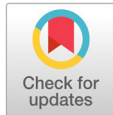


## Original Article

## Moderating effect of self-esteem and depression on the correlation between the frequency of community volunteer activities and job consciousness in dental hygiene students



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### Abstract

**Objectives:** This study examined dental hygiene students' frequency of participation in community volunteer activities, job consciousness, depression, and self-esteem, and then identified the correlation among them. We also analyzed the moderating effect of depression and self-esteem on the correlation between participation in community volunteer activities and job consciousness. **Methods:** We surveyed 312 dental hygiene students attending four universities in South Chungcheong Province, Korea, from May 2 to June 15, 2016, through direct visits. They were given structured questionnaires containing four items on community volunteer activities, three on job consciousness, ten on self-esteem, and 13 on depression. To examine the moderating effect of depression and self-esteem, we performed analysis of variance, correlation analysis, and structural equation modeling analysis (based on the path analysis model and by inserting interaction terms) using SPSS and AMOS. **Results:** We observed a negative correlation between self-esteem and depression ( $r=-0.062$ ) but a positive correlation between self-esteem and job consciousness ( $r=0.125$ ). Depression and job consciousness had a negative correlation ( $r=-0.176$ ). Depression had a statistically significant impact on job consciousness ( $r=-0.519$ ,  $p<0.01$ ). The interaction term between depression and frequency of community volunteer activities also had a statistically significant influence on job consciousness ( $r=0.090$ ,  $p<0.05$ ). These findings indicate that depression moderates the correlation between frequency of community volunteer activities and job consciousness at a statistically significant level. **Conclusions:** More frequent participation in volunteer activities enhances dental hygiene students' self-esteem, reduces depression, and raises job consciousness. The positive impact of volunteering on self-esteem, depression, and job consciousness warrants encouraging students'

participation in community volunteer activities, creating supportive structures, and developing various volunteer programs relevant to the students' area of study.

**Key Words:** Community volunteer activity, Depression, Dental hygiene students, Job consciousness, Self-esteem

## Introduction

Universities contribute to a nation's economic and industrial development with the knowledge produced and accumulated through educational and research activities [1]. They also train future talents through joint programs with businesses in various sectors while facilitating technological advances and supporting the economic growth of a community [2]. Academic achievements in university, when combined with community volunteer activities, can create great value for universities, students, and communities. Volunteering in the context of university education goes beyond the distribution of resources or philanthropy; it enhances the quality of education in university and offers students an opportunity to pursue self-development [3]. Volunteering also enables students to gain an accurate, informed insight into social phenomena, analyze them critically, envision solutions to social issues, and put them into practice [4].

Korea's economic development and ensuing technological advances have enhanced the quality of health care services and allowed people to turn their attention from struggling to meet their basic needs to taking care of their health and beauty. These trends have brought an increasing number of patients to dental clinics. However, an equally increasing number of people in local communities throughout the country are simultaneously excluded from health care services owing to physical, financial, and time constraints.

The volunteering programs for residents in local communities who do not have access to oral care services are attracting increasing participation from dental hygiene students. Korea's statute law defines volunteer activities as activities performed by individuals or organizations devoting their time and effort without compensation at their free will, for the benefit of the local community, nation, and human society [5]. Dental hygiene students involved in these volunteer activities contribute to ongoing efforts to improve oral health conditions in communities by educating residents excluded from oral care services on dental management and prevention of dental diseases. Educators are called upon to incorporate volunteering into their school's formal or informal curricula to maintain students' mental health, as an experience with volunteering can enhance students' self-esteem and reduce depression [6]. A previous study reported that students' experience with volunteer activities enhances their confidence at work [7].

Dental hygiene students' participation in volunteer activities can be credited with creating synergies for both residents in local communities and the students themselves. The frequency of participation in such activities is associated with various socio-psychological factors and can potentially influence the

students' job consciousness as they prepare themselves for a professional career.

Previous research on dental hygiene students' job consciousness examined its correlation with the students' sex-role identity [8], job values [9], satisfaction with their major [10], and career awareness [11]. However, the correlation between job consciousness and community volunteer activities remains unclear.

As such, this study examined dental hygiene students' frequency of participation in community volunteer activities, self-esteem, depression, and job consciousness, and analyzed the moderating effect of self-esteem and depression on the correlation between the frequency of community volunteer activities and job consciousness. We anticipate that our findings will contribute to ongoing endeavors in promoting community volunteering programs among dental hygiene students and raising their consciousness about their future career.

## Methods

### 1. Research design

This study adopted a cross-sectional, correlational design to examine dental hygiene students' participation in community volunteer activities and job consciousness, and to analyze the moderating effect of self-esteem and depression on the correlation between them.

### 2. Subjects

The study population consisted of students attending universities across Korea that operate a dental hygiene course. A total of 312 dental hygiene students at four universities in South Chungcheong Province, Korea, were selected for this study. The sample size was determined on the basis of Kline's methodology [12], which recommends a minimum of 20 times the size of measured variables as the ideal sample size for a structural equation model, among various methods of sample size estimation. Regarding ethical considerations, this study obtained approval from the Institutional Review Board of S University (IRB No: SM-201509-036-1).

### 3. Data collection

The participants were surveyed from May 2 to June 15, 2016, using structured questionnaires. We paid a direct visit to the universities selected for the survey, explained the purpose of our research to the students, distributed the questionnaire copies to the students who consented to participation, and then collected the copies immediately upon completion. Of the collected questionnaires, 12 were excluded on account of incomplete answers, and the remaining 300 were used for the analysis.

### 4. Measuring tools

The questionnaire contained 4 items on the participants' general characteristics (year of study, total duration of course, and frequency of participation in community volunteer activities), 3 on their job

consciousness, 10 on self-esteem, and 13 on depression. Self-esteem was measured using Rosenberg's [13] self-esteem measurement tool, where the positively worded question items 1, 2, 4, 6, 7 were chosen for our survey and anchored between 1 = strongly disagree and 5 = strongly agree, with higher scores indicating higher self-esteem. The Cronbach's internal consistency coefficient of this tool was 0.777. Depression was measured with the Center for Epidemiologic Studies Depression (CES-D) scale restructured by Kang [14]. The participants' mean scores were calculated based on the question items anchored between 1 = strongly disagree and 5 = strongly agree, with higher scores indicating a higher degree of depression. The Cronbach's coefficient of this tool was 0.817.

Job consciousness was measured with Hwang and Cho's [11] tool. The items were anchored between 1 = strongly disagree and 4 = strongly agree, with higher scores indicating higher job consciousness. The Cronbach's coefficient of this tool was 0.818.

## 5. Data analysis

The collected data were analyzed using statistical processing software SPSS WIN 22.0. Descriptive statistics were calculated to examine the participants' socio-demographic characteristics and frequency of participation in community volunteer activities. Pearson's correlation analysis was performed to examine the correlation between job consciousness, self-esteem, and depression. The moderating effect of self-esteem and depression was analyzed by inserting interaction terms into the path analysis model under the structural equation modeling analysis, for which AMOS 21.0 software was used. The significance level used to determine statistical significance of the outcome, was set at 0.05.

# Results

## 1. Participants' general characteristics

<Table 1> gives the participants' general characteristics. In terms of the total duration of the course, 218 students (72.7%) were enrolled in a four-year course, and 82 (27.3%) in a three-year course. A total of 89 students (29.7%) were in their third year in university, followed by 84 (28.0%) in the second year, 64 (21.3%) in the first year, and 63 (21.0%) in the fourth year. Regarding the frequency of participation in community volunteer activities, the most common response was less than once in two or three months (126 participants, 42.0%), followed by once or twice a month (97 participants, 32.3%) and once or twice a week (77 participants, 25.7%).

## 2. Descriptive statistics on depression, self-esteem, and job consciousness

<Table 2> shows the descriptive statistics on the participants' self-esteem, depression, and job consciousness. Self-esteem and depression scores, rated on a five-point scale, stood at a moderate level, with mean scores of 3.19 and 3.00, respectively. The job consciousness score was also moderate, with a mean score of 2.62 out of the total 4.

### 3. Variations in self-esteem, depression, and job consciousness vis-à-vis frequency of participation in community volunteer activities

We analyzed the variations in the subjects' self-esteem, depression, and job consciousness vis-à-vis their frequency of participation in community volunteer activities <Table 3>. More frequent participation in community volunteer activities led to higher self-esteem and lower depression. The respondents who said that they volunteer either once or twice a week or once or twice a month demonstrated higher self-esteem and lower depression at a statistically significant level compared with those who reported participating less than once in two or three months ( $p < 0.001$ ). Variations in job consciousness scores vis-à-vis frequency of participation in community volunteer activities were not statistically significant ( $p = 0.615$ ).

### 4. Correlations between self-esteem, depression, and job consciousness

We analyzed the correlation between the participants' self-esteem, depression, and job consciousness

**Table 1.** Participants' general characteristics

Characteristics	Division	N	%
Academic	3	82	27.3
	4	218	72.7
Grade	1	64	21.3
	2	84	28.0
	3	89	29.7
	4	63	21.0
Service frequency	1-2 times a week	77	25.7
	1-2 times a month	97	32.3
	Less than once every two or three months	126	42.0

**Table 2.** Descriptive statistics on self-esteem, depression and job consciousness

Characteristics	N	Min	Max	Mean ± SD	Cronbach's α
Self-esteem	300	1.00	5.00	3.19 ± 0.91	0.777
Depression	300	1.23	5.00	3.00 ± 0.73	0.817
Job consciousness	300	1.00	4.00	2.62 ± 0.76	0.818

**Table 3.** Variations in self-esteem, depression, and job consciousness vis-à-vis frequency of participation

Characteristics	N	Self-esteem	Depression	Job consciousness
Characteristics	N	Mean ± SD	Mean ± SD	Mean ± SD
1-2 per weekends	77	3.62 ± 0.69 <sup>a</sup>	2.63 ± 0.70 <sup>a</sup>	2.66 ± 0.49
1-2 per months	97	3.43 ± 0.67 <sup>a</sup>	2.80 ± 0.56 <sup>a</sup>	2.60 ± 0.44
>1 per two or three months	126	2.75 ± 0.99 <sup>b</sup>	3.37 ± 0.70 <sup>b</sup>	2.66 ± 0.53
$p^*$		<0.001	<0.001	0.615

\* by one way ANOVA test at  $\alpha = 0.05$

<sup>a,b</sup> Means followed by different letters (Duncan) are significantly different at  $\alpha = 0.05$

<Table 4>. We observed a negative correlation between self-esteem and depression ( $r=-0.062$ ) and a positive correlation between self-esteem and job consciousness ( $r=0.125$ ). Depression and job consciousness had a negative correlation with each other ( $r=-0.176$ ). In other words, a higher self-esteem meant lower depression and higher job consciousness, whereas higher depression translated into lower job consciousness.

## 5. Moderating effect of self-esteem and depression on the correlation between frequency of participation in community volunteer activities and job consciousness

The model fit, described in <Table 5>, was 327,428 in terms of the chi-squared statistic (CMIN), which was statistically significant at 3 degrees of freedom. This finding warrants further analysis based on a larger number of explanatory variables to explain the variables in our data. Comparative Fit Index (CFI) and Goodness-of-fit Index (GFI) were close to 0.9, indicating an overwhelmingly better fit of the above model over the basic model. However, the Root Mean Square error of approximation (RMSEA) value, which exceeded 0.10, suggested a certain level of gap between the observed and actual covariance models. A more complex model would increase the model fit, but our primary aim in this study was to analyze the presence of moderating variables and their impact through the structural equation model. We thus focused on examining the moderating variables than estimating the parameters, the latter of which was unnecessary for the purpose of this research.

<Table 6> describes the outcomes from analyzing the moderating effect of self-esteem and depression on the correlation between frequency of volunteer activities and job consciousness. A more frequent participation in community volunteer activities led to higher job consciousness ( $r=0.459$ ,  $p<0.05$ ). In addition, we inserted two interaction terms (i.e., frequency of volunteer activities and self-esteem; frequency of volunteer activities and depression) into the model to determine whether self-esteem and depression moderate the impact of the frequency of volunteer activities on job consciousness.

The analysis showed that depression has a statistically significant impact on job consciousness ( $r=0.519$ ,  $p<0.01$ ). Moreover, the interaction term composed of frequency of volunteer activities and self-esteem had a statistically significant impact on job consciousness ( $r=0.091$ ,  $p<0.05$ ) and depression had a statistically significant impact on job consciousness ( $r=0.090$ ,  $p<0.05$ ). These outcomes suggest that

**Table 4.** Correlations between self-esteem, depression, and job consciousness

Characteristics	Self-esteem	Depression	Job consciousness
Self-esteem	1.000		
Depression	-0.602**	1.000	
Job consciousness	0.125*	-0.176**	1.000

\* $p<0.05$ , \*\* $p<0.01$  by the pearson's correlation analysis

**Table 5.** Model fit for the path model

CMIN	df	<i>p</i>	CMIN/df	CFI	RMSEA	GFI
327.428	3	<0.001	109.143	0.857	0.601	0.818



**Table 6.** Moderating effect of self-esteem and depression on the correlation between frequency of participation in community volunteer activities and job consciousness

	r	S.E	C.R	p
Community volunteer activity frequency -> Job consciousness	0.459	0.218	2.106	0.035
Self-esteem -> Job consciousness	-0.151	0.184	-0.819	0.413
Depression -> Job consciousness	-0.519	0.161	-3.223	0.001
Community volunteer activity frequency × Self-esteem -> Job consciousness	0.091	0.044	2.064	0.039
Community volunteer activity frequency × Depression -> Job consciousness	0.090	0.036	2.536	0.011

depression has a statistically significant moderating effect on the correlation between frequency of volunteer activities and job consciousness.

In contrast, self-esteem did not explain the impact of the frequency of volunteer activities on job consciousness with statistical significance, when the influence of depression was controlled for ( $p > 0.05$ ).

## Discussion

Regular participation in volunteering as part of the learning process enhances students' soft skills, including critical thinking, conflict resolution, leadership, interpersonal skills, and collaborative capacity [15]. Given the increasing number of residents in local communities excluded from the benefits of health care services owing to various reasons including physical, financial, and time constraints, dental hygiene students' volunteer activities for these people are all the more meaningful. These students' engagement with their local communities through volunteering creates synergies that benefit not only local residents but also the students themselves, especially in terms of the positive impact of volunteer activities on their self-esteem, depression, and job consciousness.

This study sought to examine the correlation between the frequency of dental hygiene students' participation in community volunteer activities and their job consciousness, and to identify the moderating effect of self-esteem and depression. Our findings are anticipated to inform ongoing efforts to promote community volunteer programs.

We found that more frequent participation in volunteer activities translated into higher self-esteem, which is consistent with Park's [6] findings. The volunteering, satisfies people's innate desire to take part in something valuable, make themselves necessary to others, and win social recognition [16]. In this sense, we suggest that volunteer activities may open dental hygiene students' eyes to their self-worth as future dental hygienists and give them a sense of fulfillment, both of which contribute to higher self-esteem.

The present study also found that a more frequent participation in volunteer activities led to lower depression, which is consistent with Kang's findings [14]. Student volunteers donate their talents and, in return, receive due recognition and respect from the beneficiaries of their assistance. This experience shows them how valuable they are, offers them the pleasure of feeling fulfilled through the beneficiaries'

appreciation of their service, and, consequently, reduces depression.

More frequent volunteering also translated into higher job consciousness, consistent with Shin's [7] findings. Shin [7] noted that university students as volunteers are capable of providing more professional services compared with other types of volunteers, and volunteer activities during university education can become students' free-time pursuits that, in turn, influence their satisfaction with their major. We believe that dental hygiene students became more comfortable with and confident about their major through volunteer activities related to their area of study, and, as a result, felt more satisfied with their academic pursuits and became more conscious of their future career.

The negative correlation between self-esteem and depression observed in this study is congruent with the findings of many previous studies. Kim et al [17] reported a high negative correlation between depression and self-esteem. Lee [18] also found a negative correlation between them. Those with low self-esteem devalue themselves and harbor a negative self-image, which create negative feelings and cause depression [19].

Self-esteem and job consciousness had a statistically significant correlation in the correlation analysis, but self-esteem had no statistically significant effect when depression, self-esteem, and the interactive terms were inserted simultaneously into the model. This finding suggests that self-esteem does not have a remarkable influence on its own, possibly owing to the high correlation between frequency of volunteer activities and self-esteem or between frequency of volunteer activities and depression.

More specifically, the participants with low depression scores had higher job consciousness regardless of the frequency of their participation in community volunteer activities. It is notable that a high depression level and low frequency of volunteer activities translate into a very low level of job consciousness, but highly frequent volunteer activities induce a large increase in job consciousness even in the participants with high depression scores. This outcome indicates that variations in job consciousness are more evident in high-depression groups. In other words, volunteering may have a positive influence on raising job consciousness among students with a high level of depression.

In summary, we found that dental hygiene students' community volunteer activities raised their job consciousness. The results also showed that self-esteem and depression have a statistically significant moderating effect on the correlation between community volunteer activities and job consciousness. Health care professionals' own attitudes are crucial in the ongoing endeavors toward better oral health among the public. Promoting community volunteer activities, combined with mental health programs aimed at enhancing self-esteem and reducing depression, will help students learn the necessary attitudes as truly dedicated health care professionals.

The following are the policy proposals based on our findings. First, we recommend the development of volunteer programs that can meet the needs of voluntary workers themselves along with beneficiaries. Volunteer programs that fail to satisfy volunteers' needs will only undermine the motivation to participate. Listening to volunteers' voices and ideas and then reflecting them in actual programs will arouse their interest and give them a further sense of responsibility, which, in turn, will motivate them to provide more effective and efficient services. Second, most participants in volunteer programs



usually turn up on an irregular basis. We thus encourage host organizations to educate the participants in their volunteer programs on a constant basis to raise their awareness of the importance of volunteering and to promote continued participation. Third, most dental hygiene students help their local communities under volunteer programs related to their area of study. These programs need to be diversified to give the students further opportunities to gain a wider range of experiences in relation to the work of dental hygienists. Most volunteering programs in this regard are currently confined to educating local residents or giving them topical fluoride application. However, professional dental hygienists deal with a much wider range of tasks, which means that students should experience a wider range of activities and offer a more extensive service through volunteering. We thus encourage professional organizations to provide students with necessary assistance so that they can benefit from wider, more diversified experiences through their participation in volunteer activities.

The significance of this study lies in the confirmation of the correlation between frequency of dental hygiene students' participation in community volunteer activities and their job consciousness through empirical analysis. However, the limited number of question items in the job consciousness measurement tool in this study precluded the precise measurement of job consciousness among the students. We thus call for the development of a standardized tool that enables objective evaluation in consideration of the rising demand toward objectivity of research in recent years. We also look forward to longitudinal studies, along with cross-sectional research, using the proposed tool to examine changes over time through repeated surveys.

## Conclusions

This study examined the correlation between the frequency of dental hygiene students' participation in community volunteer activities, job consciousness, depression, and self-esteem, and then validated the moderating effect of depression and self-esteem on the correlation between participation in community volunteer activities and job consciousness. The following are the findings of our analysis.

1. Most subjects participate in community volunteer activities less than once in two or three months (42.0%), followed by once or twice a month (32.3%) and once or twice a week (25.7%). The mean job consciousness score was 2.62 out of the maximum 4.00. The mean self-esteem score was 3.19, and the mean depression score was 3.00 out of the maximum 5.00.

2. Self-esteem demonstrated a negative correlation with depression ( $r=-0.062$ ) but a positive correlation with job consciousness ( $r=0.125$ ). Depression and job consciousness had a negative correlation ( $r=-0.176$ ).

3. Depression had a statistically significant impact on job consciousness ( $r=0.519$ ,  $p<0.01$ ), and the interaction term of depression and frequency of community volunteer activities had a statistically significant impact on job consciousness ( $r=0.090$ ,  $p<0.05$ ). These findings show that depression moderates the correlation between frequency of community volunteer activities and job consciousness at a statistically significant level.

In summary, a more frequent participation in volunteer activities raises dental hygiene students' self-esteem, reduces depression, and enhances their job consciousness. These positive changes in self-esteem, depression, and job awareness warrant endeavors to encourage students' voluntary participation in volunteer activities, create supportive structures, and develop various programs relevant to students' area of study.

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