Original Article

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Increasing the Awareness of the Parents Regarding the Oral Health Status of Their 0-3 Years-Old Children

0-3 Yaş Grubu Çocuğu Olan Ebeveynlerin, Çocuklarının Ağız ve Diş Sağlığı Hakkında Farkındalıklarının Artırılması

Tamer TÜZÜNER[1], Havva KARADENİZ[2], İlknur KAHRİMAN[2], Özgül BAYGIN[1], Ezgi BALTACI[3], Ayca KURT[4]

[1]Karadeniz Technical University Faculty of Dentistry, Department of Pediatric Dentistry, Trabzon, Turkey
[2]Karadeniz Technical University, Faculty of Health Sciences, Trabzon, Turkey
[3]Trakya University Faculty of Dentistry, Department of Pediatric Dentistry, Edirne, Turkey
[4]Recep Tayyip Erdogan University Faculty of Dentistry, Department of Pediatric Dentistry, Rize, Turkey

ABSTRACT

Objective: This study aimed to: (a) compare nursing students' knowledge about the oral and dental health of children before and after oral health education; (b) evaluate the effectiveness of oral health education of parents with children aged 0-3-year-old by these trained students during home visits.

Methods: In this quasiexperimental study, firstly, 60 senior students in the nursing department were trained on infants' and young children's oral and dental health through standartized training modules. Secondly, 180 parents with children aged 0-3 from low socioeconomic status were trained by the nursing students during home visits with face to face interviews. Both nursing students' and parents' pre and post-training knowledge levels and the changes in their awareness after training were measured using standard questions which were administered as pre-test (preT) and post-test (postT) with 1 week intervals. Wilcoxon test was used to assess the differences of correct answers between pre- and post-tests. The significant value was considered as $p<0.05$.

Results: The mean age of the children of the parents was 18.92±9.96 months. The median values of preT and postT were found to be 28 and 37.5, respectively for the total number of correct answers given to 50 questions related to the education consisting of seven modules. It was determined that the total number of correct answers increased statistically significantly in postT ($p<0.001$). The median

ÖZ

Amaç: Bu çalışmanın amacı, 0-3 yaş grubu çocuğu olan ebeveynlerin, çocuklarının ağız ve diş sağlığı hakkında bilgi düzeylerinin ölçülmesi ve farkındalıklarının hemşirelik son sınıf öğrencileri aracılığı ile ev ziyaretleri kapsamında artırılmasını sağlamaktır.

Yöntemler: İki basamaktan oluşan araştırmanın, ilk basamağında 60 son sınıf hemşirelik öğrencisine çocuk ve yenidoğanlarda ağız ve diş sağlığı hakkında eğitim verildi. İkinci basamakta, 60 son sınıf hemşirelik öğrencisi ev ziyaretleri kapsamında 0-3 yaş çocuğu olan 180 ebeveyni çocuklarda ağız ve diş sağlığı hakkında yüz yüze görüşmeler ve broşürler aracılığı ile bilgilendirdi. Hem 60 son sınıf hemşirelik öğrencisi hem de 180 ebeveynin farkındalık ve bilgi düzeylerindeki değişim, derslerin anlatımından önce ve sonra, eğitimin etkinliğini ölçmeye yarayan standart sorular ön-test (ÖT) ve son-test (ST) olacak şekilde 1 hafta ara ile uygulanarak tespit edildi. ÖT-ST arasındaki değişimler Wilcoxon testi ile $p<0,05$ anlamlılık düzeyinde analiz edildi.

Bulgular: Ebeveynlere ait çocukların yaş ortalaması 18,92±9,96 ay olarak bulgulandı. Yedi modülden oluşan eğitime ait 50 adet soruya verilen toplam doğru cevap sayısının ÖT ve ST medyan değerleri 28 ve 37,5 olarak saptandı. Toplam doğru cevap sayısının ST'de istatistiksel olarak anlamlı düzeyde arttığı belirlendi ($p<0,001$). Ebeveynlere broşürler aracılığı ile uygulanan eğitimdeki 14 adet sorunun ÖT ve ST doğru cevap sayısı medyan değerleri

Address for Correspondence: Ezgi BALTACI, Trakya University Faculty of Dentistry, Department of Pediatric Dentistry, Edirne, Turkey
E-mail: baltaciezgi@gmail.com **ORCID ID:** orcid.org/0000-0001-8553-3858

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values of preT and postT correct answers to 14 questions in the education given to parents through brochures were found to be 6 and 10, respectively. It was determined that the total number of correct answers increased statistically significantly in postT after the training (p<0.001).

Conclusion: The knowledge level of nursing students about the oral and dental health of children can be increased through standardized training programs. Home visits and face-to-face interviews are applicable to increase awareness in parents by non-dental healthcare professionals.

Keywords: Oral health, awareness, health education, home visits, nursing students

6 ve 10 olarak tespit edildi. Toplam doğru cevap sayısının eğitim sonrası ST'de istatistiksel olarak anlamlı düzeyde arttığı belirlendi (p<0,001).

Sonuç: Diş hekimi olmayan sağlık çalışanlarının koruyucu dental programlarda yer alabileceği, yaşamın ilk yıllarında ebeveynlerin ve özellikle annelerin toplum sağlığı için çalışan hemşireler aracılığı ile ev ziyaretleri kapsamında bilgilendirilmesinin ve çocuklarının ağız ve diş sağlığı hakkında farkındalıklarının artırılmasının yararlı olabileceği düşünülebilir.

Anahtar Sözcükler: Ağız sağlığı, farkındalık, sağlık eğitimi, ev ziyaretleri, hemşirelik öğrencisi

Introduction

The oral and dental health of children is essential for general body health and healthy adulthood (1). Considered as a whole, oral health in childhood includes topics related to nutritional and cleaning behaviors, first dentist appointment, tooth cavities, preventive treatments, non-nutritive sucking habits, changes in the jaws and teeth during growth and development, mouth injuries, and other oral diseases (2,3). Early childhood caries (ECC) is defined as the presence of one or more decayed tooth (cavitated or non-cavitated lesions), missing tooth due to caries, or filled surfaces in the primary teeth of children younger than 6 years of age, and any sign of smooth surface caries in children younger than three years is an indicator of severe ECC (S-ECC) (4). According to a study carried out in 2015 (5); caries observed in primary teeth affected 560 million children worldwide and became the 12th most common disease when examined together at all ages. The high prevalence of ECC in children aged 1, 2, and 3, which is 17%, 36%, and 43%, respectively, indicates that this disease is left untreated in children under 3 years of age (6,7). The treatment process of ECC requires sedation/general anesthesia methods with high costs and potential health risks due to the cooperation difficulties of the age group it affects, and the recurrence of lesions is frequently observed after the procedures, thus creating a social and economic burden (8-10). Dental injuries are the most common ones of oral injuries, and luxation injuries are the most common injuries in children aged 1-3 years and usually caused by falls (11,12). Oral injuries are often perceived as a neglected public health problem due to the inability to access appropriate healthcare at the right time (13). The untreated early oral and dental diseases observed in children cause eating difficulties, pain complaints, increase in the risk of infection, growth and development problems, sleeping difficulty, restricted social life, increase in absenteeism at school, behavioral problems, and decrease in the quality of life of the child and family (14-16).

The biological, behavioral, psychosocial characteristics and awareness and knowledge levels of those responsible for the primary care of the child (mostly the mother) are the main factors that have a role in the maintenance of oral and dental health of children (17). In developing countries, social and economic inequalities, insufficient dental care centers and staff, non-dental health professionals who do not have enough equipment in the oral and dental health of children, and inability to integrate oral health into the primary health care system cause preventable oral and dental health problems in children to continue to be relevant and to increase (18,19).

The 0-3 age period is an important time period for parents to have awareness of oral and dental health in children and receive guidance for the development of correct attitudes and behaviors (20). Nurses are among the first healthcare professionals that the family and child encounter in the healthcare system for reasons such as home visits, routine controls, information, vaccination, and childhood diseases. This situation provides an important advantage to this occupational group in terms of informing parents about oral and dental health in children (21,22).

This study aims to educate senior nursing students about oral and dental health in neonatal and childhood periods and to raise awareness of parents with children aged 0-3 about the oral and dental health of children by means of face-to-face interviews and brochures through these nursing students during home visits. Our hypotheses are;

1. After the education to be given to nursing students, awareness and knowledge levels can be increased,

2. With the nursing students and the brochures prepared, the awareness and knowledge level of the parents can be increased after the education.

Methods

Ethical Consideration

The study was approved by the Karadeniz Technical University Committee on Human Research (approval number: 2015/42). Before ethical approval, permission was obtained through correspondence with Georgetown University for use of their courses via online access and the tests prepared in international standards to measure the effectiveness of the education that were available back in 2016 under the title "A Health Professional's Guide to Pediatric Oral Health Management". Although the educational content at the website was no longer available, the training modules were provided as a child oral health resource for healthcare providers previously (23). All the documents

regarding permission, original and/or Turkish versions of training modules, tests and previous presentations are available at the web address of http://tamertuzuner.com/0_3_yas_cocugu_bulunan_ebeveyn_egitimi.zip.

Necessary legal permissions were also obtained from the Republic of Turkey Ministry of Health and Public Health Institution for home visits and field activities involving parental education. Informed written consent was obtained from both nursing students and parents that participated in the study.

Subjects and Sample Size

The study was conducted in Trabzon, Turkey with 180 parents with children aged 0-3 years old who lived in City Center, and 60 senior nursing students studying in Karadeniz Technical University, Faculty of Health Sciences, Class of 2017. Parents selection were made from low socioeconomic status (monthly income below TRY 1770) (24).

Since the number of possible nursing students that could be included to the study population were obtained as 60, we included the whole students into the study design who signed the consent form. Thus, we decided to achieve the final calculation by considering the total number of parents. After considering alpha error =0.05, beta error =0.20 and the effect size as 0.20, the required parent numbers were determined as 164. However, by considering the possible dropouts, missing data, and failures for the study design, we determined to use 180 (averaged 10% increased) parents. Thus, one nurse was matched with 3 parents to complete study design.

Study Design

In this study, pretest-posttest model, one of the quasi-experimental research designs, was used (Table 1). The translation process for educational content and questions asked to both nurses and parents was carried out in two stages. In the first part, the original English version was translated into Turkish separately by a professional interpreter and a pediatric dentist with a good command of English who was not a participant in the study, and a draft was created by combining the Turkish versions. In the second part, the Turkish draft version was answered by 10 nursing students and parents who were not included in the study, and points in the drafts that could not be understood were evaluated and edited. The test-retest (internal consistency) of the answers were also tested between 1 week intervals by nursing students and parents who were not included in the study with final Turkish version. The final Turkish version was translated into English by a professional interpreter and compared with the original one (Table 2). As a result of compliance and internal consistency, all questions were used in the study.

The research was carried out in two stages. In the first stage, 60 senior nursing students were given theoretical and practical education with a training guide which included such topics as; an introduction to infants and young children's oral health, oral conditions and abnormalities, prevention of oral diseases, non-nutritive sucking habits, oral injury, infants and young children with special health care needs and the relationship between general health and oral health, by faculty members from the department of pediatric dentistry, department of pediatric nursing and department of public health nursing. The training content was documented to facilitate the follow-up of the courses by nursing students and to ensure their use later. A survey with 50 questions (Table 3) was applied to nursing students as a pretest before the training to measure the level of knowledge, awareness, and demographic variables. The questionnaire to measure the level of knowledge of the modules at the beginning of the study were re-administered as a posttest one week later and recorded.

In the second stage, some of the survey questions (relatively important topics) applied to nursing students were designed for parents as a survey of 14 questions (Table 4) by faculty members from the department of pediatric dentistry, and applied to parents as a pre-test. Previously trained senior nursing students visited selected families for oral health education with brochures, dental toothbrushes, and models. Home-visits were conducted under supervision of faculty members of Faculty of Health Sciences. The families were visited again one week after training and the same questionnaire to measure level of knowledge and awareness was repeated as a post-test. The results were analyzed to evaluate the success of training.

Statistical Analysis

The data were analyzed with SPSS for Windows 17.0. Descriptive statistics of demographic data were recorded for both nursing students and parents. The distributions of the correct answers to the questionnaires were also calculated with descriptive statistics. The Cronbach alpha level was calculated for test-retest activity. Compliance with normal distribution was evaluated by Shapiro-Wilk test. The Wilcoxon test was used to assess the differences of the correct answers given by students and the parents between one-week intervals. The confidence interval was determined as 95% in all methods.

Table 1. Quasiexperimental research design

First stage	Second stage
50-question baseline survey 60 senior nursing students	14-question baseline survey 180 parents
Nursing students' training about children's oral health	Parents' oral health education by nursing students in home visits with face-to-face interviews
One week after training 50-question survey 60 senior nursing students	One week after educational visit 14-question survey 180 parents

Results

Demographic information of nursing students and parents who participated in the questionnaire was given in Table 5. It was found that nursing students were mostly female, and the majority of the parents were mothers. The educational level of the parents in the research group was found to be generally primary and secondary education levels. The mean age of the children in the study was 18.92±9.96 months. The Cronbach alpha levels were found higher than >0.70 both for nursing students and parents.

Considering the findings of oral health education for nursing students; who were educated through standardizes training modules and whose knowledge/awareness levels were evaluated with pretest/posttest methods (50 questions), it was determined that the number of correct answers were higher than the pretest in the posttest ($p<0.001$) except for the module 5, and even an increase was found in all subheadings ($p>0.05$) (Table 6).

As a result of 14-question pretest/posttest of brochure-based information given to parents about the oral and dental health of their 0-3 year-old children within the scope of home visits, it was found that awareness levels increased significantly ($p<0.001$) (Table 7).

Discussion

In this study with quasi-experimental design, the increase in knowledge and awareness of 60 senior nursing students through standardized training programs and 180 parents with children aged 0-3 years, who were educated by these nurses through home visits, about oral and dental health in children was investigated and all hypotheses were proven to be right.

As far as we know, there was no study through which non-dental health professionals performed a practice in the field in order to raise awareness of parents with children at such young ages in our country. Social and behavioral factors such as the parents' level of education and income, family's level of knowledge of the oral health including the feeding and cleaning habits, the number of children in the family, and the environmental conditions the child lives in are observed among the risk factors for early childhood oral and dental health (26,27). Preventive oral and dental health services in children primarily aim to reach the parent responsible for the primary care of the child and to increase knowledge and awareness on this issue

Table 2. Translation algorithm of educational content

Original English version	
Professional interpreter	Pediatric dentist with good command of English
Combined Turkish versions as a draft	
A pilot study of the Turkish version was performed with 10 nursing students and 10 parents	
Editing	
Test-retest (internal consistency)	
The final Turkish version translated into English by a professional interpreter and compared with the original version	

Table 3. Topics in training modules and questions in nursing students'survey

Module 1 (N=5): An introduction to infants' and young children's oral health
How can health professionals promote the oral health of infants and children?
Which group of children is especially vulnerable to oral disease?
What is the most common chronic childhood disease among children?
What types of medications are most likely to cause intrinsic staining of the teeth if taken
during tooth formation?
Which of the following is a potential outcome of oral health problems in young children?
Module 2 (N=9): Managing infants' and young children's oral health
Dental caries is?
What should health professionals do if they encounter a young child whose teeth
have not erupted within 6 months of the schedule?
When does primary tooth eruption typically begin?
Which of the following is NOT recommended to reduce teething discomfort?
Why is the oral screening important?
How should an infant or child under age 30 months be positioned during the oral
screening?
When should the first oral health examination performed by a dentist?
How often should children receive oral examinations performed by a dentist?
What is anticipatory guidance?
Module 3 (N=9): Oral conditions and abnormalities
How should a child's primary teeth appear?
How should an infant's or young child's healthy lips and tongue appear?
How should a child's healthy facial bones usually appear?
Which of the following is NOT a risk factor associated with early childhood caries?
What typically happens when tooth decay is not treated?
What is dental hypoplasia?
What causes fluorosis?
What can cause extrinsic coloration?
How does candidiasis appear?
Module 4 (N=7): Prevention of oral diseases
What is dental plaque composed of?
What happens if dental plaque is left undisturbed?
When should parents begin cleaning their infant's teeth?
When are children able to clean their teeth effectively without help?
How does drinking fluoridated water affect children?
At what age should fluoridated toothpaste be introduced?
What kinds of snacks should young children be encouraged to eat?

Table 3. Continued

Module 5 (N=6): Non-nutritive sucking habits
Which of the following benefits can non-nutritive sucking provide for infants and young children?
What proportion of children who suck fingers or a thumb discontinue the habit by age 4?
Which of the following factors have NOT been associated with prolonged non-nutritive
sucking habits?
What are the effects of non-nutritive sucking habits on developing teeth in infants and
children under age 3?
Which of the following does NOT determine the ways in which teeth change as a result
of non-nutritive sucking habits?
Which of the following is NOT necessary for an intervention to help a child stop a
non-nutritive sucking habit?
Module 6 (N=10): Oral Injury
What percentage of young children may experience injuries to the primary teeth?
In what age group does injury to the primary teeth occur most often?
Which of the following is NOT appropriate anticipatory guidance for health professionals
to provide parents?
What should a health professional do if he or she suspects child abuse or neglect?
In infants and young children, which teeth are most often affected by oral injury?
What causes discoloration of primary teeth?
What dictates the intervention strategy for injured primary teeth?
How long after oral injuries occur should they be assessed?
Which of the following statements are true in the case of an avulsed primary tooth?
Which of the following should a health professional NOT advise a parent to do in the
case of an avulsed permanent tooth?
Module 7 (N=4): Infants and young children with special health care needs
Which of the following may affect oral health?
What can bruxism lead to?
What can cause gingival overgrowth?
How can health professionals help parents ensure that their child with special health care needs experiences optimal oral health?

(28). This study was initiated by foreseeing that it would be beneficial that nurses took an active role in preventive oral and dental health guidance services for parents following the experiences they would gain by expanding their curriculum.

The necessity of integration of oral and dental health as a part of general health with primary healthcare services is an issue that has been studied in many studies globally (29-31). In the prevention of ECC, as well as general practitioners and pediatricians, with whom family and child meet before the dentist in the health system, nurses, too, have an advantageous position in terms of information, early diagnosis, and anticipatory guidance (32). This kind of integration concept requires a complex structure and should be approached from different perspectives. Common barriers to integration are observed as the absence of appropriate health policies and the lack of education of non-dental health professionals in oral health (33). In a study conducted in Turkey, (25) it was presented that pediatric nurses had insufficient knowledge of oral and dental health in newborns and children.

Table 4. Questionnaire of parents

Which of the following is one of the results of oral health problems in children?
Dental decay is…
When do baby teeth usually start eruption?
Which of the following is not recommended for comforting the child during teething?
When should a child first visit the dentist?
How often should child visit the dentist?
How a child's baby teeth should look like?
Which of the following is not a risk factor for early childhood caries?
When should parents begin to clean the baby's teeth
When children can clean their teeth effectively without help?
When should children start to use fluoride-containing toothpaste?
Which kind of snacks should children be encouraged to eat?
When should oral injuries be examined after they occur?
Which of the following may affect oral health?

In 1986, the American Academy of Pediatric Dentistry recommended that children's first dentist visit should be performed before the age of 1 (34). In our country, the first encounter of a child with the dentist occurs if the oral and dental problems catch the attention of the parents or when these problems progress enough to affect the daily life of the child. The insufficient number of pediatric dentists, the unwillingness of general dental practitioners to care for pediatric patients, and the difficulty experienced by families in accessing an institution providing service for the dental health of their children due to geographical and socioeconomic barriers are among the factors that require the scope of general health services to be changed in preventing ECC. In the report published by the Organization for Economic Cooperation and Development and the European Union (EU), it is stated that due to the income levels, geographical conditions, and the limitations of the health system of 28 member countries of the EU, the unmet oral health needs are disadvantageous to the low-income group, according to the data of 2014 (35). There are studies presenting the prevalence of S-ECC as 51% (36), %78.57 (37), and %61 (38) in Turkey. Considering that these studies were performed on patients presented to dental

Table 5. Demographic variables of the study

	Age (mean ± SD)	Gender (N/%)		Education level (N/%)	
		Female	Male	Female	Male
Children	18.92±9.96 months	93/51.7	87/48.3		
Nursing students	21±1.2 year	46/76.7	14/ 23.3	Senior class in nursing graduate programme	
Parents	32.25±7.32 year	173/96.1	7/3.9	Primary education 100/55.6	Primary education 81/45
				High school 60/33.3	High school 70/38.9
				University graduate 19/10.6	University graduate 27/15
				Postgraduate 1/0.5	Postgraduate 2/1.1

SD: Standard deviation

Table 6. Results of surveys of nursing students (median values of correct answers)

A health professional's guide to pediatric oral health management	Baseline pre-test median (min-max)	1 week later post-test **median (min-max)**
Module 1 (N=5): An introduction to infants' and young children's oral health	**3 (0-5)^{A}**	**5 (2-5)^{B}**
Module 2 (N=9): Managing infants' and young children's oral health	**6 (3-8)^{A}**	**8 (1-9)^{B}**
Module 3 (N=9): Oral conditions and abnormalities	**5 (2-8)^{A}**	**8 (3-9)^{B}**
Module 4 (N=7): Prevention of oral diseases	**5 (2-7)^{A}**	**7 (3-8)^{B}**
Module 5 (N=6): Non-nutritive sucking habits	**2 (0-5)^{A}**	**2 (0-5)^{A}**
Module 6 (N=10): Oral injury	**4 (1-7)^{A}**	**7 (1-10)^{B}**
Module 7 (N=4): Infants and young children with special health care needs	**2 (0-4)^{A}**	**3 (0-4)^{B}**
TOTAL (N=50)	**28 (15-33)^{A}**	**37.5 (20-47)^{B}**

*A-B: p<0.001, **A-A: p=0.169; p>0.05 p values by Wilcoxon Signed Rank test, min: Minimum, max: Maximum

Table 7. Results of the survey of parents (median values of correct answers)

	Baseline pre-test median (min-max)	One week after home visit post-test median (min-max)
14 questions prepared for parents	**6 (1-12)^{a}**	**10 (4-14)^{b}**

*a-b: p<0.001
p values by Wilcoxon Signed Rank test

clinics of universities in developed cities in Turkey, it could be projected that the number of children without access to dental health services across the country was much more. According to Petersen and Kwan (39), the population living in cities has higher rates of access to oral and dental health services compared to those living in rural areas in all income brackets.

Parents who participated in the study were of low socioeconomic status and their educational levels were mostly primary and secondary according to the data of the local Family Health Center. Considering the effect of social inequality on access to dental services, the selection of the sample group was both a strong feature of the study and a risk of bias. For the same reason, the fact that the method chosen to raise awareness in parents was through home visits and face-to-face interviews was among the factors that increased the effectiveness of the study in overcoming cultural and geographical barriers, but partially carried the risk of bias. Home visits are comprehended as a promising approach to the implementation of preventive health services for psychosocially and economically disadvantaged families (40,41). Accordingly, in our study, awareness was decided to be created through home visits.

The training modules used in the study were not only related to ECC, but also included the issues such as anomalies that could be observed in the oral cavity, prevention of oral diseases,

non-nutritive sucking habits, oral injuries, and the relationship between oral health and general health. English-Turkish and Turkish-English translations of these training modules were performed and standardized by different people who were competent in their fields. Quasi-experimental research designs test causal hypotheses and analyse changes in outcomes before and after an intervention (42). The effectiveness of these standardized training modules was evaluated by pre/post-testing on both nursing students and parents. The increase in the levels of knowledge and awareness of nursing students and parents educated by these students about the oral and dental health of children at the end of the tests indicated that these standard training modules were effective. Consequently, we foresee that applying the comprehensive education model in the study to larger populations in the future may be beneficial.

Study Limitations

There were some limitations in the study. Quasi-experimental methods are most often used when it is not possible to randomize individuals or groups to treatment and control groups (42). The lack of randomization in the nursing students and parent groups and the limited number of samples, the fact that there was no long-term test results and motivation follow-up of these groups, and the inability to determine the long-term effect of parent education on the oral health of the child due to the lack of registration and oral examination of the children of the parents who were educated were the limitations of the study. We think that these issues should be taken into consideration in future studies to be conducted on this subject. Home care practices are not a new concept for health legislation in Turkey (43). However, there is a need for more studies by considering the multidisciplinary approach in the process of creating appropriate health policies and their integration into primary health care services.

Conclusion

As a result of this study, which could be considered as a pilot study, it was foreseen that; The knowledge level of nurses about the oral and dental health of children could be increased through standardized training programs. Home visits and face-to-face interviews performed in order to raise awareness in parents were applicable within the scope of preventive dentistry in children. The non-dental primary care providers could be used in increasing the knowledge and awareness of parents about the oral and dental health of children.

Ethics

Ethics Committee Approval: The study was approved by the Karadeniz Technical University Committee on Human Research (approval number: 2015/42).

Informed Consent: Informed written consent was obtained from both nursing students and parents that participated in the study.

Peer-review: Externally peer reviewd.

Authorship Contributions

Concept: T.T., H.K.M., İ.K., Design: T.T., Ö.B., Data Collection or Processing: T.T., H.K.M., İ.K., A.K., Analysis or Interpretation: T.T., H.K.M., Ö.B., E.B., A.K., Literature Search: T.T., H.K.M., Ö.B., E.B., A.K., Writing: T.T., E.B.

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