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5th year group 13

**MOTHERS KNOWLEDGE IN PREVENTION OF SEVERE
EARLY CHILDHOOD CARIES**

Master thesis

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Kaunas, Lithuania 2019

LITHUANIAN UNIVERSITY OF HEALTH SCIENCES MEDICAL ACADEMY
FACULTY OF ODONTOLOGY
CLINIC FOR PREVENTIVE AND PEDIATRIC DENTISTRY

Mothers knowledge in prevention of severe early childhood caries

Master's Thesis

Student did the thesis (Signature)

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..... (Degree, name surname)

..... **20**.... (Day/month)

Kaunas, 2019

EVALUATION TABLE OF CLINICAL–EXPERIMENTAL MASTER’S THESIS

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No.	MT parts	MT evaluation aspects	Compliance with MT requirements and evaluation		
			Yes	Partially	No
1	Summary (0.5 point)	Is summary informative and in compliance with the thesis content and requirements?	0.3	0.1	0
2		Are keywords in compliance with the thesis essence?	0.2	0.1	0
3	Introduction, aim and tasks (1 point)	Are the novelty, relevance and significance of the work justified in the introduction of the thesis?	0.4	0.2	0
4		Are the problem, hypothesis, aim and tasks formed clearly and properly?	0.4	0.2	0
5		Are the aim and tasks interrelated?	0.2	0.1	0
6	Review of Literature (1.5 points)	Is the author's familiarization with the works of other authors sufficient?	0.4	0.2	0
7		Have the most relevant researches of the scientists discussed properly and are the most important results and conclusions presented?	0.6	0.3	0
8		Is the reviewed scientific literature related enough to the topic analysed in the thesis?	0.2	0.1	0
9		Is the author's ability to analyse and systemize the scientific literature sufficient?	0.3	0.1	0
10	Material and methods	Is the research methodology explained comprehensively? Is it suitable to achieve the set aim?	0.6	0.3	0
11	(2 points)	Are the samples and groups of respondents formed and described properly? Were the selection criteria suitable?	0.6	0.3	0
12		Are other research materials and tools (questionnaires, drugs, reagents, equipment, etc.) described properly?	0.4	0.2	0
13		Are the statistical programmes used to analyse data, the formulas and criteria used to assess the level of	0.4	0.2	0

		statistical reliability described properly?			
14	Results (2 points)	Do the research results answer to the set aim and tasks comprehensively?	0.4		0.20
15		Does presentation of tables and pictures satisfy the requirements?	0.4		0.20
16		Does information repeat in the tables, picture and text?	0		0.20.4
17		Is the statistical significance of data indicated?	0.4		0.20
18		Has the statistical analysis of data been carried out properly?	0.4		0.20
19	Discussion (1.5 points)	Were the received results (their importance, drawbacks) and reliability of received results assessed properly?	0.4		0.20
20		Was the relation of the received results with the latest data of other researchers assessed properly?	0.4		0.20
21		Does author present the interpretation of results?	0.4		0.20
22		Do the data presented in other sections (introduction, review of literature, results) repeat?	0		0.20.3
23	Conclusions (0.5 points)	Do the conclusions reflect the topic, aim and tasks of the Master's thesis?	0.2		0.10
24		Are the conclusions based on the analysed material? Do they correspond to the research results?	0.2		0.10
25		Are the conclusions clear and laconic?	0.1	0.1	0
26	References (1 point)	Is the references list formed according to the requirements?	0.4	0.2	0
27		Are the links of the references to the text correct? Are the literature sources cited correctly and precisely?	0.2	0.1	0
28		Is the scientific level of references suitable for Master's thesis?	0.2	0.1	0
29		Do the cited sources not older than 10 years old form at least 70% of sources, and the not older than 5 years – at least	0.2	0.1	0

		40%?			
Additional sections, which may increase the collected number of points					
30	Annexes	Do the presented annexes help to understand the analysed topic?	+0.2	+0.1	0
31	Practical recommendations	Are the practical recommendations suggested and are they related to the received results?	+0.4	+0.2	0
General requirements, non-compliance with which reduce the number of points					
32	General requirements	Is the thesis volume sufficient (excluding annexes)?		15-20 pages (-2 points)	<15 pages (-5 points)
33		Is the thesis volume increased artificially?	-2 points	-1 point	
34		Does the thesis structure satisfy the requirements of Master's thesis?		-1 point	-2 points
35		Is the thesis written in correct language, scientifically, logically and laconically?		-0.5 point	-1 points
36		Are there any grammatical, style or computer literacy-related mistakes?	-2 points	-1 points	
37		Is text consistent, integral, and are the volumes of its structural parts balanced?		-0.2 point	-0.5 points
38		Amount of plagiarism in the thesis.	>20% (not evaluated)		
39		Is the content (names of sections and subsections and enumeration of pages) in compliance with the thesis structure and aims?		-0.2 point	-0.5 points
40	Are the names of the thesis parts in compliance with the text? Are the titles of sections and subsections distinguished logically and correctly?		-0.2 point	-0.5 points	
41	Was the permit of the Bioethical Committee received (if necessary)?			-1 point	
42	Are there explanations of the key terms and abbreviations (if needed)?		-0.2 point	-0.5 points	
43	Is the quality of the thesis typography (quality of printing, visual aids, binding) good?		-0.2 point	-0.5 points	

*In total (maximum 10 points):	
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****Remark:*** *the amount of collected points may exceed 10 points.*

Reviewer's comments:

Reviewer's name and surname Reviewer's signature

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DĖL PRITARIMO TYRIMUI

LSMU Bioetikos centras, įvertinęs Salin Zindrou pateiktus dokumentus, studentės tiriamajam darbui tema „Mothers knowledge in prevention of severe early childhood caries“ pritaria*.

dr. Eimantas Pocius

* Pastaba: Šis pritarimas neatleidžia tiriamąjį mokslinį darbą vykdančių asmenų nuo prievolės laikytis Bendrojo duomenų apsaugos reglamento nuostatų ir nuo atsakomybės gauti nacionalinio arba regioninio bioetikos komiteto leidimą, jei toks leidimas būtinas pagal LR Biomedicininų tyrimų etikos įstatyme numatytus reikalavimus.

SUMMARY

Author: Salin Zindrou

Title: Mothers knowledge in prevention of severe early childhood caries

Sampling and methods of research:

The respondents will receive an explanation of the purpose of this questionnaire and, only after consent has been obtained; they will be asked to complete the self-administered anonymous questionnaire. Data were processed and analyzed using IBM SPSS Statistics, version 25. The descriptive analysis included the calculation of the prevalence of mothers with young children.

Study participants:

Mothers at Panemune primary school and at Mažylis maternity hospital.

Results: Children first visited the dental clinic around the age 13-36 months ($p=0.042$), mother's felt like they had enough knowledge however the mean age of tooth brushing started around 24 months. The children who were given nocturnal beverage with cariogenicity were likely found to have S-ECC ($p=0.023$). The mothers who had enough knowledge about oral health and believed in vertical transmission kissed their child on the lips ($p=0.003$)

Conclusions:

In conclusion, it was found that mothers who are employed and who had higher monthly income tend to take their child to the first dental visit earlier ($p<0.05$), mothers who have at least more than one child take their children for prophylaxis less often ($p<0.05$). 2/3 of the mothers of children with S-ECC fed their children with nightly bottle ($p<0.05$). However, mothers in a marriage tend to brush their children's teeth more often ($p<0.05$). Despite the fact that 2/3 of mothers have knowledge about bacterial vertical transmission, they do not avoid kissing their child on the mouth ($p<0.05$).

Overall, mothers with better dental knowledge about dental caries prophylaxis tend to have less dental fear and prefer to use toothpaste with fluoride for prevention ($p<0.05$).

ABBREVIATIONS

Severe, early childhood, caries, prophylaxis, knowledge, oral health, mutans streptococci

INTRODUCTION

Early childhood caries (ECC) is defined when there is presence of more than 1 decayed missed filled tooth surfaces (DMFTs) in primary teeth between birth and 71 months (5 year) old child ^[1] and S-ECC is defined as caries in smooth surfaces and/or of anterior teeth of maxilla. The score is \geq to 4 in age 3, $>$ than 5 in age 4 and equal to 6 in age 5. ^[2]

There are several terminologies for early childhood caries (ECC), previous terminologies have been “nursing caries”, “baby bottle tooth decay” and “comforter caries”. The best terminology is early childhood caries, which was invented by The Center for Disease Control and Prevention 1994.

Early childhood caries has multifactorial nature; it is worldwide and it is 20 times more common than juvenile diabetes, 7 times more common than hay fever, 5 times more common than asthma and 4 times more common than having childhood obesity. ^{[1] (2)}

Perception of the fact and knowledge of S-ECC such as prevention, treatment and diagnosis among healthcare workers needs to be increased, more so prophylaxis needs to be improved. ^{[3] (1)}

American Academy of Pediatric Dentistry claims that today it is an international threat in both developing, 1-12% and non developing countries 70%, which is an infectious disease that plays a big role affecting a child's health. ^{[1] (3) [3] (2) [4]}

In 2017 *Anil S. et al.*, stated according to previous studies the prevalence and epidemiology of ECC or S-ECC differentiates between continents. Sweden had 11.4% comparing to Italy that had 7-19%, Greece 36%. Brazil had 45.8%, Israel 64.7% and India 51.9%. Highest prevalence of ECC was found to be in the Middle East (Palestine) with 76% and UAE 83%. ^[5]

Early childhood caries is a public health problem that has a great impact on the individual. The child usually suffers from pain, in the oral cavity and is restricted physically. It is harmful to a child's growth rate development, and causes reduced life quality. ^[6]

Caries can be induced by biological and environmental factors and in many studies it has been researched to provide more information about individuals with higher risk of caries. The result of the studies can further target causative factors and it can be implemented in prevention of dentistry programs. ^[7]

Hypothesis:

Severe early childhood caries (S-ECC) is a chronic infectious disease, which can be prevented; the predictor of the disease is the oral flora transmitted from the mother. Poor hygiene and maintenance increase the risk of transmission to the child and the risk of caries.

Oral health should be the primary goal for every mother in order to teach the child, but according to

our aim the data is based on evaluation of mother's oral habit skills and knowledge of their child's oral care in order to prevent S-ECC.

Aim:

To assess the knowledge of mothers in prevention of severe early childhood caries.

Objectives:

1. To evaluate mother's knowledge about S-ECC risk factors according to; Employment/occupation, mother's oral hygiene habits, marital status, socioeconomic status and amount of children in the family
2. To evaluate mother's knowledge about behavioral risk factors of S-ECC according to self-perceived their child's dental status
3. To evaluate mother's knowledge about biological risk factors of S-ECC
4. To evaluate possible correlation between mother's knowledge about dental care prophylaxis and their own behavior related to oral care.

LITERATURE REVIEW

Associated risk factors, socioeconomic impact and mothers knowledge

World health organization (WHO) describes that dental caries is caused by multiple factors, which is the result of ecological shift of dental biofilm that can be found on the tooth surfaces. ^{[8] (1)} Caries is one of the most common oral diseases in childhood and adolescence. It is expensive and time-consuming treatment. ^[9] It is presented as localized dissolution and destruction of mineralized tissues. The causes of early childhood caries (ECC) are due to the host factor on the tooth surface being susceptible to the environmental factors. The host factors can be teeth with developmental defects and are predisposed to caries. Patient with increased risk to developmental defects are in mothers with pre and/or postnatal illnesses and malnutrition. A child's behavior, e.g. poor oral hygiene, bad diet, improper preventive services in dental visits, or genetics can be associated with caries.

Environmental factors that attract to the tooth biofilm are fermentable carbohydrates, which is cariogenic. Usually, saliva has protective characteristics that include flow, protein, buffer and minerals to promote remineralization.

However, intake of sugars at night/bed-time when saliva secretion is lower and increases the risk to cause carious diseases. Other environmental factors include socioeconomic status and family background (low income and educational level, unemployed, single-parents, many children in the household)

Severe ECC is linked to economical and familial stresses, mother's psychological distress and a child's difficult temperament. ^{[8] (2)}

In a cross-sectional study by *Marvin So et al.* it was aimed to examine association between ECC, mouth pain and malnutrition. 1407 children from birth until the age of 6 years old were conducted in a study program for analysis and examination. It was found that caries that is not prevented from progression nor treated could cause oral infections, pain, and malnutrition and reduce the potential for children to become more involved in educational and social programs. A total of 65.4% children had caries and 33.8% had associated mouth pain, this was however more commonly found in the children who were 3-6 years old. The children who had mouth pain were also associated with underweight and sleeping difficulties. ^[10] However, according to *Chamber C et al.* showed that a child whom demonstrated a fussy behavior and was complaining about discomforts in the body is hard to distinguish from other sources of pain. From the age of birth to two years old, pain associated with tooth eruption was more applicable than chronic caries. ^[11]

Moreover, a study in Lithuania 2014 written by *K. Saldūnaitė et al.*, it was explained about parental attitudes regarding their children's oral hygiene. Mothers, parents or guardians play a big role in

maintaining children's oral health. A guardian builds an environment for the child to enable healthy lifestyle, forming habits and self-esteem. However, socioeconomic and educational status may have an impact on the view of motivation for preventive measures and positive attitude. In the study 1248 parents were enrolled and it showed that parents with higher educational level and high socioeconomic status went to check-ups more regularly and were more motivated about oral hygiene comparing to those with lower educational and socioeconomic status. ^[12]

Further more, *Zafar et al.*, found out that the correlation of ECC and S-ECC occurring depends on parental education level. Children with parents or siblings who have had or has carious lesion are in greater risk of also having it, it is passed on in generations. It is not only the mother's oral micro flora that is a cause of caries but also her knowledge. Children who are born in families with poor economy, single parent household, or low educated parents; especially mothers are usually found having ECC. Socioeconomic status does not only increase the risk of caries, it also causes; lower birth weight, distress in children that increase absence from school, which in turn leads to lower educational level. ^[13] A case report written by *Henk et al.*, about children with dental caries due to its multifactorial nature, one important factor is detecting in early stage is child abuse and neglect. In the study a Caucasian 4 year-old boy was examined due to several tooth extractions and severe caries that were found to be due to neglect, social services were contacted and after one year the child had no caries and was brushing his teeth twice a day. The case report in total involved examining 66 children and 38 of the children who reported child abuse was related with severe dental caries. This included the neglect of oral hygiene, tooth brushing, and poor diet. ^[14] More so, a case control study in 2014 states that basic regime of dental care is; regular tooth brushing, dental visits, requires parents time, knowledge, motivation and skills. 28 children who had caries comparing to 26 healthy children it was found that parent's encouragement has an impact on children's oral status. ^[15]

Behavior regarding nutrition, oral hygiene habits and fluoride usage

At time of infancy proper diet and oral hygiene habits needs to be established and maintained through early childhood. ^[16] ⁽¹⁾ S-ECC has been extended beyond the thought of improper oral hygiene; it is linked with poor nutrition and health status as well. ^[17] Meanwhile, *Davidson K. et al.*, in 2016 did a study to examine to association between Body Mass Index (BMI) and S-ECC. The children who were conducted in this study were ≥ 2 years old. Out of the 235 children, 141 had S-ECC and 94 did not have any caries at all. 34.4% of the children participating were overweight, with higher BMI. It is mentioned that previous reports have been made relating underweight and malnutrition with S-ECC, but overweight or higher BMI is correlated to S-ECC too. However, it has not been established whether there is any direct link between obesity and severe caries. The

outcome of this is due to poor socioeconomic status and low education level, and by over consuming carbohydrate-rich food, often snacking and improper health behaviors. ^[18]

In 2015 *W. Chaffee et al.*, did a cohort study that clearly showed that increased amount of sweetened food and drinks were related to caries. Feeding habits during first period of life has greater preference of continuation of poor habits. Secondly is the influence of *S. mutans*. In the study a research stated that S-ECC is more related to liquid cariogenicity sources rather than solid food cariogenicity. It is also known that mother's influence of her diet influences the child's behavior as well. ^[19]

Colak H. et al., explains in a review that a major factor of caries developing is fermentable carbohydrates. When a small size of sugar molecule present in the oral cavity it allows the enzyme amylase to split the molecule and prohibits it to be metabolized by bacterial plaque. This in turn leads to bacteria being able to produce acidic products which eventually causes demineralization of tooth surface, and increase risk of caries.

When relationship between sugar and poor oral hygiene habits, the correlation between caries formation and sugar intake is clearly marked. It is a known fact that the acids that are produced by bacteria persist for 20-40 minutes. ^{[20] (1)}

Neglecting fluoride usage and tooth brushing increases the risk of caries, and in children who do not brush their teeth before sleep. Fluoride usage is important to prevent caries in permanent dentition, and the most important act is to remineralize the enamel. According to studies, children that live in fluoridated areas have 50% less caries than non-fluoridated areas. ^[21]

American academy of pediatric dentistry points out the importance of parents aiding in tooth brushing when they are younger because they lack motivation. The behavior of parents towards their children includes assisting while tooth brushing twice a day, and it was found to be protecting from ECC.

Positive outcomes have been seen of mother's with good oral health and knowledge has well attitude and motivation, which eventually lead on to the behavior of the children. ^[22]

Breast and bottle-feeding

According to American Academy of Pediatrics (AAP) milk from mother is identified as the ideal nutrient for infants. It has been demonstrated that using milk from the mother has several benefits for the health of an infant, the mother and the society.

Pediatricians recommend breastfeeding for at least the first year of the child, ^[23]

However, according to a study by *Azevedo et al.*, prolonged breastfeeding has been reported risk factors for development of early childhood caries. S-ECC is highly linked with children who were breastfed more than 12 months. ^[24]

Moreover, *Olatosi et al.* conducted a study to find the association between ECC and breast/bottle-feeding. It is recommended by pediatricians or other healthcare professionals to continue for at least 6-12 months. Prolonged, unrestricted and nightly breastfeeding has been found to be a potential risk of caries. Use of bottle-feeding with sugary beverages and sweetened pacifiers are also a risk to case ECC. Determinately, nocturnal and frequency of breastfeeding was not associated with early childhood caries, however if it lasted more than 12 months children were found to be more likely to have risk of ECC. [25]

R. Tham et al. did a systemic review and meta-analysis in 2015 to find evidence between association of caries and breastfeeding. The evidence regarding infant breast or bottle-feeding is an inconsistent risk factor, however, it is the cariogenic bacteria in the child's oral flora adhering to the tooth surface and the frequency of feeding, more so nocturnal feeding that may lead to caries. Breast milk is nutritious and contains Lactobacilli, human casein and IgA, which actually inhibits growth of cariogenic bacteria. Further research needs to be understood in order to relate prolonged breastfeeding with increased risk of ECC. [26]

Biological factor and transmission of microorganisms in oral cavity

The main cariogenic microorganism is *S. Mutans* and *S. Sobrinus* and *Lactobacillus*. [27] These microorganisms produce acid that is found in the oral cavity and they tend to demineralize the tooth surface when fermentable carbohydrates are found. Investigations of oral flora have revealed that children with E-CC or S-ECC, *S. Mutans* accumulate to plaque flora. *S. Mutans* usually occurs in infants through an age-window. However, children with low infection levels are in lower risk of being infected and are also found to be in a lower risk of having caries.

Moreover, a child can be infected from the mother by vertical transmission, or any other caregiver. Evidence was found in studies where mothers *S. Mutans* were isolated and a child, which were found to be identical patterns. With more advanced technology, chromosomal DNA patterns or identical plasmids were found. [20] (2)

Researches have cleared the fact that *S. Mutans* is potentially transmissible, and mothers are a major source of early colonization. The way of transmission i.e. tastes the food before (to check the temperature or taste), sharing utensils (toothbrush, spoon, glass), etc. [16] (2)

Prenatal care, treatment and prevention of S-ECC

Dental caries is possible to prevent, but it is very difficult and straining on the child and parents. Yet another reason for early childhood caries is lack of preventive education of oral health. Poor knowledge and behavior in parents or guardians reflect the result in children.

Studies were made on educational program for mothers without further success, even changing dietary habits did not show any success because most of the parents knew that the cariogenic liquids

before bedtime that were given to the children were related to ECC. The first step of prevention was to target to microorganism *S. Mutans* by applying topical antimicrobial agents. [28]

According to American Academy of Pediatric Dentistry it is recommended for mother's whom are pregnant or have their first child in early age to attend oral health programs [29]

Fluoride is necessary to as prophylactic treatment since fluoride varnish increasing on tooth surfaces prevents early stages of demineralization. When the varnish hardens and it contacts with saliva, it lasts for a period of 1-7 days, which is a longer exposure than using toothpaste only that only lasts 10-15 minutes. However, the amount and concentration of fluoride used depends on the demineralized surfaces. [21] (2)

Edem et al. did an updated study in 2017 regarding S-ECC and stated that prevention of S-ECC needs to primarily start by prenatal care, which is during pregnancy. The mother needs informed and given programs regarding oral health. However, vertical transmission is a risk factor of bacterial acquisition and colonization but it is yet not completely clarified. Mother's need to go to prenatal dental visits to understand importance of regular going to the dentist for; examinations, prophylaxes and prevention of caries within the first year of the child. To reduce or completely prevent vertical transmission of *S. Mutans* from mother to child, educational programs should be taken during pregnancy including; diet, oral hygiene, dental treatments. [30]

MATERIAL AND METHODS

Data analysis

Data were processed and analyzed using IBM SPSS Statistics, version 25.

The descriptive analysis included the calculation of the prevalence of mothers with young children. Categorical and ordinal data were presented as percentages (N, %). Comparisons were done using the Chi-Square Test, Fisher's exact test and Mann-Whitney U Test.

The statistical significance level was set at 95% ($p < 0.05$).

Survey

The survey was conducted in January 2019 in Kaunas, Lithuania. Anonymity was ensured for all participants and it was voluntary to participate. The survey was handed out to mothers in Panemune primary school with children aged from within a year to 15 years of age. It was also shared in Mažylis maternity hospital.

The questionnaire was in Lithuanian language and it was including questions regarding mother's marital status, income and knowledge about dental health.

A total of 103 questionnaires were shared, 50 at Panemune primary school whom answered 33 and 70 at Mažylis maternity hospital. 3 answers were incomplete and only 100 answers were used in this survey.

Ethical approval

Approval was obtained from bioethics department of Lithuanian University of Health Sciences 2018-12-11. Reference nr. BEC-OF-41

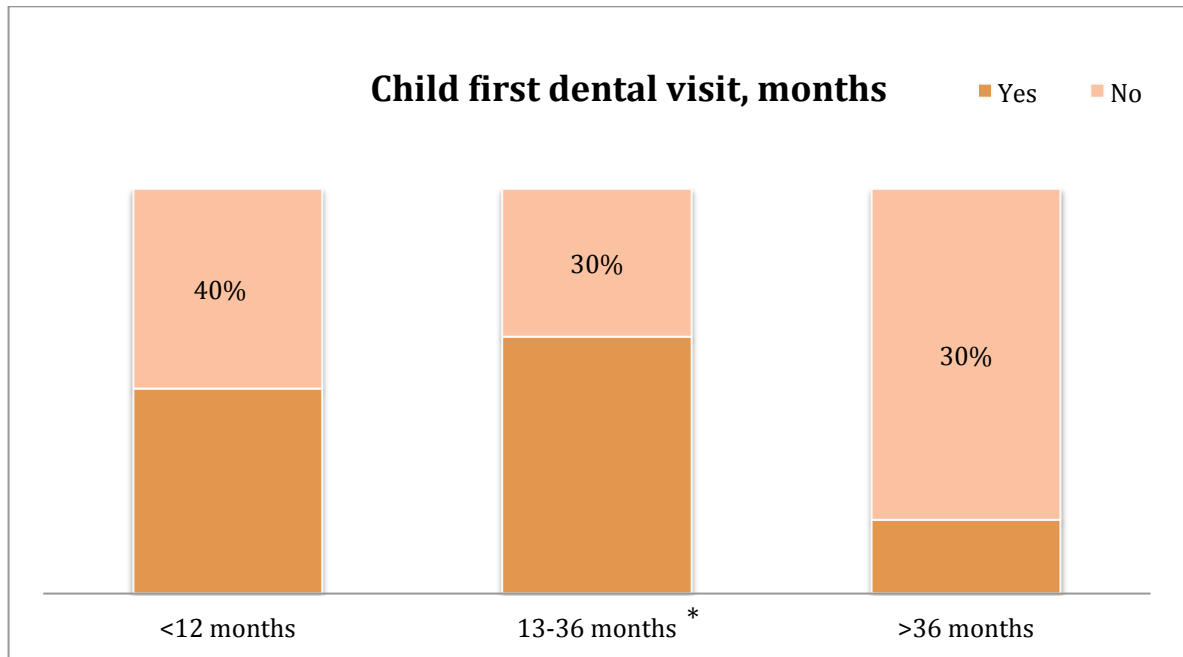
RESULTS

DEMOGRAPHIC

Variable	Frequency	Percentage	Total
Living place			
Urban	89	89%	100%
Rural	11	11%	
Mothers age			
<30	31	31%	100%
30 – 45	68	68%	
> 45	1	1%	
Employment/occupation			
Yes	90	90%	100%
No	10	10%	
Monthly income			
<350€	32	32%	100%
>350€	68	68%	
Amount of children in the household			
1 child	58	58%	100%
2 children	30	30%	
3 children	12	12%	

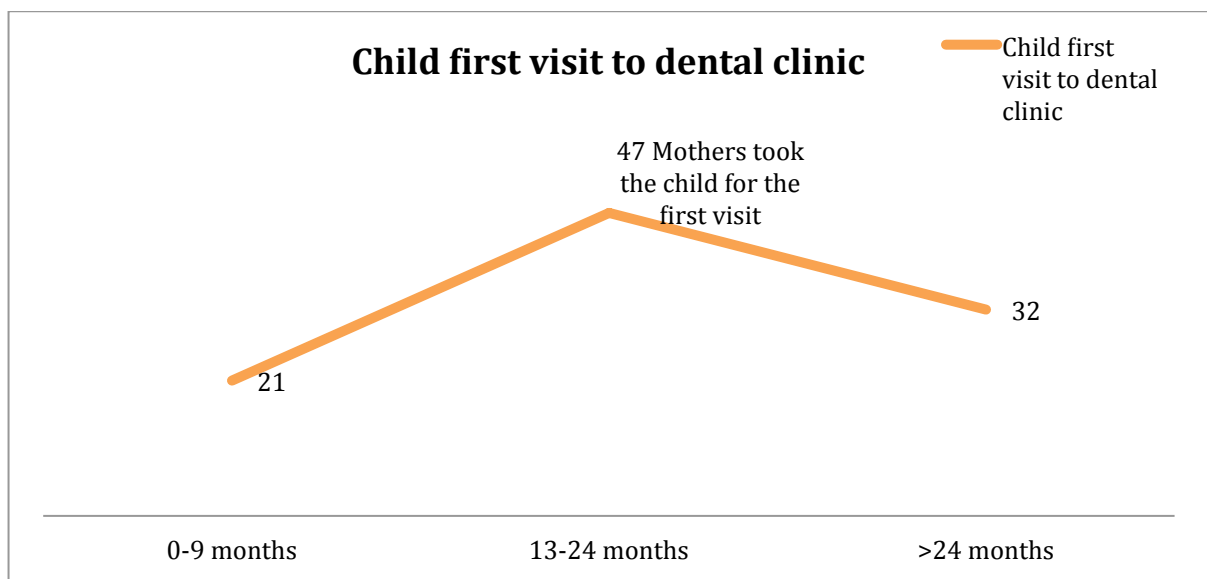
In this survey, which was conducted with a questionnaire to mothers, a total of 103 questionnaires were shared, 50 at Panemune primary school whom answered 33 and 70 at Mažylis maternity hospital. 3 answers were incomplete and only 100 answers were used.

BEHAVIORAL



$\chi^2=6.336$, $df=2$, $p=0.042$; * $p<0.05$

Mother (52%) takes the child first dental visit within 71 months, most common period was between 13-36 months.

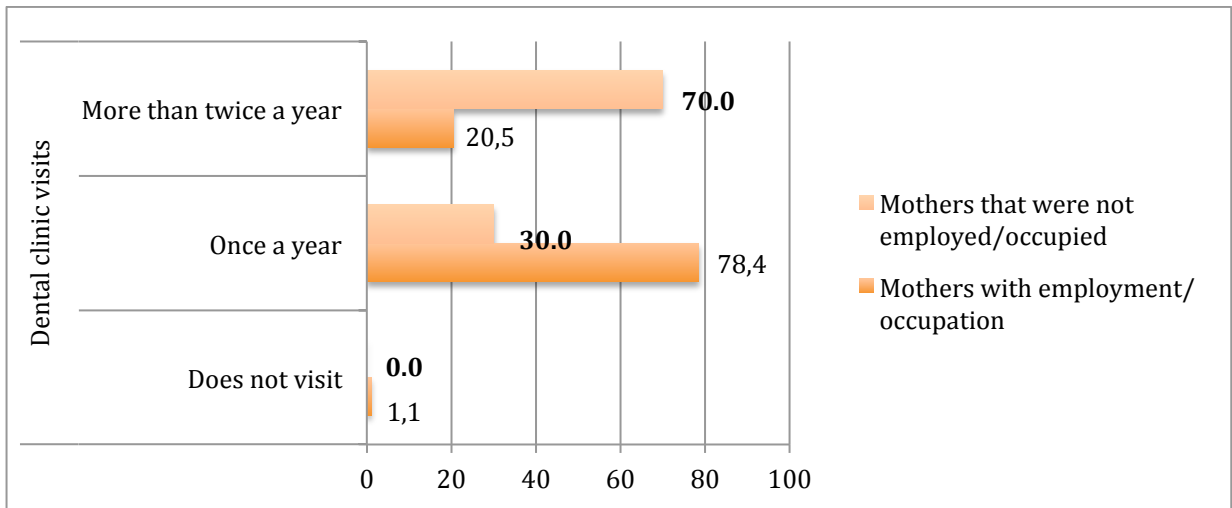


In our results it was found was that the mean age for mothers taking their child to the first dental visit was about 26 months.

Mean: 26,52

Std.Deviation: 14,126

Missing: 18 not answered – children had never been to the dentist before.



A statistical significance ($p=0.003$) was found in mothers with employment/occupation visited the dental clinic at least once a year.

Variable	Employment/occupation		Total N (%)	P-value
	Yes	No		
Child first visit to dental clinic				
<12 months	90,2%	9,8%	100,0%	0,0042
13-36 months *	94,0%	6,0%	100,0%	
>36 months	66,7%	33,3%	100,0%	

Mother's with employment/occupation tend to take their child to the dentist for the first time during 13-36 months, ($p<0.05$).

Variable	Monthly income		Total N (%)	P-value
	<350€	>350€		
Child first visit to dental clinic				
<12 months	39,0%	61,0%	100,0%	0,429
13-36 months	28,0%	72,0%	100,0%	
>36 months	22,2%	77,8%	100,0%	

$\chi^2=1,693$ $df=2$, $p=0,429$; * $p>0.05$

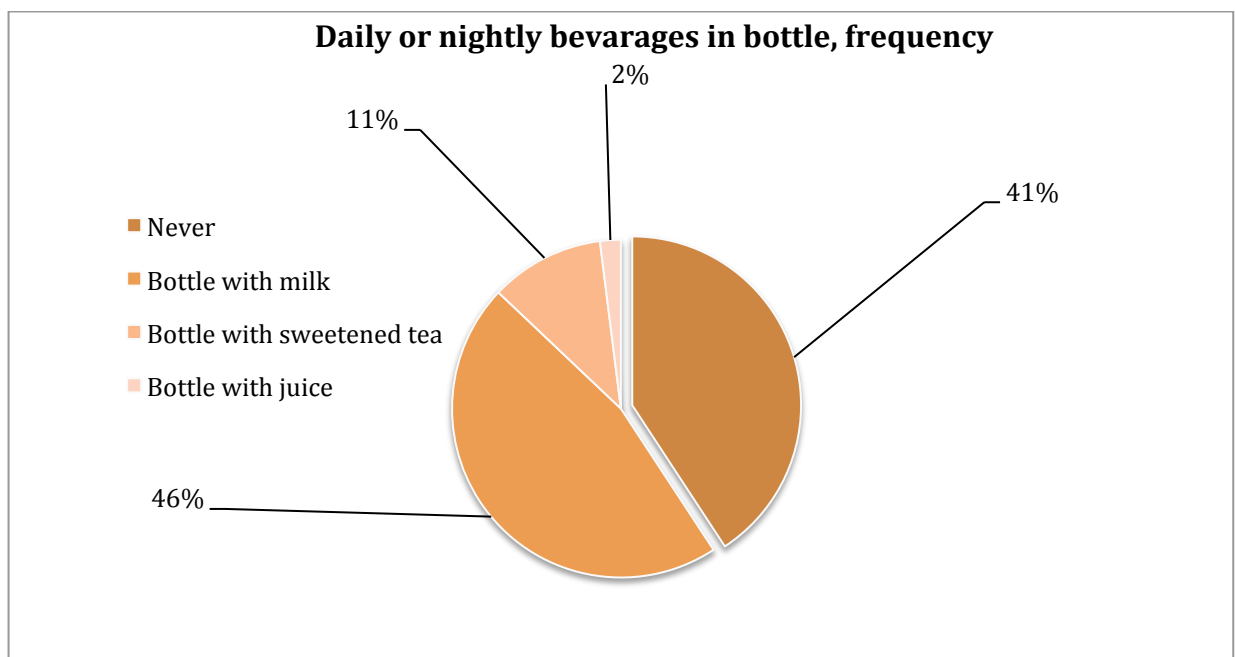
Mother's socioeconomic status did not have an affect on the timing of child's first dental visit.

Variable	Amount of children N (%)			Total N (%)	P- value
	1	2	3		
Frequency of dental visits					
Does not visit	88,9%	5,6%	5,6%	100,0%	0.040
	27,6%	3,3%	8,3%		
Once a year	48,2%	39,3%	12,5%	100,0% *	
	46,6%	73,3%	58,3%		
Twice or more	57,76%	26,9%	15,4%	100,0%	
	25,9%	23,3%	33,3%		

$\chi^2=10,046$ $df=4$, $p=0,040$; * $p<0.05$

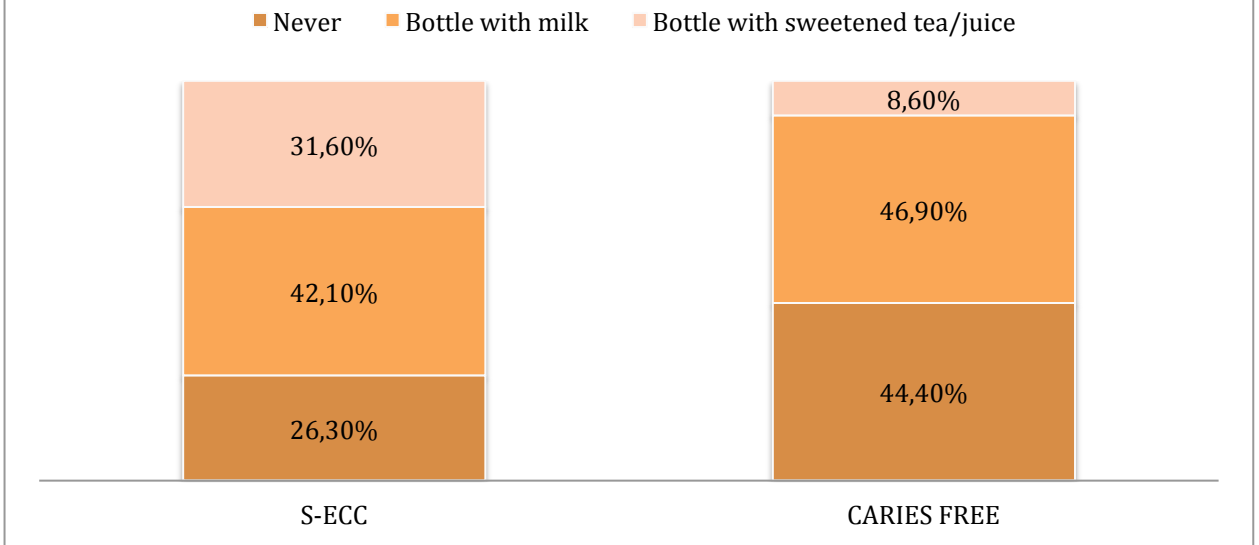
In our results it was found that mothers that had 1 child would take the child less to the dentist than having 2 children or more where it was significant that a mother would take their children to the dentist at least once a year.

NUTRITIONAL HABITS



Out of 100 mothers it was found that the frequency of bottle-feeding was the highest in the children that were given bottle with milk (46%), almost equal amount to never given any bottle to children (41%)

Did child have bottle tooth decay by drinking daily/night bevarages



$\chi^2=7,539$ df=2, p=0,023; * p<0.05

It was compared between the child having daily or nightly beverages with baby bottle decay. The result was statistically significant with a p value of <0.05. 42% of the children that were given bottle with milk and 26.30% that were given sweetened tea were related with baby bottle tooth decay.

MOTHERS ORAL HYGIENE HABITS

Variable	Mother tooth brushing frequency			Total N (%)	P-value
	N (%)				
	1/day	2/day	3-4/day	Frequency N (%)	
Child tooth brushing frequency					
Does not clean	25,0%	62,5%	12,5%	100,0%	0.001
	22,2%	5,9%	16,7%		
Once a day	30,4%	69,6%	0%	100,0%	
	77,8%	18,8%	0%		
Twice a day	0%	75,3%	83,3%	100,0% *	
	0%	64%	5%		

$\chi^2=0,460$ df=4, p=1,04; * p<0.05

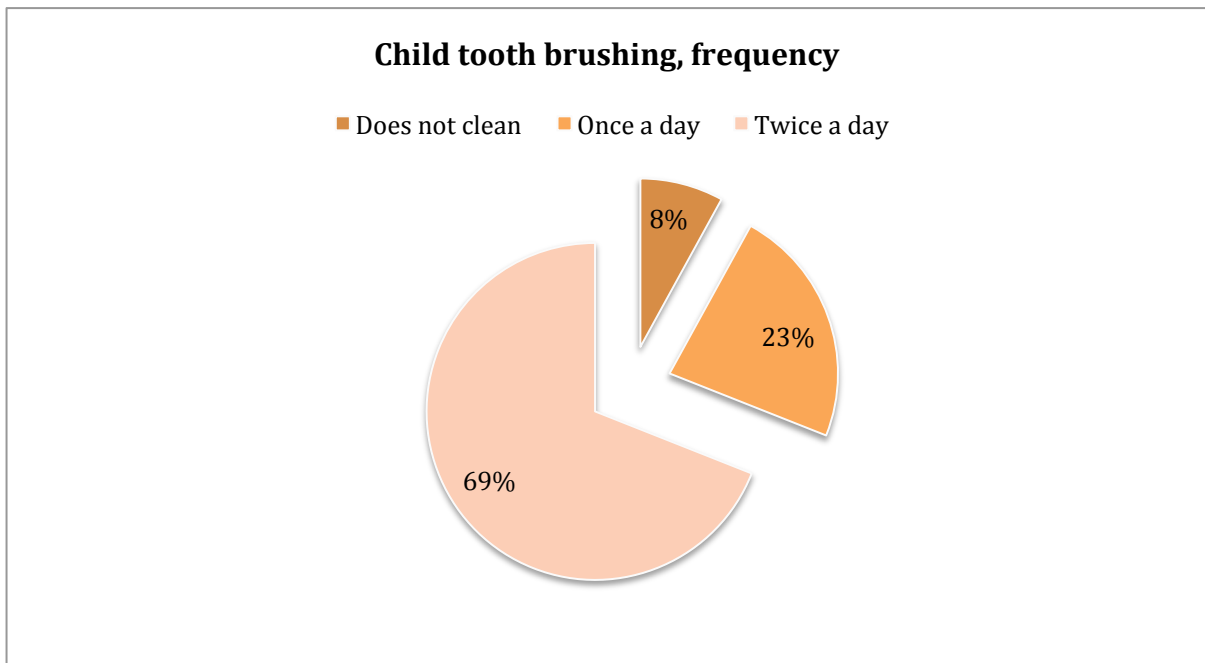
Mothers oral hygiene habits such as tooth brushing was compared to the frequency of the child

tooth-brushing, it was statistically significant that the mother who cleaned once a day also had the child cleaning once a day 77.8% and the mothers who cleaned twice a day 75.3% also had children cleaning twice a day. $P < 0.05$.

Nonparametric

Correlations $r=0.4$, $p < 0.001$ (,000 - $p < 0.001$)

Frequencies $M(SD)$ 21.8(16.4) (median - 24 months)



Child tooth-brushing frequency is statistically insignificant which means that there is not significant difference between the child habits and frequency of tooth brushing.

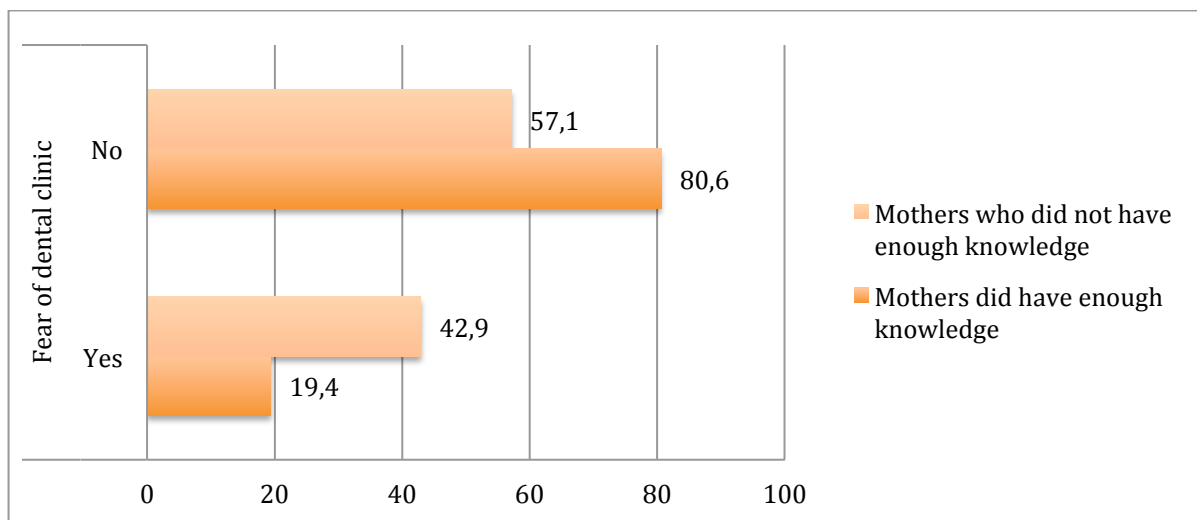
69% of the children brush their teeth twice a day. The median age of started brushing teeth is 24 months.

Variable	Marital status		Total N (%)	P-value
	Married	Partnership		
			Frequency N (%)	
Parents help child brush teeth				
Does not help	84,0%	16,0%	100,0%	0,837
Once a day	79,4%	20,6%	100,0%	
Twice a day	78,0%	22,0%	100,0%	

$\chi^2=0,355$ df=2, p=0,837; * p<0.05

It was compared whether there was any difference from mother's being in a stable marriage or in a relationship if it had any impact on how frequent the child's tooth brushing habits were. P>0.05

MOTHERS BEHAVIOR



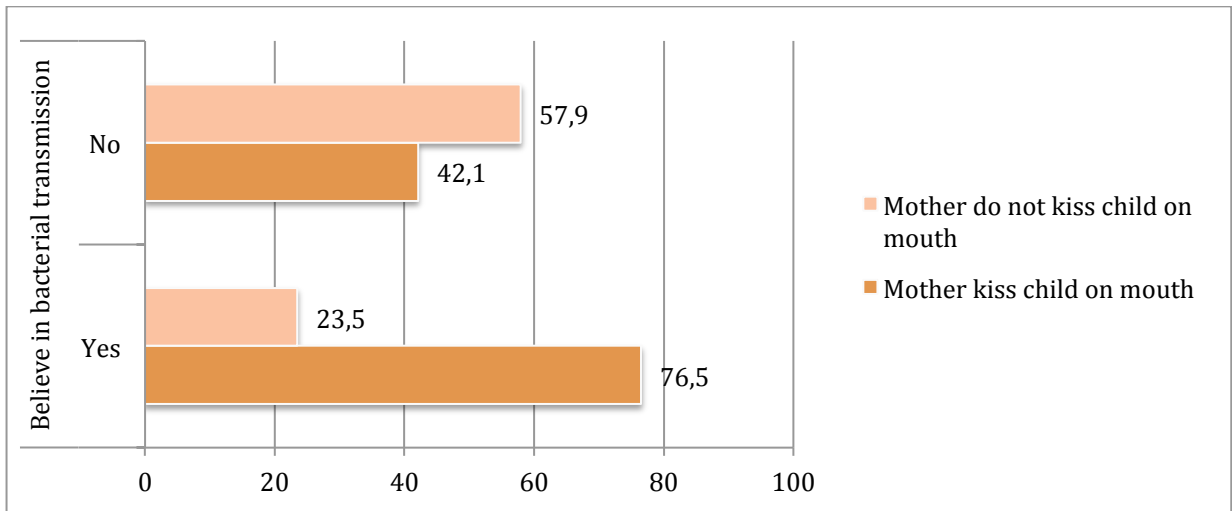
Significance was found in mothers who did not have enough knowledge was correlated with dental fear. 14(19.4%) of the mothers who had enough knowledge were afraid of visiting the dental clinic and 12(49.9%) of the mothers did not have enough knowledge but were afraid of visiting the dental clinic.

More importantly, mothers who had enough knowledge were not afraid of visiting the dental clinic for treatment or prophylaxis 58(80.6%), 16(57.1%) mothers with not enough knowledge were not afraid. (p=0.017).

Variable	Child dental fear		Total N (%)	P-value
	Yes	No		
			Frequency N (%)	
Mother dental fear				
Yes	50,0%	50,0%	100,0%	0,015
No	24,3%	75,7%	100,0%	

Mother dental fear is implemented into the child, which can be seen in these results with a P<0.05. Almost half of the children (24,3%) were also afraid who had a mother that was afraid (50,0%).

MOTHERS KNOWLEDGE



In this result it was clear is that mothers knew about bacterial transmission but tend to kiss their children on the mouth. 70(70.0%) of 100 mothers answered yes and 30(30.0%) answered no, (p=0.003).

Variable	Mothers knowledge N (%)		Total N (%)	P-value
	Yes	No	Frequency N (%)	
Toothpaste with Fluor				
Yes	73,6%	27,4%	100,0%	0,825
No	70,4%	29,6%	100,0%	

Mother's who felt that they did have enough knowledge, or did not have enough knowledge was not correlated to the usage of fluoride toothpaste. P value >0.05

DISCUSSION

This study was done to research if Lithuanian mother's knowledge level about oral hygiene habits actually had an impact on their children's, or if it was due to lack of motivation or socioeconomic status that lead to S-ECC. It was also researched to know their preventive knowledge.

As seen in our results, many of the mother's felt like they were well aware of the frequency of tooth brushing, dental visits and the use of fluoride toothpastes. The study was compared with other articles. 103 mothers participated, however only 100 results were used in the research. Most of the mothers lived in urban area and were in the age 30-45 years old. 90% of the mothers had employment/occupation and an income over 350€. It was more common for a mother to have 1 child than >1.

In a recent study 2019, by *ElKarmi R. et al*, expectant mothers were questioned regarding knowledge in prevention of childhood caries, out of the 400 mothers, 59% brushed their teeth twice a day, 16% of the mothers said that tooth brushing should start at time of eruption of deciduous teeth and 68% believed that it is not necessary to stop breast or bottle-feeding after 2 years of age. According to previous studies mentioned, improper oral hygiene, bottle-feeding and carbohydrate food are risk indicators for ECC. However, the expectant mothers knew that sugary junk food was cariogenic. It was found that low educated knew less about oral hygiene habits comparing to higher level of education. More over, they did not know the first time of dental visit and normally visited when the child was in pain.^[31] Further more, comparing to our results we can see that mothers that had enough knowledge knew about cariogenic factors and their children were not breast/bottle fed. However, it was statistically significant that those children who were given bottle with milk or sugary beverages before sleep was found to have baby bottle decay. The mothers that were questioned took their child to the dentist for the first time during a period of 13-36 months. More over, another study that was compared to, in 2018 by *AlShahrani et al*, majority of the children were taken to the dentist for the first time between the ages 3-6 years. The parents were unaware of the importance of when to take the child to the dentist for the first time, and the first visits were when the child was in pain. Only 8% (out of 320 mothers that answered) were taken in the age 0-1 years old,^[32] and through our results it was found that (out of 100 mothers) 40% took their child to the dentist for the first time. According to a cross-sectional study that was done in Egypt January 2019, they state that parents play an important role in developing children's oral hygiene habits. Education of the parents and socioeconomic status highly affects the children's oral health habits. Low socioeconomic status was correlated to the poor dietary habits and an unhealthy lifestyle that contributed to poor oral health.^[33]

What is determinable from the results of research is that mother's economical income does not affect poor dietary habits, or helping children taking care of their teeth. On the other hand the ones with low socioeconomics do not visit the dental clinic as often as those with higher socioeconomic status. A total of 69 (78.4%) employed mothers visited the dentist once a year and 18 (20.5%) visited twice a year. 3 (3.0%) Non-employed mothers visited the dentist once a year meanwhile 7(70.0%) visited more than twice a year.

75.3% of the mother's whom brushed their teeth twice a day was highly significant with a child that also brushed their teeth twice a day. However, it was not significant whether it differentiated between parents who were married or in partnership meaning that they received assistance while brushing for mother, father or guardian. In a cross-sectional study by *Pullishery F. et al*, the mean age of starting brushing teeth was 22.4 months ^[34], corresponding to our result the median was 24 months.

Mothers who felt like they had enough knowledge about dental health care did not have any type of fear and anxiety correlated to dental treatments 80.6%, comparing to mothers who did not have enough knowledge 42.9% had dental fear.

In a study in 2012, it was claimed that anxiety and fear is inherited behavior rather than being born with it. There is no difference in susceptibility of fear and anxiety in neither adults nor children. ^[34] A cross-sectional study in 2017 cleared the fact that there is no association between socioeconomic status, age or knowledge of the family and mother/child dental anxiety. ^[35]

According to another article 86.5% of the mothers did not know when the first visit to the dentist should be. 77.8% did not believe there was any vertical transmission from mother to child. ^[36]

European academy of pediatric dentistry recommends parents to visit the dental clinic at least 1-2 times per year ^[37]

Another systematic review, Brazil 2014, wrote about mother to child transmission of *S.Mutans* was found that it is transmittable, however *S.Mutans* could also be transmitted from a father but with unknown source. The age of acquiring the microorganism is not identifiable, but if a further analysis was done to know at what age a child inherit the bacteria is it possible to target preventive interventions and to delay the transmission, which in turn reduces the risk of caries. ^[38]

In my research it was found that 76.5% of the mothers believed there was transmission of bacteria from mother to child but it is not stated whether they believed it could have an impact on caries progression in their children.

In an article written by European archives of pediatric dentistry it is recommended to use fluoride daily combined with oral hygiene instructions, it is one of the most basic recommendations in a preventive program of caries. *Dhull KS et al.*, stated according to a study report that *S.Mutans* is

implemented through mothers around 2 years old it was found that children who had S.Mutans in their oral cavity was significantly higher exposed to decayed missed filled surfaces (DMFS) at 2 years old rather than children who inherited it at 4 years old. [16] (2)

Other recommendations are diet counseling, fissure sealants and other ways of topical fluoride. [39] 50 mothers (73.6%) out of the mother's who had enough knowledge used fluoride toothpaste comparing to the ones who did not was 20(71.4%). Mothers who did not have enough knowledge did use fluoride toothpaste 19(26.4) and 8(28.6%) did not. In total 28 out of 100 mothers did not use fluoride toothpaste, which is important to prevent severe early childhood caries.

CONCLUSION

In conclusion, it was found that mothers who are employed and who had higher monthly income tend to take their child to the first dental visit earlier ($p<0.05$), mothers who have at least more than one child take their children for prophylaxis less often ($p<0.05$). 2/3 of the mothers of children with S-ECC fed their children with nightly bottle ($p<0.05$). However, mothers in a marriage tend to brush their children's teeth more often ($p<0.05$). Despite the fact that 2/3 of mothers have knowledge about bacterial vertical transmission, they do not avoid kissing their child on the mouth ($p<0.05$).

Overall, mothers with better dental knowledge about dental caries prophylaxis tend to have less dental fear and prefer to use toothpaste with fluoride for prevention ($p<0.05$).

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The author would like to thank the participated mothers for the help by filling the surveys, and statistician Irena Nedzinskienė who contributed in this research with statistical advices.

Special thanks to advisor and supervisor Prof. Dr. Eglė Slabšinskienė

CONFLICT OF INTEREST

The author reports no conflicts of interest.

ETHICS COMMITTEE CLEARANCE

Title: Mothers knowledge in prevention of severe early childhood caries

Date of issue: 2019

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ANNEXES

My name is Salin Zindrou, I am 5th year odontology student at Lithuanian University of Health Sciences.

I am writing a scientific research about mother's knowledge in prevention of severe early childhood caries, aimed to assess the knowledge of mothers in prevention of severe early childhood caries with young children.

The participants of this research are mothers in Panemune primary school and Mažylis maternity hospital. Data is collected from anonymous questionnaires that will only be used for scientific purposes and confidentiality is guaranteed.

If you require any further information, feel free to contact Prof. Dr. Eglė Slabšinskieneė

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Tel no: 837388069

E-mail: salinzindrou@hotmail.com

Thank you for your participation.

CONSENT FORM AND QUESTIONNAIRE

I,....., understand all information provided to me in the information sheet and agree to participate in the research of Salin Zindrou “Mother’s knowledge in prevention of severe early childhood caries” aimed to assess the knowledge of mothers in prevention of severe early childhood caries among mothers with young children in mothers of Panemune primary school and Mažylis maternity hospital.

Name, surname of research participant _____

(Signature)

No. _____

Date _____

Where do you live?	City/center	Countryside
Age (birth-year)		
Marriage status	Single	Married
		Two parent household
Income	<350 €	> 350 €
How many children do you have?		
How old is your child?		
Gender of your child?	Boy	Girl
Employment/occupation?	Yes	No
How many times per day do you brush your teeth?		
Do you use toothpaste with fluoride?	Yes	No
Do you have any fear of the dental clinic?	Yes	No
Do you think that you have enough knowledge about nutrition impact on caries?	Yes	No

Do you have any hereditary diseases?	Yes If yes, what: _____		No	
How often do you visit the dentist?	Never	Once a year	Only when I feel pain	
How often do you visit the dental clinic for prophylactic treatment? Ex: check up, professional oral hygiene, etc.	Never	Once a year	More than 2 times per year	
Does your gums bleed while brushing?	Yes		No	
Have you had any dental treatments?	Fillings If yes: how many? _____	Root canal treatment	Extractions	
How often do you floss your teeth?	Everyday	Seldom	Never	
How often do you clean your child's teeth?	Does not clean	Once a day	Twice a day	Three times a day
How often does the mother, father or others clean the teeth of the child?	Does not clean	Once a day	Twice a day	Three times a day
At what age did you start brushing your child's teeth?				
What does the child drink at daytime and at nighttime? (Indicate all beverages the child receives)	Nothing	Water	Water and sugar-sweetened beverages	Sugar-sweetened beverages. Ex: tea with sugar, milk with honey, juice, chocolate milk etc.
For how long was the child breastfed as a baby?	Was not nursed	<6 months	≤1 year	>1 year
How long was the child				

attached to bottle-feeding or pacifier?				
At what age did the child go to the first dental visit?				
Does your child have any fear of the dental clinic?	Yes		No	
How often do you take your child to the dentist?	Never	Once a year		More than 2 times/year
Has your child had any dental treatments?	Fillings		Extraction	
When you feed your children, do you feed with the same spoon or glass?	Yes		No	
Are you familiar with bacterial transmission in oral cavity?	Yes		No	
Do you think transmission of streptococcus mutans is possible from one person to another?	Yes		No	
Do you kiss your child on the lips?	Yes		No	
Does your children use the same toothbrush?	Yes		No	
How often do you change toothbrush?	Once a month	Once every three months	When the bristles are spruced	After being sick with throat infection

Kur Jūs gyvenate?	Mieste		Kaime
Jūsų amžius (metai)			
Šeimyninė padėtis	Vieniša	Ištekėjusi	Partnerystėje
Šeimos pajamos vienam šeimos asmeniui	<350 €		> 350 €
Kiek vaikų turite? (0,1,2...)			
Kokio amžiaus Jūsų vaikai? (Nurodykite skaičius, jei vaikų dar neturite, grafos nepildykite)			
Jūsų vaiko (vaikų) lytis? (Nurodykite skaičiais)	Berņiuukas	Mergaitė	
Ar turite pastovų darbą?	Taip	Ne	
Kiek kartų per dieną valotės savo dantis ? (nurodykit skaičių)			
Ar naudojate dantų pastą su fluoru?	Taip	Ne	
Ar Jūs turite dantų gydymo baimę?	Taip	Ne	
Kaip Jūs galvojate, ar turite pakankamai žinių apie mitybos poveikį dantų ėduonies (dantų gedimui) išsivystymui?	Taip	Ne	
Ar sergate kokiomis nors paveldimomis ligomis?	Taip Jei taip, tai kokiomis ?:_____	Ne	
Kaip dažnai Jūs lankotės pas odontologą ?	Nesilankau	Kartą metuose	Tada, kai pajaučiu skausmą
Kaip dažnai pas odontologą lankotės profilaktiškai?	Niekada	Vieną kart metuose	Daugiau nei dukart metuose
Ar dantų valymo metu	Taip	Ne	

kraujuoja Jūsų dantenos?				
Kokias dantų gydymo procedūras esate patyrusi?	Dantų plombos Kiek plombuotų dantų turite? _____	Dantų šaknų kanalų gydymas (nurodykite dantų skaičių)	Dantų rovimas (nuolatinių dantų) Nurodykit Skaičių	
Kaip dažnai naudojate higieninį siūlą tarpdančiams valyti?	Kiekvieną dieną	Kartais	Niekada	
Kaip dažnai Jūsų vaikas valosi dantis?	Nesivalo	Vieną kartą dienoje	Du kart dienoje	
Kaip dažnai kažkuris iš tėvų valo vaikui dantis?	Nevalo	Vieną kartą dienoje	Du kart dienoje	
Nuo kokio vaiko amžiaus Jūs pradėjote jam valyti dantis? (nurodykit skaičiumi)				
Ar vaikui kai buvo mažas, bet jau turėjo išdygusių pieninių dantų, duodavote prieš miegą (dienos ar nakties) gerti iš buteliuko (turinys pienas, saldintos arbatos, sultys)?	Niekada	Buteliuke būdavo pienas	Buteliuke būdavo saldinta arbata	Buteliuke būdavo sultys
Kaip ilgai vaiką (vaikus) maitinote krūtimi?	Nemaitinau	Nuo 0 iki 6 mėnesių	Nuo 6 mėn iki 1 metų	➤ Virš 1 metų
Kiek ilgai vaikas gėrė iš buteliuko? (nurodykite skaičių, jei negėrė)?				
Kokio amžiaus buvo vaikas, kai pirmą kartą apsilankė pas odontologą?				
Ar Jūsų vaikas turi odontologo baimę?	Taip		Ne	

Kaip dažnai Jūs vaiką vedate pas odontologą?	Niekada nebuvęs	Vieną kart metuose	Daugiau nei vienakart metuose	
Kokią odontologinę gydymo patirtį turėjo Jūsų vaikas?	Dantų plombavimas		Dantų šalinimas	
Ar Jūsų vaikas turėjo buteliuko kariesą (vaikui iki 3m išgenda priekiniai arba visi pieniniai dantys)?	Taip		Ne	
Ar kai vaikas buvo mažas, maitinant ragaudavot maistą iš to pačio šaukšto?	Taip		Ne	
Ar nukritus vaiko čiulptukui ant žemės, jį nučiulpdavot prieš paduodant vaikui?	Taip		Ne	
Kaip Jums atrodo, ar bakterijas, sukeliančias ėduonį, gali tėvai perduoti vaikui?	Taip		Ne	
Ar bučiuojate savo vaiką į lūpas?	Taip		Ne	
Ar vaikas kartais naudojami Jūsų dantų šepetėliu?	Taip		Ne	
Kaip dažnai Jūs keičiate savo dantų šepetėlį?	Kartą į mėnesį	Kartą į tris mėnesius	Kai šepetėlis nusidėvi ir deformuojasi šereliai	Po kiekvienos peršalimo ligos

EVALUATION FORM OF THE MASTER THESIS FOR THE MEMBER OF THE DEFENCE COMMITTEE

Graduate student _____,

of the year _____, and the group _____ of the integrated study program of Odontology Master

Thesis title:

.....

No.	MT evaluation aspects	Evaluation		
		Yes	Partially	No
1	Has the student's presentation lasted for more than 10 minutes?			
2	Has the student presented the main problem of the Master's thesis, its aim and tasks?			
3	Has the student provided information on research methodology and main research instruments?			
4	Has the student presented the received results comprehensively?			
5	Have the visual aids been informative and easy to understand?			
6	Has the logical sequence of report been observed?			
7	Have the conclusions been presented? Are they resulting from the results?			
8	Have the practical recommendations been presented?			
9	Have the questions of the reviewer and commission's members been answered correctly and thoroughly?			
10	Is the Master's thesis in compliance with the essence of the selected study programme?			

Remarks of the member of evaluation committee of Master's Thesis

Evaluation of the Master's Thesis

Member of the MT evaluation committee:

(scientific degree)

(name and surname)

(signature)