teeth compared to the group with less than 9, indicating that the number of missing teeth has a significant effect on OHIP-Total (Park et al., 2008). In a study that compared before and after the installation of fixed prostheses such as implants as well as natural teeth, the placement of fixed prostheses using implants in the case of a small number of missing teeth was associated with oral health related quality of life, masticatory function, social function, psychological function satisfaction, and interest in oral health. (Cho, Kim, & Hwang, 2010). In a study on the elderly living in Daejeon, it was found that the number of remaining teeth, including fixed prostheses, had a significant effect on food intake ability. To maintain and improve the oral health quality of life of the elderly, it was found that it is desirable to maintain 21 or more natural teeth and to improve the quality of life through the restoration of a fixed prosthesis when natural teeth are

lost (Kim & Hwang, 2016).

Oral health is an important matter to maintain physical and mental health. It is determined by various factors such as the number of teeth, the condition of teeth and gums, and masticatory function. Among which, a study on the relationship between the number of teeth and oral health related quality of life (Lee, Choi, & Kim, 2020) demonstrates that the higher the number of natural teeth, implants, and dentures, the higher the quality of life and the higher the correlation. However, there are a few studies on which type is more efficient when comparing natural teeth and implant teeth. Hence, this study compares the quality of life according to the number of natural teeth and implant teeth, discusses what is a more efficient method, and presents what direction oral support it ought to have.

This study seeks to identify the oral health quality of life for the elderly related to the number of teeth using the 7th Population Research Panel Survey, and also identify the effects of the number of natural teeth and the number of implant teeth on the oral health quality of life for the elderly, and be used as basic data to improve the quality of life. It figures out the correlation between the general characteristics of the research subjects and oral health quality of life, the number of natural teeth, and the number of implant teeth, and propose a plan to improve the quality of life for a group with a significant correlation.

2. Research Method

2.1 Research Data and Research Subjects

This study used the data from the 7th Korean Longitudinal Study of Aging (KLoSA) to analyze the correlation between the number of natural and implant teeth and oral health quality of life. In the aging research panel survey, the entry into an aged and super-aged society is gradually accelerating, but the basic data on aging are insufficient, and the development of systematic statistical data is required first. The purpose of the aging research panel survey is to produce the basic data to be used in establishing and implementing effective social and economic policies in the process of changing the world into a super-aged society. It captures and grasps various aspects of an aging society and builds data to enable academic research in various fields. Furthermore, it is meaningful to produce data that may be internationally compared with developed countries that are conducting panel surveys for middle-aged and elderly people and use them as basic data for policy development and academic research.

As for the aging research panel survey, a basic survey was conducted with a focus on the same survey items in even-numbered years from 2006, and a sample and survey were conducted targeting general households among middle-aged and elderly people aged 45 or older residing in regions other than Jeju Island. Since 2007, for the odd-numbered years, a specific topic has been set and the survey is conducted focusing on the contents not included in the basic survey. As of 2018, the 7th basic survey was completed.

The population of the aging research panel survey is citizens aged 45 or older residing nationwide

except for Jeju Island, and the sampling frame in the sampling process is the survey area of the 2005 Population and Housing Census. Among the total survey districts, 261,237 ordinary survey districts and apartment survey districts, excluding island areas and facility unit survey districts, were set as the sample unit survey districts. Considering the average population of 1.67 people aged 45 or older per household shown in the 2000 Population and Housing Census, 1,000 sample survey areas were extracted. Before extracting the sample survey area, the population was stratified by region and housing type. Regions were stratified by 15 special metropolitan cities and provinces into eastern and eup/myeon areas, and then stratified into general housing survey districts and apartment survey districts within each regional layer.

In the process of sampling, the population survey districts stratified by region and housing type were sorted in the order of administrative code, and then the assigned number was extracted by applying the phylogenetic sampling method. In preparation for the situation in which the sampling districts were changed, 20% of the preliminary sampling districts were combined and extracted, and the preliminary sampling districts corresponding to 20% of the extracted sample districts were again classified into the main sampling district and the preliminary sampling district by the systematic sampling method. After confirming 1,000 sample districts in the same manner, the sample households were extracted using a simple random method using the household list of the 2005 Census. The sample households selected by the interviewer are visited in the order set by the interviewer, and if at least one person aged 45 or older resides among the household members, the household is determined to be eligible for the survey, and all household members aged 45 or older residing in the household were interviewed. If a household aged 45 or older does not reside, it is determined as an ineligible household, and panel furniture and panels are constructed by visiting the next sample household.

The subjects of the aging research panel survey were the middle-aged and older adults aged 45 years or older who were born before 1962 living in regions other than Jeju Island, Korea, and a sample of about 10,000 people was sampled, and a panel of 10,254 people was established. In 2014, 920 people, mainly those born between 1962 and 1963, were added. The interview method of the aging research panel survey is conducted through computer-assisted personal interviews (CAPI), and in the case of special surveys, an appropriate survey method is adopted and operated according to the survey content or survey item.

2.2 Characteristics of Variables

2.2.1 Independent variable

The independent variables of this study, the number of natural teeth and the number of implant teeth, were divided into the natural teeth and implant teeth, respectively, based on the oral condition of the elderly aged 55 years or older in the 7th Aging Research Panel Survey, identifying the detailed number. The number of natural teeth was calculated including wisdom teeth. The greater the number of natural teeth and implant teeth, the greater the number of healthy teeth.

2.2.2 Dependent variable

Quality of life (QOL), the dependent variable of this study, was measured through the KLoSA 1st to 7th questionnaires, "How satisfied are you with the overall quality of life (feeling of happiness) compared to other people of the same age?" Through the question, it was measured on the response index in 10-point units from 0 to 100 points. The closer the quality of life score is to 100, the higher the level of satisfaction.

2.2.3 Correction variable

2.2.3.1 Sociostatistical factors

In this study, as the socio-statistical variable, "age group", "education level", "gender", "marital status", and "health insurance type" of the aging research panel survey were selected as the variables. "Age" is classified into the three categories of "55-64 years old," "65-74 years old," and "75 years old or older." "Educational level" was classified into "below elementary school graduate," "middle school graduate," "high school graduate," and "college graduate or higher," and "gender" was classified into "male" and "female." "Marital status" was classified into 'married', 'widowed, divorced', and 'single'. "Health insurance type" was classified into 'National Health Insurance' and 'Medical Insurance'.

2.2.3.2 Health condition factor

As the health status variable in this study, the predefined data of "subjective health status" of the aging research panel survey was selected as a variable. "Subjective health status" was classified into the three categories of 'good', 'average', and 'poor'.

2.2.3.3 Health behavior factor

In this study, as health type variables, predefined data such as "labor restriction," "drinking intake," and "number of chronic diseases" from the aging research panel survey were selected as variables. Labor restrictions and alcohol consumption were classified into 'yes' and 'no' categories, and the number of chronic diseases was classified into the three categories of '0', '1', and '2 or more'.

2.2.4 Statistical analytical method

The statistical analytical method of this study used chi-square test, multiple sample design, and multiple linear regression analysis. After controlling for age, educational level, gender, marital status, work restriction, drinking status, health insurance status, number of chronic diseases, and subjective health status variables, correlations were analyzed. Furthermore, a detailed analysis was conducted according to age and level of education. The collection and statistical analysis of the collected data was performed using SAS ver. 9.4 (SAS Institute Inc., Cary, NC, USA), and the statistical significance was tested at a significance level of 5%.

3. Results

3.1 General Characteristics of the Research Subjects

Table 1 demonstrates the results of applying a composite sample design to the general characteristics of the study subjects to examine the relationship between the number of teeth and oral health quality of life. The average oral health quality of life (Oral QOL) in all 6,922 subjects was 50.61 points (SD: 8.8).

Table 1. General characteristics of subjects included for analysis at baseline

	Total		Oral QOL			number of natural teeth			number of dental implant		
	N	%	Mean	SD	P-value	Mean	SD	P-value	Mean	SD	P-value
Age					<0.001			<0.001			<0.001
55-64	2,583	37.3	53.52	7.8		26.31	5.3		1.00	3.0	
65-74	2,033	29.4	50.58	8.0		21.97	8.9		1.40	3.3	
≥75	2,306	33.3	47.37	9.5		14.81	11.2		0.90	3.1	
Education level					<0.001			<0.001			<0.001
≤ Elementary school	2,664	38.5	48.14	9.4		16.94	11.2		0.75	2.7	
Middle school	1,154	16.7	51.15	8.3		22.24	9.3		1.16	3.1	
High school	2,225	32.1	52.34	7.9		24.22	7.8		1.28	3.4	
≥ College	879	12.7	52.98	8.0		25.14	6.5		1.51	3.5	
Gender					0.752			<0.001			0.720
Male	2,930	42.3	50.99	8.6		21.42	9.8		1.23	3.3	
Female	3,992	57.7	50.33	9.0		21.05	10.1		0.98	3.0	
Marital status					0.001			<0.001			0.083
Married	5,221	75.4	51.40	8.6		22.46	9.2		1.18	3.3	
Separated, divorced	1,644	23.8	48.03	9.2		17.17	11.2		0.78	2.6	
Single	57	0.8	52.07	8.9		22.67	9.7		1.07	3.9	
Working restriction					<0.001			<0.001			0.009
Yes	2,533	36.6	47.85	9.9		17.69	11.2		0.88	2.9	
No	4,389	63.4	52.20	7.7		23.23	8.6		1.20	3.2	
Alcohol consumption					0.374			0.035			0.080
Yes	2,257	32.6	51.91	8.3		23.34	8.5		1.25	3.4	
No	4,665	67.4	49.98	9.0		20.17	10.5		1.00	3.0	
Health insurance					0.000			0.000			0.371
National Health Insurance	6,637	95.9	50.76	8.8		21.41	9.9		1.09	3.1	
Medical aid	285	4.1	46.97	9.6		16.49	11.6		1.05	4.4	
Number of chronic disease*					0.191			0.777			0.298
0	6,279	90.7	50.73	8.9		21.36	9.9		1.07	3.1	
1	583	8.4	49.59	8.4		19.84	10.6		1.27	3.4	
≥2	60	0.9	47.50	9.0		18.30	10.9		1.25	2.7	

	Total		Oral QOL			number of natural teeth			number of dental implant		
	N	%	Mean	SD	P-value	Mean	SD	P-value	Mean	SD	P-value
Self-rated health					<0.001			<0.001			0.390
Good	2,043	29.5	52.85	7.8		24.58	7.6		1.10	3.4	
Moderate	3,048	44.0	51.87	7.9		21.97	9.3		1.16	3.0	
Bad	1,831	26.5	46.01	9.7		16.18	11.4		0.95	3.1	
Total	6,922	100.0	50.61	8.8		21.20	10.0		1.08	3.1	

* Hypertension, diabetes, cancer, chronic obstructive pulmonary disease, liver disease, cardiovascular disease, cerebrovascular disease, arthritis

According to age, among 6,922 subjects, 2,583 (37.3%) between the ages of 55 and 64 had an average oral health quality of life of 53.52 (SD: 7.8), and the average number of natural teeth was 26.31 (SD: 5.3). The number of implant teeth was 1.00 (SD: 3.0). The oral health quality of life of 2,033 (29.4%) aged 65 to 74 years was 50.58 points (SD: 8.0), the number of natural teeth was 21.97 (SD: 8.9), and the number of implant teeth was 1.40 (SD: 3.3). The oral health quality of life of 2,306 people (33.3%) aged 75 years or older was 47.37 points (SD: 9.5), and the number of natural teeth was 14.81 (SD: 11.2) and the number of implant teeth was 0.90 (SD: 3.1).

According to the level of education, the oral health related quality of life of the elementary school graduate group (2,664 people) was 48.14 points (SD: 9.4), and the number of natural teeth and implant teeth were 16.94 (SD: 11.2) and 0.75 (SD: 2.7). The oral health related quality of life of the college graduate or higher group (879 persons) was 52.98 points (SD: 8.0), the number of natural teeth was 25.14 (SD: 6.5), and the number of implant teeth was 1.51 (SD: 3.5). It was statistically significant that oral health related quality of life, the number of natural teeth, and the number of implant teeth turned out to be high.

3.2 Relationship Between the Number of Natural Teeth and the Number of Implant Teeth in Quality of Life

Table 2 demonstrates the results of multiple linear regression analysis with other control variables corrected to determine the relationship between the number of natural teeth and the number of implant teeth in oral health quality of life.

Table 2. Adjusted effect of correlation between the number of teeth or dental implant and QOL

	Model 1				Model 2				Model 3			
	B	95% CI		P-value	*B*	95% CI		P-value	*B*	95% CI		P-value
number of natural teeth	0.004	0.003	0.004	<0.001					0.004	0.004	0.005	<0.001
number of dental implant					0.002	0.001	0.003	0.002	0.005	0.003	0.006	<0.001

	Model 1				Model 2				Model 3			
	B	95% CI		P-value	*B*	95% CI		P-value	*B*	95% CI		P-value
Age												
55-64	ref				ref				ref			
65-74	-0.023	-0.033	-0.013	<0.001	-0.034	-0.044	-0.024	<0.001	-0.025	-0.035	-0.015	<0.001
≥75	-0.036	-0.048	-0.024	<0.001	-0.065	-0.077	-0.054	<0.001	-0.035	-0.047	-0.023	<0.001
Education level												
≤ Elementary school	-0.017	-0.031	-0.003	0.018	-0.027	-0.041	-0.012	0.000	-0.012	-0.026	0.002	0.098
Middle school	-0.007	-0.021	0.008	0.367	-0.010	-0.025	0.004	0.164	-0.004	-0.018	0.010	0.578
High school	-0.006	-0.018	0.006	0.343	-0.009	-0.021	0.004	0.172	-0.004	-0.016	0.008	0.477
≥ College	ref				ref				ref			
Gender												
Male	ref				ref				ref			
Female	0.003	-0.006	0.012	0.545	0.008	-0.002	0.017	0.105	0.002	-0.007	0.011	0.654
Marital status												
Married	ref				ref				ref			
Separated, divorced	-0.013	-0.024	-0.003	0.012	-0.017	-0.027	-0.006	0.002	-0.012	-0.022	-0.002	0.024
Single	0.022	-0.019	0.062	0.298	0.021	-0.021	0.062	0.332	0.022	-0.019	0.062	0.292
Working restriction												
Yes	-0.019	-0.029	-0.010	<0.001	-0.023	-0.032	-0.014	<0.001	-0.018	-0.027	-0.009	0.000
No	ref				ref				ref			
Alcohol consumption												
Yes	ref				ref				ref			
No	0.003	-0.007	0.011	0.591	0.001	-0.008	0.010	0.776	0.003	-0.006	0.012	0.483
Health insurance												
National Health Insurance	ref				ref				ref			
Medical aid	-0.013	-0.034	0.008	0.217	-0.019	-0.040	0.003	0.088	-0.014	-0.035	0.007	0.193
Number of chronic disease*												
0	ref				ref				ref			
1	0.004	-0.010	0.018	0.542	0.005	-0.010	0.019	0.518	0.004	-0.010	0.017	0.617
≥2	-0.015	-0.058	0.029	0.508	-0.014	-0.058	0.030	0.541	-0.016	-0.059	0.028	0.478
Self-rated health												
Good	0.072	0.060	0.085	<0.001	0.082	0.069	0.095	<0.001	0.072	0.059	0.084	<0.001
Moderate	0.074	0.063	0.085	<0.001	0.082	0.071	0.093	<0.001	0.073	0.062	0.084	<0.001
Bad	ref				ref				ref			

Model 1 is the natural teeth correction in addition to correction variables, and as the number of natural teeth increases by one unit (number), oral health quality of life is 0.004 points (B: 0.004, 95% Confidence Interval [CI]: 0.003-0.004, p-value: <0.001) increased. Model 2 was implant tooth correction in addition to correction variables. As the number of implant teeth increased by one unit, oral health quality of life increased by 0.002 points (B: 0.004, 95% CI: 0.001-0.003, p-value: 0.002).

In the case of Model 3, for natural teeth and implant teeth other than the correction variable, as the number of natural teeth increased by one unit, the oral health quality of life increased by 0.004 points (B: 0.004, 95% CI: 0.004-0.005, p-value: <0.001) increased, and as the number of implant teeth increased by one unit, oral health quality of life increased by 0.005 points (B: 0.003, 95% CI: 0.003-0.006, p-value: <0.001).

According to age, the oral health quality of life between the ages of 65 and 74 was lower by 0.025 points (B: 0.025, 95% CI: _0.035-_0.015, p-value: <0.001) compared to those between the ages of 55 and 64., Oral health quality of life for those aged 75 and older was also lower by 0.035 points (B: 0.035, 95% CI: _0.047-_0.023, p-value: <0.001).

According to the type of subjective health perception, the oral health quality of life of the group perceived as ‘good’ was 0.072 points compared to the group perceived as ‘bad’ (B: 0.072, 95% CI: 0.059-0.084, p-value <0.001) The oral health quality of life of the group perceived as ‘normal’ was 0.073 points higher (B: 0.073, 95% CI: 0.062-0.084, p-value: <0.001), which turned out to be statistically significant.

4. Discussion and Conclusion

The continuous increase in the elderly population is a socially noteworthy issue. The aging population could no longer be ignored, and improving their quality of life has become an important task. Oral health has a great influence on improving the quality of life of the elderly population. Summarizing the main results of the analysis of eight studies selected from among studies published from 2005 to 2020 (Kang et al., 2008; Jang & Choi, 2011; Park, Kim, & Kim, 2011; Sim & Han, 2014; Kim & Kwan, 2016; Shin, Ahn, & Cho, 2017; Shin, Lee, & Cho, 2016; Bae & Baek, 2019), it was confirmed that the quality of life was high in low oral quality, high oral awareness and good oral condition (Park, 2021). Hence, this study utilized the aging research panel survey to find out the relationship between the number of natural teeth, the number of implant teeth, and oral health quality of life (Oral QOL) in the oral health of the elderly population. This study seeks to discuss ways to improve the oral health quality of life of the elderly by analyzing and identifying which one, the number of natural teeth and the number of implant teeth, has a more significant effect on the quality of oral health life.

In this study, the analysis of natural teeth and implant teeth, in addition to the correction variables, demonstrated that the quality of life in oral health increased as the number of implant teeth increased by one unit compared to the number of natural teeth. This means that when analyzing the effect of oral health on the quality of life, the number of implant teeth has a significantly more positive

effect than the number of natural teeth. In the detailed analysis according to age and subjective health perception type, it may be seen that the older the age, the lower the oral health quality of life. The oral health quality of life was higher than that of the group perceived as 'poor'. These results suggest that oral health quality of life improves as the patients perceive that their oral health is not bad.

The result that the number of implant teeth had a greater effect on the quality of life of oral health than the number of natural teeth is consistent with the studies that analyzed the quality of life of patients with implants and found that the quality of life was good (Park et al., 2011). This study differs from this study because it did not compare the number of natural teeth and only analyzed the results of implant patients. Since the quality of life before and after implant surgery was not compared, it is difficult to determine whether the quality of life affected by implants was accurately estimated due to the lack of comparison targets for the quality of life of patients after implant surgery. Since the sample was limited, it should be noted that there may be errors in generalizing the results to the entire country.

Based on the reseach result which claimed that the installation of fixed prostheses using implants in the case of minor loss of teeth can improve oral health related quality of life, masticatory function, social function, psychological function satisfaction, and interest in oral health (Cho, Kim, & Hwang, 2010), the fact that implant teeth have a significant effect on the oral health was informed. In this study, when teeth are lost due to oral disease, masticatory ability deteriorates, making it difficult to maintain health and physical strength, as well as affecting pronunciation and appearance, which can limit interpersonal relationships and smooth social life (Boretti, Bicket, & Geering, 1995). A related recent study also found that chewing and speaking problems affect anxiety/depression, subjective health status, and usual stress perception (Son, 2021), which also claimed that it can solve the problem (Son, 2021). This suggests that oral health affects mental health as well as physical health. Hence, the result of this study is that dental restoration improves masticatory ability and is ultimately significantly involved in improving quality of life (Cho, Kim, & Hwang, 2010). When natural teeth are once lost, there is little method to restore the number of teeth other than dental restoration using a prosthesis such as an implant. In view of which, the research result that the oral health quality of life score increases as the number of implant teeth increases rather than the number of natural teeth is interpreted as meaning that the quality of life may be improved for the elderly.

This study is meaningful in that it studied which tooth shape would be more beneficial to the elderly through comparison with natural teeth rather than differences in implant teeth. Furthermore, since the study was conducted using the national data, the aging panel data, it can reflect the representativeness of middle-aged and elderly people in Korea, so generalization is possible. In 2000, Korea entered an aging society as the population aged 65 or older accounted for more than 7% of the total population. This study has room for use as basic data for establishing and implementing effective socio-economic policies, and seeks to produce them. It analyzes the aging society from various aspects, presents implications, and utilizes them to construct data for academic research in other various fields.

From this point of view, the research results on oral health quality of life using an aging panel

show that implant teeth should be emphasized as important as natural teeth to improve the oral health quality of life of the elderly in Korea. If the maintenance, preservation, and prevention of natural teeth are preceded, and if this is not solved through this, if implant teeth are used, the necessity is emphasized because it may be predicted that the quality of oral health life will increase accordingly. In the case of natural teeth affected by periodontal disease, the periodontal clinical index is checked at each visit to confirm the change pattern, and for teeth that can guarantee a good prognosis with the existing treatment method, considering the risk-benefit ratio, and if a treatment method that maintains natural teeth is selected and if it is determined that it is difficult to maintain healthy periodontal tissue with existing treatments, examining the research results such as that it would be desirable to maintain the remaining alveolar bone and ensure a long-term prognosis by performing strategic extraction and then placing an implant (Kim, 2006), it is apparent that the treatment method varies depending on the patient's oral condition. When the treatment of natural teeth is difficult and maintenance costs are high or time-consuming, it may be seen that it is desirable to use implant teeth, and it may be seen that implant teeth improve the oral health quality of life for the elderly. That is, an increase in the number of implant teeth leads to an improvement in oral health quality of life. However, in the case of the elderly, there are many cases in which implants are hesitant due to economic reasons, and even in situations where implant teeth are absolutely necessary, the cost burden increases due to a lack of economic support, which is the current situation in society.

Based on such results, it may be expected to improve the quality of life of oral health for the elderly through the improvement of implant health insurance and economic support, such as the expansion of implant support costs for the elderly through health insurance and the increase in the number of teeth that may be covered by insurance. Furthermore, if the implant may be used for a longer period of time with a single procedure through continuous management and examination after dental implant treatment, a higher quality of life may be expected at a lower cost.

In this study, only a simple numerical comparison was made, and as a result, there is a lack of research on how much financial support is needed for the elderly and how much implant tooth support is needed per elderly person. Furthermore, even for the same implant teeth, the results of the study are not perfect because the quality of the implant teeth themselves could not be considered. Even in the improvement of oral health quality of life, it is unknown as to whether the quality of life improves by a certain number per implant tooth and whether the number of implant teeth increases, drawing a gentle curve in terms of quality of life satisfaction, and hence, additional studies in that direction are needed.

Conflicts of Interest

The authors declare no conflict of interest.

References

Boretti G., Bicket M., & Geering A. H. (1995). A review of masticatory ability and efficiency. *J Prosthet Dent, 74*, 400-403.

Cho, K. H., Kim, H. Y., & Hwang, S. J. (2010). Change of the Oral Health Related Quality of Life After Fixed Prosthetic Treatment Using Implant Therapy. *Journal of Dental Hygiene Science, 10*(5), 315-321.

Employment Survey Analysis System. (2021). Korea Longitudinal Study of Aging (KLoSA). https://survey.keis.or.kr/klosa/klosa01.jsp

Hong, J. Y. (2017). Periodontitis and Systemic Disease. *The Journal of Kyung Hee University Medical Center, 32*(1), 1-8.

Kim, D. H., & Hwang, S. J. (2016). Influence of the Food Intake Ability and the Number of Remaining Teeth on Oral Health Related Quality of Life in Some Elderly People. *Journal of Dental Hygiene Science, 16*(1), 53-61.

Kim, T. I. (2006). Consideration of periodontally compromised teeth for conservation or implantation. *The Korean Academy of Implant Dentistry, 25*(2), 36-40.

Lee, E. J., & Kim, M. K. (2016). The Effect of Oral Function on the Quality of Life of Korean Adults by Age Group. *The Korean Journal of Health Service Management, 10*(2), 99-110.

Lee, N. Y., Choi, H. N., & Kim, H. N. (2020). Number of teeth and quality of life among the elderly: A systematic review. *Journal of Korean society of Dental Hygiene, 20*(5), 545-559.

Park, B. R. (2021). Analysis of Research Trends on Quality of Life Related to Oral Health of Elderly in Nursing Homes in Korea. *The Journal of Humanities and Social science, 12*(2), 1595-1606.

Park, J. H., Jeong, S. H., Lee, G. R., & Song, K. B. (2008). Pubic Health Dentistry: The impact of tooth Loss on oral health related quality of Life among the elderly in Seongju, Korea. *Journal of Korean Academy of Oral Health, 32*(1), 63-74.

Park, J. H., Urm, S. H., Kwun, H. S., Cho, G. S., Heo, S. J., Lee, S. Y., & Yu, B. C. (2011). Relationship between oral health quality of life and oral health related factors in patients with successful dental implants. *Journal of Korean society of Dental Hygiene, 11*(5), 717-727.

Son, E. G. (2021). The effects of oral function problems and dental treatment on quality of life: Comparison of data from the National Health and Nutrition Examination Survey 2013, 2016, and 2019. *Journal of Korea Academia-Industrial cooperation Society, 22*(11), 203-210.

Statistics Korea. (2021). 2020 life table. https://kostat.go.kr/portal/korea/kor_nw/1/6/9/index.board?bmode=read&bSeq=&aSeq=415300&pageNo=1&rowNum=10&navCount=10&currPg=&searchInfo=&sTarget=title&sTxt=

Statistics Korea. (2021). Senior Citizen Statistics. https://kostat.go.kr/portal/korea/kor_nw/1/1/index.board?bmode=read&aSeq=403253