

## A Survey on Utilization of Dental Services by Foreign Children in Seoul

Rute Mateus Vanda<sup>1†</sup>, Yeji Sun<sup>1†</sup>, Hyseol Lee<sup>2</sup>, Seunghye Kim<sup>3</sup>, Jaeho Lee<sup>1</sup>

<sup>1</sup>*Department of Pediatric Dentistry, College of Dentistry, Yonsei University*

<sup>2</sup>*Department of Pediatric Dentistry, College of Dentistry, Kyung-Hee University*

<sup>3</sup>*Department of Pediatric Dentistry, College of Dentistry, Ajou University*

### Abstract

This study aims to investigate the utilization status of dental services by foreign children living in Seoul and their level of satisfaction with the treatments.

We developed a structured questionnaire with 35 questions, which comprised 14 questions (demographic characteristics) and 21 questions (oral hygiene and dental experience of the child).

In this study, the distribution of nationality of 391 participants differed from the actual statistics in Korea. It consisted of high percentage of participants from African countries (23.6%), as well as North American countries (24.1%). In addition, the education status of most parents was above the level of college graduate. Despite the relatively high socioeconomic status of the participants, they showed minimal dental health knowledge regarding the aspect of oral hygiene. Utilization of dental health services and the types of dental clinics visited by them were similar before and after coming to Korea. The participants showed overall satisfaction with the care, but many of them expressed the need for improvement with regard to treatment fee and communication.

In conclusion, foreign children living in Seoul require appropriate dental health education and governmental support to promote regular dental check-ups, to improve their overall oral health, and prevent the incidence of dental caries.

**Key words :** Foreign children, Dental service, Seoul

### I. Introduction

Over the past two decades, Korea has transformed into a major migration destination in Asia. The foreign population has more than doubled in 2015, compared to that in 2005[1], and comprises approximately 1.81 million people. This sudden increase of resident foreigners in Korea may have resulted

from Korea's recent economic development and globalization.

Oral health is an important part of overall health and should not be neglected; furthermore, oral diseases should be recognized as a public health problem[2]. When prioritizing overall medical services and health problems, oral health management is likely to be neglected compared to other systematic diseases. However, there is strong evidence that the general

Corresponding author : Jaeho Lee

Department of Pediatric Dentistry, College of Dentistry, Yonsei University, 50-1 Yonsei-ro, Seodaemun-gu, Seoul, 03722, Korea

Tel: +82-2-2228-3173 / Fax: +82-2-392-7420 / E-mail: leejh@yuhs.ac

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† These authors equally contributed to this work.

health status of young children directly influences their health, development and well-being throughout life. Severe dental caries in early childhood can disturb physical growth and cognitive development by interfering with sleep, appetite and eating patterns, and can lead to poor performance and behavioral problems school, and negative self-esteem[3]. An inverse relationship between socioeconomic status and caries prevalence has been reported in studies of children aged less than six years. Children from immigrant backgrounds have been reported to have a three times higher rate of dental caries compared to those with non-immigrants backgrounds in the United States[4].

According to statistics in 2013, the population of foreign children under the age of nine years comprised approximately 3.8% (59,584) of all foreigners living in Korea. With the acceleration of globalization, the number of foreign children in Korea will increase. Although there are some studies on the utilization of dental services by adult foreigners, no study has been conducted on the utilization of dental services by foreign children in Korea[5].

The purpose of this study is to investigate the utilization status of pediatric dental services by foreign children living in Seoul, the capital of South Korea, as well as their level of satisfaction with the services provided. This study is designed to offer preliminary data for providing dental services and to establish health care policies for foreign children living in Korea.

## II. Materials and Methods

### 1. Subjects

This study has been conducted to assess the utilization status of pediatric dental services by foreign children, between September 20 and December 5, 2014. Data were collected randomly from foreign children aged 6 months to 14 years, who are living in Seoul. We used a structured questionnaire with written information about the study, as well as dental recommendations for children. The total number of collected questionnaires was 411 and among them, 20 questionnaires with inadequate response were eliminated. In total, 391 were used for statistical analysis.

The participants who could read and understand English were from the embassies of Africa, Asia, Australia and Oceania, Europe, North America and South America. Foreigners encountered on the streets in Hannam-Dong and Itaewon

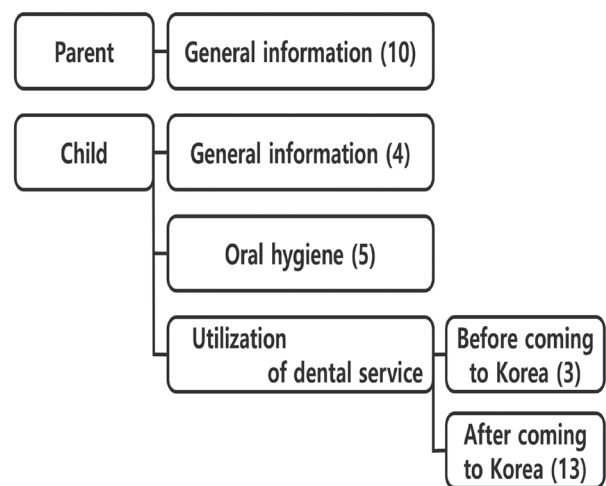
also participated in this study; they were from Brazil, China, Philippines, Ghana, Italy, and Nigeria. We visited and surveyed other groups of people or institutions that participated in this study, including the military, the International Lutheran church, Youngsan-Gu office, International schools of South Korea, the Word of Faith Mission Center Program, Women's Federation for World Peace-International Women in Korea, Seoul Children's Dental Center, Soon-Chun-Hyang University Hospital-International Clinic (Depart. of Family Medicine), and Severance Hospital - International Clinic Care Center (Depart. of Pediatric).

### 2. Methods

Based on previous studies, we revised and supplemented various questionnaires according to our study purpose and subject. Additionally, two dental professionals, fluent in Korean and English, translated the English-language survey into Korean and compared each with the other to verify the conformance of the survey. Research items were 35 questions in total comprising of 14 questions relevant to demographic characteristics and 21 questions concerning the oral hygiene of the child (Fig. 1, Fig. 2).

### 3. Statistical analysis

The data for this study were analyzed using the SPSS (Statistical Package for the Social Science Version 12.0) program.



**Fig. 1.** Scheme of survey questionnaires. (n) : number of questions.

IF YOU HAVE MORE THAN A CHILD, PLEASE ANSWER SEPARATELY (B-1, B-2, B-3)

B-1.

INFORMATION ON CHILD

Gender Male  Female

Age \_\_\_\_\_

Education Kinder  Elementary  Middle school  None

Verbal abilities in Korean:  
 Very Fluent  Fluent  Moderate  Poor  Very Poor

ORAL HYGIENE OF CHILD

a. How many times does your child brush his/her teeth?  
 Once  Twice  More than twice  None

b. Who performs the child's tooth-brushing the majority of the time?  
 Child alone  Child with supervision or help by adults  Adults solely

c. Does your child use fluoride toothpaste?  
 Yes  No

d. Does your child use floss?  
 Yes  No

e. Has your child ever had a fluoride treatment?  
 Yes  No   
 If yes, when was it done? \_\_\_\_\_

● Does your child have previous dental treatment before coming to Korea?  
 Yes  No  (Reason: \_\_\_\_\_)

If yes, please check the two questions below.

a. Type of clinic  
 General hospital  Private dental clinic  Pediatric dental clinic   
 Others \_\_\_\_\_

b. What was the treatment that your child received?  
 Filling  Extraction/Surgery  Orthodontic treatment   
 Root canal therapy/Crown  Gum  Others \_\_\_\_\_

● Has your child ever received any dental treatment in Korea?  
 Yes  No   
 (Reason: \_\_\_\_\_)

If yes, please check the questions below.

a. Where was your child treated?  
 General hospital  Private dental clinic  Pediatric dental clinic   
 Others \_\_\_\_\_

b. How did you choose this facility for your child's dental treatment?  
 Recommended by friends/families  Web-site  Closest dental clinic   
 Affordable(cheap) treatment fee  Recommendation of dentist

c. What was the treatment that your child received?  
 Filling  Extraction/Surgery  Orthodontic treatment   
 Root canal therapy/Crown  Gum  Others \_\_\_\_\_

d. Who normally pays for dental treatment of your child?  
 Self-pay  Insurance  Company   
 Partially self-pay and insurance/company

e. Please tick one box in each row to assess your level of satisfaction with the following aspects of dental services your child received in Korea.

	Very satisfied	Satisfied	Okay	Dissatisfied	Very dissatisfied
Quality of treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pleasant environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Staff friendliness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cost of treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Speed of treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

f. Overall, in what aspect are you satisfied with the dental services in Korea?  
 Very satisfied  Satisfied  Okay  Dissatisfied  Very dissatisfied

g. In your opinion, what is mostly required to improve the dental services in Korea for foreign children?

Communication <input type="checkbox"/>	Quality of treatment <input type="checkbox"/>	Environment <input type="checkbox"/>
Cost <input type="checkbox"/>	Speed of treatment <input type="checkbox"/>	Attitude of staff <input type="checkbox"/>

THANK YOU FOR TAKING TIME TO ANSWER THIS QUESTIONNAIRE

Fig. 2. Survey questionnaires about child information.

Demographic characteristics and the utilization status of pediatric dental services by foreign children living in Seoul were analyzed by frequency and percentage. Other criteria were analyzed by descriptive statistics.

### III. Results

#### 1. General information of participated parents

A total of 237 foreign parents (aged 39.7 ± 8.0 years, Male : Female = 1 : 2) participated in the survey. Seventy-two, i.e., majority (30.4%) of the parents were from Asia, followed by North America (24.1%), Africa (23.6%), Europe (9.7%), and South America (8.9%), Australia and Oceania (2.5%).

Most of the responding parents (80.2%) had an education level of college graduate degree or higher. Regarding their verbal abilities in Korean languages, more than half of them (58.22%) admitted to having poor to very poor verbal ability in

the native Korean language (Table 1).

#### 2. General information of participated children

In the present study, 391 foreign children were included. As shown in Table 2, children aged of 0 - 5 years old were approximately 48.1%, followed by 6 - 10 years old (29.9%) and 11 - 15 years old (20.7%). Regarding their verbal abilities in Korean, only 38 (9.7%) children were able to speak very fluent or fluent Korean, and 253 (64.7%) children had poor to very poor Korean language skills (Table 2).

#### 3. Children's oral hygiene care

Regarding brushing frequency, 229 (58.6%) children brushed their teeth twice a day, and 53 (13.6%) brushed more than twice a day; further, 158 (40.4%) children brushed on their own and 138 (35.4%) brushed under supervision or with as-

**Table 1.** General information of participated parents

Category	Classification	Number of subjects (%)
Total		237 (100)
Age	20s	18 ( 7.6)
	30s	95 (40.1)
	40s	79 (33.3)
	50s	29 (12.2)
	Over 60	3 ( 1.3)
	Unmarked	13 ( 5.5)
Gender	Male	86 (36.3)
	Female	149 (62.9)
	Unmarked	2 ( 0.8)
Nationality	Africa	56 (23.6)
	Asia	72 (30.4)
	Australia and Oceania	6 ( 2.5)
	Europe	23 ( 9.7)
	North America	57 (24.1)
	South America	21 ( 8.9)
	Unmarked	2 ( 0.8)
Education	High school	22 ( 9.3)
	College	102 (43.0)
	Post-graduate	34 (14.3)
	Master's degree	54 (22.8)
	Unmarked	25 (10.5)
Employment	Business	24 (10.1)
	Company employee	29 (12.2)
	Diplomat	35 (14.8)
	Housewife	85 (35.9)
	Language teacher	22 ( 9.3)
	Professional soldier	8 ( 3.4)
	Student	14 ( 5.9)
	Others	31 (13.1)
	Mother Language	English
French		11 ( 4.6)
Japanese		30 (12.7)
Spanish		9 ( 3.8)
Others		116 (48.9)
Verbal abilities in Korea	Very fluent	27 (11.4)
	Fluent	23 ( 9.7)
	Moderate	47 (19.8)
	Poor	42 (17.7)
	Very poor	96 (40.5)
Unmarked	2 ( 0.8)	

**Table 2.** General information of participated children

Category	Classification	Number of subjects (%)
Total		391 (100)
Age	0-5	188 (48.1)
	6-10	117 (29.9)
	11-15	81 (20.7)
	Unmarked	5 ( 1.3)
Gender	Male	197 (50.4)
	Female	188 (48.1)
	Unmarked	6 ( 1.5)
Education	Kinder	93 (24.6)
	Elementary	129 (33.0)
	Middle school	67 (17.1)
	High school	5 ( 0.5)
Verbal abilities in Korea	Unmarked	97 (24.8)
	Very fluent	38 ( 9.7)
	Fluent	38 ( 9.7)
	Moderate	47 (12.0)
	Poor	71 (18.2)
	Very poor	182 (46.5)
Unmarked	15 ( 3.8)	

**Table 3.** Children's oral hygiene care

Category	Classification	Number of subjects (%)
Total		391 (100)
Brushing frequency	None	29 ( 7.4)
	Once	80 (20.5)
	Twice	229 (58.6)
	More than twice	53 (13.6)
Child's tooth-brushing performer	Adults solely	51 (13.0)
	Child alone	185 (40.4)
	Child with supervision or help from adults	138 (35.4)
	Unmarked	43 (11.0)
Fluoride toothpaste	Used	272 (69.6)
	Unused	114 (29.2)
	Unmarked	5 ( 1.3)
Floss	Used	74 (18.9)
	Unused	307 (78.5)
	Unmarked	10 ( 2.6)
Fluoride treatment	Yes	83 (21.2)
	No	302 (77.2)
	Unmarked	6 ( 1.5)

sistance from adults. Regarding the use of fluoride toothpaste, 272 (69.6%) used fluoride toothpaste and 114 (29.2%) did not. However, only 74 (18.9%) used dental floss, and 307 (78.5%) of foreign children had never used a dental floss. Regarding experience with fluoride treatment, 83 (21.2%) had received it

previously, and 302 (77.2%) did not have any prior experience with fluoride treatment at all (Table 3).

#### 4. Children's dental experience before coming to Korea

Among the total of 391 children included in this study, 266 children (68.0%) did not have any prior dental treatment and only 112 (28.6%) had dental treatment before coming to Korea. Fifty-seven (50.9%) children had visited private dental clinics, and only 25 children (22.3%) had visited a pediatric dental clinic.

Among the total number of dental appointments 32 (28.6%) were filling treatments, 25 (22.3%) orthodontic treatments, 19 (17.0%) preventive treatments, 13 (11.6%) routine check-ups, 12 (10.7%) gum treatments and 10 (8.9%) extraction/surgery treatments (Table 4).

#### 5. Children's dental experience in Korea

Among the total of 391 children who participated in this study, only 142 (36.3%) had a history of dental treatment in Korea, and 238 (60.9%) reported to have no dental treatment for various reasons (Table 5). Of those having undergone dental treatment in Korea, 68 were treated in private dental clinics (47.9%), 39 were treated in pediatric dental clinics (27.5%), and nearly 32 were treated in a general hospital (22.5%) due to the policies in the institution.

Regarding selection criteria of dental clinics, 95 (66.9%) of participants selected a dental clinic recommended by friends and family. Regarding the type of treatments, majority of children received filling treatments (40.8%), followed by orthodontic treatments (23.2%), root canal treatment and crown restora-

tions (22.5%), and extraction/surgery treatments (22.5%). Visits for regular check-ups were only 17.6%. Further, only 37.3% of the participants were paying the treatment fee by themselves, and others were financially supported by an insurance company, either fully or partially.

The issues that were most frequently reported to need improvement were communication problem (64.1%) and cost (52.1%) (Table 5).

**Table 4.** Children's dental experience before coming to Korea

Category	Classification	Number of subjects (%)
Total		391 (100)
Dental experience	Yes	112 (28.6)
	No	266 (68.0)
	Unmarked	13 ( 3.3)
Clinic type	General hospital	20 (17.9)
	Pediatric dental clinic	25 (22.3)
	Private dental clinic	57 (50.9)
	Unmarked	10 ( 8.9)
Kind of treatment	Extraction/Surgery	10 ( 8.9)
	Filling	32 (28.6)
	Gum	12 (10.7)
	Orthodontic treatment	25 (22.3)
	Root canal therapy/Crown	6 ( 5.4)
	Preventive treatment	19 (17.0)
	Check up	13 (11.6)

**Table 5.** Children's dental experience in Korea

Category	Classification	Number of subjects (%)
Total		391 (100)
Dental experience	Yes	142 (36.3)
	No	238 (60.9)
	Unmarked	11 ( 2.8)
Reason that children had no dental experience in Korea	Cost	53 (22.3)
	Language problem	15 ( 6.3)
	Too young	44 (18.5)
	others	14 ( 5.9)
	No need	81 (34.0)
	Unmarked	31 (13.0)
Facility where child was treated	General hospital	32 (22.5)
	Pediatric dental clinic	39 (27.5)
	Private dental clinic	68 (47.9)
	Pediatric & Private dental clinic	1 ( 0.7)
	Unmarked	2 ( 1.4)
Facility selection criteria	Affordable treatment	4 ( 2.8)
	Closest dental clinic	16 (11.3)
	Recommendation of dentist	27 (19.0)
	Recommended by friends/families	95 (66.9)
	Website	10 ( 7.0)
Kind of treatment	Extraction/Surgery	32 (22.5)
	Filling	58 (40.8)
	Gum	10 ( 7.0)
	Orthodontic treatment	33 (23.2)
	Root canal therapy/Crown	32 (22.5)
	Preventive treatment	3 ( 2.1)
	Check up	25 (17.6)
Person or institution in charge of payment	Company	13 ( 9.2)
	Insurance	49 (34.5)
	Self-pay	53 (37.3)
	Partially self-pay and insurance/company	35 (24.6)
Improvement point	Attitude of staff	5 ( 3.5)
	Communication	91 (64.1)
	Cost	74 (52.1)
	Environment	1 ( 0.7)
	Quality of treatment	16 (11.3)
	Speed of treatment	13 ( 9.2)

## 6. Satisfaction with dental clinics in Korea

Regarding dental clinics in Korea, the overall satisfaction level with respect to quality of treatment, environment, speed of treatment, and staff friendliness were mostly average or above average. Cost of treatment and communication showed a relatively high percentage of dissatisfaction, i.e., 25.2% and 22.6%, respectively (Table 6).

## IV. Discussion

This study was performed to investigate the status of utilization of pediatric dental services by foreign children living in Seoul. All questionnaires were answered by parents. The participants in this study demonstrated minimal dental knowledge regarding oral hygiene and preventive dental care, with a majority reporting, average or above average levels of satisfaction regarding the quality of dental service they received. However, dental treatment fee and communication still appeared to be the most significant barriers for foreign patients.

Most respondents had basic knowledge about the importance of brushing twice a day and use of fluoridated toothpaste. The participants understood that the regular use of fluoride toothpaste is one of the most cost-effective methods for preventing dental caries[6]. Approximately 70% of the respondents answered that their children brush their teeth at least twice a day and use fluoridated toothpaste. However, most respondents lacked knowledge about additional effective methods of preventing dental caries, such as tooth brushing under parental supervision, use of dental floss, periodic fluoride application, and regular dental check-ups.

Preschool children are often too young to perform effective tooth-brushing on their own; therefore, tooth-brushing under parental supervision is recommended[7]. About 40.4% of the participant's children were brushing their teeth without adult supervision or assistance. Nearly 80% of the respondents reported that their children were neither using dental floss nor receiving any fluoride treatment; this was a surprising result considering that more than 80% of the respondents had high education level. According to a systemic review by Merrillyn *et al.*[8], parental oral health knowledge influences the children's diet and dental hygiene, resulting in a decreased risk of caries. In another study, it was reported that children of parents with low education levels visited a dentist less frequently[9]. Dental health knowledge did not correlate with the level of education of foreign parents included in this study. In this case, a high education level does not imply extensive dental knowledge. Therefore, education regarding oral hygiene is needed, for immigrants to reduce the development of dental caries in children, and improve their oral health.

In this study, correlation was observed, to some extent, between nationality and the use of fluoride toothpaste and additional fluoride treatment. It was determined that Africa had the highest percentage of children (53.3%), who had not used either fluoride toothpaste or any additional fluoride treatment, followed by Europe (39.1%), North America (21.0%) and Asia (18.0%). Availability and accessibility of oral health services is very limited in African countries, and little is known about the utilization status of oral health services in African countries[3,10,11]. This study shows the lack of oral health knowledge in African parents with high levels of education, leading to the neglected of oral health care systems in many African

**Table 6.** Satisfaction on dental clinic in Korea

Category	Number of subjects (%)					
	Very dis-satisfied	Dis-satisfied	Okay	Satisfied	Very satisfied	Missing
Quality of treatment	2 ( 1.4)	1 ( 0.7)	31 (21.8)	46 (32.4)	61 (43.0)	1 ( 0.7)
Pleasant environment	0 ( 0.0)	1 ( 0.7)	35 (24.6)	49 (34.5)	55 (38.7)	2 ( 1.4)
Speed of treatment	2 ( 1.4)	9 ( 6.3)	52 (36.6)	43 (30.3)	31 (21.8)	5 ( 3.5)
Cost of treatment	27 (19.0)	23 (16.2)	39 (27.5)	30 (21.1)	22 (15.5)	1 ( 0.7)
Staff friendliness	1 ( 0.7)	3 ( 2.1)	34 (23.9)	41 (28.9)	59 (41.5)	4 ( 2.8)
Communication	17 (12.0)	15 (10.6)	45 (31.7)	27 (19.0)	37 (26.1)	1 ( 0.7)
Overall satisfaction	3 ( 2.1)	3 ( 2.1)	38 (26.8)	57 (40.1)	39 (10.0)	2 ( 1.4)



countries.

According to this study, there were no significant barriers that hindered the respondents from visiting dental clinics in Korea. Their frequency of dental treatment was similar before and after their migration to Korea, as were the types of dental institutions they visited. When asked to explain why they did not avail dental treatment in Korea, only 13% of them referred to the expensive dental treatment fee as the main reason, while others answered that there was 'no need' (21%), their children were 'too young' (11.3%), or due to the 'language problem' (3.8%). The remaining 33% of the respondents did not specify a reason. On the basis of these results, it may be concluded that the low utilization rate of dental health services by foreign children in Korea is not influenced by inaccessibility to dental clinics, language/communication problems, or financial burden, but rather deficient dental health knowledge and insufficient interests in oral health. Most of the respondents took their children to dental clinics when dental problem occurred, such as cavitation, pain, or mobility of teeth. This observation is supported by the finding that the most frequently received dental treatment, both before and after migration to Korea, was the 'filling' of dental cavitation.

The foreign children who had received dental treatment in Seoul showed overall satisfaction of about 95% regarding quality of treatment, pleasant environment, speed of treatment, and friendliness of staff. However, reduction of the treatment fee and improvement in communication were pointed out as strategies to improve their utilization of dental services in Seoul. Approximately 60% of the respondents answered that they pay the treatment fee either fully or partially. Only 60% of the respondents were receiving benefits from either private insurance or company coverage. Although foreign employees are eligible for Korean worker health insurance since 2004, many foreigners decline to apply due to the unfavorable application system and requirements[12]. For these reasons and due to expensive insurance coverage, many foreigners seem to defer joining Korean health insurance. Without insurance coverage or support from a company, health care fee will remain a burden to most foreigners living in Korea. Regarding communication, only 20% of the respondents had the ability to speak fluent Korean language, with more than 60% admitting to having poor to very poor Korean language skills. In this study, the respondents showed similar rates of utilization of dental health services before and after their migration to Korea, which indicates that dental treatment fee and communication

hindrance were not the most significant barriers. However, in another study regarding foreigners in Korea, lack of time and excessive treatment fee were main reasons for not using dental health services in Korea[12]. Therefore, the result of this study should not be generalized to the entire foreign population living in Korea.

Immediate systemic changes and improvements regarding national health insurance, reduction of dental treatment fee, or communication support for foreigners are hard to achieve in a short term; moreover, owing to the steady growth of foreign population, long-term governmental considerations are necessary. Meanwhile, educating the parents of foreign children can be a cost-effective and practicable modality for preventing dental caries and maintaining good oral health. In this study, 86% of the group, that reported the frequency of tooth brushing as zero times per day, was comprised of infants and young children aged 0 - 5 years old. This demonstrates a lack of knowledge regarding the importance of oral health and hygiene in infants and young children. Educating foreign patients about the importance of good oral hygiene practices, such as tooth brushing under parental supervision, use of dental floss, and fluoridated tooth-paste, will be a valuable preventive approach. They should be also educated about the importance of different preventive measures, such as regular dental examination and additional fluoride application, e.g., fluoride varnish, which has been proven effective in preventing dental caries by robust scientific evidence from clinical trials[13]. Oral health education can be provided at international schools, embassies, or as a part of the Korean immigration and integration program. In addition, inclusion of foreign infants and children in the infant and child dental check-up programs will be a meaningful step for maintenance and improvement of dental health of foreign children living in Korea. If the Korean government takes the initiative to promote the importance of oral health of foreigners as well as their employment and integration into Korean society, their quality of life in Korea will definitely improve.

Though not included in this study, the children of North Korean refugees and internationally married couples should also be considered as foreigners in Korea. According to AAPD guidelines, children with immigrant backgrounds have a three times higher rate of tooth decay than those with non-immigrants backgrounds[4]. According to data regarding the oral health status, North Koreans in South Korea show a higher dft index (6.35) and DMFT index (3.67) compared to South Kore-

ans (3.15 and 2.27, respectively). Young North Koreans adolescents in South Korea, showed 0% experience with sealant or topical fluoride application[12]. Further, the children of internationally married couples are another easily neglected population of children in Korea. According to the National Statistical Office, the ratio of international marriages to all marriages is increasing from 3.5 percent in 2000 to 10.8 percent in 2009[5]. Therefore, studies evaluating the oral health status of children of internationally married couples and North Koreans in Korea are necessary to determine the need for special dental care for these two groups of children.

This study has several limitations in regard to the participants, as they were selected by convenient sampling. The participants of this study did not reflect the actual demographic characteristics of foreigners in Korea, in regards to nationality distribution and socioeconomic status. According to the Immigration Policy Headquarters in 2015, majority (50.6%) of the foreigners in Korea are from China, followed by the United States (7.8%), Vietnam (7.2%), Thailand (4.9%), and others[1]. However, the nationality distribution of the participants in this study consists of a particularly high percentage of countries in Africa (23.6%), as well as North America (24.1%). Furthermore, most of the respondents had high education levels and lived in Seoul; eighty percent of the respondents were either college graduates or had attained higher education level. Although this study was not a randomized controlled study, it provides some meaningful information about the dental health knowledge and status of pediatric dental services utilization by foreign children with relatively high socioeconomic status living in Seoul. In addition, the questionnaires were written in English; the participants who do not have English as a native language were more than 50%, even if the object of this study is who can read and understand English. Therefore, inadequate understanding of the questionnaires may have resulted in misleading answers. In spite of these limitations, this study still provides valuable data that may improve the Korean governmental approach to educating foreign parents and children about the importance of dental care and utilization of preventive measures for improving their quality of life in Korea.

## V. Conclusions

The result of this study indicate that although foreign children living in Seoul belong to relatively high socioeconomic backgrounds, they have inadequate dental knowledge and

require dental health education pertaining to oral hygiene and preventive dental care. Implementation of mandatory dental health education will be significantly more helpful for foreign children in Korea, in order to overcome the systemic disadvantages, financial burden, and communication issues. The keen interest of the Korean dentistry academy as well as the support of the community and government are needed in this matter.

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국문초록

## 서울 거주 외국인 아동의 치과 이용 실태 조사

Rute Mateus Vanda<sup>1†</sup> · 선예지<sup>1†</sup> · 이효설<sup>2</sup> · 김승혜<sup>3</sup> · 이제호<sup>1</sup>

<sup>1</sup>연세대학교 치과대학 소아치과학교실

<sup>2</sup>경희대학교 치과대학 소아치과학교실

<sup>3</sup>아주대학교 치과대학 소아치과학교실

이번 연구는 서울에 거주하는 외국인 아동의 치과진료 현황 및 만족도를 설문을 통하여 조사하는 것으로, 국내 거주 외국인 아동에 대한 치과의료서비스의 확충 및 관련 제도의 개선을 위한 기초 자료를 제공하는 것이다.

이번 연구를 위한 설문지는 총 35개의 문항으로 구성되었으며, 그 중 14개 문항은 응답자의 국적을 포함한 인구통계학적 정보에 관한 문항이었고 나머지 21개 문항은 응답자의 구강 위생 관리 및 치과 경험에 관한 것이었다..

이번 연구에 참여한 총 391명 외국인 집단의 국적 분포는 현재 한국에 체류하는 외국인의 국적별 통계 실태를 반영하진 않았다. 이번 연구 참가자 중 18.9%가 아프리카 출신이었는데, 이는 북미 비율 (21.0%)과 비슷할 정도로 높았다. 또한 대학교 이상의 학력을 가진 보호자가 80% 이상으로 사회경제적 지위가 높은 외국인들이 연구 대상에 다수를 차지하는데 비해, 외국인 아동 및 보호자의 구강위생 및 우식 예방과 관련된 치과적 지식이 부족함이 나타났다. 한국에 오기 전과 후의 치과 경험율은 비슷하였다. 전반적인 만족도 검사에서 치과 치료의 질과 직원의 친절도 등에서는 높은 만족도를 보였으나, 언어 소통의 불편함과 진료비에 대한 부담이 큰 것으로 나타났다.

이번 연구를 통하여 비교적 높은 사회경제적 지위의 한국 체류 외국인들도 자녀의 구강 건강에 대한 지식이 부족함을 알 수 있었다. 국내 거주 외국인 아동의 구강 건강을 증진시키고 치아 우식증을 예방하기 위하여 외국인 아동에 대한 영유아 치과 검진의 확대 및 구강 보건 교육이 필요할 것이다.

**주요어:** 외국인 아동, 치과진료 실태, 서울