



A Study on the Oral Health Literacy and Related Factors of Mother's in Some Areas

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Background: This study aims to provide basic data for development of the level-based oral health care program depending on the mother's oral health literacy by finding out how mother's oral health literacy can effect on the preschool children's oral health and behavior.

Methods: The survey was conducted on 192 mothers who have preschool children and the data were analyzed by t-test, ANOVA, multiple regression analysis to identify differences in verbal and functional oral health literacy.

Results: The study showed statistical significance ($p < 0.05$) in educational level depending on differences in verbal and functional oral health literacy by sociodemographic factor. In differences in verbal and functional literacy depending on experience of education for oral health behavior and oral health, statistical significance ($p < 0.05$) was showed highly on verbal and functional literacy in the case that subjects have an experience of education for oral health and their children have not been experienced of oral illness. And when it comes to the case that subjects have experience of education for oral health within one to two years, statistical significance was showed highly on verbal literacy. It showed that verbal and functional oral health literacy effects to oral health care behavior of children judging from results that the higher level of mother's verbal oral health literacy, the higher score of children's oral health knowledge, attitude and behavior.

Conclusion: It is necessary to develop the systematic program which is appropriate for characteristics of each oral period in childhood depending on level of primary caregiver's oral health literacy, and systematic education should be preceded to enhance the literacy of the caregiver. It is considered necessary to improve the oral health care of children by developing a manual for oral health care education to enhance primary caregiver's oral health literacy.

Key Words: Dental health education, Oral health, Health literacy, Health behavior, Preschool child

Introduction

Young children refer to the children in their first half of preschool age between 2 to 6 years old, which is a period of active growth and development. Oral health care in young children sets the basis for a lifetime and affects the quality of life for oral health¹⁾. Dental caries in primary teeth occur frequently in young children due to increased mastication with a full set of primary teeth at about 36 months of age with high susceptibility²⁾. Dental caries in primary teeth also cause the development of subsequent

permanent teeth, and early loss of primary teeth due to dental caries can lead to disturbances of mastication and maxillofacial development³⁾. As a result of the oral health survey of the children in South Korea, the ratio of children with dental caries experience among 5-year-olds decreased from 83.3% in 2000 to 67.7% in 2006 and 62.2% in 2012, and then increased to 68.5% in 2018. The ratio of children with dental caries experience among 12-year-olds also decreased from 77.1% in 2000 to 61.1% in 2006, 57.3% in 2012, and 56.4% in 2018. However, the children with dental caries experience still accounted for

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more than half of 12-year-olds, indicating that many children were experiencing dental caries; the decayed, missing, and filled teeth (DMFT) index was 1.84 in 2018, still higher than the OECD (Organisation for Economic Co-operation and Development) average of 1.2⁴⁾. Oral health refers to a condition in which the oral cavity can perform its functions³⁾. Oral health care in young children will be the starting point for continuous oral health care in the future. Even the primary teeth to be replaced with permanent teeth must be properly managed, and proper oral care must be provided by treating any dental caries at an appropriate time^{2,3)}. Therefore, oral health care education appropriate to the growth stage must be provided, and such education leads to changes in the behavior, knowledge, and attitude of oral health care⁵⁾. The responsible concern and attitude of caregivers for oral health care of young children are very important as it is difficult to expect young children to engage in voluntary oral care, and they tend to have low motivation for oral care^{6,7)}. Previous studies have reported a high correlation with parents in determining the oral health status and behavioral knowledge of young children, and the parents of young children with good oral health and behavior have been reported to have better oral health knowledge and oral health behavior than the parents of young children who do not⁸⁻¹⁰⁾. In particular, among the caregivers, mothers spend a lot of time with their children in daily life, and play a central role in oral health care such as dental checkups and treatments¹¹⁾. The oral health awareness for children was higher in mothers than for in caregivers, and the oral health knowledge and behavior of the mothers were reported to have a strong correlation with the oral health behavior of the children¹²⁻¹⁴⁾. Literacy refers to the ability to understand health information, and is an ability required for individuals to make appropriate medical choices (Office of Disease Prevention and Health Promotion, 2000). Low health literacy makes it difficult for one to access medical services, thereby resulting in poor health¹⁵⁾. The same applies for oral health; the higher the health literacy is, the better the oral health is, with more positive oral health behavior¹⁶⁾. In this respect, oral health literacy seems to have an effect on oral health, and it is important to find out the level of oral health literacy of

caregivers who are nurturing young children, laying the cornerstone of lifelong oral care. However, the existing studies on oral health literacy have been conducted mostly in some adults and elementary school students, and there is an insufficient number of studies on oral health literacy in caregivers of young children. Therefore, this study aims to understand the oral health literacy of mothers who are the main caregivers of young children, to investigate the effects of oral health literacy of mothers on the oral health and behavior preschool children, and to provide the basic data for the development of oral health programs by level according to the oral health literacy of caregivers for promoting oral health of young children.

Materials and Methods

1. Subjects

The survey was conducted from September 1 to 14, 2020. As a result of calculating the minimum sample size using the G*POWER 3.1 program, the total number of subjects was 204 (significance level of 0.05, effect size of 0.15, and power of 0.95). Therefore, this study attempted to reduce the sample error as much as possible, and to select the subjects in consideration of the bias or 10% dropout rate of 10% of the sample. This study selected 201 caregivers of preschool children as subjects by convenient sampling with the cooperation of daycare centers and kindergartens in the J region. Subjects were provided with the explanation of the purpose and content of the study; if the subjects agreed to participate, they were asked to fill in the self-reported questionnaire distributed online. Of the data of 201 subjects surveyed, the data of 192 subjects were used for the final analysis, excluding data with many missing values.

2. Research tool

A structured questionnaire was used in this study by modifying and supplementing the content based on the research tools used in previous studies¹⁷⁻²²⁾. The questionnaire for the caregivers consisted of 36 items in total: 4 items on the general characteristics including age, level of education, employment status, and number of children; 5 items on the oral health behavior including the time of oral health

education, oral pain in children, experience in oral health education, time of oral health education, and channel of oral health education; 10 items on verbal oral health literacy; 7 items on functional oral health literacy; and 10 items on oral health care behavior for children.

As for the tool to measure verbal oral health literacy, the researcher of this study modified and supplemented the Rapid Estimate of Adult Literacy in Dentistry (REALD) modified and supplemented by Lee¹⁷⁾ and Ju et al.¹⁸⁾ based on the terminology commonly used in dental treatment for children. The answers to the items were scored according to the scoring method in the study by Lee¹⁷⁾: 1 point for “I know exactly what it means,” and 0 point for “I have heard of it but do not know what it means” or “I do not know exactly what it means.” A higher score means higher verbal oral health literacy. Cronbach’s α was 0.926 for the verbal oral health literacy in this study.

The measurement tool modified and supplemented by Lee¹⁷⁾ based on the Test of Functional Health Literacy in Dentistry (TOFHLiD) developed by Gong et al.¹⁹⁾, revised and modified by Ju et al.²⁰⁾, and the tool modified and supplemented by Kang and Cho²²⁾ based on the Oral health Literacy Instrument for Korean Children’s Caregiver (OHLIKCC) developed by Ryu²¹⁾ were used for measuring functional oral health literacy. There were 7 items in total: 2 items on scaling (Cronbach’s $\alpha=0.674$), 3 questions on dental sealant (Cronbach’s $\alpha=0.711$), and 2 questions on fluoride varnish (Cronbach’s $\alpha=0.710$). For each item, 1 point was given for each correct answer, and 0 point for

each incorrect answer.

3. Data analysis

The item discrimination was measured by the contingency coefficient; the higher the division coefficient was, the higher the item discrimination was. The item discrimination was evaluated based on the level of item discrimination by Ebel and Frisbie²³⁾. As for the discriminative index, 0.10 to less than 0.20 indicated low item discrimination, 0.20 to less than 0.30 indicated slightly low item discrimination, 0.30 to less than 0.40 indicated moderate item discrimination, and 0.40 or higher indicated high item discrimination.

Differences in verbal and functional oral health literacy according to sociodemographic factors, differences in verbal and functional oral health literacy according to oral health behavior and oral health education of the caregivers, and differences in verbal and functional oral health literacy according to oral health care behavior of caregivers for children were examined by t-test (independent t-test) and analysis of variance (one-way ANOVA); the effects of sociodemographic factors associated with the caregivers and oral health care behavior of the caregivers for the children on verbal and functional oral health literacy were examined by multiple regression analysis. The significance level (α) used for the statistical test was 0.05, and the collected data were analyzed using the SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA) program.

Table 1. Item Difficulty and Item Discrimination of Verbal Oral Health Literacy (n=201)

Item	Correct answers	Item difficulty	Item discrimination	Item discrimination assessment
Dental plaque	37 (18.4)	0.184	0.57	High
Tooth sealant	86 (42.8)	0.428	0.75	High
Dental calculus	117 (58.2)	0.582	0.83	High
Fluorine	98 (48.8)	0.488	0.80	High
Eruption of teeth	35 (17.4)	0.174	0.47	High
Milk tooth	113 (56.2)	0.562	0.84	High
Permanent tooth	118 (58.7)	0.587	0.84	High
Tooth extraction	117 (58.2)	0.582	0.80	High
G.I	26 (12.9)	0.129	0.49	High
Dental resin	84 (41.8)	0.418	0.76	High

Values are presented as number (%).
G.I: glass ionomer.

Results

1. Difficulty and discrimination of verbal and functional oral health literacy items

Table 1 shows the difficulty and discrimination of the items on verbal oral health literacy. The item asking the time when children could eat after receiving fluoride varnish showed high discrimination with the contingency coefficient of 0.41, followed by the item asking the time to drink water after receiving fluoride varnish for maximizing the effect with contingency coefficient of 0.36 and the item asking the correct behavior after receiving dental

scaling with contingency coefficient of 0.30. The item on permanent teeth showed the highest correct answer rate at 58.7%, followed by the items on extraction and dental calculus each with the correct answer rate of 58.2%.

Table 2 shows the difficulty and discrimination of the items on functional oral health literacy. All items had adequate discrimination with a contingency coefficient of 0.40 or higher, and the items on primary teeth and permanent teeth showed highest discrimination with the contingency coefficient of 0.84. The item asking the purpose of dental sealant showed the highest correct answer rate at 99.4%, followed by the item asking the time

Table 2. Item Difficulty and Item Discrimination of Functional Oral Health Literacy (n=201)

Item	Correct answers	Item difficulty	Item discrimination	Item discrimination assessment
Correct behavior after scaling	164 (81.6)	0.815	0.30	Middle
Knowledge related to scaling	129 (65.8)	0.618	0.21	Low
Purpose of tooth sealant	174 (99.4)	0.994	0.21	Low
Treatment area of tooth sealant	138 (68.7)	0.686	0.18	Few
A routine medical examination period of tooth sealant	171 (85.1)	0.850	0.12	Few
Time to eat after fluoride varnish	132 (65.7)	0.656	0.41	High
Water intake time for maximum effect after fluoride application	138 (68.7)	0.686	0.36	Middle

Values are presented as number (%).

Table 3. Differences in Oral Health Literacy according to Demographic Sociological Factors (n=200)

Item	Number of patients	Verbal oral health literacy	Functional oral health literacy	
Age (y)	20 ~ 29	51	2.94±1.99	4.60±1.81
	30 ~ 39	112	4.92±1.23	5.75±1.12
	≥ 40	37	5.63±1.59	4.82±1.80
	p-value		0.013	0.204
Education	High school	24	3.75±1.20	5.41±1.53
	College	80	4.15±1.46	5.52±1.39
	≥ University	96	5.17±1.84	5.67±1.28
	p-value		0.002	0.040
Occupation	Housewife	57	5.35±1.13	5.69±1.34
	Full-time work	105	4.23±1.11	5.64±1.24
	Part-time work	38	4.87±1.27	5.23±1.63
	p-value		0.055	0.050
The number of children	1	112	3.93±1.13	5.58±1.37
	2	75	5.22±1.05	5.68±1.18
	≥ 3	13	7.00±1.74	5.00±1.95
	p-value		0.016	0.167

Values are presented as number only or mean±standard deviation. p-values calculated by ANOVA or t-test.

of regular check-up after receiving dental sealant with the correct answer rate of 85.1%.

2. Differences in verbal and functional oral health literacy according to sociodemographic factors

Table 3 shows the differences in verbal and functional oral health literacy according to sociodemographic factors. The verbal oral health literacy according to sociodemographic factors was statistically significant in the items on age, level of education, and number of children ($p < 0.05$). The older the mother, the higher the level of education, and the larger the number of children was, the higher the verbal literacy was.

The functional oral health literacy according to sociodemographic factors was statistically significant in the item on level of education ($p < 0.05$). The higher the level of education was, the higher the functional literacy was.

3. Differences in verbal and functional oral health literacy according to oral health behavior for children and oral health education of mothers

Table 4 shows the differences in verbal and functional oral health literacy according to oral health behavior for children and oral health education of mothers. The verbal oral health literacy according to oral health behavior for children and oral health education was statistically significant in the items on oral pain in children, experience in oral health education, time of oral health education, and channel of oral health education ($p < 0.05$). If the children did not complain of pain in the oral cavity, or if the caregivers had received oral health education, the caregivers demonstrated high verbal literacy; those within one to two years from receiving oral health education showed high verbal literacy; and those who received oral health education from an expert or a dental clinic showed high verbal literacy.

The functional oral health literacy according to oral health behavior for children and oral health education was statistically significant in the items on oral pain in children and experience in oral health education ($p < 0.05$). If the children had not experienced pain in the oral cavity, or if

Table 4. Differences in Oral Health Literacy according to Oral Health Behavior and Oral Health Education Status (n=200)

Item		Number of patients	Verbal oral health literacy	Functional oral health literacy
Visit your child's dentist for the past year	Yes	143	4.47±1.12	5.67±1.34
	No	57	5.10±1.20	5.35±1.36
	p-value		0.074	0.158
Child's oral pain for the past year	Yes	72	4.17±1.58	5.26±1.34
	No	128	4.80±1.96	5.76±1.33
	p-value		0.042	0.030
Mother's oral health education	Yes	130	5.00±1.06	5.58±1.35
	No	70	3.97±1.21	4.58±1.37
	p-value		0.027	0.047
Period of oral health education (y)	Within 1 ~ 2	74	4.97±1.07	5.67±1.14
	Within 3 ~ 5	48	4.14±1.94	5.62±1.51
	≥ 6	24	3.64±1.43	4.89±1.53
	p-value		0.037	0.408
Provide oral health education	Expert (dental)	108	5.14±1.11	5.52±1.37
	Other	34	3.60±1.14	5.71±1.08
	p-value		0.001	0.210

Values are presented as number only or mean±standard deviation. p-values calculated by ANOVA or t-test.

the caregivers had received oral health education, the caregivers demonstrated high functional literacy.

4. Differences in verbal and functional oral health literacy according to oral health care behavior of caregivers for children

Table 5 shows the differences in verbal and functional oral health literacy according to oral health care behavior

Table 5. Differences in Oral Health Literacy according to the Oral Health Care of the Mother's Children (n=200)

Item		Number of patients	Verbal oral health literacy	Functional oral health literacy
Toothbrush your child after snack	Not	33	2.93±1.38	5.77±2.36
	Usually	59	5.35±1.15	5.10±1.64
	Yes	108	4.82±1.95	5.77±1.10
	p-value		0.070	0.120
Toothbrush your child after a meal	Not	19	3.38±1.75	5.56±1.55
	Usually	50	5.11±1.19	5.42±1.37
	Yes	131	4.64±1.05	5.64±1.32
	p-value		0.025	0.050
Toothbrush your child before bedtime	Not	9	1.00±1.25	6.14±1.07
	Usually	25	5.91±1.06	5.17±1.40
	Yes	166	4.76±1.08	5.62±1.35
	p-value		0.022	0.058
Restriction on intake of sugar-added foods	Not	36	2.88±1.96	5.42±1.06
	Usually	86	5.53±1.96	5.55±1.45
	Yes	78	4.47±1.20	5.69±1.36
	p-value		0.089	0.096
Food intake restriction before bed	Not	34	2.88±1.19	5.45±1.35
	Usually	58	4.93±1.22	5.34±1.40
	Yes	108	4.73±1.06	5.74±1.32
	p-value		0.043	0.021
Restriction on consumption of cavity-inducing foods	Not	51	1.81±1.41	5.21±1.52
	Usually	74	6.56±1.44	5.61±1.29
	Yes	75	4.52±1.18	5.78±1.27
	p-value		0.058	<0.001
Check after brushing your child's teeth	Not	37	3.33±1.22	5.36±1.39
	Usually	73	4.68±1.29	5.44±1.47
	Yes	90	5.08±1.96	5.78±1.22
	p-value		0.019	0.054
Teach the right way to brush teeth	Not	20	1.80±1.49	5.61±1.04
	Usually	72	5.17±1.31	5.52±1.45
	Yes	108	4.64±1.05	5.61±1.35
	p-value		0.084	0.154
Use fluoride toothpaste	Not	44	3.62±1.13	5.46±1.39
	Usually	74	4.66±1.07	5.46±1.55
	Yes	82	4.95±1.22	5.75±1.12
	p-value		0.048	0.083
Tongue brushing	Not	13	1.00±2.12	5.25±1.86
	Usually	54	5.33±1.43	5.71±1.26
	Yes	133	4.56±1.03	5.55±1.33
	p-value		0.064	0.402

Values are presented as number only or mean±standard deviation. p-values calculated by ANOVA or t-test.

of caregivers for children.

The verbal oral health literacy according to oral health care behavior of caregivers for children was statistically significant in the items on teaching children to brush teeth after eating, teaching children to brush teeth before going to bed, limiting food intake before bedtime, checking the oral cavity of children after toothbrushing, and guiding children to use fluoride toothpaste ($p < 0.05$). The verbal literacy was 4.64 points for the group teaching children to brush teeth after each meal, 5.11 points for the group of moderate practice, and 3.38 points for the group not teaching children to brush teeth after each meal. The verbal literacy was 4.76 points for the group teaching children to brush teeth before going to bed, 5.91 points for the group of moderate practice, and 1.00 points for the group not teaching children to brush teeth before going to bed. The verbal literacy was 4.73 points for the group limiting food intake of children before bedtime, 4.93

points for the group of moderate practice, and 2.88 points for the group not teaching children to brush teeth before going to bed. The verbal literacy was 5.08 points for the group checking the oral cavity of children after toothbrushing, 4.68 points for the group of moderate practice, and 3.33 points for the group not checking the oral cavity of children after toothbrushing. The verbal literacy was 4.95 points for the group guiding children to use fluoride toothpaste, 4.66 points for the group of moderate practice, and 3.62 points for the group not guiding children to use fluoride toothpaste.

The functional oral health literacy according to oral health care behavior of caregivers for children was statistically significant in the items on limiting food intake before bedtime and limiting cariogenic food intake ($p < 0.05$). The functional oral health literacy was 5.74 points for the group limiting food intake before bedtime, and 5.45 points for the group not limiting food intake before

Table 6. Effects of Demographic Sociological Factors and Children’s Oral Health Management on Oral Health Literacy

Item	Verbal oral health literacy				Functional oral health literacy			
	Model 1		Model 2		Model 1		Model 2	
	β	p-value	β	p-value	β	p-value	β	p-value
Age	0.238	0.041	0.759	0.065	-0.170	0.226	-0.157	0.388
Education	0.138	0.056	0.686	0.046	0.318	0.016	0.388	0.020
Occupation	0.217	0.307	0.994	0.053	-0.106	0.421	-0.125	0.459
The number of children	0.182	0.050	0.967	0.100	-0.136	0.325	-0.124	0.479
Toothbrush your child after snack			0.604	0.427			-0.117	0.052
Toothbrush your child after a meal			0.252	0.059			0.106	0.683
Toothbrush your child before bedtime			0.966	0.034			-0.151	0.521
Restriction on intake of sugar-added foods			0.040	0.886			0.183	0.383
Food intake restriction before bed			0.512	0.366			0.133	0.050
Restriction on consumption of cavity-inducing foods			0.370	0.068			0.171	0.025
Check after brushing your child’s teeth			0.212	0.050			0.065	0.741
Teach the right way to brush teeth			0.250	0.235			-0.014	0.956
Use fluoride toothpaste			0.346	0.396			0.020	0.922
Tongue brushing			0.265	0.108			0.100	0.650
R ²	0.094		0.864		0.189		0.314	
Adjusted R ²	0.119		0.747		0.125		0.208	

p-value calculated by logistic regression.

bedtime. The verbal literacy was 5.78 points for the group limiting cariogenic food intake, 5.61 points for the group of moderate practice, and 5.21 points for the group not limiting cariogenic food intake.

5. Effects of sociodemographic factors and oral health care behavior of caregivers for children on verbal and functional oral health literacy

Table 6 shows the effects of sociodemographic factors associated with the caregivers and oral health care behavior of the caregivers for the children on verbal and functional oral health literacy.

In Model 1, in which sociodemographic factors were used as independent variables to investigate the effects of sociodemographic factors of the caregivers and oral health care behavior for the children on verbal oral health literacy, the older the caregivers was, the higher the verbal oral health literacy was ($p < 0.05$). In Model 2, in which sociodemographic factors and oral health care behavior for the children were used as independent variables, the higher the level of education was, and the more the children were taught to brush teeth before going to bed, the higher the verbal oral health literacy was ($p < 0.05$).

In Model 1, in which sociodemographic factors were used as independent variables to investigate the effects of sociodemographic factors of the caregivers and oral health care behavior for the children on verbal oral health literacy, the higher the level of education, the higher the functional oral health literacy was ($p < 0.05$). In Model 2, in which sociodemographic factors and oral health care behavior for the children were used as independent variables, the higher the level of education was and the more the children were limited to consume cariogenic food, the higher the verbal oral health literacy was ($p < 0.05$).

Discussion

Young children undergo overall physical development, and oral health is very important to maintain healthy physical development. Although young children consume a lot of sugary foods, they are at high risk of dental caries

as they have difficulty in voluntary oral health care due to immature motor neuron development²⁴). As the negligence of oral care in early childhood may result in oral health problems throughout life, it can be seen as the time to lay the cornerstone of lifelong oral care. In order to maintain oral health in early childhood, proper oral health education must be provided. Oral health education during this period is mainly conducted by caregivers to build the ability to manage oral health in young children⁸⁻¹⁰). The role of caregivers seemed essential in oral health care of young children; therefore, this study aimed to provide a basis for the development of oral health programs by level according to the oral health literacy of caregivers. As for the difficulty and discrimination of the items on verbal oral health literacy, the item on permanent teeth showed the highest correct answer rate, followed by the items on extraction and tartar. While such results were similar to the correct answer rates reported by Ju et al.²⁰), the correction answer rate for the item on dental plaque was 18.4%, still leaving much to be desired in terms of verbal oral health literacy for many items. As for the difficulty and discrimination of the items on functional oral health literacy, the items asking the purpose of dental sealant and the time of regular check-up after receiving dental sealant showed high correct answer rates. The high correct answer rate may have been caused by the designation of dental sealant as a reimbursable item of the health insurance. However, the correct answer rate of the item asking the time when children could eat after receiving fluoride varnish was 65.7%, and that of the item asking the time to drink water after receiving fluoride varnish for maximizing the effect was 68.7%. This may have been caused by insufficient awareness of caregivers about fluoride varnish, suggesting the need for providing the information on fluoride varnish to caregivers. The difference in verbal and functional oral health literacy according to sociodemographic factors was statistically significant in the item on level of education, in line with the result of the study by Kang and Cho²²), but there was no difference in verbal and functional oral health literacy according to the age of caregivers. Caregivers taking care of more children had higher verbal literacy, and housewives had higher functional literacy. It is easy to access dental information

through dental clinic visits, parenting books, and the Internet searches, and caregivers of multiple children may have high verbal literacy based on the information obtained from nurturing the older children. As housewives may have high functional literacy as they spend more time with children than the caregivers who go to work.

As for the differences in verbal and functional oral health literacy according to oral health behavior and oral health education of mothers, if the children had not experienced pain in the oral cavity, or if the caregivers had received oral health education, the mothers demonstrated high verbal and functional literacy, and those within one to two years from receiving oral health education showed high verbal literacy. In the results of the study by Jung and Jun³⁾, experience of mothers in oral health education affected the oral health behavior of children, and the caregivers could have prevented any problem in oral health of children based on high oral health literacy. Since the first national oral health screening program for infants and children in South Korea held twice in 2007, and the oral check-ups have been expanded to three times, from 18 to 29 months, from 42 to 53 months, and from 54 to 65 months. The national oral health screening program for infants and children consists of examination by interview, oral examination, and oral health education. In spite that it was an opportunity not only to prevent oral diseases by early treatment and detection of oral diseases based on the oral examination of young children, but also to receive oral health education and counseling by age, the participation rate of the national oral health screening program for infants and children was 45.2% as of 2018, showing a low screening rate of less than half²⁵⁾. Considering that those who received oral health education from an expert or a dental clinic showed high verbal literacy, It seems necessary to come up with active promotion and measures for improving the screening rate of the national oral health screening program for infants and children to enhance the oral health literacy of caregivers by receiving periodic oral health education at the dental clinic.

The differences in verbal and functional oral health literacy according to oral health care behavior of caregivers for children were statistically significant in the

items on limiting food intake before bedtime. This was in line with the results of the study by Kang and Cho²²⁾ reporting low numbers of teeth with dental caries and restored teeth, suggesting that the oral health behavior of caregivers affected the oral health behavior of children. However, as for the oral health behavior of caregivers, the literacy for the items on teaching children to brush teeth after eating snack, limiting intake of cariogenic food, and guiding children to practice proper toothbrushing. The study by Cho²⁶⁾ reported that parents should have confidence in their oral health knowledge and behavior in order to cultivate oral health behavior in children. To this end, caregivers need to improve oral health literacy by providing oral health education for children.

As for the effects of sociodemographic factors of the caregivers and oral health care behavior for the children on verbal and functional oral health literacy, the results obtained by inputting the sociodemographic factors and oral health care behavior as independent variables were similar to the results of differences in literacy according to sociodemographic factors and the results of differences in literacy according to the oral health care behavior of the caregivers for the children, indicating a correlation. Park and Kang²⁷⁾ reported that the higher the level of education was in mothers, the more significant differences were found in the oral care practice of young children, which might have caused the high oral health literacy in early childhood with a higher level of education in caregivers. Ryu et al.²⁸⁾ reported that the oral health knowledge and behavior of mothers influenced the oral health of children; Sim et al.²⁹⁾ reported that those with higher level of oral health knowledge not only managed their own oral health to prevent the development of oral diseases, but also affected their family. As a result of study, the oral health in young children depends on the role of caregivers in oral health care. The higher the oral health literacy of caregivers was, the more impact the caregivers had on the oral health behavior of children. Therefore, it would be necessary to devise various measures according to sociodemographic factors to enhance the oral health literacy of caregivers.

This study had limitations in that, despite the rise in the research on oral health literacy, the development of

research tools for literacy skills was insufficient, and the age groups of the subjects were not diverse enough. Since this study limited the range of subjects to the mothers, who were the main caregivers, future research would be required to supplement the research tools and the research subjects. However, this study is meaningful in that there has been insufficient number of studies on the oral health behavior of young children according to the literacy of caregivers while there have been many studies on oral health literacy of adults. As a result of study, the understanding of verbal and functional literacy was essential for improving the oral health literacy of mothers, the main caregivers, and the oral health literacy of mothers affected children. Therefore, it would be necessary to develop systematic programs considering the characteristic of oral development in young children according to the oral health literacy of caregivers, and it should be preceded by systematic education to improve the oral health literacy of caregivers. Based on the result that those who received oral health education from an expert or a dental clinic showed high verbal oral health literacy, it would be necessary to prepare the measures to improve the screening rate of the national oral health screening program for infants and children. There seems to be a need to improve the oral health of children by developing an oral health education manual to enhance the oral health literacy of caregivers through the national oral health screening program for infants and children.

Notes

Conflict of interest

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

Ethical approval

This study was approved by the Wonkwang University Bioethics Review Committee (IRB No. WKIRB-202008-SB-045).

Author contributions

Conceptualization: Mi-Jeong Kim. Data acquisition: Mi-Jeong Kim. Formal analysis: Cha-Young Lim. Funding: Mi-Jeong

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