

Effect of exercise immersion experience on health promotion and lifelong physical education of high school students in sports club activities

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The purpose of this study was to investigate the impact of high school students' athletic commitment, health promotion education, and lifelong sports activities. To this end, the researcher searched for research subjects of 397 high school students residing in Seoul in 2019. As a result of the analysis, the following conclusions were drawn. First, the effect of exercise commitment on sports health promotion education was investigated. Looking at the activities of high school students, their commitment to behavior has had a profound impact on their health responsibilities and relationships. Second, the study also investigated the impact

of athletic commitment to lifelong sports of sports activities in high school students and found that cognitive and behavioral commitment had a significant impact on lifelong sports. Finally, as a result of investigating the impact of health promotion education on lifelong sports of high school student sports activities, it was found that health responsibility and relationships have a great influence on lifelong sports.

Keywords: High school student, Exercise commitment, Sports activity, Health promotion education, Lifetime sports


INTRODUCTION

The current health policy sets out people's current physical and athletic abilities and provides guidance on athletic and sports activities. Adolescence is a time when a lot of physical and mental changes take place, but the current Korean entrance exam-oriented educational climate has made adolescents prolonged sedentary life, and their mental health is also threatened by lack of movement and academic stress. High school students in Korea have an increasing obesity rate due to lack of physical activity, and are exposed to risk factors related to various health behaviors, such as smoking, drinking alcohol, lack of exercise, stress, and irregular eating habits (Michael and Ben-Zur, 2007).

Lack of physical health has been considered an important cause of future lifestyle-related diseases, including metabolic syndrome, diabetes, or high blood pressure. In previous studies, it has been reported that people with low levels of physical activity have in-

creased body mass index, waist circumference, and body fat mass compared to people with high levels of physical activity (Woolf et al., 2008). Children with higher levels of physical activity have reported better cardiovascular health indicators than children with lower levels of physical activity, and stronger physical activity has been reported to weaken arterial stiffness (Proudfoot et al., 2019).

Nutrition education has a good effect on children's eating habits, and the nutritionist's role is to oversee food preparation and meal planning, as well as to teach nutrition education as a teacher (Nakamura, 2008). Regular physical exercise is an activity with the main ability to maintain and improve physical and mental health (Mayolas-Pi et al., 2017). Satisfaction with physical activity is known to be an important factor in maintaining physical activity, but the factors that influence satisfaction are not well known (Baldwin et al., 2013). These physical activities should not be limited to adolescence throughout life, but should consist of lifelong physical education. Sports activities have attracted the most

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people in recent decades thanks to their ability to maintain and improve their health (Nogueira et al., 2018).

Students who do not have the habit of engaging in sports or sports activities may have lacked motivation. However, they had a high level of positivity for sports or sports activities. Therefore, it is important to be actively engaged in exercise and/or physical activity with a specific purpose in mind (Tamura et al., 2021). Therefore, this study attempted to grasp the perception of health promotion education and lifelong physical education as a result of exercise immersion of high school students participating in sports activities. This is to emphasize the importance of health promotion education through sports activities and to provide basic data for linking sports activities of high school students to lifelong physical education.

MATERIALS AND METHODS

Subjects

This study distributed a survey of 450 high school students living in Seoul and participating in sports activities in 2019. All 450 surveys were collected, and a total of 397 questionnaires were used

Table 1. Demographic characteristics of research subjects (N=397)

Variable	No. (%)
Gender	
Boys	250 (63.0)
Girls	147 (37.0)
Grade	
1st year	30 (7.6)
2nd year	152 (38.3)
3rd year	215 (54.2)
Years of exercise	
Less than 6 mo	117 (29.5)
6 mo–1 yr	108 (27.2)
1–2 yr	87 (21.9)
2–3 yr	29 (7.3)
3 yr or more	56 (14.1)
No. of exercises	
1 Time a wk	48 (12.1)
2 Times a wk	129 (32.5)
3 Times a wk	170 (42.8)
4 Times a wk or more	50 (12.6)
Hours of exercise	
2 hr	51 (12.9)
2–3 hr	205 (51.6)
3–4 hr	112 (28.2)
4 hr or more	29 (7.3)

for actual analysis, excluding 53 incomplete surveys that were inconsistent or missing content. This experiment was approved by the Research Ethics Committee (2019-145). The characteristics of the participants are shown in Table 1.

Composition of research tools

This study used a survey questionnaire as a tool for collecting data. The questionnaire consisted of 35 questions in four areas, including questions that measured the general characteristics of high school students, exercise immersion, health promotion education, and connection to lifelong physical education. A 5-point Likert Scale was used for each item, and for the exercise immersion scale, eight measurement questions used in a research by Scanlan et al. (1993) were used after revising. Next, health-promoting lifestyle profile II was partially modified to meet the purpose of this study (Bozo et al., 2009).

Validity and reliability of research tools

In this study, exploratory factor analysis was performed to verify the validity and reliability of the questionnaire. To verify reliability in Table 2, this study calculated Cronbach's α coefficient to confirm the internal consistency among the questions.

Validity and reliability of exercise immersion

As a result of exploratory factor analysis of orthogonal rotation through principal component analysis for exercise immersion, the factor load criterion was set to 0.4 or more. To find out the normal distribution of the population and the suitability of the data, the study conducted Bartlett's unit matrix test and the standard suitability Kaiser-Meyer-Olkin (KMO) for each variable. In Table 3, the cumulative rate explaining the two factors of exercise immersion was 70.206%, and Cronbach α was relatively high (0.909–0.807), so the exercise immersion scale has both reliability and validity.

Table 2. Reliability test of research tools

Variable	Subfactors	No. of questions	Cronbach α
Exercise immersion	Cognitive immersion	5	9.909
	Behavioral immersion	5	0.867
Health promotion education	Health responsibility	4	0.837
	Exercise and nutrition	4	0.892
	Self-realization	4	0.778
	Interpersonal relationship	3	0.764
Connection to lifelong physical education	Single factor	5	0.853

Table 3. Factor analysis of exercise immersion

Question	Cognitive immersion	Behavioral immersion
Exercise immersion 6	0.844	0.280
Exercise immersion 4	0.810	0.319
Exercise immersion 5	0.802	0.351
Exercise immersion 9	0.760	0.314
Exercise immersion 3	0.701	0.427
Exercise immersion 7	0.242	0.861
Exercise immersion 10	0.277	0.761
Exercise immersion 2	0.390	0.752
Exercise immersion 1	0.424	0.692
Exercise immersion 8	0.484	0.536
Eigenvalue	3.785	3.236
Variance (%)	37.845	32.361
Cumulative (%)	37.845	70.206

Kaiser-Meyer-Olkin = 0.923, $\chi^2 = 2,622.374$, $df = 45$, sig = 0.000.

Validity and reliability of health promotion education

As a result of orthogonal rotation exploratory factor analysis through principal component analysis for health promotion education, the factor load criterion was set to be 0.4 or higher. To find out the normal distribution of the population and the suitability of the data, the study conducted Bartlett's unit matrix test and the standard suitability KMO for each variable. In Table 4, the cumulative rate explaining the four factors of health promotion education is 70.152%, and Cronbach's α is relatively high at 0.892–0.764, so the health promotion education scale has both reliability and validity.

Validity and reliability of the awareness of connection to lifelong physical education

As a result of orthogonal rotation exploratory factor analysis through principal component analysis for health promotion education, the factor load criterion was set to be 0.4 or more. To find out the normal distribution of the population and the suitability of the data, the study conducted Bartlett's unit matrix test and the standard suitability KMO for each variable. In the Table 5, the cumulative ratio explaining a single factor linked to lifelong physical education was 63.477%, and Cronbach α is relatively high at 0.853, so the lifelong physical education scale has both reliability and validity.

RESULTS

Correlation analysis

In this study, a correlation analysis was performed to verify the relationship between the scales of each subfactor whose uniformity was proven, and the results are shown in Table 6. As a result of

Table 4. Factor analysis of health promotion education

Question	Health responsibility	Exercise and nutrition	Self-realization	Interpersonal relationship
Health promotion education 14	0.847	0.129	0.152	0.072
Health promotion education 15	0.816	0.119	0.108	0.174
Health promotion education 12	0.766	0.028	0.201	0.205
Health promotion education 13	0.597	0.230	0.060	0.395
Health promotion education 6	0.160	0.867	0.165	0.190
Health promotion education 7	0.146	0.843	0.191	0.177
Health promotion education 5	0.141	0.839	0.247	0.137
Health promotion education 8	0.045	0.628	0.128	0.541
Health promotion education 3	0.347	0.143	0.773	0.205
Health promotion education 1	0.081	0.292	0.618	0.283
Health promotion education 2	0.598	0.135	0.614	0.008
Health promotion education 4	0.058	0.410	0.587	0.310
Health promotion education 10	0.176	0.204	0.275	0.788
Health promotion education 11	0.387	0.193	0.178	0.619
Health promotion education 9	0.290	0.329	0.311	0.536
Eigenvalue	3.148	3.126	2.125	2.123
Variance (%)	20.989	20.842	14.170	14.152
Cumulative (%)	20.989	41.830	56.000	70.152

Kaiser-Meyer-Olkin = 0.919, $\chi^2 = 3,213.674$, $df = 105$, sig = 0.000.

Table 5. Factor analysis of the awareness of connection to lifelong physical education

Question	Single factor
Awareness of connection to lifelong physical education 3	0.832
Awareness of connection to lifelong physical education 2	0.828
Awareness of connection to lifelong physical education 4	0.812
Awareness of connection to lifelong physical education 1	0.780
Awareness of connection to lifelong physical education 5	0.727
Eigenvalue	3.174
Variance (%)	63.477
Cumulative (%)	63.477

Kaiser-Meyer-Olkin = 0.841, $\chi^2 = 832.297$, $df = 10$, sig = 0.000.

the correlation analysis, Pearson correlation coefficient was 0.242–0.753, which was less than the multicollinearity criterion of 0.80, so there was no problem with weighted collinearity.

The effect of exercise immersion experience on health promotion education

Table 7 shows the results of analysis of high school students' exercise immersion experience in sports activities for health promotion education. Among the factors of exercise immersion through participation in sports activities, behavior immersion ($\beta = 0.463$) had a significant effect on health responsibility, a subfactor of

Table 6. Correlation analysis among exercise immersion experience, health promotion education, and the awareness of connection to lifelong physical education

Variable	1	2	3	4	5	6	7
Cognitive immersion	1						
Behavioral immersion	0.753**	1					
Health responsibility	0.287**	0.417**	1				
Exercise and nutrition	0.289**	0.242**	0.378**	1			
Self-realization	0.265**	0.326**	0.578**	0.592**	1		
Interpersonal relationship	0.328**	0.366**	0.573**	0.614**	0.651**	1	
Connection to lifelong physical education	0.550**	0.590**	0.426**	0.263**	0.349**	0.373**	1

** $P < 0.01$.**Table 7.** The effects of exercise immersion experience on health promotion education

Variable	Health responsibility		Exercise and nutrition		Self-realization		Interpersonal relationship	
	β	t	β	t	β	t	β	t
Cognitive immersion	-0.062	-0.886	0.246	3.355***	0.045	0.621	0.120	1.693
Behavioral immersion	0.463	6.671***	0.057	0.785	0.292	4.038***	0.276	3.885***
F	41.973		18.272		23.610		32.132	
R^2	0.176		0.080		0.107		0.140	

*** $P < 0.001$.**Table 8.** Effects of exercise immersion experience on connection to lifelong physical education

Variable	Connection to lifelong physical education	
	β	t
Cognitive immersion	0.245	4.039***
Behavioral immersion	0.406	6.703***
F	117.665	
R^2	0.374	

*** $P < 0.001$.

health promotion education, and the regression explanatory power was 17.6%. Cognitive immersion ($\beta = 0.246$) had a significant effect on exercise and nutrition with 8.0% regression explanatory power, and behavioral immersion ($\beta = 0.292$) had a significant effect on self-realization with 10.7% regression explanatory power. Lastly, behavioral immersion ($\beta = 0.276$) had a significant effect on interpersonal relationship with 14.0% regression explanatory power. In other words, the higher the behavioral immersion of exercise immersion, the higher the health responsibility, self-realization, and interpersonal relationships, whereas the higher the cognitive immersion, the higher the exercise and nutrition.

The effects of exercise immersion experience on the awareness of lifelong physical education awareness connection

Table 8 is the result of analyzing the effect of high school stu-

Table 9. The effects of health promotion education on the awareness of connection to lifelong physical education

Variable	Connection to lifelong physical education	
	β	t
Health responsibility	0.292	5.018***
Exercise and nutrition	0.019	0.315
Self-realization	0.074	1.122
Interpersonal relationship	0.146	2.164*
F	25.999	
R^2	0.210	

* $P < 0.05$. *** $P < 0.001$.

dents' exercise immersion experience on the perception of association with lifelong physical education in sports activities. Among the factors of exercise immersion, cognitive immersion ($\beta = 0.245$) and behavioral immersion ($\beta = 0.406$) had a significant effect on the perception, and the regression explanatory power was 37.4%. In other words, the higher cognitive immersion and behavioral immersion, which are the subfactors of exercise immersion, the higher the awareness of the association with lifelong physical education is.

The effects of health promotion education on the awareness of connection to lifelong physical education

Table 9 is the results of analyzing the effects of health promotion education on the awareness of connection to lifelong physical

education. Among the factors of health promotion education, health responsibility ($\beta = 0.292$) and interpersonal relationship ($\beta = 0.146$) had a significant effect on the students' perception, and the regression explanatory power was 21.0%. In other words, the higher the health responsibility and interpersonal relationship, which are the subfactors of health promotion education, the higher the awareness of the association with lifelong physical education.

DISCUSSION

The intense relationship between adolescent individuals and peer groups points to the importance of planning prevention and intervention programs for risky behaviors. In addition to individual counseling, interventions may be more effective if group-level programs are conducted within factions rather than in school classes. It suggests that interventions can successfully achieve their goals if performed individually for each gender, and highlights the factors that have a discriminatory impact between boys and girls (Michael and Ben-Zur, 2007).

It has been shown that people with higher average levels of positive experiences and lower levels of thinking about the negative aspects of exercise are more likely to report higher levels of satisfaction, and perceived progress towards positive experiences and goals within the individual (Baldwin et al., 2013). Without exercise for 2 weeks, depression, confusion, anger, and fatigue increased, as well as a slight increase in β -endorphin, resulting in decreased vitality (Antunes et al., 2016). Exercise has been shown to improve sleep efficiency and duration, especially in populations suffering from disease (Dolezal et al., 2017). Most of the people who were aware of their health were worried about their eating habits and some about their physical activity.

The purpose of this study was to investigate the effect of high school students participating in sports activities on the relationship between exercise immersion experience, health promotion education, and lifelong sports connection perception. To achieve the purpose of this study, 397 high school students living in Seoul and participating in sports activities were selected as the subject of the study, and data collection and analysis were conducted using a questionnaire to draw the following conclusions.

First, as a result of examining the effect of exercise immersion experience of high school students participating in sports activities on health promotion education, behavioral immersion was found to have a significant effect on health responsibility, self-realization, and interpersonal relationships. It was found to have a

significant effect. In other words, the higher the behavioral immersion of exercise immersion, the higher the health responsibility, self-realization, and interpersonal relationships, and the higher the cognitive immersion, the higher the exercise and nutrition.

Second, as a result of examining the effect of the sports immersion experience of high school students participating in sports activities on the perception of lifelong sports connection, both cognitive immersion and behavioral immersion had a significant effect on the perception of lifelong sports connection. In other words, the higher the cognitive immersion and behavioral immersion, which are the subfactors of exercise immersion, the higher the awareness of lifelong sports connection.

Third, as a result of examining the effect of health promotion education through exercise immersion experience of high school students participating in sports activities on the perception of lifelong sports connection, it was found that health responsibility and interpersonal relationships had a significant effect on lifelong sports connection. In other words, the higher the health responsibility and interpersonal relationships of health promotion education, the higher the awareness of lifelong sports connection increases.

Thus, the exercise immersion experienced by high school students engaging in sports activities allows them to have a desirable perception of their health responsibilities. Since self-actualization and stable interpersonal relationships can lead to lifelong physical education through health promotion education, it is necessary to provide continuous physical education in high school.

CONFLICT OF INTEREST

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

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