Clinical and Experimental Health Sciences

Knowledge and Attitudes of Pregnant Women with and without Children about Fluoride and Herbal Toothpastes

Zeynep Ceren Çelik[1], Çiğdem Elbek Çubukçu[2], Halil Çelik[3], Gül Dinç Ata[1]

[1] Department of Restorative Dentistry, Faculty of Dentistry, Bursa Uludag University, Bursa, Türkiye.
[2] Department of Pedodontics, Faculty of Dentistry, Bursa Uludag University, Bursa, Türkiye.
[3] Department of Periodontology, Faculty of Dentistry, Istinye University, İstanbul, Türkiye.

Correspondence Author: Zeynep Ceren Çelik
E-mail: zeynepceren@uludag.edu.tr
Received: 18.01.2022 **Accepted:** 01.09.2022

ABSTRACT

Objective: Objective: Pregnant women may be vulnerable to dental caries due to their inability to fully implement oral hygiene practices. Toothpastes are main component of oral hygiene and the most important tool for the primary prevention of caries. The study aimed to examine the knowledge and attitudes of pregnant women with children (PC) and without children (PNC) about fluoride and herbal toothpastes.

Methods: A self-administered and validated 20-item questionnaire was completed by a total of 219 pregnant participants, 85 PC and 134 PNC. Statistical analyses were performed using the SciPy v1.2.3. program.

Results: Most of the PC (57.65%; 69.41%) and PNC (72.39%; 47.76%) participants responded with "no idea" when asked about fluoride sources and the optimal amount of fluoride added to tap water by local health authorities (p= .006). The majority of the PC (62.4%) and the PNC (47.0%) had no preference for herbal toothpastes during pregnancy (p= .03). In addition, 86.6% of the PNC showed low knowledge about the non-fluoride content of herbal toothpastes (p= .023). While 51.5% of the PNC responded with "no idea" about a preference for herbal toothpastes for their children, 56.47% of the PC stated that they might not prefer using herbal toothpastes for their children's routine oral hygiene.

Conclusion: The findings show that both PC and PNC participants had little knowledge of toothpastes and their contents. Considering that toothpastes are the most common self-applied oral hygiene tools, knowledge and awareness of fluoride and herbal toothpastes should be raised via antenatal programs.

Keywords: pregnant women, toothpastes, knowledge, fluorides, herbal

1. INTRODUCTION

Dental caries is a disease of the hard tissues of the teeth that affects all age groups. It is caused by an imbalance in the interactions between cariogenic bacteria in dental plaques and fermentable carbohydrates over time (1-3). Pregnant women may be more susceptible to dental caries (4, 5) due to nausea (6), changes in dietary habits (7), and delayed treatment (8) impacting their ability to practice oral hygiene. Regular and frequent tooth brushing with fluoride-containing toothpaste is considered the principal primary prevention method in caries control (9).

While there is substantial literature on the caries-preventing and remineralizing effects of fluoride (10-12), questions remain about its potentially unfavorable impact on the pineal gland, dental fluorosis, and mental retardation in children (13, 14). However, these side effects usually occur after systemic and excessive fluoride intake (13).

Toothpastes are the most common topical fluoride sources, and a review (15) found that no definite conclusions could be drawn about side effects that may arise from the application of topical fluoride. Nevertheless, people who are concerned about the amount of fluoride they are exposed to from other sources may prefer using alternatives to fluoride-containing toothpastes, such as fluoride-free herbal toothpastes that are widely available.

It has been reported that many women prefer to use herbal products during pregnancy (16). Pregnancy is a new experience full of uncertainty, especially for first-time pregnant women (17, 18). Fetal development and the use of everyday products that contain chemicals during pregnancy is a topic of interest, and many pregnant women seek a source of information to help them deal with their doubts

DOI: 10.33808/clinexphealthsci.1059505

and to navigate their decisions (18). Study groups have been designed to consider this phenomenon.

There are antenatal education programs and websites designed to support positive pregnancy experiences where pregnant women can obtain up-to-date information on wellbeing topics, such as nutrition, smoking, alcohol use, physical activity, maternal mental health, and use of everyday self-care products (including oral hygiene products). Hence, it is important to understand the level of knowledge and perspectives of pregnant women regarding self-care when developing pregnancy care guidelines and antenatal program curricula (19, 20). It is also worth noting that a pregnant woman's level of knowledge and vigilance toward the use of everyday self-care products may vary based on whether she has had prior pregnancies or not.

To our knowledge, to date, no study has investigated the level of knowledge of pregnant women about fluoride and herbal toothpastes. Therefore, the current study aimed to evaluate the knowledge and attitudes of pregnant women with and without children about the use of fluoride and herbal toothpastes.

2. METHODS

2.1. Ethical Approval

This study was performed in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of Faculty of Medicine-Clinical Researches, Istinye University (Date: 29.06.2021 / Protocol #: 21-62). All participants provided verbal consent for their participation and data use.

2.2. Participants

This study was conducted in the Gynecology and Oral and Dental Care department in VM Medicalpark Bursa Hospital, Turkey, from July to August 2021. HC interviewed pregnant women with and without prior pregnancies. The eligibility criteria for this study were (i) Turkish nationality, (ii) Turkish language literacy, and (iii) aged 18 years or older. The preliminary group of participants received a background information sheet and verbal explanation of the study. Participants who were unwilling to participate or who had not met any of the above-mentioned eligibility criteria were excluded.

2.3. Study Design

A 20-item self-administered and validated questionnaire was designed and prepared. The 20-item questionnaire was designed to collect information on two topics: the demographic characteristics of the participants, and the participants' knowledge of fluoride and non-fluoride (herbal) toothpastes. The participants were divided into two study groups. Group 1 consisted of pregnant women with children (PC), and Group 2 consisted of pregnant women without a prior pregnancy (PNC). The questionnaires were completed by the participants while they were waiting for their regular appointments in the obstetrics and gynecology outpatient clinic.

2.4. Validation Procedure

The following procedure was used to validate the questionnaire. First, the questionnaire was checked for common errors, including intrinsically leading, confusing, and repeated questions. Then, a pilot test of the questionnaire was conducted with a small group of pregnant women (n=24) to remove irrelevant and weak questions. The data collected during the pilot study were transferred to a spreadsheet, and the scores of individuals on positively phrased questions and negatively phrased questions were compared to check the consistency. Entering the collected responses from the questionnaire into a spreadsheet allowed cleaning of the data. ZCC read the values aloud and HC entered the data into the spreadsheet; this greatly reduced the risk of error and helped detect inconsistent answers. Cronbach's alpha coefficient was used to ensure the consistency of the survey answers and the reliability of the survey questions. As Cronbach's alpha coefficient in this study was 0.7, modifications were made to the questions when forming the final version of the questionnaire.

2.5. Statistical Analysis

The data obtained from the completed questionnaires were recorded for statistical analysis using the SciPy v1.2.3. program with χ^2 and Fisher's exact tests used for the multivariate frequency distribution of the variables.

3. RESULTS

Of the 255 pregnant women approached to participate in this study, 219 agreed to participate and met the inclusion criteria (PC: n=85; PNC: n=134). Table 1 shows the demographic characteristics of all the participants. The majority of participants were aged 25–28 years (n=161; 73.5%). In terms of the education level of the participants, the majority of the PC (69.4%) and of the PNC (57.6%) had completed primary school.

Of all participants, 36.5% perceived their oral health status as fair. Less than half of the participants in each group utilized professional dental care (PC= 41.1% and PNC= 38.8%) and only when they had pain. They did not specify that they utilized dental services at regular intervals.

There were significant differences ($p< .05$) between the PNC and PC groups in their answers to questions Q1, Q5, Q14, Q16, and Q18 (Tables 2 and 3).

Most of the PC (57.65%) and PNC (72.39%) responded with "no idea" to Q1 ($p = .047$), which asked about their daily-life awareness of fluoride as an additive. The mean ages of these "no idea" responders for Q1 were similar, with the mean age of the PC respondents being 26.8 ± 1.97 years

and the mean age of the PNC respondents being 27.0 ± 2.67 years.

A considerable proportion of both PC (69.41%) and PNC (47.76%) responded with "no idea" to Q5 (p = .006), which asked about their knowledge of the addition of the optimal amount of fluoride to tap water by local health authorities.

In terms of preference for herbal toothpastes during pregnancy, the majority of the PC (62.4%) and PNC (47.0%) responded with "no idea" (p= .03). In addition, 86.6% of the PNC showed low knowledge of the non-fluoride content of herbal toothpastes (sum of the "false" plus "no idea" answers to Q16; p= .023). While 51.5% of the PNC participants responded with "no idea" about a preference for herbal toothpaste for their children, the majority of the PC (56.47%) participants stated that they might not prefer using herbal toothpaste for their children's routine oral hygiene.

Table 1. *Descriptives variables of study groups*

	PC n (%)	PNC n (%)	Total n (%)
Age			
20-24	10 (5.9)	11 (8.2)	21 (9.5)
25-28	52 (73.5)	101 (75.3)	153 (69.9)
29-32	14 (13.8)	16 (11.9)	30 (13.7)
33-37	9 (6.8)	6 (4.6)	15 (6.9)
Education			
Primary School	59 (69.4)	80 (57.6)	139 (63.5)
High School / University	26 (30.6)	54 (42.4)	80 (36.5)
Trimester			
1st	26 (30.6)	33 (24.6)	59 (26.9)
2nd	36 (42.4)	61 (45.5)	97 (44.3)
3rd	23 (27.0)	40 (29.9)	63 (28.8)
Self-reported oral status			
Poor	23 (27.1)	27 (20.2)	50 (22.8)
Fair	53 (52.3)	79 (58.9)	132 (60.2)
Good	9 (10.6)	28 (20.9)	37 (17.0)
Dental visit frequency			
6 months	20 (23.5)	24 (17.9)	44 (20.1)
12 months	15 (17.7)	39 (29.1)	54 (26.6)
12-18 months	15 (17.7)	19 (14.1)	34 (15.5)
In case of pain	35 (41.1)	52 (38.8)	87 (39.7)
Toothpaste recommendation prescription by dental/health professional			
Yes	29 (34.1)	55 (41.0)	84 (38.3)
No	56 (65.9)	79 (59.0)	135 (61.7)

Table 2. *Frequency distribution of study groups based on fluoride part of an questionnaire*

	PC N=85 n (%)	PNC N=134 n (%)	p
Q1. Fluoride is found in nature in water sources, some foods and beverages.			
True	4 (4.71)	2 (1.49)	
False	32 (37.65)	35 (26.12)	.047
No idea	49 (57.65)	97 (72.39)	
Q2. Fluoride can be found in pet bottled water.			
True	17 (20)	22 (16.42)	
False	21 (24.71)	47 (35.07)	.267
No idea	47 (55.29)	65 (48.51)	
Q3. Black tea (especially when it brewed) contains high amounts of fluoride.			
True	17 (20)	26 (19.4)	
False	23 (27.06)	45 (33.58)	.579
No idea	45 (52.94)	63 (47.01)	
Q4. Fluoride can be added to tap water to strengthen tooth enamel.			
True	15 (17.65)	22 (16.42)	
False	26 (30.59)	40 (29.85)	.954
No idea	44 (51.76)	72 (53.73)	
Q5. Addition of optimal amounts of fluoride to tap water by local health authorities is harmful for health.			
True	11 (12.94)	26 (19.4)	
False	15 (17.65)	44 (32.84)	.006
No idea	59 (69.41)	64 (47.76)	
Q6. Fluoride prevents or delays the formation of tooth decay by strengthening tooth enamel.			
True	14 (16.47)	31 (23.13)	
False	32 (37.65)	42 (31.34)	.420
No idea	39 (45.88)	61 (45.52)	
Q7. Fluoride is found in toothpastes.			
True	16 (18.82)	22 (16.42)	
False	27 (31.76)	42 (31.34)	.879
No idea	42 (49.41)	70 (52.24)	
Q8. Fluoride in toothpastes causes pituitary tumors.			
True	13 (15.29)	29 (21.64)	
False	23 (27.06)	50 (37.31)	.073
No idea	49 (57.65)	55 (41.04)	
Q9. Dental fillings contain fluoride.			
True	14 (16.47)	23 (17.16)	
False	28 (32.94)	32 (23.88)	.328
No idea	43 (50.59)	79 (58.96)	
Q10. The use of fluoride toothpaste during pregnancy allows the baby to have stronger teeth.			
True	15 (17.65)	20 (14.93)	
False	25 (29.41)	33 (24.63)	.549
No idea	45 (52.94)	81 (60.45)	
Q11. Fluoride tablets should be used during pregnancy.			
True	14 (16.47)	26 (19.4)	
False	23 (27.06)	44 (32.84)	.453
No idea	48 (56.47)	64 (47.76)	
Q12. Fluoride reaches the baby through the baby cord.			
True	15 (17.65)	26 (19.4)	
False	23 (27.06)	43 (32.09)	.609
No idea	47 (55.29)	65 (48.51)	

Table 3. *Frequency distribution of study groups based on herbal part of an questionnaire*

	PC N=85 n (%)	PNC N=134 n (%)	p
Q13. Herbal toothpastes are sold in pharmacies.			
True	16 (18.82)	27 (20.15)	
False	27 (31.76)	46 (34.33)	.854
No idea	42 (49.41)	61 (45.52)	
Q14.I prefer to use herbal toothpaste during my pregnancy.			
True	13 (15.29)	25 (18.66)	
False	19 (22.35)	46 (34.33)	.03
No idea	53 (62.35)	63 (47.01)	
Q15. I think herbal toothpastes are healthier than fluoride toothpastes.			
True	14 (16.47)	25 (18.66)	
False	19 (22.35)	41 (30.6)	.292
No idea	52 (61.18)	68 (50.75)	
Q16. Herbal toothpastes do not contain fluoride.			
True	17 (20.0)	18 (13.43)	
False	14 (16.47)	44 (32.84)	.023
No idea	54 (63.53)	72 (53.73)	
Q17. Herbal dental products are better for gingival bleeding.			
True	12 (14.12)	26 (19.4)	
False	27 (31.76)	45 (33.58)	.492
No idea	46 (54.12)	63 (47.01)	
Q18. I prefer herbal toothpaste for my child.			
True	14 (16.47)	27 (20.15)	
False	48 (56.47)	38 (28.36)	.046
No idea	23 (27.06)	69 (51.49)	
Q19. I think herbal toothpastes are more expensive than fluoride toothpastes.			
True	19 (22.35)	27 (20.15)	
False	26 (30.59)	46 (34.33)	.832
No idea	40 (47.06)	61 (45.52)	
Q20. Herbal toothpastes prevent tooth decay as well as fluoride toothpastes.			
True	14 (16.47)	23 (17.16)	
False	22 (25.88)	42 (31.34)	.634
No idea	49 (57.65)	69 (51.49)	

4. DISCUSSION

A good understanding of the knowledge, attitudes, and perspectives that pregnant women have about oral and dental health will enable the establishment of preventive dentistry modules in antenatal programs (21, 22). One of the most important functions of preventive dentistry is to help individuals develop correct and adequate oral hygiene habits so that they can maintain their oral and dental health (23).

The toothbrush and toothpaste are the most basic tools used to establish oral hygiene (24). Therefore, the present study investigated the knowledge and attitudes of pregnant women with and without children about fluoride and herbal toothpastes.

In Turkey, in 2020, the highest fertility rate was recorded in the 25–29 years age group (25). Consistent with this data, in this study, pregnant women aged 25–28 years made up 73.5% and 75.3% of the PC and PNC groups, respectively.

In terms of self-reported oral health status, 60.2% of the participants (n = 132) expressed that their oral and dental health was “fair,” which is in accordance with the findings of Lakshmi et al. (26) and Gaszyńska et al. (27). Education level is regarded as one of the main factors that influences oral health knowledge and attitudes (26, 28). A significant proportion of the present study cohort (63.5%) were primary school graduates. Therefore, the low education level of the participants may explain why the response “no idea” was given to most of the questions, as shown in Tables 2 and 3.

In a recent study (29), first-time pregnant women with no children were found to be the most active participants (72.5%) in antenatal programs in Turkey. This led us to

hypothesize that PNC may have up-to-date information about maternal health issues than PC. However, the fact that both PNC and PC answered with "no idea" to 90% (18/20) of the questions indicates that antenatal programs may not be providing adequate information about oral and dental health care tools.

Despite the wide availability of dental health services in Turkey, most of the participants' dental visits (41.1% and 38.8%) were due to the participants experiencing symptoms. Dental visits play a significant role in improving the oral hygiene status of the individual and increasing their knowledge of oral health. Therefore, it is crucial that antenatal programs emphasize the need to schedule regular dental visits, even in the absence of symptoms.

The best indicator of dental health is being caries-free, and fluoride is added to toothpastes in optimal doses due to its caries-preventing effect. Even though fluoride is found in some foods, water, and almost all commercial toothpastes (30), only 4.71% of the PC and 1.49% of the PNC participants answered Q1 correctly (Table 2). It has been almost 80 years since fluoride was introduced to the market (31), yet the pregnant women in our study had little knowledge of the use of fluoride in dental products.

In addition to including fluoride in self-applied topical products (e.g., toothpastes, mouth rinses, and gels), systemic water fluoridation is practiced as a preventive measure and managed by local authorities (30, 32). The optimal approved fluoride level in water is 0.7–1.1 parts per million (ppm), and it is set according to the climate (32, 33). More than 100 health organizations, including the USA Centers for Disease Control and Prevention, the American Medical Association, the World Health Organization, and the Turkish Dental Association, recognize the benefits of water fluoridation in caries prevention. In addition, delivering appropriately fluoridated water to a large number of people may alleviate the economic burden of countries in terms of avoiding expensive dental treatments. The majority of the PNC in this study stated that the optimal dose of fluoridated water was harmful. The reason for their lack of knowledge on this subject needs to be identified. A probable reason for their lack of knowledge may be the fact that water fluoridation is not a current preventive dentistry measure applied in Turkey.

The use of herbs (34), including medicinal herbs, as botanical drugs, teas, and dietary supplements has increased significantly over the past 20 years (35, 36). Women constitute a large share of herbal product consumers. In fact, studies have shown that the preference for herbal products during pregnancy ranges from 6.4% to 67.9% (37, 38).

Herbal toothpastes are an alternative to traditional fluoride-containing toothpastes; they alleviate the symptoms of pregnancy gingivitis (39, 40) and show the same remineralizing and caries-preventing effects as fluoride-containing toothpastes (41). However, there is concern about the use of herbal products by children because little information is available about the benefits and risks in this population (42). It has previously been stated that women are the major (67%) primary source of information about children's oral hygiene habits (43). In the present study, the PNC did not express any preference for herbal toothpastes for their children, while the PC stated that they might reject herbal toothpastes for their children's routine oral hygiene. The lack of interest in using herbal toothpastes and the safety concerns expressed by the pregnant women in this study highlight the need for education on herbal dental products.

5. CONCLUSION

The data and findings of the present study were consistent with those of previous studies. The findings show that all the pregnant women who participated in this study had little to no knowledge of the vast majority of the evaluated parameters, regardless of their past pregnancy status. Considering the significant impact that pregnant women have on their future children's dental health, their knowledge and awareness of fluoride-containing and herbal toothpastes should be increased.

REFERENCES

[1] Loesche WJ. Role of Streptococcus mutans in human dental decay. Microbiol Rev. 1986;50(4):353–380. DOI: 10.1128/mr.50.4.353.380.1986.

[2] Pitts NB, Zero DT, Marsh PD, Ekstrand K, Weintraub JA, Ramos-Gomez F, Tagami J, Twetman S, Tsakos G, Ismail A. Dental caries. Nat Rev Dis Primers. 2017;3(1):17030. DOI: 10.1038/nrdp.2017.30.

[3] Anil S, Anand PS. Early childhood caries: Prevalence, risk factors, and prevention. Front Pediatr. 2017;5:157. DOI: 10.3389/fped.2017.00157.

[4] Vergnes JN, Kaminski M, Lelong N, Musset AM, Sixou M, Nabet C. Frequency and risk indicators of tooth decay among pregnant women in France: A cross-sectional analysis. PLoS One. 2012;7(5):e33296. DOI: 10.1371/journal.pone.0033296.

[5] Steinberg BJ, Hilton IV, Iida H, Samelson R. Oral health and dental care during pregnancy. Dent Clin North Am. 2013;57(2):195–210. DOI: 10.1016/j.cden.2013.01.002.

[6] Enabulele J, Ibhawoh L. Resident obstetricians' awareness of the oral health component in management of nausea and vomiting in pregnancy. BMC Pregnancy Childbirth. 2014;14:388. DOI: 10.1186/s12884.014.0388-9.

[7] Orloff NC, Flammer A, Hartnett J, Liquorman S, Samelson R, Hormes JM. Food cravings in pregnancy: Preliminary evidence for a role in excess gestational weight gain. Appetite. 2016;105:259–265. DOI: 10.1016/j.appet.2016.04.040.

[8] Tadakamadla SK, Agarwal P, Jain P, Balasubramanyam G, Duraiswamy P, Kulkarni S. Dental status and its socio-demographic influences among pregnant women attending a maternity hospital in India. Rev Clín Pesq Odontol. 2007;3:183–192.

[9] Holmes RD. Tooth brushing frequency and risk of new carious lesions. Evid Based Dent. 2016;17(4):98–99. DOI: 10.1038/sj.ebd.6401196.

[10] König KG. Role of fluoride toothpastes in a caries-preventive strategy. Caries Res. 1993;27(1):23–28. DOI: 10.1159/000261598.

[11] Twetman S, Axelsson S, Dahlgren H, Holm AK, Källestål C, Lagerlöf F, Lingström P, Mejàre I, Nordenram G, Norlund A, Petersson LG, Söder B. Caries-preventive effect of fluoride toothpaste: A systematic review. Acta Odontol Scand. 2003;61(6):347–355. DOI: 10.1080/000.163.50310007590.

[12] Hatipoğlu Z, Özbay Yavlal G, Kargül B. Effects of different fluoride-containing toothpastes on in vitro enamel remineralization. Bezmialem Science. 2019;7(1):12–17. DOI: 10.14235/bas.galenos.2018.1810.

[13] Abanto Alvarez J, Rezende KM, Marocho SM, Alves FB, Celiberti P, Ciamponi AL. Dental fluorosis: Exposure, prevention and management. Med Oral Patol Oral Cir Bucal. 2009;14(2):E103–107.

[14] Unde MP, Patil RU, Dastoor PP. The untold story of fluoridation: Revisiting the changing perspectives. Indian J Occup Environ Med. 2018;22(3):121–127. DOI: 10.4103/ijoem.IJOEM_124_18.

[15] Marinho VC, Higgins JP, Sheiham A, Logan S. One topical fluoride (toothpastes, or mouthrinses, or gels, or varnishes) versus another for preventing dental caries in children and adolescents. Cochrane Database Syst Rev. 2004;2004(1):CD002780. DOI: 10.1002/14651858.CD002780.pub2.

[16] Cuzzolin L, Francini-Pesenti F, Verlato G, Joppi M, Baldelli P, Benoni G. Use of herbal products among 392 Italian pregnant women: focus on pregnancy outcome. Pharmacoepidemiol Drug Saf. 2010;19(11):1151–1158. DOI: 10.1002/pds.2040.

[17] Cronin C, McCarthy G. First-time pregnant women – identifying their needs, perceptions and experiences. J Clin Nurs. 2003;12(2):260–267. DOI: 10.1046/j.1365-2702.2003.00684.x.

[18] Wilkins C. A qualitative study exploring the support needs of first-time pregnant women on their journey towards intuitive parenting. Midwifery. 2006;22(2):169–180. DOI: 10.1016/j.midw.2005.07.001.

[19] Feng XL, Wen C. Evaluation of a pilot program that integrated prenatal screening into routine antenatal care in western rural China: An interrupted time-series study. Lancet Reg Health West Pac. 2020;6:100075. DOI: 10.1016/j.lanwpc.2020.100075.

[20] Novick G. Women's experience of prenatal care: An integrative review. J Midwifery Womens Health. 2009;54(3):226–237. DOI:10.1016/j.jmwh.2009.02.003.

[21] Artieta-Pinedo I, Paz-Pascual C, Grandes G, Espinosa M. Framework for the establishment of a feasible, tailored and effective perinatal education programme. BMC Pregnancy Childbirth. 2017;17(1):58. DOI: 10.1016/j.jmwh.2009.02.003.

[22] Afaya A, Azongo TB, Dzomeku VM, Afaya RA, Salia SM, Adatara P, Kaba Alhassan R, Amponsah AK, Atakro CA, Adadem D, Asiedu EO, Amuna P, Amogre Ayanore M. Women's knowledge and its associated factors regarding optimum utilisation of antenatal care in rural Ghana: A cross-sectional study. PLoS One. 2020;15(7):e0234575. DOI: 10.1371/journal.pone.0234575.

[23] Glassman P, Miller CE. Effect of preventive dentistry training program for caregivers in community facilities on caregiver and client behavior and client oral hygiene. NY State Dent J. 2006;72(2):38–46.

[24] Hitz-Lindenmüller I, Lambrecht JT. Oral care. Curr Probl Dermatol. 2011;40:107–115. DOI: 10.1159/000321060. Epub 2011 Feb 10.

[25] TURKSTAT, TÜİK. https://data.tuik.gov.tr/Bulten/Index?p=Birth-Statistics-2020-37229&dil=2 (Available: 18.01.2022).

[26] Lakshmi SV, Srilatha A, Satyanarayana D, Reddy LS, Chalapathi SB, Meenakshi S. Oral health knowledge among a cohort of pregnant women in south India: A questionnaire survey. J Family Med Prim Care. 2020;9(6):3015–3019. DOI: 10.4103/jfmpc.jfmpc_329_20.

[27] Gaszyńska E, Klepacz-Szewczyk J, Trafalska E, Garus-Pakowska A, Szatko F. Dental awareness and oral health of pregnant women in Poland. Int J Occup Med Environ Health. 2015;28(3):603–611. DOI: 10.13075/ijomeh.1896.00183.

[28] Pentapati KC, Acharya S, Bhat M, Rao SK, Singh S. Knowledge of dental decay and associated factors among pregnant women: A study from rural India. Oral Health Prev Dent. 2013;11(2):161–168. DOI: 10.3290/j.ohpd.a29734.

[29] Turgut N, Güldür A, Çakmakçı H, Şerbetçi G, Yıldırım F, Ender Yumru A, Bebek A, Gülova SS. Gebe okulunda eğitim alan gebelerin bilgi düzeyleri üzerine bir araştırma (A study about knowledge level of pregnants that educated in pregnancy school). JAREN. 2017;3(1):1–8. (Turkish)

[30] Edmunds W, Smedley PL. Fluoride in natural waters. Selinus O, Alloway B, Centeno JA, Finkelman RB, Fuge R, Lindh U, Smedley PL. Essentials of Medical Geology. Springer; 2013.p.311–336. DOI:10.1007/978-94-007-4375-5_13.

[31] O'Mullane DM, Baez RJ, Jones S, Lennon MA, Petersen PE, Rugg-Gunn AJ, Whelton H, Whitford GM. Fluoride and oral health. Community Dent Health. 2016;33(2):69–99. DOI:10.1922/CDH_3707O'Mullane31

[32] Yeung CA. A systematic review of the efficacy and safety of fluoridation. Evid Based Dent. 2008;9(2):39–43. DOI: 10.1038/sj.ebd.6400578.

[33] Iheozor-Ejiofor Z, Worthington HV, Walsh T, O'Malley L, Clarkson JE, Macey R, Alam R, Tugwell P, Welch V, Glenny AM. Water fluoridation for the prevention of dental caries. Cochrane Database Syst Rev. 2015;2015(6):CD010856. DOI: 10.1002/14651858.CD010856.pub2.

[34] World Health Organization. WHO global report on traditional and complementary medicine Geneva: World Health Organization: 2019 Licence: CC BY-NC-SA 3.0 IGO.

[35] Barnes J, McLachlan AJ, Sherwin CM, Enioutina EY. Herbal medicines: Challenges in the modern world. Part 1. Australia and New Zealand. Expert Rev Clin Pharmacol. 2016;9(7):905–915. DOI: 10.1586/17512.433.2016.1171712.

[36] Teng L, Zu Q, Li G, Yu T, Job KM, Yang X, Di L, Sherwin CM, Enioutina EY. Herbal medicines: Challenges in the modern world. Part 3. China and Japan. Expert Rev Clin Pharmacol. 2016;9(9):1225–1233. DOI: 10.1080/17512.433.2016.1195263. Epub 2016 Jun 8.

[37] Louik C, Gardiner P, Kelley K, Mitchell AA. Use of herbal treatments in pregnancy. Am J Obstet Gynecol. 2010;202(5):439.e1–439.e10. DOI: 10.1016/j.ajog.2010.01.055.

[38] Abdollahi F, Yazdani Chareti J. The relationship between women's characteristics and herbal medicines use during pregnancy. Women Health. 2019;59(6):579–590. DOI: 10.1080/03630.242.2017.1421285. Epub 2019 Mar 27.

[39] George J, Hegde S, Rajesh KS, Kumar A. The efficacy of a herbal-based toothpaste in the control of plaque and gingivitis: A

clinico-biochemical study. Indian J Dent Res. 2009;20(4):480–482. DOI: 10.4103/0970-9290.59460.

[40] Laleman I, Teughels W. Novel natural product-based oral topical rinses and toothpastes to prevent periodontal diseases. Periodontol 2000. 2020;84(1):102–123. DOI: 10.1111/prd.12339.

[41] Celik ZC, Yavlal GO, Yanıkoglu F, Kargul B, Tagtekin D, Stookey GK, Peker S, Hayran O. Do ginger extract, natural honey and bitter chocolate remineralize enamel surface as fluoride toothpastes? An in-vitro study. Niger J Clin Pract. 2021;24(9):1283–1288. DOI: 10.4103/njcp.njcp_683_20.

[42] Tomassoni AJ, Simone K. Herbal medicines for children: An illusion of safety? Curr Opin Pediatr. 2001;13(2):162–169. DOI: 10.1097/00008.480.200104000-00014.

[43] Wapniarska K, Buła K, Hilt A. Parent's pro-health awareness concerning oral health of their children in the light of survey research. Przegl Epidemiol. 2016;70(1):59–63,137–140.

How to cite this article: Çelik ZC, Elbek Çubukçu C, Çelik H, Dinç Ata G. Knowledge and Attitudes of Pregnant Women with and without Children about Fluoride and Herbal Toothpastes. Clin Exp Health Sci 2023; 13: 114-121. DOI: 10.33808/clinexphealthsci.1059505