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Effects of Oral Health Education Experience, Knowledge, and Practice Behaviors on Oral Health Care Self-efficacy Among College Students

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Effects of Oral Health Education Experience, Knowledge, and Practice Behaviors on Oral Health Care Self-Efficacy among College Students

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Abstract: Since the college years represent an important period for forming oral health behaviors during adulthood, it is important that college students establish proper oral health-promoting behaviors. Therefore, this study aims to identify the effects of oral health education experience, knowledge, and practice behaviors on oral health care self-efficacy among college students, as studies related to this topic are scarce. A total of 236 college students participated in a questionnaire survey comprising 21 questions. The collected data were analyzed through a chi-square test, independent-samples t-test, and logistic regression analysis using SPSS version 22.0. Participants with oral health education experience showed higher levels of oral health knowledge and practice behaviors than those who did not, and the odds of them having oral health care self-efficacy was 3.743 higher. Moreover, a one-unit increase in oral health knowledge and practice behaviors was associated with a 1.199 and 1.351 increase in oral health care self-efficacy, respectively. For oral health promotion among college students, oral health care self-efficacy reinforcement programs tailored to college students should be developed. These should focus on expanding oral health education opportunities to promote improvement in oral health care self-efficacy by strengthening oral health knowledge and the motivation to practice oral health behaviors.

Keywords: college students; oral health education experience; oral health knowledge; oral health practice behaviors; oral health care self-efficacy

1. Introduction

The college years represent an important period for forming oral health behaviors during adulthood based on habits formed during childhood and adolescence; therefore, it is important for college students to form proper oral health care habits and practices during their college years [1]. Proper oral health-promoting behaviors during this period can help individuals establish and sustain a healthy lifestyle, thus acting as a preventive measure against diseases that may occur after reaching adulthood [2,3]. Moreover, maintaining and improving health during the college years can be an important factor for facilitating academic performance and enabling active engagement in life, both at school and in general [4]. Therefore, to properly maintain and enhance oral health among college students, oral health education that can raise awareness about the importance of oral health and that aims to facilitate behavioral modifications should be implemented [5].

Oral health knowledge and behaviors, which are closely associated with oral health care practice, can change as a result of oral health education [6]. In addition, accumulated oral health knowledge increases interest in oral health and encourages oral health behaviors, making it the most effective factor for maintaining and enhancing oral health [7]. Therefore, improving oral health status among college students requires efforts to provide oral health-related education that is tailored to the level and context of college students and promotes proper knowledge. Good oral health knowledge can result in the practice of appropriate oral health behaviors, and proper knowledge of oral health and behavioral modifications acquired through oral health education influence oral health care self-efficacy [8,9].

"Oral health care self-efficacy" refers to the sense of self-confidence that the motivation to practice self-care behaviors for oral health can be successfully maintained and to the ability to manage

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oral health continuously and rationally. Individuals with higher self-efficacy have increased ability to continue to practice oral health behaviors on their own, which likely results in the maintenance and enhancement of oral health [10]. Moreover, since oral health education experience is associated with higher oral health care self-efficacy, active implementation of oral health education can be a practical measure for enhancing oral health care self-efficacy and oral health level. To this end, an urgent need has arisen to develop continuous oral health care programs and systematic oral health education [11].

However, college students are often not considered in school oral health education programs because they have recently moved from adolescence to adulthood. In addition, although they are adults, they have not yet entered the workforce, so they are also excluded from employee-targeting oral health examinations; accordingly, the opportunity to experience oral health education is very insufficient [12]. Therefore, it is crucial to develop an institutional-level approach to improve the level of oral health care self-efficacy through oral health education exclusively for college students [13].

To contribute to the improvement of the oral health care habits of college students, this study seeks to highlight the importance and necessity of oral health education for oral health promotion at the national level. It also presents basic data that can guide the development of oral health care self-efficacy reinforcement programs to facilitate the voluntary practice of oral health care behaviors.

2. Materials and Methods

2.1. Data Collection and Ethical Considerations

In this study, an Internet-based electronic questionnaire survey was conducted from July 4 to August 1, 2022, on college students from "D" Metropolitan City in Korea. For the ethical protection of the participants, sufficient information about the purpose of the study, voluntary nature of participation, anonymity, and confidentiality was provided prior to data collection, and all participants signed an informed consent form. This study was approved by the Institutional Review Board of Konyang University (KYU 2022-03-003-002) and was conducted in accordance with the Declaration of Helsinki. The sample size was determined using G*power 3.1.9.7; calculations based on a significance level of 0.05, effect size of 0.25, and statistical power of 0.8 for regression analysis showed that the minimum sample size required was 229. Considering a dropout rate of 10%, a total of 240 questionnaires were distributed. To prevent the spread of COVID-19, the questionnaire was completed using the Naver Office form and conducted through social media, including Everytime, KakaoTalk, and Instagram, which are commonly used by the college student community. After excluding four sets of responses that could not be statistically processed because of missing values or insincere responses, data from 236 questionnaires were included in the final analysis.

2.2. Measures

The questionnaire consisted of 21 questions that included three on general characteristics (i.e., gender, college year, and major),one on oral health education experience, and the following items.

2.2.1. Oral health knowledge

Oral health knowledge was measured using a tool from Shin [14] and subsequently modified and supplemented for the purpose of this study. The tool consisted of six items related to the importance of tooth brushing, timing of tooth brushing, the need for oral care products, the need for regular oral examinations, awareness of dietary control, and the need for oral health education. Each item was rated on a 5-point Likert scale, with higher scores indicating higher levels of oral health knowledge. The Cronbach's α of the tool in this study was 0.776.

2.2.2. Oral health practice behaviors

For oral health practice behaviors, the tools used in the study by Cho and Choi [15] were revised and used according to the purpose of this study. The tool comprised eight items related to tooth brushing, oral care product use, regular dentist visits, and dietary control. Each item was rated on a 5-point Likert scale, with higher scores indicating higher levels of oral health practice behaviors. The Cronbach's α of the tool in this study was 0.785.

2.2.3. Oral health care self-efficacy

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Oral health care self-efficacy was measured using a shorter version of the Self-Efficacy Scale for Self-Care (SESS) developed by Kakudate et al. [16,17]. The tool comprised three items related to dental care, dietary management, and dental examination. Each item was rated on a 5-point Likert scale, with higher scores indicating higher levels of oral health care self-efficacy. Based on a median value of 10 points, oral health care self-efficacy was divided into "high group" and "low group." The Cronbach's α of the tool in this study was 0.802.

2.3. Data Analysis

A chi-squared (χ^2) test was performed to investigate the association of oral health education experience with the general characteristics of the collected data. An independent t-test was performed to analyze the differences in oral health knowledge and practice behaviors according to the general characteristics and oral health education experience. Logistic regression analysis was performed to identify the factors influencing oral health care self-efficacy. Regarding statistical significance, the significance level was set to 0.05 for two-sided tests. The collected data were analyzed using SPSS version 22.0 (IBM Corp., Armonk, NY, USA).

3. Results

3.1. Oral Health Education Experience According to General Characteristics

Students with health-related majors (χ^2=4.015, p=.045) were found to have experienced more oral health education (Table 1).

Table 1. Oral health education experience according to general characteristics.

Variable	Division	Oral health education experience			
		Yes	No	Total	$\chi^2(p)$
Gender	Male	72(64.9)	39(35.1)	111(47.0)	2.116(.146)
	Female	92(73.6)	33(26.4)	125(53.0)	
Grade	Lower grade (1st, 2nd)	73(64.6)	40(35.4)	113(47.9)	2.445(.118)
	Upper grade (3rd, 4th)	91(74.0)	32(26.0)	123(52.1)	
Major	Health-related	87(75.7)	28(24.3)	115(48.7)	4.015(.045)*
	Non-health-related	77(63.6)	44(36.4)	121(51.3)	
Total		164(69.5)	72(30.5)	236(100.0)	

Values are presented as n(%).*p<.05.

3.2. Oral Health Knowledge and Practice Behaviors According to General Characteristics

Regarding oral health knowledge, a significant difference was found in relation to grade, while for oral health practice behaviors, significant differences were found for both grade and major. With respect to oral health knowledge according to grade, lower- and upper-grade students' mean scores were20.98 and 22.71 points, respectively, indicating that the level of oral health knowledge was significantly higher among upper-grade students (p<.001). With respect to oral health practice behaviors according to grade, upper-grade student (30.10 points) had a significantly higher mean score than lower-grade students (27.66 points; p<.001). As for oral health practice behaviors according to major, the mean score for students with health-related majors was 29.53 points, which was higher than the mean score of 28.36 points for non-health-related majors, indicating that health majors practiced more oral health behaviors(p=.013; Table 2).

Table 2. Oral health knowledge and practice behaviors according to general characteristics.

Variable	Division	Oral health knowledge		Oral health practice behaviors	
		Mean±SD	$t(p)$	Mean±SD	$t(p)$

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Gender	Male	21.52±3.23	-1.684(.093)	28.46±3.52	-1.906(.058)
	Female	22.20±2.95		29.35±3.65	
Grade	Lower grade (1st, 2nd)	20.98±2.92	-4.443(<.001)***	27.66±3.30	-5.484(<.001)***
	Upper grade (3rd, 4th)	22.71±3.03		30.10±3.50	
Major	Health-related	22.25±3.13	1.802(.073)	29.53±3.50	2.510(.013)*
	Non-health-related	21.53±3.03		28.36±3.64	

SD = standard deviation.*p<.05; ***p<.001.

3.3. Oral Health Knowledge and Practice Behaviors According to Oral Health Education Experience

Regarding oral health knowledge, participants with and without oral health education experience had a mean score of 22.96 and 19.42 points, respectively, indicating that those with oral health education experience had a higher level of oral health knowledge (p<.001). Regarding oral health practice behaviors, participants with and without oral health education experience had a mean score of 30.01 and 26.47 points, respectively, indicating that those with oral health education experience practiced oral health behaviors more frequently than did those without health education experience (p<.001; Table 3).

Table 3. Oral health knowledge and practice behaviors according to oral health education experience.

Variable	Division	Oral health knowledge		Oral health practice behavior	
		Mean±SD	$t(p)$	Mean±SD	$t(p)$
Oral health education experience	Yes (n=164)	22.96±2.48	9.525(<.001)***	30.01±3.05	7.761(<.001)***
	No (n=72)	19.42±2.96		26.47±3.60	

SD = standard deviation.***p<.001.

3.4. Factors Influencing Oral Health Care Self-Efficacy

Table 4 shows the results of the logistic regression analysis on the factors influencing oral health care self-efficacy of participants. The Hosmer–Lemeshow test for goodness of fit of the logistic regression model showed a p-value of 0.235, which was greater than 0.05, indicating that the model had sufficient goodness of fit. Moreover, Nagelkerke's $R^2$was 0.524, indicating that the explanatory power of the logistic regression model was 52.4%, while the predictive accuracy of the logistic regression model was found to be 80.9%. Factors influencing oral health care self-efficacy were identified to be oral health education experience, oral health knowledge, and oral health practice behaviors. After comparing parameter estimates by converting them to odds ratios, the odds of students who experienced oral health education to show oral health care self-efficacy were 3.743 times higher than those who did not. In addition, as the knowledge and practice behaviors of oral health increased, the odds of oral health care self-efficacy increased by 1.199 times and 1.351 times, respectively.

Table 4. Factors influencing oral health care self-efficacy.

Independent variable	Oral health care self-efficacy		
	OR	95% CI	p
Oral health education experience (Yes)	3.743	1.648–8.504	.002**
Oral health knowledge	1.199	1.027–1.401	.022*
Oral health practice behaviors	1.351	1.179–1.547	<.001***

Variables that are not statistically significant are not shown (p>.05).Values are presented as odds ratio(95% confidence interval).*p<.05; **p<.01; ***p<.001.

4. Discussion

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As an investigation into the oral health knowledge and behaviors according to oral health education experience among college students, this study provides basic data for developing oral health policies that can increase oral healthcare self-efficacy. By establishing policies that promote oral health knowledge and behavioral patterns for college students, young adults may be able to improve their oral health-related quality of life during adulthood [2,18].

With respect to oral health education experience, participants who were health-related majors had more oral health education experience than those who were non-health-related majors, which is consistent with another study that reported high interest in oral health among health-related majors as compared with non-health-related majors [19]. This may be because students who are health-related majors have relatively more opportunities to receive oral health education than those who are non-health-related majors. Moreover, because students who are health-related majors have more interest in oral health than students who are non-health-related majors, they may have participated more actively in their education through various media. Therefore, the need exists to develop educational programs that can increase the participation rate in oral health education among students who are non-health-related majors by generating interest among such students.

Additionally, this study found the level of oral health knowledge was higher in upper-grade students than in lower-grade students, a result consistent with the study by Yoon and Jang [4]. This result is also in line with another study by Choi and Song [20], who found that the higher the grade, the higher the awareness of the importance of oral health. Such results may be due to upper-grade students having more opportunities for oral health-related education than lower-grade students, which increases both their interest in oral health and their recognition of its importance. Therefore, it is necessary to provide opportunities for oral health education through, for example, special lectures or liberal arts classes starting in the lower grades to increase college students' knowledge of oral health and their motivation to practice oral health behaviors.

Regarding oral health practice behavior, upper-grade students and those in health- related majors had higher scores than those in lower grades and non-health-related majors. This result is consistent with Yoon and Jang's [4] study and with a study by Lee and Lee [19], which found that students in health-related majors had more educational opportunities concerning scaling and brushing and used more oral care products than those in general majors. Accordingly, policy measures that promote regularly practicing oral health care should be explored, as well as expanding opportunities for oral health education for all college students, regardless of their majors, to enable continued practice of proper oral health care among college students.

In terms of oral health knowledge and practices according to oral health education experience, this study found that the level of knowledge and behavior was higher in students with oral health education experience. This result is consistent with a study that showed that college students' level of oral health knowledge and practices was higher in the group that received oral health education [18]. Such findings may be because oral health knowledge acquired through oral health education can increase interest in oral health, which can lead to the practice of oral health behaviors. Therefore, oral health education programs that can motivate active participation and promote interest in continuous oral health among college students should be developed and implemented; these should involve not only colleges and universities but also be linked to community and national policies.

The factors influencing oral health care self-efficacy among college students were oral health education experience, oral health knowledge, and oral health practice behaviors. Specifically, college students with oral health education experience had 3.743timesthe odds of showing oral health care self-efficacy compared to those without such experience. In addition, students who demonstrated oral health knowledge and practice behaviors had 1.199 and 1.351 times the odds, respectively, of showing oral health care self-efficacy than those who did not. This is consistent with a study that found that oral health knowledge and behavioral changes facilitated through oral health education influenced oral health care self-efficacy [9]. In addition, receiving oral health education was associated with higher oral health care self-efficacy, which is in line with a study that found a significant positive correlation between oral health education, self-efficacy, and practice behavior [21]. Such findings suggest that oral health education is a prerequisite for college students to properly and confidently practice oral health care. In other words, oral health care self-efficacy, which has a significant effect on oral health care behavior and promotion, increases through oral health education, enabling successful oral health care [17,20,22]. Therefore, to increase oral health care self-efficacy among

college students, institutional measures focusing on active and regular oral health education are needed to increase oral health knowledge and the motivation to practice oral health care. In addition, it is necessary to make efforts to improve oral health management, such as developing an oral condition experience program that can directly provide information to participants regarding their own oral condition to increase their interest in education for oral health care [23].

This study had some limitations. First, the study population was limited to college students from one specific region, and thus the findings cannot be generalized to all college students. However, as previous studies analyzing the effects of oral health education experience, knowledge, and practice behaviors on oral health care self-efficacy among college students are scarce, the current study's findings are significant enough to serve as basic data for establishing voluntary oral health-promoting measures for college students. Therefore, expanded research settings are needed in future research. In addition, analyzing the factors influencing oral health care self-efficacy in a more multidimensional way is important for determining how to facilitate and improve college students' active participation in oral health care. Finally, follow-up studies focusing on opportunities for oral health education targeting college students should be continuously conducted so that college students are considered in the national oral health agenda.

5. Conclusions

The present study's results suggest measures involving expanding opportunities for oral health education can motivate college students to regularly practice oral health care. These should be planned and implemented at the college/university-level and also linked to community and national policies. Moreover, oral health education is key to enhancing college students' oral health care self-efficacy, which requires promptly developing an oral health education policy tailored to college students that can strengthen oral health practice behavior. Additionally, it is hoped that studies recognizing that university students should be included in the national oral health agenda will be continuously conducted to improve oral health and oral health-related quality of life throughout adulthood.

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Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki and was approved by the Institutional Review Board of Konyang University (KYU 2022-03-003-002,approved on July 1, 2022).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data are available upon reasonable request to the authors. The data are not publicly available due to the privacy protection of the participants.

Conflicts of Interest: The author declares that they have no conflicts of interest.

References

1. Lee, H.O.; Kim, A.J. Analysis of smoking characteristics and oral health practice in health and non-health related majors. *J. Dent Hyg Sci.* **2014**, *14*, 183–190.
2. Baik, J.W.; Nam, H.E.; Ryu, J.S. The effects of the college students' will for the improvement of health playing on self-efficacy, happiness, life satisfaction and leisure satisfaction. *Korean J. Health Serv Manag.* **2012**, *6*, 173–183. DOI: 10.12811/kshsm.2012.6.1.173
3. Choi, J.E.; Kim, Y.G. The relationship between university students` nutrition knowledge, dietary self-efficacy, dietary habits and menu choice behavior. *J. Foodserv Manag.* **2012**, *15*, 249–275.
4. Yoon, S.U.; Jang, S.J. Convergent relationship between oral health knowledge and oral health behavior of health-related and health-unrelated majors university students in some areas. *J. Korea Converg Soc.* **2016**, *7*, 97–104. DOI: 10.15207/JKCS.2016.7.1.097
5. Lee, D.H.; Yun, J.W.; Lee, S.M.; Lee, J.H. Comparison of oral health knowledge, behavior and use of oral health care devices in some health-related and health-unrelated majors. *AJMAHS.* **2018**, *8*, 27–35. DOI: 10.35873/ajmahs.2018.8.8.004
6. Im, A.J.; Heo, Y.M.; Kim, H.J.; Lim, H.J. Influencing factors on oral health behavior and dental clinic use in industrial workers by Andersen model. *J. Korean Soc Dent Hyg.* **2015**, *15*, 235–243. DOI: 10.13065/jksdh.2015.15.02.235
7. Song, J.R.; Lim, C.Y.; Lee, H.S. Relationship between work loss due to oral diseases and self-perceived oral health status among workers. *J. Korean Acad Oral Health.* **2017**, *41*, 80–89. DOI: 10.11149/jkaoh.2017.41.2.80

8. Lee, J.S.; Lee, H.S. The oral health behavior and its related factor in Korean university students. *J. Korean Acad Oral Health.* **2004**, *28*, 331–346.
9. Lee, H.O.; Kim, J. Effects of elders' oral health beliefs and oral health behaviors on their quality of life. *J. Dent Hyg Sci.* **2008**, *8*, 57–63.
10. Heo, S.E. A study on the structural equation model for determinants of oral health practice in adults aged 20 years or older. *J. Korea Converg Soc.* **2017**, *8*, 161–174.DOI: 10.15207/JKCS.2017.8.9.161
11. Heo, S.E. The effects of subjective oral health status and health practice behavior on oral health-related self-efficacy in adults. *J. Converg Inf Technol.* **2020**, *10*, 168–176. DOI: 10.22156/CS4SMB.2020.10.05.168
12. Lim, J.N.; Jung, Y.R. Development proposal of oral health educational media based on the oral health care and educational needs of college students. *J. Korean Soc Dent Hyg.* **2013**, *13*, 323–334. DOI: 10.13065/jksdh.2013.13.2.323
13. Jun, M.J. Oral health behaviors according to socioeconomic characteristic in Korean adolescents. *J. Dent Hyg Sci.* **2010**, *10*, 417–424.
14. Shin, S.M. A Study on the Oral Health Education Experiences and Needs of the Elderly. Master's Thesis, Dankook University, Cheonan, Republic of Korea, 2010.
15. Cho, S.S.; Choi, M.H. Recognition on oral health and its care by workers in enterprising place. *Chung-Ang J Nurs* **2001**, *5*, 25–33.
16. Kakudate, N.; Morita, M.; Fujisawa, M.; Nagayama, M.; Kawanami, M. Development of the self-efficacy scale for self-care(SESS) among periodontal disease patients: Reliability and validity examination. *Nihon Shishubyo Gakkai kaishi.* **2007**, *49*, 285–295.DOI: https://doi.org/10.2329/perio.49.285
17. So, M.H. Influencing Factors on Elderly's Oral Health Level Based on the Social Ecological Model. Doctoral Dissertation, Ewha Womans University, Seoul, Republic of Korea, 2018.
18. Roh, S.I. Recognition for the Health of the Mouth and Behaviors on Some University Students. Master's Thesis, Daegu Haany University, Daegu, Republic of Korea, 2009.
19. Lee, S.B.; Lee, J.H. Oral health knowledge and oral health behavior according to the majors of some university students. *AJMAHS.* **2019**, *9*, 509–516. DOI: 10.35873/ajmahs.2019.9.6.049
20. Choi, E.J.; Song, Y.S. The association between oral health behavior intention and self-efficacy of dental hygiene students. *J. Korean Soc Dent Hyg.* **2012**, *12*, 485–493.DOI: 10.13065/jksdh.2012.12.3.485
21. Cho, Y.S.; Hwang, Y.J.; Bae, H.S.; Kim. S.Y. Effect of oral health education practice and self-efficacy of teacher on oral health attitude. *J. Dent Hyg Sci.* **2009**, *9*, 99–108.
22. Kim, I.Y.; Yu, S.H. Influencing factors on oral health related self-efficacy and social support in high school students. *J. Korean Soc Dent Hyg.* **2015**, *15*, 129–135.DOI: 10.13065/jksdh.2015.15.01.129
23. Jung, S.J. Factors related to subjective oral health level of the elderly. *J. Converg Inf Technol.* **2021**, *11*, 171–180. DOI: 10.22156/CS4SMB.2021.11.06.171