



The Association between Parents' Oral Examination and Dental Clinic Use and Their Children's Oral Examination and Dental Clinic Use

Hyo-Jeong Park¹, In-Young Ku², Jong-Ae Chun²

¹Department of Dental Hygiene, Yeungnam University College, Daegu, ²Department of Dental Hygiene, Kyungwoon University, Gumi, Korea

Objective: The purpose of this study was to determine the association between parents' oral examination and dental clinic use and their children's oral examination and dental clinic use and suggest parents' roles in improving oral health of their children.

Methods: The data concerning elementary and secondary school students aged between 7 and 18 who had a parent or parents were selected among those from the 2017 Korea National Health and Nutrition Examination Survey and the data from 572 respondents were finally analyzed, with the exception of missing data. IDs of the selected children were matched with those of their parents.

Results: A total of 88.9% of the children whose father was a dental clinic user were dental clinic users ($p=0.001$) and 89.8% of those whose mother was a dental clinic user were dental clinic users ($p=0.002$). A total of 96.9% of the children whose single mother was in her thirties were slightly more likely to use a dental clinic ($p=0.021$).

Conclusion: The more likely parents were to use a dental clinic, the more likely their children were to use a dental clinic because parents' good knowledge and awareness of dental and oral care makes it easier for their children to use a dental clinic. It is however necessary to conduct institutional research on how to make it easy for single parents to take oral examination and use a dental clinic so that their children can benefit from oral examination and dental clinic use.

Keywords: oral examination, dental clinic use, parents, single parent

Introduction

Dental caries is a condition that has existed since the New

Stone Age. It has been chronic as one of the causes of tooth extraction. While it is important for people to do oral care for themselves, it is impossible to neglect some environmental conditions around them. A dietary habit in the living environment is important among the non-oral, environmental factors for the occurrence of oral diseases [1]. A dietary habit is typically formed at home, and is inseparable from and deeply affected by parents. It was found that parents made great contributions to the decrease in dental caries for their children [2]

Corresponding author **Jong-Ae Chun**

E-mail: belllove01@hanmail.net

 <https://orcid.org/0000-0002-5656-5807>

Received November 20, 2019, Revised December 11, 2019, Accepted December 13, 2019

Copyright © 2019. Korean Academy of Preventive Dentistry. All rights reserved.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

and that the largest factor for children's oral health status, knowledge, attitude, and behavior was related to their parents [3]. It is therefore necessary to make steady oral examination and care and dental clinic use easy with the objective of preventing dental caries and periodontal diseases as well as of receiving dental treatment; parents' roles are not negligible but most central to oral health maintenance and promotion [4].

The Korean National Oral Health Survey (KNOHS) showed that the rate of experiencing deciduous dental caries in childhood in South Korea [5] decreased from 83.3% in 2000 to 61.5% in 2010 and tended to remain almost unchanged in 2012. KNOHS also showed that the rate of experiencing permanent tooth caries in adolescence decreased drastically from 77.1% in 2000 to 61.1% in 2006 and has decreased slowly since 2012. However, the extent of the decrease has recently decreased. The rate of experiencing dental caries in South Korea is still higher than in other advanced countries. So mothers' oral health care has a critical impact on their children's oral health [6]. It was reported that middle school students aged 12 years saw permanent tooth arrangement completed by second molar eruption and thus required good knowledge about oral conditions and oral care behavior [7]. Therefore, it is essential for parents to pay attention to their children's oral care in childhood and they also need to give constant attention and support to their children in adolescence so that they can make dental care for themselves, instead of damaging the habit formed in childhood.

For oral care, they need to be familiar with dental clinic use, which involves regular oral examination. Tooth injury at its early stage is asymptomatic and is rarely recognized. Tooth injury accompanied by pain can generally be diagnosed as progression of caries more deeply through the dentinal layer in the dental structure. Dental caries, which once occurs, cannot be restored to the original state but is accumulated continuously, depending on the prevalence or amount [8]. Teeth, once injured, generally cannot be treated at low cost. In particular, therapeutic tooth extraction or nerve damage can require more costs.

While research has been conducted on the association with and the effects on the knowledge about oral health behavior in adolescence [9,10], on the status and awareness of oral health behavior in adolescence [11,12], on the association between mothers' oral health care behavior and the number of milk teeth with caries for their children [13], and on the association with children's oral health conditions by parents' employment status [14], no study has been conducted on how parents' oral care behaviors, such as oral examination and dental clinic use, were correlated with their children's oral examination and dental clinic use. As for the correlation between parents' so-

dium intake and that of their children in another area of health, Kim [15] reported that parents' sodium intake affected that of their children. Children and adolescents can have formation of dietary habits and several health behaviors affected even by getting together with their parents.

This study aimed to determine if parents' oral examination and dental clinic use affected their children's oral examination and dental clinic use and give basic data that could make some contributions to oral health protection at the family level.

Materials and Methods

1. Subjects

The raw data from the 2017 Korea National Health and Nutrition Examination Survey (KNHANES) VII-1 [16] were used. Elementary and secondary school students aged between 7 and 18 were sampled and the data from 572 respondents were finally analyzed, with the exception of missing data. Of these, 243 had both parents and 329 had a single parent (n=58 for a single father and n=271 for a single mother). IDs of the included adolescents having both parents were matched with those of their parents to form paired data.

2. Methods and variables

This study used oral examination and dental clinic use as dependent variables to determine the association between parents' oral examination and dental clinic use and that of their children in adolescence. Oral examination status was determined by the answer to the question "Did you take oral examination for oral health conditions, even if you had no particular problem in your mouth, for the past year?" and dental clinic use was determined by the answer to the question "Did you use a dental clinic for the past year?" Dental clinic use involves oral examination, periodontal disease treatment, simple tooth decay treatment, endodontic treatment, preventive treatment, tooth extraction or intra-oral surgery, treatment of a tooth removed or broken by accident, prosthetics, and other types of orthodontic or aesthetic treatment. As for the general characteristics, both boys and girls were included; lower graders at elementary school were aged between 7 and 9, higher graders at elementary school were aged between 10 and 12, middle school students were aged between 13 and 15, and high school students were aged between 16 and 18. The household income for adolescents and their parents was divided into four groups—high, middle or higher, middle or lower, and low—according to quartile of income by monthly household income to estimate average monthly household equivalence income.

The parents were grouped by age: those in their 30s aged

30-39, those in their 40s aged 40-49, those in their 50s aged 50-59, and those in their 60s or older. They were divided into elementary school graduates or those at lower education levels, middle school graduates, high school graduates, and college graduates or those at higher education levels. In terms of occupation, white collar workers included managers, professionals, officer workers, salespersons, and service providers; blue collar workers included farmers and fishers, technicians, and simple laborers; and the unemployed included housewives and students.

3. Data analysis

The data were analyzed using the open-source statistical software R 3.6.0 version. χ^2 test was performed for the variation in the general characteristics, oral examination, and dental clinic use among the adolescents by the presence of parents as well as for the differences in the general characteristics of both and single parents. This study also intended to see the differences in oral examination and dental clinic use among the adolescents by their parents' general characteristics, oral examination, and dental clinic use. We considered $p < 0.05$ to be statistically significant.

Results

1. Children's general characteristics and oral examination and dental clinic use

A total of 51.4% of the lower graders at elementary school and 28.4% of the higher graders at elementary school had both parents and 39.7% of the lower graders at elementary school and 43.1% of the higher graders at elementary school had a single father. A total of 36.9% of the lower graders at elementary school, 29.9% of the higher graders at elementary school, 16.6% of the middle school students, and 16.6% of the high school students had a single mother ($p < 0.001$). Children's oral examination status differed by the presence of parents: 78.2% of the children having both parents took oral examination and 21.8% of them took no oral examination; 75.9% of the children having a single father took oral examination and 24.1% of them took no oral examination; and 68.6% of the children having a single mother took oral examination and 31.4% of them took no oral examination ($p = 0.045$). No difference was found in dental clinic use among the children by the presence of parents ($p > 0.05$) (Table 1).

Table 1. Children's general characteristics and oral examination and dental clinic use by their parents' status

| Variable | Parents | Single father | Single mother | χ^2 (p-value) |
|-----------------------------------|------------|---------------|---------------|--------------------|
| Child's gender | | | | |
| Men | 113 (46.5) | 33 (56.9) | 135 (49.8) | 2.122 (0.346) |
| Women | 130 (53.5) | 25 (43.1) | 136 (50.2) | |
| Child's age (yr) | | | | |
| Lower grade in elementary school | 125 (51.4) | 23 (39.7) | 100 (36.9) | 26.484 (<0.001) |
| Higher grade in elementary school | 69 (28.4) | 25 (43.1) | 81 (29.9) | |
| Middle school | 35 (14.4) | 7 (12.1) | 45 (16.6) | |
| High school | 14 (5.8) | 3 (5.2) | 45 (16.6) | |
| Household income | | | | |
| High | 95 (39.1) | 18 (31.0) | 81 (29.9) | 11.733 (0.068) |
| Middle or higher | 83 (34.2) | 21 (36.2) | 81 (29.9) | |
| Middle or lower | 47 (19.3) | 15 (25.9) | 78 (28.8) | |
| Low | 18 (7.4) | 4 (6.9) | 31 (11.4) | |
| Child's oral examination status | | | | |
| Examined | 190 (78.2) | 44 (75.9) | 186 (68.6) | 6.191 (0.045) |
| Not examined | 53 (21.8) | 14 (24.1) | 85 (31.4) | |
| Child's dental clinic use status | | | | |
| Using | 204 (84.0) | 44 (75.9) | 212 (78.2) | 3.515 (0.172) |
| Not using | 39 (16.0) | 14 (24.1) | 59 (21.8) | |
| Total | 243 (100) | 58 (100) | 271 (100) | |

Values are presented as number (%).

2. General characteristics and oral examination and dental clinic use of both and single parents

A total of 59.3% of the mothers with a spouse were in their 40s, 18.5% in their 30s; 56.8% of the single mothers were in their 40s, 17.0% in their 60s or older ($p=0.004$). As for household income, 39.1% of the mothers with a spouse were at the high level, 34.2% at the middle or higher level, and 29.9% of the single mothers were at the high and middle or higher levels, 28.8% at the middle or lower level ($p=0.013$). As for the education level, the distribution of college graduates or those at high education levels and high school graduates was similar between mothers with a spouse and single mothers, who had relatively higher distribution of elementary school graduates or those at lower education levels: 61.7% of the mothers with a spouse were college graduates or those at higher education levels, 27.2% high school graduates, 8.2% elementary school graduates or those at lower education levels, and 2.9% middle school graduates, and 48.0% of the single mothers were college graduates or those at higher education levels, 29.9% high

school graduates, 17.0% elementary school graduates or those at lower education levels, and 5.2% middle school graduates ($p=0.003$) (Table 2).

3. Children's oral examination by general characteristics and oral examination of both and single parents

Children's oral examination differed by age of their father with a spouse: 88.9% of those in their 30s, 88.3% of those in their 40s, 56.7% of those in their 50s, and 60.0% of those in their 60s had their children take oral examination ($p<0.001$). Children's oral examination differed by age of their mother with a spouse: 88.9% of those in their 30s, 81.3% of those in their 40s, and 52.8% of those in their 50s had their children take oral examination ($p=0.001$). Children's oral examination differed by the education level of their father with a spouse: 87.2% of the college graduates or those at higher education levels, 67.9% of the high school graduates, 53.3% of the elementary school graduates or those at lower education levels, and 52.6% of the middle school graduates had their children take oral examination ($p<0.001$). Children's oral examination

Table 2. General characteristics and oral examination and dental clinic use of both and single parents

| Variable | Father | Single father | χ^2 (p-value) | Mother | Single mother | χ^2 (p-value) |
|-----------------------------------|------------|---------------|--------------------|------------|---------------|--------------------|
| Parent's age (yr) | | | | | | |
| 30s | 18 (7.4) | 4 (6.9) | 0.170 (0.982) | 45 (18.5) | 32 (11.8) | 13.415 (0.004) |
| 40s | 145 (59.7) | 36 (62.1) | | 144 (59.3) | 154 (56.8) | |
| 50s | 60 (24.7) | 13 (22.4) | | 36 (14.8) | 39 (14.4) | |
| $\geq 60s$ | 20 (8.2) | 5 (8.6) | | 18 (7.4) | 46 (17.0) | |
| Household income | | | | | | |
| High | 95 (39.1) | 18 (31.0) | 1.851 (0.604) | 95 (39.1) | 81 (29.9) | 10.782 (0.013) |
| Middle or higher | 83 (34.2) | 21 (36.2) | | 83 (34.2) | 81 (29.9) | |
| Middle or lower | 47 (19.3) | 15 (25.9) | | 47 (19.3) | 78 (28.8) | |
| Low | 18 (7.4) | 4 (6.9) | | 18 (7.4) | 31 (11.4) | |
| Parent's education | | | | | | |
| Elementary school or lower | 15 (6.2) | 3 (5.2) | 0.125 (0.989) | 20 (8.2) | 46 (17.0) | 14.051 (0.003) |
| Middle school | 19 (7.8) | 5 (8.6) | | 7 (2.9) | 14 (5.2) | |
| High school | 53 (21.8) | 13 (22.4) | | 66 (27.2) | 81 (29.9) | |
| College or higher | 156 (64.2) | 37 (63.8) | | 150 (61.7) | 130 (48.0) | |
| Parent's occupation | | | | | | |
| White collar | 148 (60.9) | 33 (56.9) | 0.649 (0.723) | 117 (48.1) | 102 (37.6) | 5.961 (0.051) |
| Blue collar | 75 (30.9) | 21 (36.2) | | 33 (13.6) | 48 (17.7) | |
| Unemployed | 20 (8.2) | 4 (6.9) | | 93 (38.3) | 121 (44.6) | |
| Parent's oral examination status | | | | | | |
| Examined | 101 (41.6) | 19 (32.8) | 1.541 (0.218) | 114 (46.9) | 105 (38.7) | 3.496 (0.062) |
| Not examined | 142 (58.4) | 39 (67.2) | | 129 (53.1) | 166 (61.3) | |
| Parent's dental clinic use status | | | | | | |
| Using | 144 (59.3) | 28 (48.3) | 2.307 (0.129) | 147 (60.5) | 160 (59.0) | 0.112 (0.737) |
| Not using | 99 (40.7) | 30 (51.7) | | 96 (39.5) | 111 (41.0) | |
| Total | 243 (100) | 58 (100) | | 243 (100) | 271 (100) | |

Values are presented as number (%).

differed by the education level of their mother with a spouse: 88.0% of the college graduates or those at higher education levels, 65.2% of the high school graduates, 60.0% of the elementary school graduates or those at lower education levels, and 42.9% of the middle school graduates had their children take oral examination ($p < 0.001$). Children's oral examination differed by the oral examination status of their mother with a spouse: 85.1% of those taking oral examination had their children take oral examination and 72.1% of those taking no oral examination had their children take oral examination ($p = 0.014$).

Children's oral examination differed by age of their single mother: 84.4% of those in their 30s, 74.0% of those in their 40s, 56.4% of those in their 50s and 50.0% of those in their 60s or older had their children take oral examination ($p = 0.001$). Children's oral examination differed by their single mother's household income: 77.8% of those at the high level, 70.4% of those at the middle or higher level, 64.1% of those at the middle or lower level, and 51.6% of those at the low level had their children take oral examination ($p = 0.043$). Children's oral examination differed by their single mother's education: 79.2%

of the college graduates or those at higher education levels, 64.3% of the middle school graduates, 63.0% of high school graduates, and 50.0% of the elementary school graduates or those at lower education levels had their children take oral examination ($p = 0.001$). Children's oral examination differed by their single mother's occupation: 74.4% of the jobless, 68.6% of the white collar workers, and 54.2% of the blue collar workers had their children take oral examination ($p = 0.038$). No difference was found in children's oral examination by the education level, occupation, or oral examination status of their single father ($p > 0.05$). Children's oral examination differed by their single mother's oral examination status: 81.1% of those taking oral examination and 60.8% of those taking no oral examination had their children take oral examination ($p = 0.001$) (Table 3).

4. Children's dental clinic use by general characteristics and dental clinic use of both and single parents

Children's dental clinic use differed by age of their father with a spouse: 90.3% of those in their 40s, 88.9% of those in

Table 3. Child's oral examination by general characteristics and oral examination of single and both parents

| Variation | Parents | | | | Single parent | | | |
|----------------------------------|------------------------------------|--------------------|------------------------------------|--------------------|------------------------------------|--------------------|------------------------------------|--------------------|
| | Child's oral examination by father | χ^2 (p-value) | Child's oral examination by mother | χ^2 (p-value) | Child's oral examination by father | χ^2 (p-value) | Child's oral examination by mother | χ^2 (p-value) |
| Parent's age (yr) | | | | | | | | |
| 30s | 16 (88.9) | 30.037 | 40 (88.9) | 17.448 | 4 (100) | 6.377 | 27 (84.4) | 15.889 |
| 40s | 128 (88.3) | (<0.001) | 117 (81.3) | (0.001) | 28 (77.8) | (0.095) | 114 (74.0) | (0.001) |
| 50s | 34 (56.7) | | 19 (52.8) | | 7 (53.8) | | 22 (56.4) | |
| ≥60s | 12 (60.0) | | 14 (77.8) | | 5 (100.0) | | 23 (50.0) | |
| Household income | | | | | | | | |
| High | 77 (81.1) | 6.478 | 77 (81.1) | 6.478 | 13 (72.2) | 4.733 | 63 (77.8) | 8.175 |
| Middle or higher | 69 (83.1) | (0.091) | 69 (83.1) | (0.091) | 19 (90.5) | (0.192) | 57 (70.4) | (0.043) |
| Middle or lower | 33 (70.2) | | 33 (70.2) | | 10 (66.7) | | 50 (64.1) | |
| Low | 11 (61.1) | | 11 (61.1) | | 2 (50.0) | | 16 (51.6) | |
| Parent's education | | | | | | | | |
| Elementary school or lower | 8 (53.3) | 23.380 | 12 (60.0) | 24.049 | 2 (66.7) | 1.370 | 23 (50.0) | 15.534 |
| Middle school | 10 (52.6) | (<0.001) | 3 (42.9) | (<0.001) | 3 (60.0) | (0.713) | 9 (64.3) | (0.001) |
| High school | 36 (67.9) | | 43 (65.2) | | 11 (84.6) | | 51 (63.0) | |
| College or higher | 136 (87.2) | | 132 (88.0) | | 28 (75.7) | | 106 (79.2) | |
| Parent's occupation | | | | | | | | |
| White collar | 127 (85.8) | 12.920 | 89 (76.1) | 5.368 | 28 (84.8) | 3.691 | 70 (68.6) | 6.523 |
| Blue collar | 50 (66.7) | (0.002) | 22 (66.7) | (0.068) | 13 (61.9) | (0.158) | 26 (54.2) | (0.038) |
| Unemployed | 13 (65.0) | | 79 (84.9) | | 3 (75.0) | | 90 (74.4) | |
| Parent's oral examination status | | | | | | | | |
| Examined | 82 (81.2) | 0.911 | 97 (85.1) | 5.992 | 17 (89.5) | 2.859 | 85 (81.0) | 12.081 |
| Not examined | 108 (97.1) | (0.340) | 93 (72.1) | (0.014) | 27 (69.2) | (0.091) | 101 (60.8) | (0.001) |
| Total | 190 (78.2) | | 190 (78.2) | | 44 (75.9) | | 186 (68.6) | |

Values are presented as number (%).

Table 4. Child's dental clinic use by general characteristics and oral and dental clinic use of single and both parents

| Variable | Parents | | | | Single parent | | | |
|-----------------------------------|-------------------------------------|--------------------|-------------------------------------|--------------------|-------------------------------------|--------------------|-------------------------------------|--------------------|
| | Child's dental clinic use by father | χ^2 (p-value) | Child's dental clinic use by mother | χ^2 (p-value) | Child's dental clinic use by father | χ^2 (p-value) | Child's dental clinic use by mother | χ^2 (p-value) |
| Parent's age (yr) | | | | | | | | |
| 30s | 16 (88.9) | 15.819 | 38 (84.4) | 13.012 | 4 (100.0) | 5.194 | 31 (96.9) | 9.752 |
| 40s | 131 (90.3) | (0.001) | 127 (88.2) | (0.005) | 29 (80.6) | (0.158) | 120 (77.9) | (0.021) |
| 50s | 41 (68.3) | | 23 (63.9) | | 7 (53.8) | | 30 (76.9) | |
| ≥60s | 16 (80.0) | | 16 (88.9) | | 4 (80.0) | | 31 (67.4) | |
| Household income | | | | | | | | |
| High | 87 (91.6) | 10.652 | 87 (91.6) | 10.652 | 15 (83.3) | 3.000 | 66 (81.5) | 2.652 |
| Middle or higher | 70 (84.3) | (0.014) | 70 (84.3) | (0.014) | 17 (81.0) | (0.392) | 66 (81.5) | (0.448) |
| Middle or lower | 34 (72.3) | | 34 (72.3) | | 10 (66.7) | | 58 (74.4) | |
| Low | 13 (72.2) | | 13 (72.2) | | 2 (50.0) | | 22 (71.0) | |
| Parent's education | | | | | | | | |
| Elementary school or lower | 9 (60.0) | 24.563 | 14 (70.0) | 14.932 | 2 (66.7) | 4.322 | 32 (69.6) | 4.228 |
| Middle school | 11 (57.9) | (<0.001) | 4 (57.1) | (0.002) | 2 (40.0) | (0.229) | 11 (78.6) | (0.238) |
| High school | 41 (77.4) | | 50 (75.8) | | 11 (84.6) | | 61 (75.3) | |
| College or higher | 143 (91.7) | | 136 (90.7) | | 29 (78.4) | | 108 (83.1) | |
| Parent's occupation | | | | | | | | |
| White collar | 89 (76.1) | 5.368 | 101 (86.3) | 2.134 | 70 (68.6) | 6.523 | 76 (74.5) | 6.738 |
| Blue collar | 22 (66.7) | (0.068) | 25 (75.8) | (0.344) | 26 (54.2) | (0.038) | 33 (68.8) | (0.034) |
| Unemployed | 79 (84.9) | | 78 (83.9) | | 90 (74.4) | | 103 (85.1) | |
| Parent's dental clinic use status | | | | | | | | |
| Using | 128 (88.9) | 6.397 | 132 (89.8) | 9.436 | 22 (78.6) | 0.217 | 130 (81.3) | 2.094 |
| Not using | 76 (76.8) | (0.011) | 72 (75.0) | (0.002) | 22 (73.3) | (0.641) | 82 (73.9) | (0.148) |
| Total | 204 (84.0) | | 204 (84.0) | | 44 (75.9) | | 212 (78.2) | |

Values are presented as number (%).

their 30s, 80.0% of those in their 60s or older, and 68.3% in their 50s had their children use a dental clinic ($p=0.001$). Children's dental clinic use differed by their parents' household income: 91.6% of those at the high level, 84.3% of those at the middle or higher level, 72.3% of those at the middle or lower level, and 72.2% of those at the low level had their children use a dental clinic ($p=0.014$). Children's dental clinic use differed by the education level of their father with a spouse: 91.7% of the college graduates or those at higher education levels, 77.4% of the high school graduates, 60.0% of the elementary school graduates or those at lower education levels, and 57.9% of the middle school graduates had their children use a dental clinic ($p<0.001$). Children's dental clinic use differed by the education level of their mother with a spouse: 90.7% of the college graduates or those at higher education levels, 75.8% of the high school graduates, 70.0% of the elementary school graduates or those at lower education levels, and 57.1% of the middle school graduates had their children use a dental clinic ($p=0.002$). Children's dental clinic use differed by the dental clinic use status of their mother with a spouse: 89.8% of those using a dental clinic and 75.0% of

those not using a dental clinic had their children use a dental clinic ($p=0.002$).

Children's dental clinic use differed by their single mother's age: 96.9% of those in their 30s, 77.9% of those in their 40s, 76.9% of those in their 50s, and 67.4% of those in their 60s or older had their children use a dental clinic ($p=0.021$). Children's dental clinic use differed by their single father's occupation: 74.4% of the jobless, 68.6% of the white collar workers, and 54.2% of the blue collar workers had their children use a dental clinic ($p=0.038$). Children's dental clinic use differed by their single mother's occupation: 85.1% of the jobless, 74.5% of the white collar workers, and 68.8% of the blue collar workers had their children use a dental clinic ($p=0.034$) (Table 4).

Discussion

This study aimed to determine if parents' oral examination and dental clinic use affected their children's oral examination and dental clinic use and give basic data that could make some contributions to oral health protection at the family level. Oral

examination and dental clinic use are behaviors necessary for oral care. The number of dental clinics in South Korea nearly doubled between the 1990s and the 2000s [17]. It implies an increase in quantitative accessibility to dental clinics. Oral diseases, which begin to occur in childhood, need regular care. It has a preventive effect of reducing the probability of having dental caries and periodontal diseases. Any oral disease can be cured by brief treatment if it is detected at its early stage. For this reason, regular dental clinic use has health economic significance of reducing oral health care costs [18].

A total of 51.4% of the lower graders at elementary school and 5.8% of the higher graders at elementary school and the secondary school students had both parents and 39.7% and 36.9% of the lower graders at elementary school had a single father and a single mother, respectively ($p=0.001$). Elementary school children may have their values, attitudes, or consciousness affected by their parents' personality, attitudes, economic status, education level, and so on [19]. Moreover, they are incapable of being independent financially or socially [20]. Children's oral examination status differed by the presence of parents: children having both parents or those having a single father were slightly more likely to take oral examination than those having a single mother ($p=0.045$). Single parents are more likely to work but earn an average of 1,896,000 won a month, which even fails to reach a half of the mean household income in general as of 2014 [21], and have insufficient time to take oral examination, apart from the financial problem.

As for the general characteristics and oral examination and dental clinic use of both and single parents, 59.3% of the mothers with a spouse and 56.3% of the single mothers were in their 40s and 17.0% of the single mothers were in their 60s or older. This result of single mothers being more likely to be in their 40s is somewhat supported by the finding of the census taken by Statistics Korea in 2018: the mean age of divorce was 48.28 for men and 44.75 for women. Household income varied among the single mothers: 28.8% were at the middle or lower level, 11.4% at the low level. This result seems to support the gap in wage and the education level because women are generally regarded as the socially underprivileged staying at home and are less likely to participate in social or economic activity.

This study has confirmed that most of the variables in both and single parents' general characteristics and oral examination are correlated with their children's oral examination. Single mothers and both parents were most likely to be college graduates or those at higher education levels. This is also correlated with parents' occupation: parents at higher education levels may have a wider range of chances to choose a job and

are more likely to be white collar than to be blue collar. Mothers' oral examination status affected their children. It seems that mother's influence is a crucial factor for elementary school children rarely capable of managing their oral environment for themselves. Bae and Chang [22] analyzed the association between mothers' oral health belief and their children's treatment status and found that children's oral treatment was most significantly affected by their mother. As for mother's oral health care behaviors, frequency of mothers' toothbrush replacement, the number of mothers' missing teeth, and mothers' guidance on post-snack tooth-brushing for their children were correlated with the children's dental caries [23]. However, the increase of dual-income families and divorce tend to increase the number of children reared by single fathers. It is therefore necessary to indicate the association between fathers and children at the time of requiring oral examination and to conduct research on relevant oral care programs.

Children's dental clinic use differed more by their mother's dental clinic use than by that of their father. In general, if children have a problem with their tooth, they let their mother know it and most of them visit a hospital with their mother even in dual-income families. They are generally more sympathetic with their mother. The limitation of this study is that it cannot determine whether dental clinic use has good or bad effects because the research was conducted on the combination of oral examination, simple tooth decay treatment or tooth extraction, and preventive treatment, not on treatment alone, in terms of dental clinic use. Hallett and O'Rourke [24] reported that children having a single parent had significantly higher occurrence and severity of tooth decay than those having both parents; Sayegh et al. [25] reported that parents' socio-economic position and income level were inversely proportional to their children's experience of caries. As for health insurance for dental care in South Korea, the preventive treatment of sealant began to be covered by insurance in 2009, the coverage expanded to include dentures, scaling, and implant, and light cured composite resin began to be covered by insurance for children aged 12 years or younger in January 2019; however, because the treatment costs high, insurance coverage never leads to lower out-of-pocket costs. Therefore, the financially underprivileged and single parents rarely give priority to dental treatment, believing that it is not fatal, and the government needs to make practical, specific measures to prevent them from being isolated so that anyone can keep their oral conditions desirable. The limitation of this study is that it failed to determine what type of treatment parents and their children took in using a dental clinic and simply investigated the rate of dental clinic use; therefore, it is necessary to determine whether their dental clinic use is for the purpose of

treatment or prevention.

Conclusion

Research was conducted on the association between parents' oral examination and dental clinic use and their children's oral examination and dental clinic use by using the data from the Korea National Health and Nutrition Examination Survey, obtaining the following results:

1. Children's oral examination status was correlated with age and education level of both and single parents, and oral examination status of single mothers and mothers with a spouse contributed to their children's oral examination.

2. The more likely both parents were to use a dental clinic, the more likely their children were to use a dental clinic; single parents made no difference.

To put these results together, parents' oral examination status and dental clinic use affected their children; therefore, further research should be conducted on an accessible system that prevents every member of any type of family from being isolated with the aim of improving oral health protection.

Conflict of Interest

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

ORCID

Hyo-Jeong Park, <https://orcid.org/0000-0002-5075-6856>

Jong-Ae Chun, <https://orcid.org/0000-0002-5656-5807>

In-Young Ku, <https://orcid.org/0000-0002-9191-5200>

References

- Kang BW, Kang HK, Kim KY, Kim KS, Kim DH, Kim SY, et al. Preventive dentistry. Seoul: Komoonsa; 2016:5-6.
- Kang MS, Kim CY, Kim HG, Kim BI. Influence of self-perception, attitude, behavior and knowledge about oral health on caries experience and periodontal treatment need. *J Korean Acad Dent Health* 1994;18:144-68.
- Petersen PE. Oral health behavior of 6-year-old Danish children. *Acta Odontol Scand* 1992;50:57-64.
- Lee JH, Na SJ, Kim JB. Oral health knowledge and practices among housewives at apartment houses in metropolitan area. *J Korean Acad Dent Health* 1996;20:509-28.
- Department of Health and Human Services. National oral health survey data related to in-depth analysis [Internet]. Department of Health and Human Services [cited 2013 Mar]. Available from: http://www.prism.go.kr/homepage/entire/retrieveEntire-Detail.do?sessionid=8242E579A117718B138E7DC0025-FBBD9.node02?cond_research_name=&cond_research_start_date=&cond_research_end_date=&research_id=1351000-201100084&pageIndex=1506&leftMenuLevel=160.
- Ryung K, Jung SH, Kim JY, Choi YH, Song KB. Effect of mothers' oral health behaviour and knowledge on dental caries in their preschool children. *J Korean Acad Dent Health* 2004;28:105-15.
- Lim KO, Choi JH. Survey on oral health behavior and knowledge of middle school students. *J Korean Soc Dent Hyg* 2011;11:243-50.
- Back DL, Kim HD, Jean BH, Park YD, Shin SC, Cho JW, et al. Clinical preventive dentistry. 5th ed. Seoul: Komoonsa; 2011:11.
- Choi GY, Ju JW. Influence on oral health behavior oral health knowledge of and attitude and dental education experience of high school students. *J Korean Soc Sch Health* 2012;13:33-42.
- Woo HS, Kim JH. Factors affecting oral health condition of high school. *Int J Clin Prev Dent* 2012;8:209-14.
- Yoo JS, Kim JH, Han SJ, Sim SH, Kim YS. A descriptive study of oral health knowledge & behaviors in middle school students. *J Korean Soc Sch Health* 2008;9:85-97.
- Hwang JM, Han JH. A study on the oral health promotion behavior of high schoolers in a part. *J Dent Hyg Sci* 2009;9:197-202.
- Jang KA, Kim DY. The relations between mothers' oral health behavior and children's mean number of decayed or filled primary teeth. *J Korean Soc Dent Hyg* 2010;10:215-29.
- Sa KJ, Lee SH. The association of employment status of mother and children's oral health. *J Korean Soc Dent Hyg* 2012;12:543-51.
- Kim MG. The relationship between parental sodium intake and adolescent sodium intake. *J Korea Acad-Ind Cooper Soc* 2018;19:453-62.
- Korea Centers for Disease Control and Prevention. The Seventh Korea National Health and Nutrition Examination Survey (KNHANES VII-2) [Internet]. Korea Centers for Disease Control and Prevention [cited 2018 Dec]. Available from: http://www.prism.go.kr/homepage/entire/retrieveEntire-Detail.do?research_id=1351000-201700221.
- Lee SS. Current network subscription status of Korea's dental clinic and its satisfaction rate [thesis]. [Seoul]: Yonsei Graduate School; 2006.
- Jeon MJ. Affecting factors to using oral health of Korean adolescents. *J Korean Soc Dent Hyg* 2010;10:607-16.
- Yang KS. (The) effects of home environments and perceived family health on children's school adjustment [thesis]. [Seoul]: Department of Education Graduate School of Konkuk University; 2010.
- Lee IJ, Choi HK. Human behavior and social environment. Paju: Nanam Publishing House; 2008:65-79.
- Single Parents' Work-Life Balance in Seoul. Seoul: Seoul Foundation of Women & Family; 2017:4.
- Bae JS, Jang SS. Post-examination management state of dental caries in elementary school students in conjunction with a mother's dental health beliefs. *J Korean Soc Sch Health* 1999;

12:305-19.

23. Lee BH, Shin SC. A study on the estimation of emergence timing and emergence sequence of permanent teeth in Korean children for the preventive care. *J Korean Acad Dent Health* 1994;18:458-85.
24. Hallett KB, O'Rourke PK. Social and behavioural determinants of early childhood caries. *Aust Dent J* 2003;48:27-33.
25. Sayegh A, Dini EL, Holt RD, Bedi R. Caries in preschool children in Amman, Jordan and the relationship to socio-demographic factors. *Int Dent J* 2002;52:87-93.