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Original Article

Effects of digital literacy, e-health literacy, and attitudes towards online health information on health promotion behaviors among dental hygiene students

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ABSTRACT

Objectives: This study aimed to identify the factors influencing health promotion behaviors among dental hygiene students in the Gwangju and Jeonnam regions, focusing on digital literacy, e-health literacy, and attitudes towards online health information. **Methods:** A total of 195 students enrolled in dental hygiene departments participated in a survey we conducted between June and August 2025. The survey responses were analyzed using SPSS. **Results:** Daily internet use for 3–4 hours, regular exercise, abstaining from alcohol consumption and smoking, adequate rest and sleep, health interest, subjective health status, academic satisfaction, and positive attitudes toward online health information were found to be significant predictors of health promotion behaviors (all $p<0.001$). **Conclusions:** These findings suggest that improving the health promotion behaviors of dental hygiene students requires attention to digital literacy, e-health literacy, and proactive attitudes towards online health information. Accordingly, the development of educational programs tailored to the digital era, emphasizing practical applications of health information, is recommended.

Key Words: Digital literacy, Dental hygiene, e-health literacy, Health-promoting behavior, Internet health information

Introduction

Dental hygienists, as healthcare professionals, hold the responsibility of preventing oral diseases and promoting oral health within the community. They serve as practical educators and specialists in disease prevention, playing a crucial role in clinical settings by exemplifying oral health promotion. Oral health should not be considered an isolated field but rather an integral component closely connected to overall systemic health, highlighting its inseparability from general well-being. Therefore, the personal health management of dental hygienists is a critical aspect of their professional competence, enabling them to serve as effective role models for oral health promotion. Research by Hwang and Oh [1] demonstrates that health-promoting behaviors among nursing students positively influence the health outcomes of their future patients and establish the students as effective role models. Similarly, dental hygienists who actively manage their own health are better equipped to build trust and improve the efficacy of patient education and counseling, thereby acting as credible health exemplars with motivational influence.

Kim [2] highlighted the significance of understanding the health patterns of nurses, who are considered exemplars of health behaviors compared to the general population. Similarly, Chun [3] emphasized that the health status of nurses is a crucial factor influencing the quality of nursing care and patient survival outcomes. Therefore, investigating the health patterns and health

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promotion behaviors of dental hygienists is equally important for ensuring the provision of high-quality oral healthcare services. Furthermore, the health promotion behaviors of dental hygiene students merit substantial attention. However, there remains a notable lack of research focusing on health promotion behaviors within this specific population.

Research on health promotion behaviors among dental clinicians is crucial; however, preliminary studies involving prospective dental hygienists are equally significant. Investigating this population is important because the transitional period between adulthood and the commencement of clinical practice constitutes a critical phase for the formation of lifestyle habits and health promotion behaviors that may directly influence their future professional conduct. This phase is characterized by a dual nature: it represents both a period during which habits become established and an opportunity to modify behaviors to improve health promotion. Prior research involving nursing students, who are future healthcare professionals [4-6], has demonstrated that engagement in health promotion behaviors is positively correlated with academic achievement, perceived health status, health awareness, and health management strategies. Moreover, higher levels of digital literacy and e-health literacy enhance the effective utilization of online health information, which in turn positively impacts health promotion behaviors.

Digital literacy, defined as the capacity to engage with diverse forms of textual communication enabled by information and communication technologies [7], has been shown in numerous studies to significantly influence health-related behaviors [8]. Higher levels of e-health literacy enable individuals to make informed health decisions, thereby positively impacting their health practices [9]. Additionally, a positive attitude toward online health information has been identified as a key factor that enhances the intention to adopt health-promoting behaviors [10]. Despite the increased accessibility of the internet and the growing number of users in the information society, mere familiarity with digital information does not necessarily lead to improved health behaviors through effective information utilization. Therefore, the ability to detect inaccuracies and misinformation in health-related content is essential, highlighting the importance of examining the effects of digital literacy and e-health literacy on health behaviors [4].

In the current information age, digital literacy, e-health literacy, and attitudes toward online health information have attracted considerable scholarly attention, especially given the growing number of internet users and the increased dependence on remote communication methods during the COVID-19 pandemic. Beyond traditional determinants of health promotion behaviors, it is crucial to explore these behaviors within the context of evolving social dynamics marked by greater informatization and expanded internet access and usage. Digital literacy refers to the skills necessary for the effective and critical evaluation and use of information obtained via the internet, while e-health literacy denotes the capacity to understand, assess, and apply health-related information. Attitudes toward online information encompass individuals' positive or negative perceptions regarding its credibility, usefulness, and convenience. Empirical research indicates that these factors substantially influence individuals' engagement in health promotion behaviors. Therefore, it is imperative to examine and analyze the changing societal variables that shape health promotion practices.

This study aims to examine the characteristics and interrelationships among dental hygiene students' digital literacy, e-health literacy, attitudes toward online health information, and general health promotion behaviors. Furthermore, it seeks to evaluate the impact of these factors on health promotion behaviors. The findings are intended to provide foundational data for the development of competency enhancement programs that will equip future dental hygienists with the necessary skills to effectively participate in health promotion activities.

Methods

1. Subjects

This research investigated the influence of digital literacy, e-health literacy, and attitudes toward online health information on health-promoting behaviors among dental hygiene students in the regions of Gwangju and Jeonnam. The study received ethical

approval from the Institutional Review Board of Kwangju Women's University (IRB No. 1041465-202505-HR-001-18). Utilizing G*power 3.1.9.7, a minimum sample size of 184 participants was determined for conducting multiple regression analysis, based on an alpha level of 0.05, an effect size of 0.15, and a statistical power of 95%. To accommodate an anticipated attrition rate of 20%, a total of 220 students were recruited and surveyed via an online platform, with complete data obtained from 195 respondents included in the final analysis.

2. Study instruments

The present study comprised a total of 91 items, categorized as follows: 10 items addressing general characteristics, 9 items assessing digital literacy, 8 items evaluating e-health literacy, 12 items examining attitudes toward internet health information, and 52 items pertaining to health promotion behaviors. The constructs of digital literacy, e-health literacy, attitudes, and health promotion behaviors were measured utilizing a 5-point Likert scale, with response options ranging from 1 (strongly disagree) to 5 (strongly agree).

1) Digital literacy

The digital literacy of dental hygiene students was evaluated using items initially developed by Shin and Jeon [12], who adapted and translated Ng's [11] instrument into Korean. These items were further refined and expanded to suit the specific aims of the current study, resulting in a total of nine questions. Responses were measured on a 5-point Likert scale, with higher scores indicating greater proficiency in internet and mobile communication, as well as information utilization. The scale demonstrated high reliability, with a Cronbach's alpha coefficient of 0.939.

2) e-health literacy

The e-health literacy of dental hygiene students was evaluated using the eHealth Literacy Scale (eHEALS), which was originally developed by Norman and Skinner in 2006 [13] and later adapted by Lee et al. [14]. This instrument consists of eight items and utilizes a 5-point Likert scale, with higher scores indicating a greater ability to locate, interpret, and communicate health-related information via online platforms. The scale exhibited excellent reliability, as demonstrated by a Cronbach's alpha coefficient of 0.966.

3) Attitudes toward internet health information

The attitudes of dental hygiene students toward online health information were assessed using a modified and expanded version of the instrument originally developed by Kim et al. [15]. This instrument is itself a revised model of internet health information-seeking behavior, initially proposed by Noh et al. [10] for adult populations, and was specifically adapted to meet the objectives of the present study. The questionnaire consisted of four distinct domains: perceived usefulness of internet health information (3 items), ease of use (3 items), information reliability (3 items), and information utilization (3 items), totaling 12 items. Responses were recorded on a 5-point Likert scale, with higher scores indicating more favorable attitudes toward internet health information. The scale demonstrated excellent internal consistency, as evidenced by a Cronbach's alpha coefficient of 0.929.

4) Health-promoting behavior

The health-promoting behaviors of dental hygiene students were evaluated using a modified and revised version of the Health Promoting Lifestyle Profile (HPLP-II), originally developed by Walker et al. [16] and later adapted by Seo [17]. This instrument comprises six distinct domains and includes a total of 52 items: 9 items related to health responsibility, 8 items concerning physical activity, 9 items addressing nutrition, 9 items on spiritual growth, 9 items regarding interpersonal relations, and 8 items focused on stress management. Responses were measured on a 5-point Likert scale, with higher scores indicating greater engagement in health-promoting behaviors. The scale demonstrated excellent reliability, as indicated by a Cronbach's alpha coefficient of 0.972.

3. Data analysis

The collected data were analyzed using SPSS program (ver. 21.0; IBM Corp., Armonk, NY, USA). The assumption of normality was evaluated with the Kolmogorov-Smirnov test, which indicated a significance level of 0.05 or higher. Differences in digital literacy, e-health literacy, attitudes toward online health information, and health-promoting behaviors according to the general characteristics of dental hygiene students were examined using independent t-tests or one-way analysis of variance (ANOVA), with Scheffé's test employed for post-hoc comparisons. Pearson correlation analysis was conducted to assess the relationships among continuous variables, including digital literacy, e-health literacy, attitudes toward online health information, and health-promoting behaviors. Additionally, multiple regression analysis incorporating dummy variables was performed to identify predictors of health-promoting behaviors among dental hygiene students, considering digital literacy, e-health literacy, attitudes toward online health information, and general demographic characteristics.

Results

1. Levels of digital literacy, e-health literacy, internet health information, and health-promoting behavior

The mean scores for dental hygiene students were as follows: digital literacy, 3.18; health promotion behavior, 3.25; e-health literacy, 3.46; and internet health information, 3.47 <Table 1>.

Table 1. Levels of digital literacy, e-health literacy, internet health information, health-promoting behavior

(N=195)

Variables	Division	N	Mean±SD	Min	Max
Digital literacy		9	3.18±0.83	1.00	5.00
e-Health literacy		8	3.46±0.87	5.00	5.00
Internet health information		12	3.47±0.67	1.92	5.00
	Perceived usefulness	3	3.64±0.82	1.00	5.00
	Perceived ease of use	3	3.69±0.81	1.00	5.00
	Information reliability	3	3.24±0.77	1.00	5.00
	Information utilization	3	3.33±0.84	1.00	5.00
Health-promoting behavior		52	3.25±0.66	1.73	5.00
	Interpersonal support	9	3.34±0.67	1.78	5.00
	Spiritual development	8	3.25±0.66	1.63	5.00
	Stress management	9	3.31±0.71	1.89	5.00
	Nutrition	9	3.25±0.76	1.22	5.00
	Physical activity	9	3.27±0.75	1.00	5.00
	Health responsibility	8	3.09±0.79	1.22	5.00

2. Digital literacy, e-health literacy, attitudes toward online health information, and health-promoting behavior according to general characteristics

An analysis of the digital literacy of dental hygiene students, categorized according to their general characteristics, revealed statistically significant differences across multiple domains. Notably, significant variations were found in health interest (p<0.001), subjective health status (p<0.001), academic satisfaction (p<0.05), and living arrangements (p<0.05). Higher levels of digital literacy were observed among students with greater health interest, those who self-reported their health status as very healthy, individuals expressing high academic satisfaction, and students residing in dormitories, with the latter group exhibiting the highest literacy

scores.

e-health literacy varied significantly based on health interest (p<0.05), subjective health status (p<0.001), and living arrangements (p<0.05). Higher levels of e-health literacy were associated with greater health interest, a very good subjective health status, and residence in a dormitory, which corresponded to the highest scores observed.

Attitudes toward internet-based health information varied significantly according to internet usage duration (p<0.001), health interest (p<0.05), subjective health status (p<0.001), and academic satisfaction (p<0.05). However, subsequent post-hoc analyses did not identify significant differences between groups with respect to internet usage duration and academic satisfaction. The most positive attitudes were observed among students exhibiting higher levels of health interest and those who self-reported their subjective health status as very healthy.

Health promotion behaviors demonstrated significant variations according to health interest (p<0.001), subjective health status (p<0.001), health management methods ((p<0.05), academic satisfaction (p<0.001), and living arrangements (p<0.05). However, post-hoc analyses revealed no statistically significant differences between groups concerning health management methods and living arrangements. Notably, students exhibiting higher health interest, perceiving their health status as very healthy, and reporting greater academic satisfaction engaged in more pronounced health promotion behaviors <Table 2>.

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Table 2. digital literacy, e-health literacy, internet health information, health-promoting behavior according to general characteristics (N=195)

Characteristics	Division	Digital literacy		e-health literacy		Internet health information		Health-promoting behavior	
		Mean±SD	t/F(p^*)	Mean±SD	t/F(p^*)	Mean±SD	t/F(p^*)	Mean±SD	t/F(p^*)
Educational system	3-year	3.10±0.81	0.821	3.49±0.88	0.598	3.42±0.73	0.135	3.20±0.68	0.186
	4-year	3.30±0.84		3.42±0.84		3.56±0.57		3.33±0.62	
School year	1st	3.28±0.71	0.677	3.58±0.77	0.496	3.49±0.67	0.378	3.44±0.73	0.069
	2nd	3.15±0.72		3.33±0.80		3.43±0.65		3.11±0.50	
	3rd	3.20±0.90		3.50±0.93		3.42±0.72		3.23±0.66	
	4th	3.04±0.81		3.40±0.71		3.68±0.60		3.20±0.73	
Internet usage (hour/day)	<1	2.84±0.40	0.135	3.18±0.33	0.196	3.20±0.71[a]	<0.001	3.00±0.73	0.236
	1-2	3.87±0.68		3.17±0.72		2.98±0.71[a]		3.08±0.54	
	2-3	3.23±0.77		3.41±0.84		3.40±0.71[a]		3.41±0.74	
	4≤	3.25±0.86		3.54±0.86		3.60±0.71[a]		3.25±0.65	
Health concerns	Very interested	3.73±0.84[a]	<0.001	3.92±0.82[a]	0.001	3.79±0.85[a]	0.008	3.96±0.97[c]	<0.001
	Interested	3.33±0.58[ab]		3.67±0.63[ab]		3.58±0.51[ab]		3.32±0.54[b]	
	Moderate	3.03±0.80[b]		3.27±0.74[b]		3.34±0.61[b]		3.12±0.40[ab]	
	Not interested	2.87±0.84[b]		3.27±0.88[b]		3.43±0.82[ab]		2.80±0.64[a]	
Self-perceived healthstatus	Very healthy	3.78±0.87[a]	<0.001	4.07±0.77[a]	<0.001	4.01±0.75[a]	<0.001	4.17±0.70[a]	<0.001
	Healthy	3.50±0.65[ab]		3.75±0.78[ab]		3.70±0.68[ab]		3.46±0.56[b]	
	Moderate	3.00±0.77[bc]		3.30±0.83[bc]		3.32±0.53[bc]		3.06±0.47[c]	
	Unhealthy	2.61±0.87[c]		2.77±0.72[c]		3.06±0.80[c]		2.51±0.32[d]	
Health behavior	Diet	2.91±0.80	0.129	3.25±0.69	0.460	3.50±0.58	0.674	2.88±0.51[a]	0.019
	Exercise	3.20±0.72		3.40±0.83		3.34±0.65		3.40±0.77[a]	
	Smoking cessation	3.63±0.65		3.66±0.54		3.62±0.67		3.57±0.55[a]	
	Alcohol abstinence	2.91±0.92		3.04±0.89		3.28±0.77		3.25±0.53[a]	
	Nutrition supplements & health food	3.48±0.77		3.58±0.88		3.35±0.68		3.20±0.53[a]	
	Rest & sleep	3.22±0.81		3.54±0.92		3.54±0.71		3.31±0.64[a]	
	None	2.96±0.72		3.52±0.99		3.48±0.62		2.97±0.77[a]	
Academic satisfaction	Very satisfied	3.56±0.89[a]	0.018	3.74±0.81	0.080	3.72±0.91[a]	0.002	3.73±0.85[a]	<0.001
	Satisfied	3.33±0.76[ab]		3.63±0.95		3.72±0.56[a]		3.50±0.51[ab]	
	Moderate	3.09±0.75[ab]		3.36±0.80		3.34±0.62[a]		3.11±0.58[bc]	
	Dissatisfied	2.89±0.81[a]		3.33±0.70		3.34±0.58[a]		2.86±0.58[c]	
Type of residence	Living with parents	3.02±0.83[a]	0.010	3.30±0.86[a]	0.007	3.38±0.38	0.072	3.13±0.83[a]	0.020
	Dormitory	3.46±0.83[ab]		3.90±0.97[ab]		3.66±0.66		3.40±0.62[a]	
	Living independently	3.35±0.78[b]		3.58±0.79[b]		3.57±0.73		3.39±0.66[a]	
Smoking	Yes	3.63±0.65	0.068	3.66±0.54	0.255	3.62±0.67	0.457	3.57±0.55	0.100
	No	3.16±0.83		3.45±0.88		3.47±0.67		3.23±0.66	
Alcohol consumption	Yes	3.15±0.83	0.457	3.45±0.83	0.868	3.43±0.64	0.255	3.24±0.68	0.801
	No	3.24±0.83		3.47±0.92		3.54±0.71		3.26±0.63	

*by pearson's t-test or ANOVA, Post-hoc Scheffe

[a,b,c]The same character indication shows that there is no statistical significance.

3. Correlation between digital literacy, e-health literacy, internet health information, and health-promoting behavior

Examining correlations among digital literacy, e-health literacy, attitudes toward internet health information, and health promotion behaviors in dental hygiene students revealed that digital literacy positively correlated with health interest (r=0.546, p<0.01), subjective health status (r=0.536, p<0.01), and academic satisfaction (r=0.528, p<0.01). E-health literacy demonstrated a positive correlation with health interest (r=0.298, p<0.01), subjective health status (r=0.237, p<0.01), academic satisfaction (r=0.190, p=0.008), and digital literacy (r=0.461, p<0.01). Similarly, attitudes toward online health information were positively associated with health interest (r=0.371, p<0.01), subjective health status (r=0.380, p=0.01), academic satisfaction (r=0.373, p<0.01), digital literacy (r=0.615, p<0.01), and e-health literacy (r=0.399, p<0.01). Furthermore, health promotion behaviors exhibited positive correlations with health interest (r=0.225, p<0.01) subjective health status (r=0.163, p=0.023), academic satisfaction (r=0.234, p<0.01), digital literacy (r=0.382, p<0.01, and attitudes toward online health information (r=0.454, p<0.01) <Table 3>.

Table 3. Correlation between digital literacy, e-health literacy, internet health information, health-promoting behavior

Variables	1	2	3	4	5	6	7
Health concerns	1.000						
Self-perceived healthstatus	0.760**	1.000					
Academic satisfaction	0.674**	0.776**	1.000				
Digital literacy	0.546**	0.536**	0.528**	1.000			
e-health literacy	0.298**	0.237**	0.190**	0.461**	1.000		
Internet health information	0.371**	0.380**	0.373**	0.615**	0.399**	1.000	
Health-promoting behavior	0.225**	0.163*	0.234**	0.382**	0.133	0.454**	1.000

** p<0.01, by pearson's correlation coefficient
1: Health concerns; 2: Self-perceived healthstatus; 3: Academic satisfaction; 4: Digital literacy; 5: e-health literacy; 6: Internet health information; 7: Health-promoting behavior

4. Factors affecting health promoting behaviors among dental hygiene students

To examine the determinants of health promotion behaviors among dental hygiene students, variables exhibiting significant differences—namely internet usage duration, type of residence, health management strategies, smoking status, and alcohol consumption—were operationalized as dummy variables. A multiple regression analysis was conducted incorporating these factors alongside variables correlated with digital literacy, e-health literacy, attitudes toward online health information, health interest, subjective health status, and academic satisfaction. Multicollinearity diagnostics revealed tolerance values ranging from 0.302 to 0.898, all exceeding the threshold of 0.1, and variance inflation factors (VIF) below 10, indicating the absence of multicollinearity. The Durbin-Watson statistic was 1.924, approximating the ideal value of 2, thereby suggesting no autocorrelation in the residuals. The overall regression model was statistically significant (F=18.699, p<0.001), accounting for 59.6% of the variance in health promotion behaviors. Significant positive predictors included internet use of 2 to 3 hours (β=0.100, p=0.047), health management through exercise (β=0.196, p=0.006), abstinence from alcohol (β=0.128, p=0.028), sufficient rest and sleep (β=0.220, p=0.006), elevated health interest (β=0.237, p<0.001), improved subjective health status (β=0.321, p<0.001), and favorable attitudes toward online health information (β=0.232, p=0.008) <Table 4>.

Table 4. Factors affecting health promoting behaviors among dental hygiene students

Variables		B	S.E	β	t	p^*	Tolerance	VIF
(constant)		0.638	0.213		2.997	0.003		
Internet usage†								
	2h-3h/day	0.180	0.090	0.100	2.798	0.047	0.898	1.113
Health behavior‡								
	Exercise	0.344	0.123	0.196	2.798	0.006	0.455	2.196
	Alcohol abstinence	0.381	0.172	0.128	2.215	0.028	0.672	1.488
	Rest & sleep	0.291	0.105	0.220	2.780	0.006	0.357	2.799
Health concerns		0.178	0.042	0.237	4.254	<0.001	0.723	1.384
Self-perceived healthstatus		0.266	0.049	0.321	5.429	<0.001	0.640	1.561
Internet health information		0.228	0.085	0.232	2.688	0.008	0.302	3.316
R^2=0.772, adj. R^2=0.596, F=18.699, p<0.001, DW=1.924								

*by multiple regression analysis at α=0.05
†Reference group: Internet usage (4h≤/day)
‡Reference group: Health behavior*smoking cessation

Discussion

The principal findings of this study are summarized as follows. The mean digital literacy score among dental hygiene students was 3.18, which is lower than the 3.87 reported by Lee et al. [19] in their investigation of dental hygiene students and also below the 3.43 observed by Kim and Cheon [4] in a study involving nursing students. Conversely, this score exceeds the 2.83 documented in a study of the general adult population [13] and the 2.95 reported by Lim et al. [20] in research on elderly individuals. These results suggest that dental hygiene students exhibit greater digital engagement and accessibility compared to adults and older adults. Lee et al. [18] emphasized the necessity of enhancing digital literacy competencies to adequately prepare dental hygiene professionals for the evolving digital environment, while Yang et al. [20] highlighted the importance of assessing digital literacy levels in the context of dentistry's digital transformation and the impacts of the COVID-19 pandemic. Therefore, it is essential to develop educational programs and competencies that correspond with contemporary technological advancements and to identify factors associated with information use, digital technology, and smartphone utilization. Furthermore, Lee et al. [18] identified a correlation between digital literacy and major satisfaction among dental hygiene students, a finding consistent with the present study's observation of a significant association between digital literacy and academic satisfaction. Additionally, digital literacy varied according to health interest, subjective health status, and type of residence. Yang et al. [20] reported that among dental hygienists, variables such as age, work experience, and educational background influenced digital literacy skills, which in turn affected job performance and organizational commitment, thereby confirming the multifaceted nature of factors related to digital literacy.

The e-health literacy score among students in the department of dental hygiene was 3.46, which is lower than the 3.71 reported by Kim and Cheon [4] in their study of nursing college students, as well as lower than the 3.50 observed in a study involving adults [21] and the 3.90 reported by Chae [22] in research with elderly participants. These discrepancies may be attributed to the greater experience that adults and older individuals possess in managing chronic illnesses and medication regimens, coupled with a heightened motivation and necessity for health maintenance and preventive care relative to college students. Moreover, although college students may demonstrate proficiency in information technology and smartphone usage, such familiarity does not necessarily correspond to the ability to critically evaluate and effectively utilize medical and health-related information. In the present study, e-health literacy exhibited significant variation according to levels of health interest and subjective health status, consistent with findings reported by Shin and Cho [23] and Park et al. [24]. These results suggest that an individual's health awareness and attitudes substantially influence e-health literacy, which is defined as the capacity to access and apply digital health information. Specifically, greater health interest enhances motivation to seek information, thereby fostering experience in assessing information

accuracy. Concurrently, a more favorable subjective health status is associated with positive health experiences and information utilization, creating a reinforcing cycle that elevates self-efficacy and positively impacts e-health literacy.

The mean attitude score toward online health information in the present study was 3.47, which is lower than the 3.64 reported by Kim and Cheon [4] in their research involving nurses, yet higher than the 3.09 observed in a study focusing on office workers [10]. This study identified significant differences in attitudes toward online health information based on variables such as internet usage duration, health interest, subjective health status, and academic satisfaction. However, subsequent post-hoc analyses revealed no significant differences between groups concerning internet usage time and academic satisfaction. In contrast, Kim and Cheon [4] did not find significant differences related to internet usage time, health interest, or subjective health status but observed significant variations associated with grade level and academic satisfaction. Furthermore, their findings indicated that higher academic satisfaction correlated with a more favorable attitude toward online health information, partially corroborating the outcomes of the current study.

In the present study, the mean score for health promotion behaviors was 3.25, which exceeds the scores reported in previous research involving nurses by Kim and Cheon [4] (2.94) and Hwang and Kang [5] (2.31), as well as the 2.64 score documented in a study focusing on elderly populations [25]. The analysis revealed that health promotion behaviors varied significantly according to factors such as health interest, subjective health status, academic satisfaction, health management methods, and living arrangements. However, subsequent post-hoc analyses indicated no statistically significant differences between groups with respect to health management methods and living arrangements. Similar findings were reported in studies by Kim and Cheon [4] and Park and Lee [26], which examined adult populations and found that health promotion behaviors differed significantly based on health interest and subjective health status. These studies demonstrated that individuals with a more favorable perception of their health and higher levels of health interest engaged more actively in health-promoting activities. Collectively, these findings support a positive association between elevated health interest, improved subjective health status, and engagement in health promotion behaviors. Furthermore, this study identified a significant relationship between academic satisfaction and health promotion behaviors. Although the current research focused on university students and may not be directly comparable to studies involving adult and elderly cohorts, prior research involving Japanese university students [27], as well as studies by Kim and Yun [28] and Kim and Cheon [4], reported that individuals with greater satisfaction in their academic life and chosen major exhibited higher levels of health promotion behaviors. These results suggest that increased academic satisfaction may contribute to a beneficial cycle of health-related behaviors, including stress reduction, enhanced sleep quality, and improved nutritional habits.

The health promotion behaviors demonstrated by dental hygiene students exhibited significant positive correlations with health interest ($r=0.225$, $p<0.01$), subjective health status ($r=0.163$, $p=0.023$), academic satisfaction ($r=0.234$, $p<0.01$), digital literacy ($r=0.382$, $p<0.01$), and attitudes toward internet health information ($r=0.454$, $p<0.01$). These findings are consistent with previous studies by Kim and Cheon [4] and Shin and Jeon [12], which similarly reported positive associations among these variables in nursing student populations. Additionally, the research conducted by Hwang and Kang [5] identified a positive correlation between e-health literacy and health promotion behaviors among college students, further supporting the results of the present study.

An investigation into the determinants of health promotion behaviors among students in the department of dental hygiene demonstrated that health-promoting behaviors were enhanced when internet usage was between three and four hours, and when students engaged in physical exercise, abstained from alcohol consumption, or obtained sufficient rest or sleep. Furthermore, higher levels of health interest, subjective health status, and positive attitudes toward internet-based health information were associated with increased health-promoting behaviors. Among these variables, subjective health status, health interest, and attitudes toward internet health information were identified as the most influential factors, in descending order of impact. The present findings align with previous studies conducted by Kim and Cheon [4] and Shin and Jeon [12], which identified subjective health status as the primary determinant of health behaviors. These studies similarly demonstrated that individuals who perceive themselves as healthier are more likely to engage in health-promoting activities. Additionally, research by Kim and Yun [28] involving

elderly populations revealed that health practice behaviors are influenced by health interest, which subsequently affects health status, thereby establishing a cyclical relationship in which health interest and health status mutually reinforce one another. This indicates that increased health interest enhances motivation and attitudes toward health management, while individuals with higher subjective health status tend to exhibit greater self-efficacy, promoting proactive approaches to preventive care and exemplifying a reciprocal dynamic.

Furthermore, this study identified attitudes toward internet health information as a direct predictor of health promotion behaviors, corroborating the findings of Kim and Cheon [4], who reported that perceived usefulness and trustworthiness of health information positively influence health behavior practices. In contrast, digital literacy and e-health literacy did not exhibit a significant effect on health behaviors, consistent with the observations of Kim and Cheon [4]. This discrepancy may illustrate a digital–behavior gap, wherein the ability to access and comprehend health information does not necessarily result in the adoption of health-promoting behaviors [29]. Although digital and e-health literacy are essential for understanding and utilizing health information, they are insufficient on their own to effect behavioral change [29]. Moreover, subjective perceptions of health status may function as motivational factors for engaging in health promotion behaviors [29], highlighting the importance of positive reinforcement and educational interventions designed to enhance health awareness [3].

Given the complex and reciprocal determinants of health behaviors, motivation must be effectively directed toward action through sustained educational initiatives that reinforce practical health promotion practices. Consequently, universities should expand health-related education by incorporating it into liberal arts curricula and extracurricular programs. In light of the growing prevalence of non-face-to-face interactions and advancements in information technology, it is essential to integrate training in information-seeking skills and the appropriate application of health practices. The development of diverse university curricula aimed at enhancing competencies in information utilization, coupled with ongoing research and program innovation, is critical to achieving these goals.

This study is subject to certain limitations, notably its exclusive focus on factors influencing health-promoting behaviors, without addressing variables related to mental health and oral health promotion. Furthermore, the sample was limited to a subset of dental hygiene students, which constrains the generalizability of the findings. Nonetheless, the research provides valuable insights into the influence of digital literacy, e-health literacy, and attitudes toward online health information on health-promoting behaviors within this population. Future research should consider exploring determinants of mental and oral health and undertake comparative analyses involving students from other health-related disciplines.

Conclusions

This study analyzed 195 dental hygiene students from universities in Gwangju and Jeonnam to identify factors influencing digital literacy, e-health literacy, and attitudes toward online health information in relation to health-promoting behaviors. The objective was to generate foundational evidence to inform the development of educational programs aimed at improving the competencies and attitudes of prospective dental hygienists in the context of health promotion.

1. The mean scores for dental hygiene students were 3.18 in digital literacy, 3.25 in health promotion behaviors, 3.46 in e-health literacy, and 3.47 in the utilization of internet health information.

2. Higher health-promoting behaviors were observed among individuals with greater health interest ($p<0.001$), those who rated their subjective health status as very healthy ($p<0.001$), and those highly satisfied with their academic life ($p<0.001$).

3. Positive correlations were found between health-promoting behaviors and health interest (r=0.225, $p=0.002$), subjective health status (r=0.163, $p=0.023$), academic satisfaction (r=0.234, $p=0.01$), digital literacy (r=0.382, $p<0.01$), and attitudes toward online health information (r=0.454, $p<0.01$).

4. Factors positively associated with health promotion behaviors encompassed internet usage of 2 to 3 hours (β=0.100, $p=0.047$),

engagement in physical exercise (β=0.196, p=0.006), abstinence from alcohol consumption (β=0.128, p=0.028), obtaining adequate rest and sleep (β=0.220, p=0.006), heightened health interest (β=0.237, p<0.001), improved subjective health perception (β=0.321, p<0.001), and a constructive attitude toward health information accessed via the internet (β=0.232, p=0.008). Specifically, among dental hygiene students, health-promoting behaviors were observed to increase in conjunction with 3 to 4 hours of internet use, regular exercise, alcohol abstinence, sufficient rest, greater health interest, enhanced subjective health status, and positive perceptions of online health information.

It is advisable to design and implement educational programs alongside continuous research efforts aimed at improving health-promoting behaviors among dental hygiene students. Such initiatives should encompass training in the utilization of digital information, the effective use of online health resources, and the development of practical competencies for remote interactions and digitalization.

Notes

Author Contributions

The author fully participated in the work performed and documented truthfully.

Conflicts of Interest

The author declared no conflicts of interest.

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Ethical Statement

This study was approved by the Institutional Review Board (IRB) of Kwangju Women's University (IRB No. 1041465-202505-HR-001-18).

Data Availability

Data can be obtained from the supplementary material link.

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치위생(학)과 학생의 디지털 리터러시, e헬스 리터러시, 인터넷 건강정보에 대한 태도가 건강증진행위에 미치는 영향

초록

연구목적: 본 연구는 광주·전남 지역 치위생(학)과 재학생을 대상으로 디지털 리터러시, e-헬스 리터러시, 인터넷 건강정보에 대한 태도가 건강증진행위에 미치는 영향을 파악하고자 하였다. **연구방법:** 2025년 6월부터 8월까지 치위생(학)과 대학생 195명을 대상으로 설문조사를 실시하였으며, 치위생(학)과 학생들의 건강증진 행위에 미치는 요인을 확인하기 위해 디지털 리터러시, e-health 리터러시, 인터넷 건강정보와 일반적 특징에서는 더미변수를 활용한 다중회귀분석을 실행하였다. **연구결과:** 건강증진 행위에 미치는 요인은 인터넷 활용시간이 3-4시간 이내일 때, 운동, 금주 및 금연, 충분한 휴식과 수면으로 건강관리 할 때, 건강관심도, 주관적 건강상태, 학업만족도, 인터넷 건강정보에 대한 태도가 높을수록 건강증진 행위가 높아지는 것으로 파악되었다. **결론:** 연구 결과는 치위생학과 학생들의 건강증진행위를 향상시키기 위해 디지털 리터러시, 전자 건강정보 리터러시, 온라인 건강정보에 대한 적극적 태도를 강화할 필요가 있음을 시사한다. 디지털 시대에 적합한 교육 프로그램을 개발하여 건강정보의 실제적 활용을 강조하는 것이 필요하다고 제언한다.

색인: 디지털 리터러시, 치과위생사, e헬스 리터러시, 건강증진 행위, 인터넷 건강정보