

Some Adults' Awareness of Natural Toothpaste

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Abstract

The purpose of this study is to investigate consumers' perception of natural toothpaste by age and examine natural toothpaste perception after the paraben incident. The survey was distributed through SNS as a self-administration method and conducted from March to April 2018. A total of 212 adults were surveyed, and 25 individuals were randomly selected for each age group. A total of 100 subjects were analyzed. All collected data were analyzed using the SPSS 20.0 software (IBM SPSS statistics 20, IBM Inc, Chicago, IL, USA) program. The questionnaire was analyzed using cross-tabs analysis. The use of natural toothpaste was higher in the female group (48.6%) than in the male group (21.4%). Regarding the reason for purchasing natural toothpaste, the female group showed the highest response rate for "purchase by self" (27.8%), while the male group showed the highest response rate for "recommendation by an expert" (50.0%). Regarding the reason to use natural toothpaste, the highest response rate was for "recommendation by acquaintances" (41.2%) in the female group, and "greater efficacy than conventional toothpaste" (28.6%) and "recommendation by acquaintances" (28.6%) in the male group. Of the males, 15 (53.6%) had heard of the paraben toothpaste case, while 13 (46.4%) had never heard of it; therefore, more males had not heard of the case. Of the females, 57 (79.2%) had heard of the paraben toothpaste case, while 15 (20.8%) had not. Since more females than not had heard of the case, they had higher awareness of the case than males. Regarding the change of toothpaste after the paraben case, there was no significant difference. Age, experience using natural toothpaste, efficacy of natural toothpaste, changes in toothpaste due to paraben's monthly income, and perception of parabens between men and women vary greatly.

Keywords: Adult; Awareness; Natural toothpaste; Parabens; Recognition

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Introduction

Toothpaste is an auxiliary cleanser used to clean the tooth surface efficiently through the process of toothbrushing; the major ingredient of toothpaste is abrasive and is added to remove or prevent calculus formation. The main ingredients of toothpaste are abrasive, detergent, binder, and humectant. Other ingredients like water, flavoring, sweetening agents, preservatives, preventives, and medicaments, although disclosing agents or bleaching agents are sometimes mixed together (Jacob *Get al.*, 2009; Frank *Let al.*, 2017). Dental biofilm causes dental caries and periodontal disease and plays an integral part in plaque formation (Aliye *Aet al.*, 2018; Bente *Net al.*, 2020). The most basic concept of oral hygiene care is keeping the intraoral environment clean by removing food residues and biofilm in the mouth to prevent oral diseases like dental caries and periodontal disease (Philippe P *et al.*, 2017). A typical method of removing biofilm a common cause of oral diseases is via toothbrushing combined with the use of auxiliary oral hygiene products for thorough management of biofilm on proximal surfaces. Moreover, using a toothpaste during physical removal of the biofilm helps to polish the tooth surface (Kyra *Het al.*, 2018; Cardoso *Cet al.*, 2018). The oral biofilm associated with dental caries and periodontal disease is created by multispecies interactions. Although the antibacterial property of toothpastes has been extensively studied, a previous study has demonstrated the antibacterial effect of toothpastes containing natural extracts, chlorhexidine, or triclosan on various microorganisms associated with the most common oral diseases, including caries and periodontal disease (Bharathi *Pet al.*, 2018; Andiarra *Det al.*, 2014).

A previous study demonstrated that the pH of saliva was significantly displaced into the alkaline range by the use of herbs and natural products. The results of this study suggest that natural and herbal-based toothpaste is an effective agent in the control of plaque and gingivitis, as well as removal of biofilm, and will serve as an alternative for many who are interested in natural products (Jacob *Get al.*, 2009). The preservative paraben, one of the ingredients of toothpaste, has been found in many children and adolescents. Paraben causes disruption in the human endocrine

system and may result in immaturity or sexual prematurity in growing children. Maternal serum concentration of n-propyl paraben (n-PrP) at 10–17 weeks of gestation was associated with short anogenital distance (AGD) from birth to 24 months of age (Fisher *et al.*, 2020).

Currently, satisfaction based on the toothpaste ingredient is actively researched (Faiyaz *et al.*, 2019), but there is no research on the perception of natural toothpaste by age group. Therefore, the present study aims to investigate people's perception of natural toothpaste by surveying the perception of conventional and natural toothpaste in various age groups that use toothpaste.

Materials and Methods

Research subject and method

This study was conducted among the general adult population in their 20s–50s, and the study period was from March to April in 2018. A self-reporting questionnaire was distributed online via Simple Notification Service (SNS) to study participants. From a total of 212 survey participants, 25 in their 20s (25%), 25 in their 30s (25%), 25 in their 40s (25%), and 25 in their 50s (25%) were included, using simple random sampling. The survey was distributed through SNS as a self-administration method and conducted from March to April 2018. A total of 212 adults were surveyed, and 25 individuals were randomly selected for each age group. A total of 100 subjects were analyzed.

Data analysis

All collected data were analyzed using the SPSS 20.0 software (IBM SPSS statistics 20, IBM Inc, Chicago, IL, USA) program. The questionnaire was analyzed using cross-tabs analysis. Regarding the survey results used for analysis, we included only questionnaires that had answers to all items and no missing data. The questionnaire consisted of 11 items in total, including, 3 items on general characteristics (gender, age, monthly income), 5 items on conventional toothpaste (toothpaste currently used, purchase criteria, route of purchase, awareness of the paraben toothpaste case, change of toothpaste), and 3 items on natural toothpaste.

Results and Discussion

The general characteristics of the subjects

As shown in Table 1, Of the study participants, 72 were females (72.0%), which is greater than 28 males (28.0%), while the age groups 20–29, 30–39, 40–49, and ≥ 50 were identical in size with 25

individuals each. Regarding the distribution based on average monthly income, “≤KRW 2 million” was most prevalent with 67 (67.0%), followed by “KRW2–4 million” with 25 (25.0%), and “≥KRW 4 million” with 8 (8.0%).

Table 1: The general characteristics of the subjects

Characteristic	Classification	N (%)
Total		100(100)
Gender	Male	28(28.0)
	Female	72(72.0)
Age	20-29	25(25.0)
	30-39	25(25.0)
	40-49	25(25.0)
	≥50	25(25.0)
Monthly household income	<200	67(67.0)
	200-400	25(25.0)
	>400	8(8.0)

Gender-dependent use and awareness of natural toothpaste

As shown in Table 2, The use of natural toothpaste was higher in the female group (48.6%) than in the male group (21.4%). Regarding the reason for purchasing natural toothpaste, the female group showed the highest response rate for “purchase by self” (27.8%), while the male group showed the highest response rate for “recommendation by an expert” (50.0%). Regarding the reason to use natural toothpaste, the highest response rate was for “recommendation by acquaintances” (41.2%) in the female group, and “greater efficacy than conventional toothpaste” (28.6%) and “recommendation by acquaintances” (28.6%) in the male group. Regarding the reason for not using natural toothpaste, the highest response rate was for “price is high” (31.6%) in the female group and “it seems less refreshing than conventional toothpaste” (27.3%) in the male group.

Moreover, to the question “do you think natural toothpaste is more effective than conventional toothpaste?” 69.4% of females and 71.4% of males replied that natural toothpaste would be more effective than conventional toothpaste. To the question “which effect of natural toothpaste do you think is good?,” the highest response was for “gum disease (periodontitis) prevention” (30.0%) in the female group and “degree of tooth decay prevention” (22.4%) in the male group.

Table 2: Gender-dependent use and awareness of natural toothpaste

Characteristic	Sex		
	Men	Women	<i>P</i>
Have you ever used natural toothpaste?			
Yes	6(21.4)	35(48.6)	0.140
No	22(78.6)	37(51.4)	
How did you get your natural toothpaste?			
Self-purchased	1(16.7)	10(27.8)	0.077
Expert recommendation	3(50.0)	6(16.7)	
A non-specialistic recommendation	2(33.3)	3(8.3)	
Through advertising	0(0.0)	9(25.0)	
Etc	0(0.0)	8(22.2)	
Why do you use natural toothpaste?			
Efficacy	2(28.6)	13(38.2)	0.244
Form	1(14.3)	3(8.8)	
At home	1(14.3)	4(11.8)	
Recommendation	2(28.6)	14(41.2)	
Etc	1(14.3)	0(0.0)	

Why did you not use natural toothpaste?			
High price	5(22.7)	12(31.6)	0.653
No efficacy	4(18.2)	10(26.3)	
Less refreshing	6(27.3)	7(18.4)	
Etc	7(31.8)	9(23.7)	
Do you think natural toothpaste works better than regular toothpaste?			
Yes	20(71.4)	50(69.4)	0.846
No	8(28.6)	22(30.6)	
What do you think is good for natural toothpaste?			
Flavor	1(4.8)	2(4.1)	0.086
Caries Prevention	8(38.1)	11(22.4)	
Crispy tooth relief effect	0(0.0)	3(6.1)	
Periodontitis prevention	6(28.6)	15(30.6)	
Antibacterial effect	5(23.8)	5(10.2)	
Calculus removal effect	0(0.0)	5(10.2)	
Whitening effect	1(4.8)	0(0.0)	
Etc	0(0.0)	8(16.3)	

Age-dependent use and awareness of natural toothpaste

As shown in Table 3, The use of natural toothpaste was highest in the ≥ 50 group (60.0%) compared to groups in their 40s (56.0%), 20s (28.0%), and 30s (20.0%). Regarding the reason for purchase, the highest response rate was for “recommendation by a non-expert” (57.1%) in the 20s group, “purchase by self” (66.7%) in the 30s group, “recommendation by an expert” (35.7%) in the 40s group, and “purchase through advertising media” (40.0%) in the ≥ 50 group.

Regarding the reason for use, the highest response rate was for “recommendation by acquaintances” (44.4%) in the 20s group, while in the 30s group “greater efficacy than conventional toothpaste” (25.0%), “simply looks good” (25.0%), “had it at home” (25.0%) and “recommendation by acquaintances” (25.0%) showed identical response rates. In the 40s group, the highest response rates were for “greater efficacy than conventional toothpaste” (42.9%) and “recommendation by acquaintances” (42.9%), while in the ≥50 group, the highest response rate was for “greater efficacy than conventional toothpaste” (50.0%). Regarding the reason for not using natural toothpaste, the highest response rate was for “it does not look very different from conventional toothpaste” (22.2%) in the 20s group, while in the 30s group the response rate was identical for the three answer choices (30.4%). In the 40s group, the highest response rate was for “price is high” (50.0%), which was the same as the ≥50 group (33.3%). To the question “do you think natural toothpaste would be more effective than conventional toothpaste?,” those in their 20s (80.0%), 30s (60.0%), 40s (68.0%), and ≤50 (72.0%) replied that they think natural toothpaste would be more effective than conventional toothpaste. To the question “which effect of natural toothpaste do you think is good?,” the highest response rate was for “degree of tooth decay prevention” (55.0%) by those in the 20s, “degree of tooth decay prevention” (31.2%) by those in the 30s, “gum disease (periodontitis) prevention” (43.8%) by those in the 40s, and “gum disease (periodontitis) prevention” (55.6%) by those in the ≥50 group.

Table 3: Age-dependent use and awareness of natural toothpaste

Characteristic	Age				
	20s	30s	40s	over 50s	<i>P</i>
Have you ever used natural toothpaste?					
Yes	7(28.0)	5(20.0)	14(56.0)	15(60.0)	0.006
No	18(72.0)	20(80.0)	11(44.0)	10(40.0)	
How did you get your natural toothpaste?					
Self-purchased	0(0.0)	4(66.7)	3(21.4)	4(26.7)	0.003
Expert recommendation	2(28.6)	0(0.0)	5(35.7)	2(13.3)	
A non-specialistic recommendation	4(57.1)	1(16.7)	0(0.0)	0(0.0)	

Through advertising	0(0.0)	0(0.0)	3(21.4)	6(40.0)	
Etc	1(14.3)	1(16.7)	3(21.4)	3(20.0)	
Why do you use natural toothpaste?					
Efficacy	1(11.1)	1(25.0)	6(42.9)	7(50.0)	0.509
Form	2(22.2)	1(25.0)	0(0.0)	1(7.1)	
At home	1(11.1)	1(25.0)	2(14.3)	1(7.1)	
Recommendation	4(44.4)	1(25.0)	6(42.9)	5(35.7)	
Etc	1(11.1)	0(0.0)	0(0.0)	0(0.0)	
Why not use natural toothpaste?					
High price	2(11.1)	7(30.4)	5(50.0)	3(33.3)	0.153
No efficacy	4(22.2)	7(30.4)	1(10.0)	2(22.2)	
Less refreshing	3(16.7)	7(30.4)	2(20.0)	1(11.1)	
Etc	9(50.0)	2(8.7)	2(20.0)	3(33.3)	
Do you think natural toothpaste works better than regular toothpaste?					
Yes	20(80.0)	15(60.0)	17(68.0)	18(72.0)	0.480
No	5(20.0)	10(40.0)	8(32.0)	7(28.0)	
What do you think is good for natural toothpaste?					
The flavor of toothpaste	1(5.0)	1(6.2)	0(0.0)	1(5.6)	0.010
Prevention of tooth decay	11(55.0)	5(31.2)	2(12.5)	1(5.6)	
Crispy tooth relief effect	0(0.0)	1(6.2)	0(0.0)	2(11.1)	
Prevention of gum disease	2(10.0)	2(12.5)	7(43.8)	10(55.6)	

Antibacterial effect	5(25.0)	2(12.5)	2(12.5)	1(5.6)
Calculus removal effect	0(0.0)	3(18.8)	2(12.5)	0(0.0)
Whitening effect	1(5.0)	0(0.0)	0(0.0)	0(0.0)
Etc	0(0.0)	2(12.5)	3(18.8)	3(16.7)

Age-dependent use and awareness of natural toothpaste

As shown in Table 4, In the <KRW 2million monthly incomegroup, the highest response rate was for “recommendation by acquaintances” (28.6%), followed by “mass media advertisement” (20.4%), “introduced on TV show” (16.3%), others (8.2%), and “recommended by pharmacy and hospital” (0%), in that order. In the KRW 2–4million income group, the highest response rate was for “mass media advertisement” (46.2%), followed by “introduced on TV show” (30.8%), “recommendation by acquaintances” (15.4%), “others” (7.7%), and “recommended by pharmacy and hospital” (0%), in that order. In the ≥KRW 4 million income group, the highest response rate was for “mass media advertisement” (60.0%), followed by “recommendation by acquaintances” (20.0%), “recommended by pharmacy and hospital” (20.0%), “introduced on TV show” (0%), and “others” (0%), showing significant difference in the reason for changing toothpaste after the paraben toothpaste case (P<0.05).

Table 4: Age-dependent use and awareness of natural toothpaste

Characteristic	Monthly household income			
	<200	200-400	>400	<i>P</i>
Why did you change your toothpaste through the paraben case?				
Other people's recommendation	14 (28.6)	2 (15.4)	1 (20.0)	0.046
Expert recommendation	0 (0)	0 (0)	1 (20.0)	
Media advertising	10 (20.4)	6 (46.2)	3 (60.0)	
Internet shopping	8 (16.3)	4 (30.8)	0 (0)	

Etc	4 (8.2)	1 (7.7)	0 (0)	
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Gender-dependent awareness of the paraben case

As shown in Table 5, Of the males, 15(53.6%) had heard of the paraben toothpaste case, while 13(46.4%) had never heard of it; therefore, more males had not heard of the case. Of the females, 57 (79.2%) had heard of the paraben toothpaste case, while 15(20.8%)had not. Since more females than not had heard of the case, they had higher awareness of the case than males. Regarding the change of toothpaste after the paraben case,there was no significant difference. Of the males, 11 (39.3%) had changed their toothpaste after the case and 17(60.7%) had not; therefore, more males had not changedtheir toothpastes. Of the females, 41(56.9%) had changed their toothpaste after the case and 31 (43.1%) had not; therefore, more females had changed their toothpastes.

Table 5: Gender-dependent awareness of the paraben case

Characteristic		Sex		P
		Men	Women	
Do you heard of the paraben case?	Yes	15(53.6)	57(79.2)	0.014
	No	13(46.4)	15(20.8)	
Has the toothpaste changed due to the paraben incident?	Yes	11(39.3)	41(56.9)	0.125
	No	17(60.7)	31(43.1)	

Conclusion

With the recent issues related to the safety of household goods, such as the humidifier sterilizer case and paraben case, distrust in domestic conventional toothpastes has increased and the level of satisfaction based on toothpaste ingredient is being actively researched. However, there is no research on the awareness of natural toothpaste by age. The present study thus aimed to examine the consumer awareness of natural toothpaste. Based on participant gender, experience with natural toothpaste use was higher for females than males. Regarding the route of purchase, both males and females “purchased by self” than through “advertisements” and “recommended by experts to use natural toothpastes.” The reason for this result is that the current number of advertisements for natural toothpaste is significantly lower than for conventional toothpaste. Thus,

if information on natural toothpaste is communicated through advertisements in the future, purchases will increase.

Females used natural toothpaste for reasons of “recommendation by acquaintances,” “efficacy,” and “ingredients,” while males used it because it is “more effective than conventional toothpaste” or they were “recommended by acquaintances.” In both male and female groups, the most important criteria for selection of toothpaste were “recommendation by acquaintances” and “efficacy”/“ingredients.” This result suggests that people choose products that practically help with oral health rather than for their appearances.

Females chose not to use natural toothpaste because the “price is high” or they think it would not be much different from conventional toothpaste. In the future, advertisements or promotions will be necessary to increase awareness of natural toothpastes, along with a description about the same. More females than males thought that natural toothpaste would be more effective than conventional toothpaste. To the question about “which effect they think is good?,” females replied that “gum disease prevention” is the best, while males showed highest response for “tooth decay prevention,” followed by “gum disease prevention,” “antibacterial effect,” and “taste.” More research is required on the anti-inflammatory action that alleviates gingivitis and inhibitory effect on plaque bacteria implicated in the progression of gingivitis.

We examined the natural toothpaste use, route of purchase, reason for use, and effect of natural toothpaste based on the participant’s age and found that natural toothpaste use is higher for the ≥ 50 group than other age groups.

Regarding the route of purchase, the most common response was “recommendation by a non-expert” in the 20s group, “purchase by self” in the 30s group, “recommendation by expert” in the 40s group, and “purchase through advertising media” in the ≥ 50 group. The main reasons for using natural toothpaste were “recommendation from others” and “efficacy.” This suggests that toothpaste use is influenced by the reliability and efficacy of natural toothpaste and the routes of exposure to natural toothpaste vary by age-specific environments. Regarding the question about “whether you think natural toothpaste would be more effective than conventional toothpaste?,” the group with the highest rate that replied “yes” were the 20s, followed by the ≥ 50 , 40s, and 30s. In the question about “which effect of natural toothpaste do you think is good?,” the 20s and 30s groups replied “tooth decay prevention,” while those in the 40s and ≥ 50 groups replied “gum disease (periodontitis) prevention.” This may be associated with the age-specific diseases.

The most common reason for changing toothpaste after the paraben case based on monthly

income was “recommendation by acquaintances” in the <KRW 2million income group, “mass media advertisement” in the KRW 2–4million income group as well as the ≥KRW 4 million income group.

We examined the awareness of the paraben case by gender and found that more males had heard of the case than not, and more females had heard of the case than not, showing that females had greater awareness of the paraben case than males. Regarding change of toothpaste after the paraben case, there were more males who had not changed toothpastes than those who had. On the other hand, there were more females who had changed toothpastes than not. The major finding of this study is that females have greater interest in natural toothpastes than males, and that interest and awareness toward natural toothpaste has increased as the advances in media diversified toothpaste advertisements and consumer interest grew. This study has limitations in sampling and generalization, therefore, in future research design, the composition of the recruited sample should be more reasonable and feasible for comparative analysis.

Nevertheless, this study is the first amidst the lack of research on the paraben case, which was a social issue linked to natural toothpaste.

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