



Suggestions for the Work of Dental Hygienists and a Reflection of Health Insurance Charges according to Demographic Changes

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Given that the demand for dental care for elderly individuals is expected to increase according to demographic changes, long-term roadmaps for the current health insurance system should be actively planned. The study aimed to investigate the health insurance system in Korea, compared to that of Japan, and suggest directions for the work of dental hygienists to provide basic data on efficient improvements in the health insurance system. Based on the collected data, the website was used to collect additional related data from Korea and Japan. The most common cause of death in Korea was malignant neoplasms, and most patients were hospitalized for diseases and disorders of the musculoskeletal system and connective tissue. Dental care covered by Korean medical insurance for individuals aged 65 years or older was treatment oriented, such as dentures and implants, while in Japan, treatment-intensive items, such as visiting a dental hygienist for guidance and provision of home-care professional oral hygiene treatment, were covered. The percentages of remaining teeth in Korea and the percentage of remaining 20 teeth were 68.9% in those aged 65 to 74 years and 51.2% in those aged 75 to 84 years in Japan. A strategy for promoting oral health among elderly individuals should be established, and a multilateral intervention approach is required to prevent oral problems from leading to deterioration of whole-body health. The role of dental hygienists in providing comprehensive assessment to elderly individuals is important. In order to provide systemic oral care, it is necessary to introduce oral care systems according to the national policy.

Key Words: Aged, Demographic aging, Dental care, Insurance, Oral health

Introduction

The characteristics of the Korean population by era show that the population surged around 1960 due to the high birth rate. Between the 1960s and 1990s, the rate of population growth slowed as the birth rate decreased because of family planning, improvement in education, and the entry of women into the society^{1,2}. Since the 2000s, the birth rate has declined due to changes in the value of marriage and avoidance of childbirth; furthermore, an increase in life expectancy owing to developments in medicine and the economic growth led to aging³.

According to the National Health Insurance Service's "National Health Insurance Statistical Yearbook," the medical expense for elderly individuals' in 2017 was 28.3 trillion won, which was approximately twice that of the expenditure much in 2010. Considering that the average annual medical expenses per senior citizen is 4.2 million won, an increase in the elderly population leads to an increase in their medical expenses⁴. According to data from the Organization for Economic Cooperation and Development (OECD) Health in 2019, out-of-pocket ratios of the medical expenses in Korea and Japan were 32.9% and 12.7%, respectively, where the ratio for Korea

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was more than twice that for Japan⁵).

One of the problems associated with a rapidly aging population is that the number of elderly individuals with chronic diseases also increases⁶. In fact, the prevalence of chronic diseases in elderly individuals aged 65 years and older is reported to be approximately 90%⁷. Since chronic diseases are an urgent problem that require continuous and systematic management to prevent complications, a welfare policy for elderly individuals to manage diseases over a long period is necessary³.

In Korea, the Medical Insurance Act was enacted on December 16, 1963, and the National Health Insurance Act was enacted on February 8, 1999, expanding on the prevention and rehabilitation of diseases and injuries. On July 2, 2008, long-term care insurance for elderly individuals was implemented, aiming to stabilize their aging lives⁶. However, the scope and level of benefits, some of the criteria for judging the quality and contents of the system, are still treatment-oriented⁸. In particular, the dentistry is weaker than that in other areas. Since most dental prostheses are classified as non-beneficial, it has been reported that a large proportion of the population are left with dental defects due to large medical expenses^{1,8}. As such, the current medical insurance system is not suitable for the provision of examinations, disease prevention, and promotion of health; thus, improvements in these areas are necessary. With the rapid change in the

age group, strategies for mid- to long-term dental services must be prepared.

Since the introduction of long-term care insurance for elderly individuals, Japan has implemented various measures against aging. A new field of dental-oral life care for elderly individuals has been introduced, and its maintenance and systemization is ongoing⁹. For the long-term view of promoting oral health in individuals, a rational medical insurance system is necessary, and after scientific data has shown that oral health is closely related to general health, awareness of the necessity of the dental care system is rapidly increasing¹⁰.

Currently, Korea needs the knowledge and experience that has accumulated in countries with aging-associated problems. We investigated dental care in Japan, which has been experiencing aging problems before Korea and suggest the direction of the work of dental hygienists by providing basic data regarding how to effectively improve the dental care system.

Methods

For this study, data from the following sources were collected: 2015 National Medical Care Resources and Utilization Survey from the Ministry of Health and Welfare; cause-of-death statistics from 2007 to 2017 and number of hospitalized patients by diagnosis-related

Table 1. Trends of Causes of Death, 2007~2017 (Unit: 1 Per 100,000 People, %)

	2007		2016		2017	
	Cause of death	Rate of death	Cause of death	Rate of death	Cause of death	Rate of death
1	Malignant neoplasm	138.1	Malignant neoplasm	153.0	Malignant neoplasm	153.9
2	Cerebrovascular disease	60.0	Heart disease	58.2	Heart disease	60.2
3	Heart disease	44.1	Cerebrovascular disease	45.8	Cerebrovascular disease	44.4
4	Intentional self-harm	24.9	Pneumonia	32.2	Pneumonia	37.8
5	Diabetes mellitus	23.1	Intentional self-harm	25.6	Intentional self-harm	24.3
6	Transport accident	15.6	Diabetes mellitus	19.2	Diabetes mellitus	17.9
7	Chronic lower respiratory disease	15.4	Chronic lower respiratory disease	13.7	Liver disease	13.3
8	Liver disease	15.0	Liver disease	13.3	Chronic lower respiratory disease	13.2
9	Hypertensive disease	11.1	Hypertensive disease	10.6	Hypertensive disease	11.3
10	Pneumonia	9.4	Transport accident	10.1	Transport accident	9.8

groups in 2015 from Statistics Korea; oral health status of elderly individuals aged 65 years and older from the Korean Centers for Disease Control & Prevention; Medical Insurance Report from the Korea National Health Insurance Service; and Japan's Ministry of Health, Labor, and Welfare website.

Results

1. Causes of death and chronic diseases among hospitalized patients in Korea

The top 10 causes of death were malignant neoplasms (cancer), heart disease, cerebrovascular diseases, pneumonia, intentional self-harm (suicide), diabetes, liver diseases, chronic lower respiratory disease, hypertensive diseases, and transport accidents (Table 1)¹¹⁾. The highest percentage of malignant neoplasms occurred in the bronchus and lungs. The causes of death that increased compared to 10 years prior were heart disease, pneumonia, and liver diseases; those that decreased were cerebrovascular disease, intentional self-injury, diabetes, chronic lower respiratory disease, and transport accidents. The number of cases of pneumonia continued to increase from the 10th highest in 2007 to the 4th highest since 2016 compared to the number of cases of other causes. The highest numbers of hospitalized patients by disease group were due to

Table 2. Number of Hospitalized Patients by Disease Group

Disease	Number of hospitalized patients
Disease and disorder of the musculoskeletal system and connective tissue	2,099,286
Disease and disorder of digestive system	1,336,384
Disease and disorder of respiratory system	979,819
Disease and disorder of ear, nose, mouth and throat	607,271
Disease and disorder of nervous system	568,392
Disease and disorder of eye	517,692
Disease and disorder of circulatory system	393,706
Disease and disorder of the hepatobiliary system and pancreas	379,828
Pre-mdc	9,340

mdc: major diagnostic category.

conditions of the musculoskeletal and connective tissue; digestive system; respiratory system; ear, nose, mouth, and throat systems; nervous system; eyes; circulatory system; hepatobiliary system and pancreas; and pre-major diagnostic category (Table 2)¹²⁾.

2. Types of dentistry covered by dental care for individuals aged 65 years and older

Comparison of health insurance of 65 years and over between Korea and Japan is shown in Table 3.

1) Korea

(1) Dentures

Dentures are covered by health insurance benefit costs part 1, costs relative value scores part 2, and the relative score and calculation guidelines in chapter 18: "complete resin dentures, temporary complete resin dentures, partial dentures, and temporary partial dentures (based on three values)." Indications for complete dentures (resin or metal) in the upper jaw or lower jaw are fully edentulous patients, and those for partial metal dentures are patients who can receive partial dentures using the remaining teeth due to tooth defects in the upper or lower jaw (partial or multiple). According to the Health Insurance Review and Assessment Service, the coverage applies once every 6 years and the co-pay for individuals aged older than 65 years is 30%¹³⁾.

(2) Implants

Implants are covered by health insurance benefit costs part 1, costs relative value scores part 2, and the relative score and calculation guidelines in chapter 18: "Chapter

Table 3. Comparison of Health Insurance of 65 Years and Over between Korea and Japan

Insurance	Korea	Japan
Health insurance	Denture	Medical assistance of dental visit Dental hygiene guidance of visit
	Implant	Oral hygiene treatment specializing in rehabilitating patients such as home care
Long-term care insurance		Home care management guidance

11. Implant section.” Partially edentulous patients who require dental implants with non-precious metal ceramic prosthetic restorations using separate implants (fixed bodies, abutments) in the jawbone are covered. According to the Health Insurance Review and Assessment Service, the coverage applies twice per person, and the co-pay for individuals aged older than 65 years is 30%¹³⁾.

2) Japan

(1) Health insurance

Dental visits and education from dental hygienists are intended for patients who are unable to visit the hospital and live within a 16-km radius¹⁴⁾.

A. Dental visits

Dental visits can cost between 300 and 1,150 yen depending on the number of individuals and time. The costs add up if a dental hygienist carries out medical treatments with a dentist, and in these cases, the dental hygienist’s name must be included on the medical record card.

B. Educational visits from dental hygienists

According to the dentist that performs a dental consultation, a dental hygienist, public health nurse, nurse, or para-nurse may visit and provide on-site education on oral care and denture cleaning, as well as on restoring and maintaining patients’ oral function to patients in a single building or to families for at least 20 minutes. Depending on the number of patients in a single building, the cost can total up to 3,000 to 3,600 yen. The visits can be scheduled four times a month per patient.

C. Professional oral hygiene treatment for the care of patients at home

The costs add up if a dental hygienist is accompanied by a doctor to perform professional oral hygiene treatment. The cost is 1,200 yen per patient per month when professional oral cleaning, denture cleaning, or mechanical denture cleaning of the teeth, tongue, and oral mucosa are performed using oral cleaning equipment.

(2) Long-term care insurance

Long-term care insurance is intended for individuals aged 65 years and older, with some aged 40 years and older. The co-pay is 10%, and the conditions are use of a nursing facility, care consultation, and visits.

A. Home care management

The costs add up when patients in a single building or a family is provided with on-site instructions for oral denture cleaning and oral functions for 20 minutes or longer. Depending on the number of patients in a single building, the costs can total up to 3,000 to 3,600 yen. The visits can be scheduled within 3 months after a dentist’s appointment and 4 times a month per patient.

3. Number of remaining teeth in patients aged older than 65 years

1) Korea

According to the National Health and Nutrition Survey data (2007 ~ 2013), the percentages of elderly individuals aged older than 65 years who possessed more than 20 natural teeth were 46.65% in 2007 and 48.00% in 2013. The average numbers of retained teeth were 15.8 in 2007 and 16.4 in 2013 (Table 4)¹⁵⁾.

2) Japan

According to the survey on dental diseases by Japan’s Ministry of Health, Labor, and Welfare, the proportion of elderly individuals with more than 20 remaining teeth generally increased for all ages, and in particular, more than 50% of elderly individuals aged 75 to 84 years had more than 20 teeth (Table 5).

Table 4. Percentage of 20 or More Natural Teeth and Average of Remaining Natural Teeth in Adults Aged 65 and Over (2007~2013)

Teeth	2007	2008	2009	2010	2011	2012	2013
Percentage of 20 or more natural teeth (%)	46.65	44.65	45.00	46.95	46.55	47.70	48.00
Average of remaining natural teeth (n)	15.8	15.9	15.9	16.0	16.3	16.5	16.4

Table 5. Percentage of Over 20 Remaining Natural Teeth by Age Group in Japan

Age (y)	1993	1999	2005	2011	2016
65 ~ 74 (%)	28.9	41.5	50.1	60.4	68.9
75 ~ 84 (%)	10.6	16.3	25.0	40.2	51.2

Discussion

Due to the rapid aging in Korea, the proportion of elderly individuals in the population is expected to rapidly increase from 20% in 2020 to 41% in 2060, increasing the need for a welfare policy for elderly individuals⁵⁾. As shown in Table 1, the leading cause of death according to the cause-of-death statistics from the Korean Statistical Information Service (KOSIS) is malignant neoplasms (cancer), among which lung cancer had the highest mortality rate. It is also worth noting that the number of cases of pneumonia has gradually risen from the 10th highest in 2005 to the 4th highest in 2017, compared to the number of cases due to other causes¹¹⁾. The OECD has predicted an increase in the life expectancy when the major causes of death are eliminated, and the KOSIS data suggest that life expectancy can be increased by one year if pneumonia is eliminated as a cause of death^{5,11)}. In addition, several studies have shown that the incidence of aspiration pneumonia has reduced because of proper oral care, emphasizing the role of oral hygiene management in disease prevention¹⁶⁾. The number of hospitalized patients by disease group, as shown in Table 2, was the highest for conditions of the musculoskeletal system, followed by the digestive and respiratory systems¹²⁾. Poor nutritional intake due to poor oral function among elderly individuals leads to a decrease in muscle mass and muscle strength, leading to problems in the musculoskeletal system and physical performance¹⁷⁾. Therefore, the association between musculoskeletal disorders and oral diseases, which are the main causes of hospitalization, is considered a problem that cannot be overlooked.

As individuals age, they become more vulnerable to various diseases, and declining oral health leads to a decrease in chewing ability, which may affect mental health such as that due to stress from nutritional imbalances, increased risk of developing multiple diseases due to digestive disorders, dietary restrictions, and a loss of self-confidence¹⁸⁾. Thus, oral health is an important factor in determining the quality of life in old age¹⁹⁻²¹⁾. In 1989, when Japan began to notice the problems associated with aging, they initiated the 8020 movement with the aim of having 20 teeth at the age of 80 years, led by the Dental

Society and Ministry of Health, Labor, and Welfare. In 2000, the 8020 foundation was launched to activate private projects, and dental visits were initiated to implement the 8020 movement. According to the survey on dental disease that the Ministry of Health, Labor, and Welfare conducts every 5 to 6 years, the achievement rate of the movement increased from 10.6% in 1993 to 25.0% in 2005, 40.2% in 2011, and 51.2% in 2016 (Table 5)¹⁴⁾. In 2016, the percentage increased by more than five times since 1993, where more than half of all elderly individuals aged 80 years had more than 20 teeth. According to the National Health and Nutrition Survey of the Korean Centers for Disease Control and Prevention, half of all elderly individuals in Korea had less than 20 teeth in 2013. Even in 2015, the number of teeth remaining in elderly individuals aged above 65 years was 16 to 17²²⁾. Dental health can also be used as an indicator of systemic health. A previous study of 1,843 seniors aged 65 years and above found that the number of remaining teeth affected bone health. By analyzing the correlation between the number of remaining teeth in elderly individuals and their bone health, elderly individuals with less than 20 remaining teeth who receive prosthetic treatment have a 1.5 times higher risk of osteopenia and a 2.6 times higher risk of osteoporosis compared to that in elderly individuals with more than 20 remaining teeth²³⁾. This may be because elderly individuals who experience chewing difficulties only select soft foods that are easy to chew, leading to a deficiency of nutrients such as calcium¹⁰⁾. Without teeth, elderly individuals not only receive unhealthy nutrition, but also become prone to systemic diseases. However, discontinuation of dental treatment considering the loss of teeth as a part of aging leads to delay in treatment for economic reasons, which can affect the health of the whole body¹⁾. In addition, previous studies have demonstrated a strong association between the loss of teeth and systemic risk factors, such as malnutrition, obesity, diabetes, chronic obstructive pulmonary disease, pneumonia, cognitive impairment, and mortality risk²⁴⁾. As oral disease is a socially important problem that not only reduces an individual's health and quality of life, but also requires high medical expenses, it is important to pay close attention to the management of symptoms and the

medical history of oral diseases rather than the treatment²⁵⁾.

According to a 2014 survey of elderly individuals, more than half of all elderly individuals who experienced discomfort in sensory function felt more discomfort while chewing over their eyesight and hearing²⁶⁾. Since the proportion of elderly individuals aged 65 years or older who experienced discomfort caused by the deterioration in physical function felt the most discomfort due to their chewing ability, more active counter measures to improve chewing ability among elderly individuals are necessary. On evaluation of the chewing ability in previous studies, the number of remaining teeth and various oral functional factors were found to be complexly related²⁷⁾. Rather than applying only one method in elderly individuals experiencing physical changes due to aging, care with more comprehensive improvement and satisfaction should be provided²⁸⁾. In Japan, the concept of “deterioration in oral function” was created to not only reflect the dental condition, but also the oral filth, dryness, occlusion, deterioration of the tongue and lips, reduced tongue pressure, and reduced chewing and swallowing abilities. In 2018, medical insurance coverage for the management of oral dysfunction became available, and oral functional management is offered following oral functional tests. Dental hygienists can perform tests and manage oral function under the guidance of a dentist. However, in Korea, many medical treatments do not have come under insurance coverage, and their accessibility is failing due to high medical expenses. In addition, the health care system consists of dentures and implants, which focuses more on the treatment rather than prevention of oral diseases²⁹⁾. However, there are many preventive care items in Japan, and based on the methodology of dental care for elderly individuals, methods of oral hygiene as well as dental supplies and medicines to be used are established⁹⁾. In addition, dental hygienists provide professional oral hygiene measures and dental health education for patients in nursing homes. This may be related to the increase in the number of remaining teeth among elderly individuals in Japan.

Although the costs of visiting dental hygienists are relatively high compared to the medical expenses of dentists, the Ministry of Health, Labor, and Welfare has

initiated these visits. This is expected to help not only improve oral health, but also relieve employment shortages and provide re-employment for individuals who are in between jobs. The impact of demographic changes leads to changes in disease patterns and proportions; thus, the health insurance structure will need to change accordingly. Therefore, in Japan, efforts have been implemented to enable the early detection of diseases and prevention of chronic diseases through preventive care. As the Korean population is rapidly aging, it is necessary to implement efforts to reduce the costs of treatments with a paradigm shift from treatment to prevention (Table 3).

Based on these results, if dentists and dental hygienists can diagnose and prevent oral diseases using devices that can verify the diagnosis or symptoms of patients, this can contribute to improvements in the oral health and quality of life among elderly individuals. The role of dentists and dental hygienists in providing comprehensive assessment and access to elderly individuals is important, and it is necessary to introduce oral care systems in accordance with national policies to provide continuous and systematic oral care³⁰⁾. In particular, the long-term care roadmap for the current dental care system must be actively planned, given that the demand for dental care among elderly individuals is expected to increase as life expectancy increases³¹⁾. A multilateral interventional approach is necessary to prevent oral problems leading to a deterioration in overall health, and studies on the establishment of a healthcare system is necessary for the number of acts that guarantee the activities of dentists and dental hygienists, as well as changes in the paradigm shift from treatment to prevention.

Notes

Conflict of interest

No potential conflict of interest relevant to this article was reported.

Ethical approval

This study did not require IRB review because it was a review article.

Author contributions

Conceptualization: Sang-Hwan Oh, Myung-Jin Lee.
Data acquisition: Myung-Jin Lee. Supervision: Sang-Hwan Oh. Writing-original draft: Myung-Jin Lee. Writing-review & editing: Sang-Hwan Oh.

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