

A Study on Dental Hygiene and Career Maturity of Students Based on Alderfer's ERG Theory

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Background: This study aimed to investigate the effects of department satisfaction and career maturity on the perceived health status, relationship, and self-efficacy of dental hygiene college students based on Alderfer's existence-relationship-growth theory.

Methods: We obtained convenience samples of dental hygiene students in Daejeon and Chungnam areas; 241 questionnaires were collected from 250 persons considering the dropout rate and used for the final analysis except for 9 careless responses. The differences in perceived health status, relationship, self-efficacy, department satisfaction, and career maturity according to general characteristics were analyzed using a t-test, one-way analysis of variance and Pearson's correlation coefficients. Moreover, structural equation modeling was performed to confirm the variables. GFI, AGFI, CFI, RMR, RMSEA, TLI, and NFI indices were calculated to verify the fitness of the path model.

Results: There were significant differences in self-efficacy, department satisfaction, career maturity according to grade, and significant differences in academic performance for all variables except relationship. The school system also had a significant effect on department satisfaction. Perceived health status, relationship, self-efficacy, department satisfaction, and career maturity demonstrated statistically significant positive correlations ($p < 0.05$). The factors affecting department satisfaction were relationship and self-efficacy. The indirect and total effects of perceived health status and relationship on career maturity were not statistically significant; however, the indirect and total effects of self-efficacy on career maturity were statistically significant.

Conclusion: It is necessary to develop teaching methods according to student management plans for dental hygiene by comprehensively perceived health status, relationship, and self-efficacy affecting department satisfaction and career maturity.

Key Words: Dental hygienists, Health status, Self efficacy, Structural equation modelings

Introduction

University life is an important time to make career decisions, and most university students in Korea are contemplating their careers after enrollment and are striving to acquire the necessary qualities as a professional¹⁾. University majors can be seen as a preparatory stage for effective job performance and adaptation in the workplace after employment²⁾. If the current majoring department matches the criteria for one's ideal, career, and job, the degree of satisfaction with the major increases³⁾.

Dental hygiene students are given a license to become dental hygienist from the Ministry of Health and Welfare after passing the national examination conducted by the Korea Health Personnel Licensing Examination Institute. The basic motivation for joining majors is the professionalism and job stability after graduation, and most career paths are determined at the same time simultaneously as they go to university⁴⁾.

Dental hygienists perform various roles while providing dental treatment⁵⁾. Not only do they provide high-quality dental services, but also develop sufficient trust through

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the relationship between patients and guardians, and physical health problems due to various factors when performing their duties^{6,7}); therefore, measures for health promotion are needed. Dental hygiene students must have professional knowledge and practice for effective work performance in the department, as well as physical health, cooperation and smooth interpersonal relationships, and a sense of mission and self-efficacy for work⁸). Therefore, academic and department satisfaction is critical⁹). Career maturity is the degree of preparation in career choice or planning¹⁰). Depending on the current department satisfaction, interest and ability for the future will occur, along with specific planning for the career. Therefore, career maturity can only be achieved when satisfied with the department¹¹).

Previous research on department satisfaction and career maturity for dental hygiene students, reported that aptitude, school facility satisfaction, interpersonal relationship ability, admission motivation, self-esteem, and sex¹²). Other research has shown that both clinical practice stress according to sense of coherence and department satisfaction according to clinical practice stress had a negative influence, while department satisfaction according to sense of coherence had a positive influence¹³). The factors that influence department satisfaction were aptitude, school facility satisfaction, interpersonal relationship ability, admission motivation, self-esteem, and gender¹⁴). The sub-factors were career attitude maturity, readiness, confidence, determinism, purpose, and independence¹⁵). The main variables of career attitude maturity that influenced self-efficacy were career independence, readiness, and confidence¹⁶).

This study was based on Alderfer's ERG theory, which is a representative motivation theory, as variables affecting department satisfaction and career maturity. Motivation is generally a process of inducing and sustaining goal-oriented behavior, and performance is the result of motivation; therefore, one must observe motivation to evaluate performance¹⁷).

Most of the previous studies on department satisfaction and career maturity were conducted or correlated with the relationship between each variable rather than comprehensively dealing with each factor. This study aimed

contribute to the development of teaching methods according to student management plans of dental hygienists majoring in comprehensively perceived health status, relationship, and self-efficacy by ERG theory as factors affecting department satisfaction and career maturity using structural equations.

Materials and Methods

1. Participants

This study was investigated after the consent of the participants in accordance with the approval of institutional review board. Dental hygiene students in the Daejeon and Chungnam areas were selected to explain the purpose and method of this study and to respond to the structural-self-report questionnaire from September 1 to November 7, 2020. The participants were selected using the G*power 3.1.9.2 program to set a one-way ANOVA, significance level=0.05, effect size=0.25, and power=0.8. Consequently, the minimum number of participants was 180, and 241 questionnaires were collected from 250 respondents, considering the dropout rate, and used for the final analysis, except for 9 careless responses.

2. Study tools

Existence needs, such as health and safety, are necessary for human beings' survival¹⁷). In previous studies that applied the ERG theory, the more the participants perceived that they were physically healthy, the variable corresponding to the need for existence, the more the positive effect on the outcome¹⁸). Therefore, the scale of existence needs was set as the perceived health status, and the level increased with increase in score.

Relationship needs are the desire to establish human relations with others as a social being, and the desire for interpersonal relations, affection, belonging, and respect are among the desired classes¹⁹). The relationship scale consists of questions that indicate the connection between oneself and the world. Since intimacy, empathy, and affinity are constituent factors, they are highly correlated with the concept of relationship desire; therefore, this scale was used²⁰).

Finally, growth needs are related to personal growth

efforts, which are related to personal confidence and self-fulfillment¹⁷⁾. The growth needs scale used self-efficacy of the concept of mediating individual behavior changes as an important variable that can obtain motivation effect for individuals as an important factor that affects human behavior and achievement level²¹⁾.

1) Perceived health status

The perceived health status scale was used by Choi and Sung²²⁾, which was modified and supplemented by the Health Perception Questionnaire developed by John E. Ware. The tool consists of 10 questions and is measured using a Likert 5-point scale. The higher the score, the higher the health perception. In the study by Choi and Sung²²⁾, Cronbach's alpha was 0.69, while it was 0.66 in this study.

2) Relationship

The relationship scale was developed by Kim and consisted of 15 questions that were completed by Jeon²⁰⁾, which was measured using a Likert 5-point scale, higher score indicated higher relationship. In the study by Jeon²⁰⁾, Cronbach's alpha was 0.748, while it was 0.753 in this study.

3) Self-efficacy

The Self-efficacy scale was developed by Kim²³⁾, and Jeon²⁰⁾ completed the manual. It consisted of a total of 7 questions, it were measured using a Likert 5-point scale. The higher the score, the higher the self-efficacy. In the study of Jeon²⁰⁾, Cronbach's alpha was 0.730, while it was 0.803 in this study.

4) Department satisfaction

The study used a questionnaire similar to that in the study by Kim and Ha²⁴⁾, which was modified and supplemented by Park²⁵⁾, and consisted of 20 questions. The score was measured using a Likert 5-point scale and the higher the score, the higher the degree of satisfaction. In the previous study, Cronbach's α was 0.939 while it was 0.952 in this study.

Table 1. Perceived Health Status, Relationship, Self-Efficacy, Department Satisfaction, Career Maturity according to Characteristics (n=241)

Characteristic	n (%)	Perceived health status			Relationship			Self-efficacy			Department satisfaction			Career maturity			
		M±SD	F/t	p-value	M±SD	F/t	p-value	M±SD	F/t	p-value	M±SD	F/t	p-value	M±SD	F/t	p-value	
Grade																	
1	22 (9)	3.27±0.25	0.311	0.817	3.40±0.41	1.26	0.288	3.69±0.54 ^c	8.363	<0.001	3.81±0.34 ^b	13.465	<0.001	3.85±0.43 ^c	6.516	<0.001	
2	76 (32)	3.26±0.29			3.44±0.87			3.43±0.56 ^c			3.84±0.50 ^c			3.74±0.54 ^c			
3	100 (41)	3.23±0.36			3.33±0.49			3.13±0.58 ^{ab}			3.34±0.60 ^b			3.46±0.58 ^{ab}			
4	43 (18)	3.28±0.32			3.29±0.32			3.35±0.44			3.53±0.59 ^b			3.47±0.46			
Academic-performance																	
High	16 (7)	3.45±0.30	3.356	0.011	3.44±0.46	1.048	0.383	3.42±0.65	5.473	<0.001	3.88±0.67 ^{ab}	10.692	<0.001	3.89±0.52 ^{ab}	7.367	<0.001	
Mid-upper level	60 (25)	3.25±0.30			3.38±0.54			3.55±0.60 ^d			3.83±0.60 ^d			3.82±0.53 ^{ab}			
Middle rank	104 (43)	3.26±0.28			3.40±0.40			3.29±0.55			3.56±0.48 ^c			3.54±0.51 ^b			
Lower or middle rank	47 (19)	3.15±0.31 ^a			3.29±0.44			3.09±0.46 ^b			3.35±0.50 ^{ab}			3.40±0.51 ^{ab}			
Low rank	14 (6)	3.35±0.49			3.20±0.59			3.10±0.45			2.98±0.80 ^{abc}			3.24±0.71 ^{ab}			
Sex																	
Female	230 (95)	3.25±0.31	-1.882	0.061	3.36±0.46	0.259	0.796	3.30±0.57	-1.225	0.222	3.58±0.60	0.403	0.687	3.58±0.55	-0.63	0.526	
Male	11 (5)	3.43±0.35			3.33±0.39			3.52±0.44			3.50±0.50			3.69±0.57	5		
School system																	
3	156 (65)	3.25±0.34	-0.093	0.926	3.37±0.49	0.45	0.653	3.27±0.60	-1.528	0.128	3.52±0.61	-1.982	0.049	3.59±0.58	0.026	0.979	
4	85 (35)	3.26±0.27			3.34±0.40			3.39±0.50			3.68±0.55			3.59±0.50			

M: mean, SD: standard deviation.
^{a-d}The same letter indicates no significant difference at p=0.05 by Scheffe multiple comparison test.
p-value by independent t-test or one-way ANOVA.

5) Career maturity

Career maturity is a tool for determining career maturity of the Korean Youth Index Survey by the Korea Youth Policy Institute²⁶⁾; however, Joo and Kim²⁷⁾ secured reliability and validity by complementing the appropriateness and internal consistency of the questions. It consists of 10 questions and is a score measured using a Likert 5-point scale. In the previous study, Cronbach's=0.77 was observed, while it was 0.859 in this study.

3. Data analysis

The general characteristics were analyzed using descriptive statistics and frequency, and the differences in perceived health status, relationship, self-efficacy, department satisfaction, and career maturity according to general characteristics were analyzed using t-test and one-way ANOVA. Pearson's correlation coefficients was used to verify the correlation.

Structural equation modeling was used to confirm the causal relationship between perceived health status, relationship, self-efficacy, department satisfaction, and career maturity. Goodness-of-fit index (GFI), comparative fit index (CFI), root mean-squared residual (RMR), normed fit index (NFI), adjusted GFI (AGFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA) were calculated to verify the fitness of the path model. The collected data were analyzed using IBM SPSS 20.0 (IBM Co., Armonk, NY, USA) and AMOS 23.0 (IBM CO., Chicago, IL, USA), and statistical analysis was performed with a significance level of 0.05.

Results

1. Differences in perceived health status, relationship, self-efficacy, department satisfaction, and career maturity according to general characteristics

Differences in perceived health status, relationship, self-efficacy, department satisfaction, and career maturity according to general characteristics are shown in Table 1. In terms of self-efficacy and career maturity according to grade, there was a significant difference between the third, fourth, and first graders, and higher in the first grade ($p < 0.001$). Department satisfaction was significantly different between the first and third grades, and higher in the first and second grades ($p < 0.001$). There were significant differences in perceived health status, self-efficacy, department satisfaction, and career maturity according to grade ($p < 0.05$). Regarding perceived health status, high-ranked students had higher status than that among middle-lower students, and regarding self-efficacy, middle-high ranked students had higher self-efficacy than that among middle-lower students. In terms of department satisfaction, high and middle-high students had higher satisfaction than that among lower-level students, while high-ranked students had higher career maturity than that among lower-level students. In the school system standard, the satisfaction of the 'four-year' students was 3.68 ± 0.55 , which was statistically significant ($p < 0.05$).

2. Correlation between perceived health status, relationship, self-efficacy, department satisfaction, and career maturity

Perceived health status, relationship, self-efficacy,

Table 2. Correlations between Perceived Health Status, Relationship, Self-Efficacy, Department Satisfaction, and Career Maturity

Variable	Perceived health status	Relationship	Self-efficacy	Department satisfaction	Career maturity
Perceived health status	1				
Relationship	0.498**	1			
Self-efficacy	0.461**	0.550***	1		
Department satisfaction	0.252**	0.231***	0.381***	1	
Career maturity	0.264***	0.383***	0.473***	0.883***	1

** $p < 0.01$, *** $p < 0.001$ by pearson's correlation analysis.

department satisfaction, and career maturity all showed statistically significant positive correlations ($p < 0.05$). The correlation between department satisfaction and career maturity was the highest ($r = 0.883$, Table 2).

3. Path model fit verification

The results of the test were verified using GFI, AGFI,

CFI, root mean-squared residual (RMR), RMSEA, TLI, and NFI by entering the perceived health status, relationship, self-efficacy, department satisfaction, and career maturity to check the model fit (Table 3). $\chi^2 = 288.125$ was significant ($p < 0.001$); however, the model was modified as both the absolute and incremental fit indices did not meet the standard value (Table 3). To

Table 3. Model Fit

Model fit	χ^2	GFI	AGFI	CFI	RMR	RMSEA	TLI	NFI
Interpretation standard	$p < 0.05$	≥ 0.9	≥ 0.9	≥ 0.9	≤ 0.05	< 0.10 (Normal) < 0.08 (Good) ≤ 0.05 (Adequate)	≥ 0.9	≥ 0.9
Before modification	288.125 ($p < 0.001$)	0.877	0.831	0.881	0.042	0.081	0.794	0.755
After modification	218.690 ($p < 0.001$)	0.904	0.901	0.902	0.034	0.066	0.896	0.890

GFI: goodness-of-fit index, AGFI: adjusted GFI, CFI: comparative fit index, RMR: root mean-squared residual, RMSEA: root mean square error of approximation, TLI: Turker-Lewis index, NFI: normal fit index.

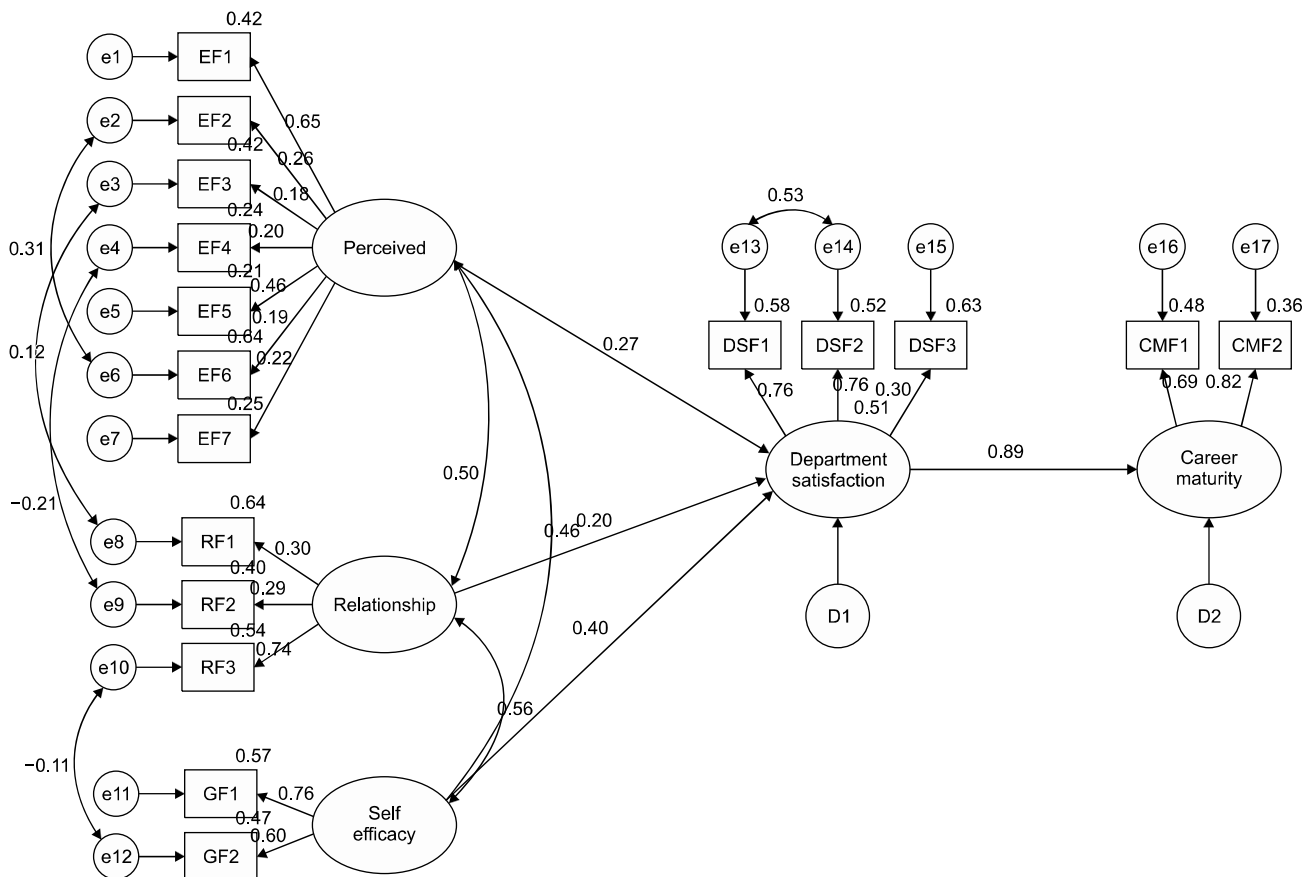


Fig. 1. Structural model based on estimation of standardized path coefficient. EF: existence need factor, RF: relationship need factor, GF: growth need factor, DSF: department satisfaction factor, CMF: career maturity factor.

increase the model fit, the model was modified by setting the path between error terms that were theoretically judged to be valid among the modified indices analyzed²⁸⁾. The error terms were set up as perceived health status 2↔perceived health status 6 (modified indices [MI]=19.801, par charge=0.169), perceived health status 3↔relationship 1 (MI=4.629, par charge=0.041), perceived health status 4↔relationship 2 (MI=9.906, par charge= - 0.059), relationship 3↔self-efficacy 2 (MI=4.209, par charge= - 0.059), and department satisfaction 1↔department satisfaction 2 (MI=4.716, par charge=0.018), and the model was modified (Fig. 1). The results of the modification were $\chi^2=218.690$ ($p<0.001$), and most of the fit indices improved.

4. Model path coefficients and effect analysis

The results of the path analysis are shown in Table 4 and Fig. 1. The factors affecting department satisfaction were relationship ($\beta=0.199$, critical ratio [CR]=2.0178, $p<0.05$) and self-efficacy ($\beta=0.399$, CR=3.620, $p<0.001$). The square multiple correlations of the model was 52%, department satisfaction according to relationship and self-efficacy showed a positive (+) effect, and the higher the relationship and self-efficacy, the higher the department

satisfaction. Career maturity ($\beta=0.891$, CR=8.631, $p<0.001$) according to department satisfaction was statistically significant and had a positive (+) effect, and the square multiple correlations were 79%.

The results of analyzing the direct, indirect, and total effects among factors in the path model are shown in Table 5. To verify the significance of the indirect effect, a bootstrapping method was performed, and the significance level was confirmed by two-tailed significance (bias-corrected). The direct effect of perceived health status on department satisfaction ($\beta=0.266$, $p=0.066$) and the total effect were not statistically significant. The direct and total effects of relationship ($\beta=0.199$, $p<0.05$) and self-efficacy ($\beta=0.339$, $p<0.001$) on department satisfaction were statistically significant. The direct effect of department satisfaction on career maturity ($\beta=0.891$, $p<0.001$) and the total effect were statistically significant. The indirect and total effects of perceived health status ($\beta=0.237$, $p=0.053$) and relationship ($\beta=0.178$, $p=0.117$) on career maturity were not statistically significant; however, the indirect and total effects of self-efficacy ($\beta=0.356$, $p<0.05$) on career maturity were statistically significant.

Table 4. Model Path Coefficients

Path	Estimates		SE	CR	SMC
	B	β			
Department satisfaction←Perceived health status	0.521	0.266	0.283	1.979	0.522
Department satisfaction←Relationship	0.169	0.199	0.088	2.018	
Department satisfaction←Self-efficacy	0.372	0.399	0.103	3.620	
Career maturity←Department satisfaction	0.871	0.891	0.100	8.631	0.794

SE: standard error, CR: critical ratio, SMC: squared multiple correlation.

Table 5. Direct Effect, Indirect Effect, Total Effect of Variable

Endogenous variable	Exogenous variable	Direct effect (p-value)	Indirect effect (p-value)	Total effect (p-value)
Department satisfaction	← Perceived health status	0.266 (0.066)		0.266 (0.066)
	← Relationship	0.199 (<0.05)		0.199 (<0.05)
	← Self-efficacy	0.399 (<0.001)		0.399 (<0.001)
Career maturity	← Department satisfaction	0.891 (<0.001)		0.891 (<0.001)
	← Perceived health status		0.237 (0.053)	0.237 (0.053)
	← Relationship		0.178 (0.117)	0.178 (0.117)
	← Self-efficacy		0.356 (<0.05)	0.356 (<0.05)

Discussion

This study was conducted to investigate the effects of perceived health status, relationship, and self-efficacy on department satisfaction and the effects of department satisfaction on the career maturity of dental hygienist college students based on Alderfer's ERG theory.

The differences in perceived health status, relationship, self-efficacy, department satisfaction, and career maturity according to general characteristics were analyzed. There was a significant difference according to grade, academic performance, and school system; however, there was no statistically significant difference according to sex. According to grade, the self-efficacy and career maturity of the first-grade students were the highest, and the satisfaction level of the department was the highest among the second-grade students. In the previous studies²⁹⁾, the degree of satisfaction was the highest among second-grade students, which was the same as that in this study. However, in previous studies^{12,30)}, the satisfaction of third graders was high, which was different from the results of this study. Dental hygiene students are under various factors of stress due to preparation for national examinations³¹⁾. Additionally, as the grade increases, department satisfaction decreases due to the burden of taking up more majors and increasing practice³²⁾. The career maturity was similar to that in the previous studies³³⁾, in which the first and second graders had higher maturity than that among the third and fourth graders; however, Yu and Yang¹¹⁾ showed that career maturity was higher among fourth and first graders. The higher the grade before graduation, the greater the anxiety regarding problems related to employment. Job stress has a statistically significant negative correlation with career maturity³⁴⁾. Self-efficacy refers to an individual's ability to perform a task to achieve results. In most cases, as the age or grade advances, the range that can be performed in the major field expands, and unlike the results of this study, previous studies have shown that the higher the grade, the higher the sense of self-efficacy³⁵⁾. In a study comprising dental hygiene first-year students, self-efficacy was the most important factor affecting school life adaptation, and it was found to be above the middle level by five points and

had a positive (+) effect on school life adaptation. Dental hygiene students must have an ideal college life and increase their self-efficacy to become competent in a rapidly changing modern society. To acquire sufficient knowledge and skills in the field of study, instructors should actively support, instill confidence, and provide opportunities for frequent contact with volunteer activities, club activities, and related programs.

In terms of department satisfaction and career maturity, the students with the highest academic performance were statistically significant. In previous studies, the higher the academic performance, the higher the department satisfaction^{13,35,36)} and career maturity¹¹⁾, which was consistent with the results of this study. Interest in majors and adaptation to the department induces the activeness of learning, which is considered to have a positive effect on interpersonal relations.

The department satisfaction according to the school system was higher among the 'four-year' students than that among the 'three-year' students. In the study by Jung and Jang³⁷⁾, the department satisfaction of the 'four-year' students' was high, which was consistent with the results of this study. However, in other previous studies^{13,38)}, the department satisfaction of the 'three-year' students was higher, which did not match the study. In a survey of 50 colleges with a 'three-year' school system³⁹⁾, an average of 119.8 credits from a minimum of 104 credits to a maximum of 144 credits for 3 years was considered. The average theoretical class time was 72.3 hours, and the practical class time was 55.6 hours. Additionally, it is considered that most of the curriculum focusing on national examinations is insufficient compared to colleges that are operated as a 'four-year' school system to produce a wide range of dental hygienists required by society.

As a result of model verification, relationship and self-efficacy were shown to be variables that directly affect department satisfaction. Lee et al.'s study¹⁴⁾ showed that interpersonal competence and department satisfaction were positively correlated and similar to this study as statistically significant results. Before working as a dental hygienist, it is deemed necessary to make efforts, such as participating in group counseling and communication programs, to improve interpersonal skills in the university

education process.

Department satisfaction was found to be a significant variable that directly affects career maturity. A previous study⁴⁰⁾ showed a positive correlation with career maturity, and the higher the department satisfaction, the higher the career maturity, which was similar to the results of this study. Students with high department satisfaction can be considered to have high career maturity, indicating the degree of career choice or preparation in their plans.

Self-efficacy had indirect effects on career maturity through the mediation of department satisfaction. Previous studies¹⁶⁾ have shown that self-efficacy and career decision-making have a positive (+) effect. The more students who think they have high job tasks and processing skills and are willing to cope with difficult situations, the faster they make decisions with confidence in determining their career paths. Additionally, self-efficacy has a strong ability to explain the deterministic dimension of career maturity, which is consistent with the results of this study. It is considered that universities should develop departments of dental hygiene and their career counseling programs, not comprehensive employment and career education; thus, can play an important role in mature career decisions based on department satisfaction by making a systematic portfolio of overall grades.

The limitations of this study are that it is difficult to generalize the results as the participants were selected from convenience sampling in limited areas. The number of 'four-year' students and male students was relatively small; therefore, it was difficult to accurately estimate the true picture of the population. It is suggested that studies on students majoring in dental hygiene are repeatedly conducted through random extraction to explore various factors that affect department satisfaction and career maturity, establish a path model, and identify a model with high explanatory power. Based on the results of this study, a variety of programs that can improve the department satisfaction and career maturity of students in dental hygiene should be developed and applied.

Notes

Conflict of interest

No potential conflict of interest relevant to this article was reported.

Ethical approval

This study was approved by the Institutional Review Board of Daejeon Health Institute of Technology (IRB No. 1041490-20200529-HR-003).

Author contributions

Conceptualization: YK Han, AN Yeo, Data acquisition: YK Han, AN Yeo, Formal analysis: AN Yeo, Funding: Daejeon Health of Technology, Supervision: YK Han, Writing-original draft: YK Han, AN Yeo, Writing-review & editing: YK Han, AN Yeo.

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