

# International journal of sport

2016 1(1)

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Publication state: Japan  
ISSN: 2423-8287

Publisher: J-INSTITUTE  
Website: <http://www.j-institute.jp>

Corresponding author  
E-mail: [exercise@konkuk.ac.kr](mailto:exercise@konkuk.ac.kr)

Peer reviewer  
E-mail: [editor@j-institute.jp](mailto:editor@j-institute.jp)

<http://dx.doi.org/10.22471/sport.2016.1.1.01>

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## Research Trend of SPORT Nutrition Science in the Republic of KOREA

Kim Ji-su<sup>1</sup>

*Konkuk University, Seoul, Republic of Korea*

Lim Ki-won<sup>2\*</sup>

*Konkuk University, Seoul, Republic of Korea*

Hwang Yoon-young<sup>3</sup>

*Konkuk University, Seoul, Republic of Korea*

### Abstract

*In this study it is aimed to classify and identify studies in the Journal of Korean Society of Exercise Nutrition(The Journal of Exercise Nutrition & Biochemistry) published from 2000 until 2014 by the topics and by the subjects so as to create the raw data for direction and quality of future researches of the exercise nutrition.*

*When summed up the research topics presented, the studies on anti-oxidation appeared to be 42(14%) as the most, followed by 36(12%) on energy metabolism, 29(10%) on fat, 28(10%) on supplements, 28(10%) on general nutrition, 27(9%) on endurance exercise, 17(6%) body composition, 12(4%) on carbohydrate, 11(4%) on immunity, 10(3%) on minerals, 8(3%) on resistance exercise, 7(2%) on vitamins, 7(2%) on protein and 4(1%) on water intake in the order. When viewed by comprehensive research topics, it had been reported as 231 researches(57%) were performed on exercise nutrition, 90(22%) on exercise physiology, 65(16%) on training, 11(3%) on growth development, 6(1%) on measurement and evaluation, and 3(1%) on special physical education in the order. Based on the study subjects, there were 198 researches(49%) performed in laboratory animals showing the highest ratio. The classification was done followed by 123 studies(30%) in adults, 30 studies(7%) in athletes, 27 studies(7%) in youth and 8 studies(2%) in elderly subjects.*

*As such as intake of fats is relatively increased largely due to westernized diets in Korea, such as cardiovascular diseases and metabolic syndromes are rapidly increased following after the increase of obesity and visceral fat. Therefore, not only in Korea, but the regular exercise as well as the nutritional knowledge for health promotion has been demanded greatly worldwide. To this end, a variety of studies for the sports science as well as for the public health should be attempted in the study of Exercise Nutrition in Korea. Therefore, the future trends of researches on Exercise Nutrition in Korea, It will be activated such as Molecular exercise nutrition research, Energy metabolism during exercise, Antioxidant mechanisms induced by exercise, Health and brain health, Ergogenic Aids, Anti-fatigue and anti-obesity, Sports drinks and sports supplements research, Natural drug research.*

**[Keywords]** *Sport Nutrition, Exercise Nutrition, Journal of Korean Society of Exercise Nutrition, The Journal of Exercise Nutrition & Biochemistry, Republic of Korea*

### 1. Introduction

Exercise and Nutrition is a science that studies not only how to enhance the ability of athletes to perform exercise but also the knowledge needed to maintain and promote optimal nutrition necessary for the movement and activities in scientific manners. In Korea, the lectures of nutrition science was

started since the mid-1970s at the department of physical education and up to the early eighties, most lectures were done at general nutrition level by the external professors from the department of Home Science and the department of Food and Nutrition[1]. However, in special circumstances of exercise, all of human metabolism process and adaptation effect of energy metabolism by training

are difficult to explain in the perspective of general nutrition. Therefore, it can be said that the exercise and nutrition science was born as a new integrated study of 'Exercise and Nutrition'[2].

The momentum for full scale research of Exercise and Nutrition as an academic science in Korea was 1988 Seoul Olympic Games, under the proposition of making the sports as a science, and it settled as a discipline so called the Exercise Nutrition Science or the Sports Nutrition Science in the course of today's physical education curriculum related subjects. Thereafter, this has repeated the break through with the establishment of the Korean Society of Exercise Nutrition in 1996[3].

Exercise Nutrition Science can be described as a study of all phenomena taking place in the human body while living, on the basis of such as physiology, biochemistry and nutrition.

In particular, in the 21st century, the correct application of the exercise and sport nutrition is needed to improve the quality of life through improving physical fitness and health promotion of the public, so its value is further increased. To embrace the needs, many domestic scholars specialized in the Exercise Nutrition have been fostered, but still requiring establishment of relevant data and trend in research.

Therefore, in this study it is aimed to classify and identify studies in the Journal of Korean Society of Exercise Nutrition published from 2000 until 2014 by the topics and by the subjects so as to create the raw data for direction and quality of future researches of the exercise nutrition.

## 2. Major Trends of Researches

The contents and trends of researches identified by analyzing the Journals of Korea Society of Exercise Nutrition published from 2000 to 2014, are as presented in <Table 1>. The articles reported in the Journal of Nutrition Exercise for 14 years are a total of 455 pieces, presenting various study results. The main topics presented are as follows.

- Energy metabolism during exercise
- Effect of endurance and resistance training
- Antioxidant mechanisms induced by exercise
- Health and brain health
- Ergogenic Aids
- Anti-fatigue and anti-obesity
- Exercise and diet composition
- Exercise and diet
- Effect of bone density and anti-diabetes

**Table 1.** Research trend of exercise nutrition science in Korea.

	2000	2001	2002	2003	2004	2005	2006	2007
General nutrition	2	4	2	3	7	2	2	1
Energy metabolism				3	3		2	
Body composition	1		1	6	2	2	3	
Carbohydrate	1	1	1	4	3	1		
Fat	2	1	2	5	4	2	2	1
Protein		1		2	1		1	
Fluid intake	1				1			
Vitamins	1				1		1	
Minerals			2		3	3		1
Immunity		1			1		1	2

Antioxidant	1	2	2	4	4	6	2	
Supplement	1	3	5	4	3	3	2	1
Resistance training				1	1	2		
Endurance exercise				3	6	5	3	4
Obesity	1			3	2	2	3	6
Anti-fatigue				3		1	3	1
Anti-diabetes				1		1	1	
Brain health						1	2	
Health				3	9	4	4	10
Bone density						4	5	2
Etc				3	3		2	3
Total	11	13	15	48	54	39	39	32

	2008	2009	2010	2011	2012	2013	2014	Total
General nutrition		3	2					28
Energy metabolism	2	2	4	4	4	4	8	36
Body composition			1				1	17
Carbohydrate	1							12
Fat	3	1	1			3	2	29
Protein	1			1				7
Fluid intake							2	4
Vitamins	1		1			1	1	7
Minerals						1		10
Immunity	3	1	1			1		11
Antioxidant	3	5	1	4	2	3	3	42
Supplement		2	1	1	2			28
Resistance exercise	1			1			2	8
Endurance exercise	1	1	2		2		2	27
Obesity	2	2	3		2	2	2	30
Anti-fatigue			1	1	2	2	1	15
Anti-diabetes		2	1		2	1	3	12
Brain health	2	3	1	3	4	2	5	23
Health	2	3	3	2	1	2	8	51

Bone density	2	1		2		1	3	20
Etc		4	5	2	3	1	2	28
Total	24	30	27	21	23	24	45	445

The research topics in the early 2000 were such as body composition, supplements, anti-oxidation and nutrients, indicating various research studies were implemented. After 2007, in particular, studies on such as obesity, anti-oxidation, health, brain health, and bone density were increased, but it was reported that the research topics were more or less reduced than the early 2000. However, as the most of studies were convergent researches implemented based on exercise and nutrition, it would be difficult to affirm that the topics of research was reduced.

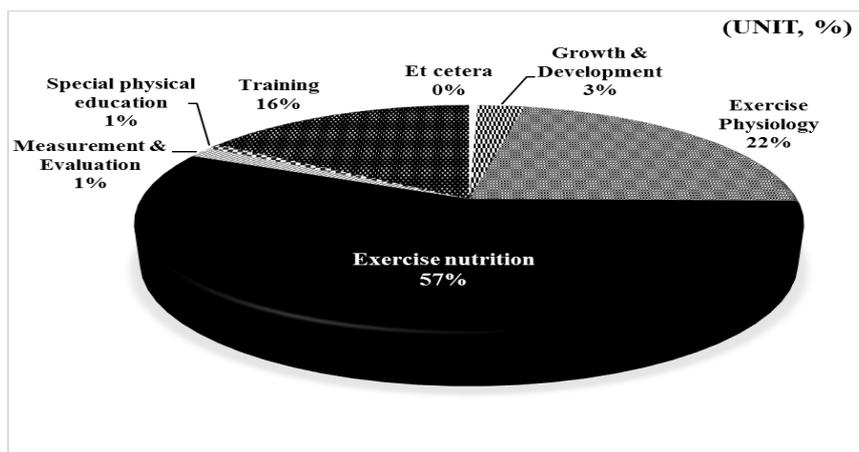
When summed up the research topics presented, the studies on anti-oxidation appeared to be 42(14%) as the most, followed by 36(12%) on energy metabolism, 29(10%) on fat, 28(10%) on supplements, 28(10%) on general nutrition, 27(9%) on endurance exercise, 17(6%) body composition, 12(4%) on carbohydrate, 11(4%) on immunity, 10(3%) on minerals, 8(3%) on resistance exercise,

7(2%) on vitamins, 7(2%) on protein and 4(1%) on water intake in the order.

Another area to note was the researches on energy metabolism which was steadily decreased from 2000, found to be increased every year since 2008, thereby, it was accounted for a large proportion together with studies on obesity and health. This is considered as because the importance of the metabolism in human body in principle has been re-recognized unlike the early to mid-period of the 2000 where the researches had focused only on the field of molecular biology.

When viewed by comprehensive research topics, it had been reported as 231 researches(57%) were performed on exercise nutrition, 90(22%) on exercise physiology, 65(16%) on training, 11(3%) on growth development, 6(1%) on measurement and evaluation, and 3(1%) on special physical education in the order <Figure 1>.

**Figure 1.** Distribution of the field of study(%).



Based on the study subjects, there were 198 researches(49%) performed in laboratory animals showing the highest ratio. The classification was done followed by 123 studies(30%) in adults, 30 studies(7%) in athletes,

27 studies(7%) in youth and 8 studies(2%) in elderly subjects <Figure 2>.

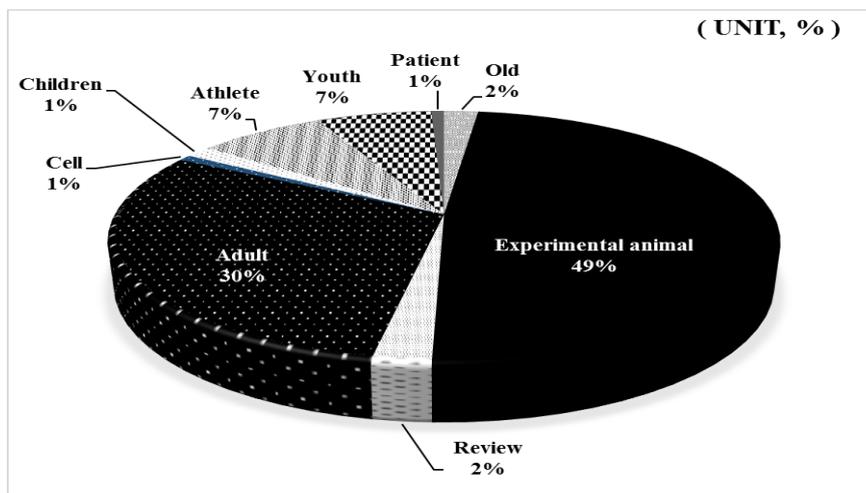
In the researches on exercise nutrition, there are many studies performed in laboratory animals and still increase every year than

any other field of physical education, this is because if performing those studies in human, they will be limited very much.

For the Exercise Nutrition, the research is conducted in a variety of subjects(athletes, obese population, people with diabetes, and youth groups) and in addition it requires dietary regulation or intake of supplements under rather special condition of exercise unlike

general nutrition, therefore there should be sufficient pre-clinical studies before implementing any clinical studies. In addition, researches on exercise nutrition show a continuously increasing trend of animal studies using mouse and rat as they intend to identify and analyze diversified mechanisms, gene expression and signaling pathways[4][5].

**Figure 2.** Classification by subjects(%).



### 3. Conclusion

Researches listed on the Journal of Korea Society of Exercise Nutrition from 2000 until 2014 were a total of 455 studies, presenting a variety of topics and subjects. These searches in early 2000 were conducted with topics mainly such as supplements and nutrients that improve exercise performance capacity, anti-oxidation and body composition, and after 2008, the studies on molecular biology and energy metabolism had been increased in addition to the studies related to obesity and health.

When summarized the research topics presented, the studies with the highest ratio were conducted on anti-oxidation as 42(14%), followed by 36 studies(12%) on energy metabolism, 29 studies(10%) on fat, 28 studies(10%) on supplements, 28 studies(10%) on general nutrition, 27 studies(9%) on endur-

ance exercise, 17 studies(6%) on body composition, 12 studies(4%) on carbohydrate, immunity 11 studies(4%) on immunity, 10 studies(3%) on minerals, 8 studies(3%) on resistance exercise, 7 studies(2%) on vitamins, 7 studies(2%) on protein, and 4 studies(1%) water intake in the order.

It had been reported that 231 studies(57%) out of a total of 455 researches were performed on exercise nutrition, 90 studies(22%) on exercise physiology, 65 studies(16%) on training, 11 studies(3%) on growth development, 6 studies(1%) on measurement and evaluation, and 3 studies(1%) on special physical education in the order. Based on the study subjects, there were 198 researches(49%) performed in laboratory animals showing the highest ratio. In the classification, it was followed by 123 studies(30%)

in adults, 30 studies(7%) in athletes, 27 studies(7%) in youth and 8 studies(2%) in elderly subjects.

Analyses are being conducted on various items exploring such as training effects[6], conditioning[7], anti-fatigue[8], nutrition intake[9], and physiologic active substances[10] and recently, as the genetic analyses are attempted, studies on mechanisms focusing on specific gene and protein expressions are being implemented. Furthermore, it has been found that even analyses on various physiological indices and intra-cell mitochondria are being widely activated[11][12].

As such as intake of fats is relatively increased largely due to westernized diets in Korea, such as cardiovascular diseases and metabolic syndromes are rapidly increased following after the increase of obesity and visceral fat[13][14][15].

Therefore, not only in Korea, but the regular exercise as well as the nutritional knowledge for health promotion has been demanded greatly worldwide. To this end, a variety of studies for the sports science as well as for the public health should be attempted in the study of Exercise Nutrition in Korea. The future trends of researches on Exercise Nutrition in Korea are as follows.

#### **Future Trends of Research on Exercise Nutrition in Korea**

- Molecular exercise nutrition research
- Energy metabolism during exercise
- Antioxidant mechanisms induced by exercise
- Health and brain health
- Ergogenic Aids
- Anti-fatigue and anti-obesity
- Sports drinks and sports supplements research
- Natural drug research

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#### Lead Author

**Kim Ji-su** / Physical Activity & Performance Institute Researcher

B.A. Kyungwoon University

M.A. Konkuk University

Ph.D. Konkuk University

#### Research field

- Silk Peptide Intake Increases Fat Oxidation at Rest in Exercised Mice, *Journal Nutrition Science Vitaminology*, 59 (2013).

- Silk Peptide Treatment Can Improve the Exercise Performance of Mice, *Journal of the International Society of Sports Nutrition*, 11(35) (2014).

#### Major career

- 2015. National Research Foundation of Korea, Researcher

- 2015~present. Physical Activity & Performance Institute, Researcher

#### Corresponding Author

**Lim Ki-won** / Konkuk University Professor

B.A. University of Tsukuba

M.A. University of Tsukuba

Ph.D. University of Tsukuba

#### Research field

- Chronic (-)-Hydroxycitrate Administration Spares Carbohydrate Utilization and, *The Journal of Nutrition*, 130(12) (2000).

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#### Major career

- 2014~present. The Korean Society for Exercise Nutrition, Chairman

- 2014~present. Physical Activity and Performance Institute, Head of Research Center

#### Co-Author

**Hwang Yoon-young** / Physical Activity & Performance Institute Researcher

B.A. Dankook University

M.A. Korea National Sport University

Ph.D. Konkuk University

#### Research field

- Effects of Pilates Exercises on Their Body Compositions Muscular Strength and 3-dimension Spine Body Type for Female University Students, *The Korean Society of Sports Science*, 22(5) (2013).

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#### Major career

- 2015~present. Physical Activity & Performance Institute, Researcher

- 2016~present. International Society for Sport Science, Organization Chairperson

Publication state: Japan  
ISSN: 2423-8287

Publisher: J-INSTITUTE  
Website: <http://www.j-institute.jp>

Corresponding author  
E-mail: [eykim@hoseo.edu](mailto:eykim@hoseo.edu)

Peer reviewer  
E-mail: [editor@j-institute.jp](mailto:editor@j-institute.jp)

<http://dx.doi.org/10.22471/sport.2016.1.1.08>

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## Influence of Stress on Self-Esteem and the Moderating Effects of PHYSICAL ACTIVITIES in KOREAN Elderly People

Kim Eui-young

*Hoseo University, Asan, Republic of Korea*

### Abstract

*The purpose of this study was to examine the influence of the stress of Korean elderly people on their self-esteem and the moderating effects of physical activities. The subjects in this study were 350 male and female senior citizens who used senior welfare centers located in Chungcheong Province and North Gyeongsang Province in 2015, and the number of the actual cases used in this study were 327.*

*The instruments used in this study were structured questionnaires that used a four-point Likert scale. The instrument used to measure stress was a scale that rearranged scale with some modifications based on Elderly Stress Scale and Mccubbin, Wilson & Oattersondml File and by consulting the data of Olsen and Boss.*

*The instrument used to evaluate self-esteem was adapted version of Self-Esteem Scale that was used in study. This scale was used in this study after it was modified and complemented to serve the purpose of the study.*

*The instrument used to assess physical activities was a short-sentence self-administered questionnaire that was one of the International physical Activity Questionnaires, or IPAQ. The IPAQ is to measure the degree of walking, moderate activities and strenuous activities over the last seven days such as leisure, indoor, outdoor, work-related or traffic-related activities and to calculate total scores that indicate the level of overall activities by gathering all the information on the frequency and duration of the activities. As for the amount of activity, MET-minutes are calculated based on energy demand, which is defined as METs, and by giving different weights to the different types of activity. Regarding the value of METs, average METs scores are calculated based on a study on the reliability of the IPAQ, which was conducted in 2000 and 2001, and based on MET scores for each activity type that were reported.*

*A statistical package SPSS WIN 18.0 was employed, and factor analysis, reliability analysis, correlation analysis and regression analysis were made. The findings of the study were as follows: First, the stress of the senior citizens affected their self-esteem.*

*They were less self-esteemed when they were more stressed out due to economic difficulties, family problems, residential problems or health problems. Second, physical activities were found to have produced moderating effects when their stress had an impact on self-esteem. The group that engaged in less physical activities were less self-esteemed when they were under more stress, whereas the group that engaged in more physical activities were highly self-esteemed even though their stress became heavier.*

**[Keywords]** *Physical Activities, Korean Elderly People, Aged Society, Stress, Self-Esteem*

## 1. Introduction

South Korea became an aged society in 2000 because of an increase in the elderly

population, and is on the verge of being a super-aged society as the elderly population is expected to account for 24.3 percent of the entire population in 2030. Indeed, there is a

tendency that the elderly population is steadily on the rise[1]. Elderly people are usually confronted with common problems. They have been dedicated to their families in their lifetime, and they have a lot of boring free time after retirement. They are stressed under the circumstances, and they are bound to lead an unsatisfactory life due to waning or impaired physical and mental functions[2]. It's inevitable for them to become physically, psychologically and socially intimidated, and they experience various sorts of stress as they are filled with a greater sense of loss than in any other time of their lives.

Studies found that it affects self-esteem when elderly people are stressed out in boring everyday life[3]. Self-esteem is a barometer of psychological satisfaction in old age, and refers to how much elderly people respect themselves and consider themselves to be valuable[4]. And that represents how much they accept themselves and how much faith they have in themselves[5]. It results in detracting from environmental adaptability when they become less self-esteemed[4], and senior citizens whose self-esteem is higher are likely to better adapt themselves to various changes in old age to lead a better life[6].

Physical activities can be said as one of the factors to ensure the quality of life in old age. Physical activities enable senior citizens to improve not only their health but their quality of life[7], and also make it possible for them to feel less lonely about the loss of roles, to have more respect for themselves, to pursue self-realization and ultimately to feel more satisfaction and happiness in daily routine life[8]. Moreover, active physical activities contribute to the improvement of psychological happiness and the decrease of tension, anxiety and stress, and these activities are a means to prevent elderly people from aging and to give more vitality to their lives[9].

The purpose of this study was, therefore, to examine the moderating effects of physical activities on the influential relationship between elderly people's stress and self-esteem.

## 2. Method

### 2.1. Subjects

The subjects in this study were 350 senior citizens who were selected from senior welfare centers located in South Chungcheong Province and North Gyeongsang Province. After this researcher and six assistant researchers who received education on this study in advance explained the purpose of this study in the senior welfare centers, each of the male and female senior citizens who understood the purpose of the study and consented to participate was separately interviewed. And the data from 327 respondents were selected except for the data from 23 elderly people that included unfaithful answers or were incomplete. Out of the 327 respondents, the men and the women respectively numbered 130 and 197. 71 elderly people were aged between 65 and 69, and 185 respondents were in their 70s. 71 senior citizens were at the ages of 80 and up.

### 2.2. Instrumentation

The instruments used in this study were structured questionnaires that used a four-point Likert scale. The instrument used to measure stress was a scale[10] that rearranged[11]'s scale with some modifications based on[12]'s Elderly Stress Scale and McCubbin, Wilson & Oaterson's dml File and by consulting the data of Olsen and Boss.

The instrument used to evaluate self-esteem was[13]'s adapted version of[14]'s Self-Esteem Scale that was used in[15]'s study. This scale was used in this study after it was modified and complemented to serve the purpose of the study.

The instrument used to assess physical activities was a short-sentence self-administered questionnaire that was one of the International physical Activity Questionnaires, or IPAQ. The IPAQ is to measure the degree of walking, moderate activities and strenuous activities over the last seven days such as leisure, indoor, outdoor, work-related or traffic-related activities and to calculate total scores that indicate the level of overall activities by gathering all the information on the frequency and duration of the activities. As for

the amount of activity, MET-minutes are calculated based on energy demand, which is defined as METs, and by giving different weights to the different types of activity. Regarding the value of METs, average METs scores are calculated based on a study on the reliability of the IPAQ, which was conducted in 2000 and 2001, and based on MET scores for each activity type that were reported in [16].

### 2.3. Data analysis

A statistical package SPSS 18.0 was employed to analyze the collected data. An exploratory factor analysis and Cronbach alpha

coefficients were utilized to test the validity and reliability of the instruments. A correlation analysis was made to determine the relationship of the elderly people's self-esteem to social support according to the level of exercise, and a regression analysis was made to produce more generalizable results after their scores were converted into standard scores. The level of statistical significance was set at .05.

## 3. Results

### 3.1. The results of the correlation analysis

**Table 1.** The correlations of self-esteem, social support and the level of physical activities.

	Economic problems	Family problems	Residential problems	Health problems	Positive self	Negative self	Physical activities
Economic problems	1						
Family problems	.231***	1					
Residential problems	.375***	.246***	1				
Health problems	.423***	.277***	.170**	1			
Positive self	-.176**	-.136	-.189**	-.115*	1		
Negative self	-.286***	-.341***	-.241***	-.307***	.326***	1	
Physical activities	-.084	.012	-.080	-.052	.449***	.134*	1
Average	2.1682	1.9460	1.8135	2.4230	3.2959	3.0379	1770.26
standard deviation	.61011	.47191	.54033	.64914	.57240	.45513	1667.219
Stewness	.467	.130	.373	-.085	-.384	-.116	3.131

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

### 3.2. The relationship of stress to self-esteem

According to <Table 2> on the results of the regression analysis, the stress of the sen-

ior citizens was found to have affected negative self-esteem. Negative self-esteem was under the influence of economic problems ( $\beta = -1.968$ ), family problems ( $\beta = -4.482$ ), residential problems ( $\beta = -2.000$ ) and health problems ( $\beta = 3.073$ ).

**Table 2.** The results of the regression analysis on stress and self-esteem.

Self-esteem \ Stress	Positive		Negative	
	$\beta$	t	$\beta$	t
Economic problems	-.097	-1.526	-.116	-1.968*
Family problems	-.073	-1.256	-.239	-4.482***
Residential problems	-.129	-2.173*	-.110	-2.000*
Health problems	-.032	-.521	-.173	-3.073**
F	4.482**		19.407***	
R	.234		.441	
R <sup>2</sup>	.055		.194	

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

### 3.3. The moderating effects of physical activities on the relationship between job stress and self-esteem

[17]'s The hierarchical regression analysis was made to determine the moderating effects of physical activities on the relationship between stress and self-esteem. The results are shown in <Table 3>. Physical activities

were found to have had moderating effects on the relationship between stress and self-esteem. The group that engaged in less physical activities became less self-esteemed when their stress became heavier, whereas the group that engaged in more physical activities became more self-esteemed even though they were more stressed out.

**Table 3.** The moderating effects of the level of physical activities on the relationship between stress and self-esteem: the results of the hierarchical regression analysis.

Model	Self-esteem								
	Model 1			Model 2			Model 3		
	B	$\beta$	t	B	$\beta$	t	B	$\beta$	t
Stress	-.412	-.383	-7.470***	-.382	-.355	-7.454***	-.398	-.370	-7.741***
Physical activities				.147	.351	7.356***	.139	.332	6.904***
Stress X physical activities							.100	.111	2.300*
R <sup>2</sup>	.147			.269			.280		
$\Delta$ R <sup>2</sup>	.269			.264			.274		
F	55.802***			59.512***			41.964*		

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

## 4. Discussion and Conclusion

So far, whether physical activities produced any moderating effects when the stress of the senior citizens affected their self-esteem was analyzed.

There was a tendency that the findings of the study on the relationship of the elderly people's stress and self-esteem corresponded to those of two earlier studies[3][18]. Their self-esteem became lower

when they were more stressed out because of financial difficulties, family problems, residential problems and health problems.

The physical activities of the senior citizens were found to have had moderating effects on the relationship between stress and self-esteem. The group that performed less physical activities became less self-esteemed when they were under more stress, while the group that performed more physical activities became more self-esteemed even though they were more stressed. Studies established that elderly people's physical activities serve to promote health and a chance of having much contact with neighbors serves to ease stress[19], that physical activities contribute to psychological happiness by relieving tension and bolstering self-fulfillment and subsequently boost self-esteem[20], and that physical activities offer emotional assistance by helping elderly people to keep an amicable relationship with others and discuss personal problems with them[7]. All the findings of these studies lend credibility to the findings of this study.

As a matter of fact, it's not easy for the elderly to engage in physical activities due to lack of time, financial reasons or the possibility of injury such as a hurt from a fall, but there is a definite evidence that active physical activities are of both physical and mental help. Therefore, senior citizens are expected to promote or maintain their physical and mental health if they participate in exercise programs offered by their local communities. Also, that is expected to be of use for the reduction of national health care burden.

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### Author

**Kim Eui-young** / Hoseo University Professor  
B.A. Yongin University  
M.A. Kyunghee University  
Ph.D. Myungji University

### Research field

- The Influence of Taekwondo Gym's Servicescape on Customer's Satisfaction -The Moderating Effect of a Leader Trust-, *The Korea Journal of Sports Science*, 24(3) (2015).
- The Effects of Security Agents Job Stress on Coping Strategy: Focusing on Moderating Effects of Five Personality Factors, *Korea Convergence Security Association*, 16(1) (2016).

### Major career

- 2006~present. Hoseo University, Professor
- 2016~present. International Society for Sport Science, Editor in Chief

Publication state: Japan  
ISSN: 2423-8287

Publisher: J-INSTITUTE  
Website: <http://www.j-institute.jp>

Corresponding author  
E-mail: [djkim@ikw.ac.kr](mailto:djkim@ikw.ac.kr)

Peer reviewer  
E-mail: [editor@j-institute.jp](mailto:editor@j-institute.jp)

<http://dx.doi.org/10.22471/sport.2016.1.1.14>

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## The Investigation of Quick Reaction Application Levels in Protection Security of Martial Arts and SPORTS in the Republic of KOREA

Han Sam-seok<sup>1</sup>

*Daegu Metropolitan Police Agency, Daegu, Republic of Korea*

Kim Dong-je<sup>2\*</sup>

*Kyungwoon University, Gumi, Republic of Korea*

### Abstract

Currently, national protection security in the Republic of Korea has developed greatly worldwide, and recently has shown off advanced security universally in grand international events held in Korea such as the Asia-Europe Meeting(ASEM), Asia Pacific Economic Cooperation(APEC), G20 and Nuclear Security Summit, and through this, with security agencies from over the world and application of Korean martial arts and sports security skills, the intercourse is being widely activated.

Accordingly, Korean Protection Security protects protectees from various dangerous elements, and the importance of security is becoming bigger as the last resort of being responsible for the safety of protectees in dead zones of terror and crime. To improve the guards' ability to react, protection training is essential.

However the exact academic concept of Protection Security of Martial Arts and Sports is not established in Korea at the moment, and the bodyguards are being trained in Judo, Taekwondo, Kendo, and Aikido. Therefore, in order to improve the abilities into a high level of use in the field, propagation of protection security of martial arts is necessary by establishing officialized concepts by harmonizing existing scientific and technical movements of martial arts.

Research showed the usage of martial arts in a police officer in performing his job in the field of security that Aikido was the highest for 52 people(36.8%), followed by Judo, 47(33.3%), Taekwondo 36(25.5%), and Kendo 6(4.2%).

Also, in the case of Judo, there were many techniques in defending short distance dangers, therefore the use of it was the highest, Taekwondo used agile movements which made quick defense or reaction from danger possible, Kendo was not so useful in short distance defense, but there were many appropriate techniques in a long range defense and defending a weapon holder.

Aikido was effective in defending and coping with danger by using various self-defense martial arts.

The purpose of this study is to examine the high use of martial arts in the field of security for police officers and to provide for the identity and generalization of security protection of martial arts by using the strengths of martial arts.

**[Keywords]** Sport, Judo, Taekwondo, Kendo, Aikido, Republic of Korea

### 1. Introduction

Today, through rapid industrialization, informatization, urbanization and internationalization, our society could lead wealth in ma-

terial and have a convenient life but such social ills are causing an increase in crime and are threatening the safety of our lives.

Therefore, it can be seen that the importance of security is becoming more significant, and especially bodyguards play a very important role in public order and security

dead zones by solving problems for protectees and meeting the demands of various kinds of security in industrialization and urbanization. The basic skill to improve these kinds of response abilities is Martial arts for protection. Also in crime prevention there are practical difficulties to expect expansion and reinforcement from the role of police officers so each citizen has to take responsibility of their own individual safety, and through the development of a new tool, security industry, the importance of training security professionals through the theory of security response techniques and experience training is increasing[1].

If we take a look at the history of security and martial arts in our country, we can see that the start was from ancient society, with the desire to live safely from wild animals or natural disasters, and this was an activity to prevent natural threats, not attacks of human, but through the separation of clans and tribes, leaders were formed and safety has expanded beyond natural disasters to threats from human such as war and assassination[2].

However currently there is no sure concept of Martial arts for protection using security and martial arts, and bodyguards are training

with existing martial arts such as Judo, Taekwondo, Kendo, Aikido, and the necessity of professionalized Martial arts for protection is being brought up, which means in order to improve martial arts techniques, we need to use scientific and technical movements of existing martial arts and establish official concepts.

Therefore, this study was processed from the beginning of June 2015 to December of 2015 and in-depth interviewing was carried out to 141 people among Korean police officers who had experience in both protection security and martial arts training.

## 2. Advanced Research

This study has a strong personality of an exploratory study in the point of examining the thoughts of related practitioners to find out the level of use of crime responses of Korean martial arts for protection. The next <Table 1> summarizes the main points of advanced research related to martial arts security until now.

**Table 1.** Advanced research.

Field of research	Researcher	Main contents
Protection security	Jo, Kim, Choi, Park (2013)	Exploratory research through empirical studies in the working environment and education of security organizations through the proposal of the necessity of change of direction according to security management and techniques of not only external threats but also the threats of the protectees themselves[3].
	Kim, Jo, Kim (2012)	Diversified social structure and environment demands a high national supply of public order and security, and for the absolute safety of protectees, the proposal of the necessity of research on the selection type for security techniques for perfect security[4].
	Kim, Kim, Jo (2012)	To complete the mission of public security organization effectively, the working characteristics of each individual must be treated importantly, and the exploration of current public security organizations; differences of structure and difference of individuals and types[5].
	Kim (2008)	Proposed the necessity of development plans for guard and security related departments by apprehending the growth and trend of the security industry and also proposed the necessity of improvement and development of quality[6].

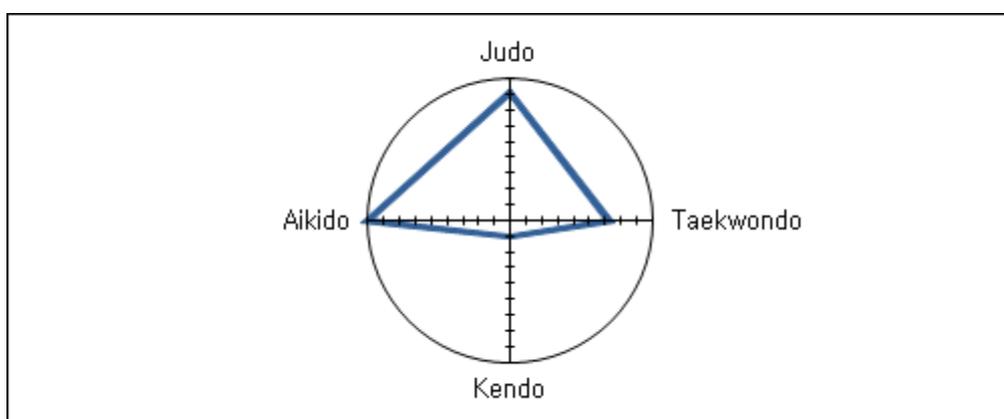
	Park (2002)	Proposed the necessity of the role and method of a professional chief secretary[7].
Martial arts	Yoon (2009)	To formulate a right concept through martial arts training, contemplate the meaning of martial arts methodology which is training, critically face current condition of our martial arts, and proposed a development direction of the value of existence in martial arts in the future[8].
	Kim (2009)	Focused on the investigation of the effects of teenage martial arts training have in the development of sociability[9].
	Yoo (2009)	Explored the essence of Judo culture as martial arts, the true nature of philosophy and performance of Judo, investigated problems occurred during the process of internationalization and sport processes and sook solutions[10].
	Kim (2006)	Investigated the effects teenage martial arts training have in adjusting to school and social cultivation and proved martial arts training is desirable education[11].
Protection security martial arts	Seo (2013)	Sook application plans with academic basic sources that will develop Aikido to be used most practically in defense, attack, and oppress by analyzing the techniques in emergency situations[12].
	Jung (2012)	Sook practical application with academic basic sources applied techniques that can protect by grafting protection security martial arts and security skills to secure the danger of the protectee in an emergency situation during guard duty[13].
	Kwon (2006)	Sook practical applications and connectivity with security martial arts to secure safety of close contact security duty and protectees through various cases, and sook practical applications of close contact security and security martial arts in the case of emergency[14].
	Kang (2002)	Through steady martial arts training the guard must be able to protect protectees and himself by security martial arts training[15].

### 3. Study Results

#### 3.1. The level of martial arts usage of security police officers

The next <Figure1>, shows the opinions of the study participants in the field of police officers performing guard duty expecting high usage of martial arts separated into Judo, Taekwondo, Kendo, and Aikido.

Figure 1. Usage of martial arts in the field.



In the field of police officers performing guard duty, the martial arts usage was Aikido, 52 people(36.8%) at the highest, next, Judo, 47 people(33.3%), Taekwondo 36 people, (25.5%) and Kendo 6 people(4.2%) Below is qualitative data in the usage of martial arts that is expressed comparatively well among all opinions of the study participants.

### 3.1.1. Judo

Judo is a type of martial art emphasizing in manner and loyalty so it cultivates determination and judgment in the process of improvement in techniques through training and challenging one's own limits. This process raises capability to react to various and sudden security situations. Furthermore, to deal with threatening elements that unfold variously in guard duty, it is the last barrier at the closest distance to react to attacks, and is most used in Tachil-waza or strangle hold techniques to suppress the suspect[16].

- Judo has many techniques to suppress suspects, and the suppressing ability is used more because it is more outstanding than other types of martial arts(20150702.M. JSU).

- It might be different according to the suspect, but in our country where it is impossible to possess guns, there is a high possibility of threats in short distances rather than long distances and most cases occurred from short distances therefore, the usage of Judo is thought highly of in the state of our country(20150711.M. DTY).

### 3.1.2. Taekwondo

No matter how fast the movement, Taekwondo controls the dynamics in strength, rapidity and gentleness of movements, therefore can obtain maximum effects with minimum energy, and is possible to react quickly at decisive moments. The characteristics of these Taekwondo techniques has strong technical points to be able to react effectively in different threatening situations that can occur in guard duty, therefore is a highly used type of martial arts in the field of security[17].

- It uses various parts of the body compared to other types of martial arts to oppress suspects and is possible to apprehend

the purpose of the opponent so it is used highly in the field(20150711.W. HSB).

- Taekwondo uses the whole body so it has the ability to react in emergency situations(20150816.M. JBS).

- There are many good techniques to oppress the opponent quickly, and by using kicks, it is outstanding in blocking access of the opponent(2015.0815.W. LSJ).

### 3.1.3. Kendo

Kendo is known as a type of martial arts with a sensitive sixth sense, exact and realistic judgment, quick movements, and extraordinary memory and concentration to predict various situations of guard duty, and cultivates basic physical strength, so it is best in the field of security that demands prevention and defensive activity for the protectees from various danger[18].

- Kendo is helpful in oppressing various types of suspects such as those who possess weapons(20150725.M. NCG).

- It is more outstanding compared to other types of martial arts on suspects that approach from long distances(20150819.M. LJY).

### 3.1.4. Aikido

Aikido has a training system of being able to oppress and deal with the suspect flawlessly in the security field and it also can be said that its techniques in oppression and standing against the opponent in emergency situations are highly used. Also, through constant training repetition of Aikido, new techniques, knowledge can be acquired and through this, not only life and property protection of the protectees but also can prevent various types of suspects in advance[19].

- There are many techniques to easily oppress the opponent by directly being in contact(20150723.M. PHD).

- By using the basic self-defense martial art of Aikido, it has an intimate relation with the arrest technique(20150815.M. KBI).

- It is advantageous in blocking when there is frequent body contact, and it is used highly

in momentarily oppression with techniques such as cracking joints(20150817.W. YSH).

## 4. Discussion and Proposal

**Table 2.** Discussion.

Sort	Main content
Judo	Adequate for defense in short distances
Taekwondo	Quick defense using agile movements
Kendo	Adequate for long distance correspondence and weapon possessors
Aikido	Various arrest techniques using basic self-defense martial arts

As a result of the exploration of this study, there was a difference in techniques in general martial arts that were being used in the field of security, and the next <Table 2> shows the discussion points of the strong points of usage of general martial arts.

This study explored general martial arts that were used highly in the field of security by security police officers. By using the strong points of general martial arts that had high usage, this study provides the identity and generalization of security martial arts. However with the limitation of this study being exploratory, it is expected that this study continues in a better environment in the future.

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#### Lead Author

**Han Sam-seok** / Daegu Metropolitan Police Agency Inspector

B.A. Yongin University

M.A. Kyungnam University

Ph.D. Kyungwoon University

#### Research field

- A Study on Introduction of Private Investigation System through Amending Security Services Industry Act, Legislation and Policy Studies, 7(1) (2015).

- The Investigation of Quick Reaction Application Levels in Protection Security of Martial Arts and Sports in the Republic of Korea, International Journal of Sport, 1(1) (2016).

#### Major career

- 1993~1997. Martial Art of the Naval Academy, Dean

- 1998~present. Agent of a Police Commando Tactics, Inspector

#### Corresponding Author

**Kim Dong-je** / Kyungwoon University Associate Professor

B.A. Yongin University

M.A. Korea National Sport University

Ph.D. Sungkyunkwan University

#### Research field

- Treadmill Exercise Ameliorates Dopaminergic Neuronal Loss through Suppressing Microglial Activation in Parkinson's Disease Mice, Life Science, 91(25-26) (2012).

- Effect of Walking Exercise on Changes in Cardiorespiratory Fitness, Metabolic Syndrome Markers, and High-molecular-weight Adiponectin in Obese Middle-aged Women, Journal of Physical Therapy Science, 26(11) (2014).

#### Major career

- 2014~present. Korean Security Science Association, Vice President

- 2016~present. International Society for Crisis & Safety, President

Publication state: Japan  
ISSN: 2423-8287

Publisher: J-INSTITUTE  
Website: <http://www.j-institute.jp>

Corresponding author  
E-mail: [jaebumlee@naver.com](mailto:jaebumlee@naver.com)

Peer reviewer  
E-mail: [editor@j-institute.jp](mailto:editor@j-institute.jp)

<http://dx.doi.org/10.22471/sport.2016.1.1.20>

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## Universality and Differentiation on the SPORTS Training Methods of Health Qigong Exercise and Yoga

Lee Sue-hyun<sup>1</sup>

*Myongji University, Seoul, Republic of Korea*

Lee Jae-bum<sup>2\*</sup>

*Dongbang Culture University, Seoul, Republic of Korea*

Park Jeong-hwan<sup>3</sup>

*Sangji University, Wonju, Republic of Korea*

### Abstract

*This study was conducted in order to explain how Qigong and yoga, which are commonly confused with each other, can be distinguished. For this purpose, this study examined the universality and differentiation of Qigong and yoga. In addition, it sampled the subjects from 150 sports-for-all instructors with experience in Qigong and yoga training and surveyed their responses using an open-end questionnaire based on inductive analysis.*

*Responses to the questionnaire were classified and categorized according to the procedure of content analysis, and from this process were derived factors by area. For the reliability of analysis results, triangulation was used in the data analysis process, and according to the results of content analysis, a total of 640 responses were identified with regard to the universality and differentiation of Qigong and yoga. The number of responses on the universality of Qigong and yoga was 243, and from them were derived 13 factors of the detailed area and 1 other area, and 9 factors of the theme area. In addition, 5 universality factors were found in the general area for the generalization of content analysis.*

*When a preliminary scale with 20 questions was constructed from collected data and exploratory factor analysis and reliability test were performed, 5 major factors were found including the use of space, motor control, meditation and breathing exercise, relaxation, and free participation. These results explain universal and differentiated parts in Qigong and yoga, and they are expected to contribute to increasing the population training in Qigong and yoga, the traditional training methods based on Oriental thoughts.*

**[Keywords]** Sports Training Methods, Universality, Differentiation, Qigong Exercise, Yoga

### 1. Introduction

In modern society, people can enjoy sport for all at anytime, anywhere without distinction of age or sex as leisure is diversified with more income and flexible working conditions. Out of many sport for all, Qigong and yoga are representative sports which are not western sports but are based on oriental philosophy with slow movement, breathing and mental training. As modern people who feel tired easily because the body rhythm goes to the pot owing to overload, stress, lack of sleep and overdrinking pay more attention to health and mental world to remove physical

and mental exhaustion and to pursue stability of body and mind, the interest in traditional exercises to minimize exhaustion and to pursue stability is getting increased[1][2].

Up to now Qigong and yoga have been studied on diversified classes in various previous studies. As Qigong is difficult to measure in standard values or by equipment, it tends to be thought as superstition and non-scientific. However, recent studies on Qigong[3][4][5][6] regarding its psychological and physiological effects on various populations compose scientific grounds. Summarizing the results of these studies, it can be in-

ferred that regular Qigong exercises help participants with psychological and emotional stability as well as physiological health. Additionally, effects of yoga and related exercises are diversely studied. When looking into the research results such as effects of yoga training on physiological variables[7], effects on concentration and study efficiency[8] and effects on mental health[9], yoga exercise makes positive effects on physiological and psychological health.

Qigong and yoga are traditional training method based on oriental philosophy. However, in the field of sport for all people who train oriental sports are often confused with training methods. Some people think that they are not much different and some people think those two traditional sports have similar movement as they both have static movements. However, they have their own characteristics although there are similarities between two traditional sports. The common characteristics that they share can be called universality and differentiation is the opposite concept. It can be used as specialness and uniqueness. Therefore, in this study, universality and differentiation of Qigong and Yoga which are representative traditional sports which are combined with oriental philosophy and are actively distributed in the field of sport-for-all will be discussed based on the ground of objectivity. It is hoped that results of this study will enhance the understanding on traditional sports and contribute to field leaders' class programs in the field of sport-for-all.

## 2. Methods

In this study, subjects were recruited with the help of Council of Sport for All in S city. They have trained Qigong and yoga for more than 6 months and are working in sport-for-all field as leaders. Subjects were recruited by convenience sampling and judgmental sampling from the sports leaders who attend Qigong and yoga classes held by S City Council of Sport-for-All in 2014. The recruited subjects are 26 males and 124 females and average age is 29.05. By training duration, 65 subjects fit less than 6 months, 29 subjects less

than 2 years, 24 subjects less than 3 years and 28 subjects over three years.

In this study an open questionnaire was used to search for the universality and differentiating factors in training methods of Qigong and yoga. Open questionnaire includes questions asking basic background such as sex, age, region and training experiences of Qigong and yoga and they can write their opinions freely with open questions such as "Please write 3 items about things in common and differences in the training methods of Qigong and yoga".

Materials are analyzed using the same methods in Scanlan and Stein(1989)[10], and Seong Chang-un and Kim Byeong-jun(1996)[11], which used contents analysis. First of all, responses to open questionnaire are classified and categorized according to the content analysis procedure, integrated into general theme area and then categorized. Especially, when categorizing by area, individual area includes various responses enough regardless of analysis level and to resolve reliability issue at the process of material analysis contents analysis is reviewed with a researcher who majored in Qigong and yoga and had experience in qualitative analysis. To check classification of the area and categorization of Qigong and yoga training methods according to the procedure, triangulation is adopted. When consensus is not made, those responses are classified as "Others".

## 3. Results

The responses to open questions regarding the universality and differentiation of Qigong and yoga training methods are classified and categorized according to content analysis procedure. From the content analysis, 13 factors and 1 other area are induced in universality from detailed areas which is the first level classification, while in differentiation 16 detailed areas and 1 other area are found. In the second level classification, theme area, 9 factors are induced in universality and 9 factors in differentiation to make 18 factors in total. Finally, in the third classification level, in general area to generalize contents analysis on universality and differentiation of

Qigong yoga training methods 5 factors in universality and 5 factors in differentiation are induced. Total number of responses in the study is 243 in universality and 397 in differentiation to make 640 in total. Universality factors are classified into 5 general theme area excluding other factors such as "Space Use Factor" including restricted space and very narrow space," "Exercise Moderation Factor" including exercise intensity moderation, variety and repetition of movements, stability of exercise, use of Qi and exercise without tools, "Mediation and Breathing Factor" including mediation and breathing exercise, "Relaxation of Body and Mind" including relaxation of body and body and mind exercise, "Participation Factor" regarding whether they participate in or not. Differentiation factors are also classified into 5 general theme areas excluding other factors such as "Movement Characteristics Differentiation Factor" including movement connection, posture maintenance, rhythmical movement and flexibility and repetition of movements, "Exercise Formality Factor" including type of exercise, intensity of exercise and exercise principles, "Difference in Qi Management" including flow of Qi, meridian system and spots on the body suitable for acupuncture, and "Popular Appeal of Training Method" including origin and popularity. Therefore general

theme areas regarding universality and differentiation are summarized as 5 areas respectively.

To search for the structure of universality and differentiation of Qigong and yoga training methods, R Type Principal Component Analysis and Quersprung type Varimax are used for exploratory factor analysis based on open materials. Before factor analysis, skewness and kurtosis analysis is performed but less than  $\pm 2$  is not found. Finally, when exploratory factor analysis is performed considering original value of each factor and redundancy and inner consistency of factors, in universality 14 items out of 5 factors such as space use factor, exercise moderation factor, mediation and breathing exercise factor, body and mind relaxation factor and participation factor, while in the exploratory factor analysis on differentiation, 12 items out of 4 factors such as movement characteristics differentiation factor, exercise formality difference factor, breathing method and apprehension difference factor, and popular appeal of training method factor. Exploratory factor analysis and reliability analysis results on universality and differentiation of Qigong and yoga are shown in <Table 1> and <Table 2> respectively.

**Table 1.** Results of exploratory factor analysis and reliability analysis on universality of qigong and yoga.

Factor	1	2	3	4	5	Cronbach alpha
Space use factor	.92 .88 .75	.15 .12 .12	.05 .15 .11	.11 .21 .21	.11 .25 .15	$\alpha=.86$
Exercise moderation factor	.23 .22 .23	.89 .85 .77	.07 .01 .21	.09 .03 .21	.12 .08 .14	$\alpha=.84$
Exercise moderation factor	.18 .24 .15	.21 .22 .17	.87 .71 .69	.16 .02 .19	.16 .11 .11	$\alpha=.71$
Body and mind relaxation factor	.22 .22 .11	.02 .02 .09	.07 -.02 .11	.88 .82 .79	.06 .12 -.21	$\alpha=.76$
Participation factor	.24 .03	.01 .19	.16 .18	.15 .16	.83 .76	$\alpha=.69$

Original value	6.33	2.11	1.99	1.77	1.33	
variable (%)	41.02	13.01	9.42	7.22	5.22	
Accumulated variable (%)	41.02	54.03	63.45	70.67	75.89	

Note: Kaiser-meyer-olkin measure of sampling adequacy=.771  
Bartlett's test of sphericity=5521.145, df=621, Sig.=.000

**Table2.** Results of exploratory factor analysis and reliability analysis on differentiation of qigong and yoga.

Factor	1	2	3	4	Cronbach alpha
Movement characteristic difference factor	.92	.02	.04	.07	$\alpha=.91$
	.88	.08	.09	.06	
	.82	.12	.08	.18	
	.78	.14	.21	.01	
Exercise formality difference factor	.21	.90	.16	.04	$\alpha=.82$
	.25	.81	-.14	.09	
	.19	.76	.12	.08	
Breathing method and apprehension difference factor	.18	.11	.88	.21	$\alpha=.84$
	.12	-.08	.82	.07	
	.12	.28	.74	.01	
Popular appeal of training method factor	-.26	.01	.01	.86	$\alpha=.81$
	.15	.15	-.08	.81	
Original value	5.86	3.11	2.21	1.44	
variable(%)	33.69	14.26	9.72	7.11	
Accumulated variable(%)	33.69	47.95	57.67	64.78	

Note: Kaiser-Meyer-Olkin measure of sampling adequacy=.771  
Bartlett's test of sphericity=5521.145, df=621, Sig.=.000

#### 4. Conclusion and Suggestion

This study is performed to objectively explain the characteristics of universality and differentiation of Qigong and Yoga training methods. For the purpose of the study, sports leaders working in sports-for-all field are asked about common things and differences between Qigong and Yoga training methods with open semi-structured questionnaire. To abstract universality and differentiation in training methods original materials are divided into detailed area, theme area and general area and abstracted factors are through the process to check validity with exploratory factor analysis and reliability analysis. From materials collected from the open semi-structured questionnaire regarding Qigong and yoga training methods, 5 factors such as Space Use Factor, Exercise Moderation Factor, Mediation and Breathing Exercise Factor,

Body and Mind Relaxation Factor and Participation Factor area explored in universality while 4 factors such as Movement Characteristics Differentiation Factor, Exercise Formality Difference Factor, Breathing Method and Apprehension Difference Factor and Popular Appeal of Training Method Factor are explored in differentiation.

Looking into major contents related to universality from the study results, it is found that the result of this study is consistent with previous studies addressing that generally Qigong and yoga can moderate exercise and are safe[12][13]. It is also confirmed that they have common feature that they are exercises circulating Qi of human bodies based on oriental philosophy. In mediation and breathing exercise factor, they are confirmed that they place much importance on spiritual culture and breathing and both of them are based on mediation. It is originated from the fact that

Qigong and yoga are much static comparing to other sports or exercises and emphasize mediation. Qigong takes Three Moderation Rules such as Body Moderation, Breath Moderation and Mind Moderation as basic training principles[14][15], while yoga places importance on breathing and mediation as well as Asana, the physical training method[16].

When looking into major contents related to differentiation, it is found that Qigong performs continuous movement and repetition without stopping but yoga has pause between movements, the posture Anga is called Asana, and has many stretching movements based on flexibility. Additionally, in the difference in exercise formality, yoga has variety of movements from very easy ones to very difficult ones. So beginners can train themselves from easy ones to difficult ones sequentially and apply one movement to other by altering a little bit. On the other hand, Qigong movements are fixed just like gymnastics so they cannot be changed. The difference between non-skilled and skilled participants can be checked with flexibility and stability of the movements. Additionally, yoga has wide fan base but Qigong is usually used as exercise of older adults. Looking into Oriental Health Promotion Project hosted by 85 Health Offices in Korea, it is found that Qigong is widely used for elderly exercise[17]. As Qigong does not need intense exercise and can be moderated, it is popular among the elderly. On the other hand, yoga is used for stretching and is more popular among people regardless of age[18]. Based on the original materials, it seems that yoga is popular among young women.

Characteristics of Qigong and yoga are identified as such in this study. This study is meaningful in that it summarizes characteristics of Qigong and yoga training methods for easy identification. Such efforts imply possibility to provide Qigong and yoga trainers with training methods efficiently and clearly. It is expected that the results of this study will enhance understanding on slow exercise in the field of sport-for-all and contribute to distribution of athletics in public. In the future, supplements should be made in the future

studies from the perspective of leisure and studies on universality and differentiation from the perspective of kinematic effects should be followed.

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**Lead Author**

**Lee Sue-hyun** / Sport for All Instructor  
B.A. Dongwon University  
M.A. Myongji University

Research field

- Universality and Differentiation on the Training Methods of Qigong Exercise and Yoga, Myongji University, Master's Thesis (2014).
- Universality and Differentiation on the Sports Training Methods of Health Qigong Exercise and Yoga, International Journal of Sport, 1(1) (2016).

Major career

- 2007~present. Korea Sungdogu Council of Sport for All, Instructor
- 2016~present. International Society for Sport Science, Member

**Corresponding Author**

**Lee Jae-bum** / Dongbang Culture University Guest Professor

B.A. Myongji University  
M.A. Myongji University  
Ph.D. Myongji University

Research field

- Application Process of Qigong Training for Elders: A Grounded Theory Approach, International Journal of Human Movement Science, 6(1) (2012).
- Values of Qigong as Elderly Exercise, The Korean Society of Growth and Development, 23(1) (2015).

Major career

- 2012~present. Gimpo Community Health Center, Health Care Examiner
- 2014~present. Korea Hapkido Federation, Director

**Co-Author**

**Park Jeong-hwan** / Sangji University Professor

B.A. Yongin University  
M.A. Youngdong University  
Ph.D. Myongji University

Research field

- Application of Korean Hapkido Skill to Guard Martial Arts, The Journal of Korean Alliance of Martial Arts, 12(3) (2010).
- A Study on the Amendment of the Rules of Korean Hapkido Match, The Journal of Korean Alliance of Martial Arts, 14(1) (2012).

Major career

- 2008~present. The Korea Hapkido Union, Secretary General
- 2014~present. The Korea Security Fusion Business Society, Executive Director

Publication state: Japan  
ISSN: 2423-8287

Publisher: J-INSTITUTE  
Website: <http://www.j-institute.jp>

Corresponding author  
E-mail: [btkim@ikw.ac.kr](mailto:btkim@ikw.ac.kr)

Peer reviewer  
E-mail: [editor@j-institute.jp](mailto:editor@j-institute.jp)

<http://dx.doi.org/10.22471/sport.2016.1.1.26>

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## Effect of High-School ATHLETIC Majors' Self-Leadership and Self-Efficacy on Exercise Adherence Intention

Park Su-hyeon<sup>1</sup>

*Taegu Science University, Daegu, Republic of Korea*

Kim Byung-tae<sup>2\*</sup>

*Kyungwoon University, Gumi, Republic of Korea*

Choi Bong-jun<sup>3</sup>

*Kyungwoon University, Gumi, Republic of Korea*

### Abstract

*Korea rose to the status of sports powerhouse in the world arena as it ranked high place in 88 Seoul Olympic Games and has since remained as elite in sports within 10th place. Elite school sports policy has worked as an important foundation for Korea to have become a sports giant. Especially, Special Athletic Talent System which began as athletic talent education from 1971 has discovered talented student athletes in early age, developed their talents and help athletes to exercise them.*

*Especially, when excessive stress is placed on young athletes, they not only lose sense of satisfaction and interest but, in extreme cases, they also reach the stage of abandoning their future as athletes due to negative thinking.*

*Recently, with growing interest in social and psychological factors related to athletes' performance, various studies have reported their results. While interest in and concern for student athletes' exercise adherence intention has been rising, leaders raising them tend to be interested only in enhancing their performance while neglecting their duty to establish system to provide the athletes with psychological stability to continue their athletic career.*

*Preceding studies have found that, in order for students to consistently maintain athletic career path, self-leadership, which enhances confidence and performance by exercising influence on athletes themselves and helping them to achieve their goals, and self-efficacy, which enables the athletes to be aware of their high competency and expect corresponding behaviors and results, are vital. Therefore, the purpose of this study is to verify the causal relationship among high-school athletic majors' exercise adherence intention and their self-leadership and self-efficacy and, through this, provide basic material for studies to boost exercise adherence intention.*

*The subjects of this study were 410 students of athletic high school selected through convenience sampling. Students were led to respond to the questionnaires in self-administration method and answered questionnaires were collected on the spot. Data were analyzed by using SPSS 20 and Amos 20. Validity and reliability of the measurement tools were verified through confirmatory factor analysis and reliability analysis. In order to examine subjects' demographic characteristics, technical statistics were conducted and, in order to find out correlation among variables, correlation analysis was conducted. To verify goodness-of-fit of study model and causal relationship among variables, structural equation model was used.*

*In order to verify validity of test, confirmatory factor analysis was conducted and for reliability analysis, Cronbach's  $\alpha$  coefficient was calculated. Excluding items with low SMC (Squared Multiple Correlations) for each factor, TLI value was .903~.927, CFI value was .909~.930 and RMSEA value was .067~.070, confirming the goodness-of-fit of the model. As the result of reliability analysis, value of Cronbach's  $\alpha$  was .761~.826, securing reliability.*

**[Keywords]** Sport, Republic of Korea, Athletic, Self-Leadership, Exercise Adherence Intention

## 1. Introduction

Korea rose to the status of sports powerhouse in the world arena as it ranked high place in 88 Seoul Olympic Games and has since remained as elite in sports within 10th place. Elite school sports policy has worked as an important foundation for Korea to have become a sports giant. Especially, Special Athletic Talent System which began as athletic talent education from 1971 has discovered talented student athletes in early age, developed their talents and help athletes to exercise them[1][2].

Especially, when excessive stress is placed on young athletes, they not only lose sense of satisfaction and interest but, in extreme cases, they also reach the stage of abandoning their future as athletes due to negative thinking[3].

Recently, with growing interest in social and psychological factors related to athletes' performance, various studies have reported their results[4]. While interest in and concern for student athletes' exercise adherence intention has been rising, leaders raising them tend to be interested only in enhancing their performance while neglecting their duty to establish system to provide the athletes with psychological stability to continue their athletic career[5].

Preceding studies have found that, in order for students to consistently maintain athletic career path, self-leadership, which enhances confidence and performance by exercising influence on athletes themselves and helping them to achieve their goals, and self-efficacy, which enables the athletes to be aware of their high competency and expect corresponding behaviors and results, are vital[6][7].

The purpose of this study is to verify the causal relationship among high-school athletic majors' exercise adherence intention and their self-leadership and self-efficacy and, through this, provide basic material for studies to boost exercise adherence intention.

## 2. Theoretical Background

### 2.1. Self-leadership

Self-leadership means the process of each member motivating and influencing oneself to change and grow[8]. It has positive effect on and enhances individual performance[9].

### 2.2. Self-efficacy

Self-efficacy refers to awareness of ability of oneself to organize[10] and execute necessary behaviors and to perform set form of actions[11].

### 2.3 Exercise adherence intention

Exercise adherence means participating in and obsession and continuation of athletic activities regularly including exercise frequency, intensity and duration[12].

## 3. Study Methods

### 3.1. Study subjects

The subjects of this study were 410 students of athletic high school selected through convenience sampling. Subjects' demographic characteristics were as follows; male students were 55.4%(n:227) while females students were 44.6%(n:183), and freshmen were 36.8%(n:151) and junior were 29.8%(n:122) while senior were 33.4%(n:137).

### 3.2. Study procedure and data processing

Study contacted the school in advance informing about the study and, with the cooperation of school authority, students and teachers, conducted questionnaire survey by visiting the school in person. Students were led to respond to the questionnaires in self-administration method and answered questionnaires were collected on the spot. Data were analyzed by using SPSS 20 and Amos 20. Validity and reliability of the measurement tools were verified through confirmatory factor analysis and reliability analysis. In order to examine subjects' demographic characteristics, technical statistics were conducted and, in order to find out correlation among variables, correlation analysis was conducted. To verify goodness-of-fit of study model and

causal relationship among variables, structural equation model was used.

### 3.3. Validity and reliability of measurement tools

In order to verify validity of test, confirmatory factor analysis was conducted and for reliability analysis, Cronbach's  $\alpha$  coefficient was

calculated. Excluding items with low SMC(Squared Multiple Correlations) for each factor, TLI value was .903~.927, CFI value was .909~.930 and RMSEA value was .067~.070, confirming the goodness-of-fit of the model. As the result of reliability analysis, value of Cronbach's  $\alpha$  was .761~.826, securing reliability.

**Table 1.** Result of confirmatory factor analysis and reliability analysis.

Factor	TLI	CFI	RMSEA	Cronbach's $\alpha$
Self-leadership	.911	.930	.070	.801~.826
Self-efficacy	.903	.910	.067	.788~.819
Exercise adherence intention	.927	.909	.078	.761~.820

## 4. Study Result

### 4.1. Correlation analysis

As for the result of correlation analysis, there was positive(+) relationship between

self-leadership and self-efficacy( $r=.370$ ) and there was also positive(+) relationship between self-leadership and exercise adherence intention. In addition, there was positive(+) relationship between self-efficacy and exercise adherence intention as well( $r=.569$ ).

**Table 2.** Result of correlation analysis.

Factor	Self-leadership	Self-efficacy	Exercise adherence intention
Self-leadership	1		
Self-efficacy	.370***	1	
Exercise adherence intention	.363***	.569***	1

### 4.2. Goodness-of-fit of structural model

**Table 3.** Goodness-of-fit of structural model.

X2	Q	RMSEA	NFI	CFI	GFI	AGFI	P
108.327	8.412	.066	.992	.996	.946	.900	.001

In order to verify causal relationship among causal relationship among high-school athletic majors' exercise adherence intention, their self-leadership and self-efficacy, this study analyzed structural equation model. As

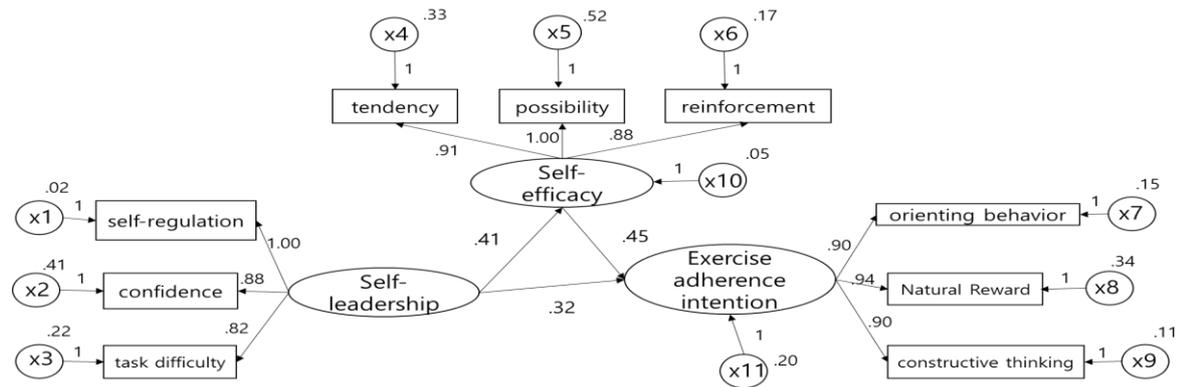
for goodness-of-fit for the structural model,  $X^2=108.327$ ,  $Q=8.412$ ,  $RMSEA=.066$ ,  $NFI=.992$ ,  $CFI=.996$ ,  $GFI=.946$ ,  $AGFI=.900$  and  $P=.000$ , verifying its goodness of fit.

### 4.3. Causal relationship among variables

**Table 4.** Result of path test.

Course	$\beta$	S.E	t	P
Self-leadership → Self-efficacy	.411	.047	8.780***	.001
Self-leadership → Exercise adherence intention	.452	.037	10.053***	.001
Self-efficacy → Exercise adherence intention	.321	.072	6.233***	.001

**Figure 1.** Result of research model.



Results of verification on causal relationship among variables are as follows; there was positive(+) causal relationship in the path between self-leadership and self-efficacy with .411( $t=8.780$ ,  $p<.001$ ) and there was also positive(+) causal relationship in the path between self-leadership and exercise adherence intention with .452( $t=10.053$ ,  $p<.001$ ). There was positive(+) causal relationship in the path between self-efficacy and exercise adherence intention with .321( $t=6.233$ ,  $p<.001$ ).

## 5. Conclusion

As the result of analysis on the effect of high-school athletic majors' self-leadership and self-efficacy on exercise adherence intention, self-leadership had causal relationship with self-efficacy and exercise adherence intention, and self-efficacy had causal relationship with exercise adherence intention, which corresponds with the result of preceding studies. Therefore, various education and training methods are required to enhance high-school athletic majors' self-leadership and self-efficacy and, through this, it is

necessary to boost their psychological stability together with performance, not just their performance alone.

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## 6.2. Thesis degree

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## 6.3. Books

- [10] Bandura A. Social Foundations of Thought and Action: A Social Cognitive Theory. Prentice Hall (1986).

### Lead Author

**Park Su-hyeon** / Taegu Science University Professor  
B.A. Kyungwoon University  
M.A. Yongin University  
Ph.D. Yongin University

#### Research field

- A Change of Private Security Labor Market and Countermeasures by Population Aging, *Convergence Security Journal*, 15(1) (2015).
- The Influence of Apartment Guards Emotional Labor on Job Stress and Job Burnout, *The Journal of Humanities and Social Science*, 6(4) (2015).

#### Major career

- 2014~2016. Korea Security Association, Lecture.
- 2014~2016. Kyungwoon University, Lecture.

### Corresponding Author

**Kim Byung-tae** / Kyungwoon University Professor  
B.A. Yongin University  
M.A. Yongin University  
Ph.D. Daegu Catholic University

#### Research field

- The Mediating Effects of Athletes Self-management between Perceived Autonomy Support and Mental Power of Taekwondo Competitors, *Korean Alliance of Martial Arts*, 12(1) (2010).
- A Study on the Effect of Airport Special Guards Job Stress on Their Job Satisfaction and Intention to Change Job, *Public Police and Security Studies*, 8(2) (2011).

#### Major career

- 1996. Asia Taekwondo Championship, Gold Medal.
- 1998. World cup Taekwondo Competition, Gold Medal.

### Co-Author

**Choi Bong-jun** / Kyungwoon University Assistant Professor  
B.A. Yongin University  
M.A. Andong National University  
Ph.D. Kyungwoon University

#### Research field

- The Impact of Security Major College Students on the Personal Relations and Satisfaction Factors in Martial Art Training, *Journal of The Korean Society of Private Security*, 13(2) (2014).
- Effects of the Participation Style of Martial Art Classes in Students Majoring in Guard on Both Major Satisfaction and Adapt to School Life, *Korean Security Science Review*, 41 (2014).

#### Major career

- 1998. Italian Open Championship Taekwondo -80kg, 1st.
- 2000~2003. Republic of Korea Army, First Lieutenant.

Publication state: Japan  
ISSN: 2423-8287

Publisher: J-INSTITUTE  
Website: <http://www.j-institute.jp>

Corresponding author  
E-mail: [jalhanda98@hanmail.net](mailto:jalhanda98@hanmail.net)

Peer reviewer  
E-mail: [editor@j-institute.jp](mailto:editor@j-institute.jp)

<http://dx.doi.org/10.22471/sport.2016.1.1.31>

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## Current Condition and Supporting Service Measures of Childhood, Adolescent Diabetes Patient in Republic of KOREA: Focused on the SPORT

Park Min-hyang

Chungbuk Health & Science University, Cheongju, Republic of Korea

### Abstract

*This study aims to contemplate on the necessity of supplement of medical support service as in institutional through and enhance the stand of insulin dependent childhood, adolescent diabetes patient who were excluded from beneficiary of medical support service. Type-1 diabetes is a disease which the pancreas makes less or none of insulin so that the blood sugar increases and the rest of the sugar come out by urine, which the high blood sugar level damages eye, heart, kidney and other body organs. This has no basic prevention, and for the treatment, the one must inject insulin 4 times a day which is a definite burden to childhood, adolescent diabetes patients.*

*The childhood, adolescent diabetes patient are easy to be exposed to physiological trauma in daily lives due to the self-management of diabetes along with growing and development. Actually, the adolescent with type-1 diabetes patients are more 2~3 times more likely to suffer depression than the normal ones.*

*Insulin-dependent diabetic child and adolescent need continuous management, which goal is to control proper blood sugar, normal growth, development, prevention of acute complication, chronic complication. In other words, to conduct similar level of activity and function as peers and maintain proper blood sugar. The normal growth and development means maintaining proper height and weight for specific age group and accomplish emotion and social development. Including the growth of childhood, adolescent diabetes patient have burden of managing diabetes for the lifetime.*

*National Health Insurance Corporation has published health insurance payment material analysis result for recent 10 years from 2006 to 2015. According to the analysis, child patients under age 18 who are treated with medicine treatment for diabetes increased 31% from 4076 patients in year 2006 to 5338 in year 2015. During the period, when considering the child population decrease, the total number of patient per 100 thousand populations increased from 35.6 patients in year 2006 to 55.3% which is 55.3% increase.*

*Finally, the various angle of studies for correct recognition toward insulin dependent child and adolescent diabetes patients are required. The insulin dependent diabetes requires various angle of treatment management environment. The financial, social, educational support must be backed for each period of lifetime, not just limiting to the individual pathological problem. Above all, future studies with present senses for the insulin dependent child and adolescent diabetes patients must continue to develop the medical support service they require and provide the service.*

*This thesis seeks understanding toward childhood, adolescent diabetes patient and support service for childhood, adolescent diabetes patient.*

**[Keywords]** Sport, Republic of Korea, Diabetes, Insulin, Financial Support

## 1. Introduction

When child passes early childhood and enter childhood, one's scope of activity widens to school and neighbor, and develop various aspects of personality from peer relation other than family. Also, the adolescent after childhood is the period of developing into an adult which obtains characteristics of both childhood and adulthood so that not only the rapid physical transition but also the psychological insecurity, and formation of self-awareness occurs. Moreover, one becomes more liberal and independent from parents, and goes through various problems and stress from development process, academic burden, school, friends, family and other role expansion[1]. Diabetes is classified into type 1 diabetes (insulin dependent diabetes mellitus) and type 2 diabetes (non-insulin dependent diabetes mellitus), and most of the diabetes are type 2 diabetes[2]. According to the national health nutrition inspection in 2012, the prevalence rate of diabetes over age 30 was 10.1% and the number of diabetes patients was approximately 4~5 million[3].

When one is diagnosed with type-1 childhood diabetes, the disease period extends in physically, psychologically, emotionally immature age, and the life time self-managements such as blood-sugar test, insulin injection, diet and exercise are needed, and influences the whole life of a person such as friends, family relation, career, social life, marriage, pregnancy, childbirth and military[4].

Type-1 diabetes is a disease which the pancreas makes less or none of insulin so that the blood sugar increases and the rest of the sugar come out by urine, which the high blood sugar level damages eye, heart, kidney and other body organs. This has no basic prevention, and for the treatment, the one must inject insulin 4 times a day which is a definite burden to childhood, adolescent diabetes patients[5].

The childhood, adolescent diabetes patient are easy to be exposed to physiological trauma in daily lives due to the self-management of diabetes along with growing and development. Actually, the adolescent with

type-1 diabetes patients are more 2~3 times more likely to suffer depression than the normal ones[6].

Insulin-dependent diabetic child and adolescent need continuous management, which goal is to control proper blood sugar, normal growth, development, prevention of acute complication, chronic complication. In other words, to conduct similar level of activity and function as peers and maintain proper blood sugar. The normal growth and development means maintaining proper height and weight for specific age group and accomplish emotion and social development. Including the growth of childhood, adolescent diabetes patient have burden of managing diabetes for the lifetime.

Recently, many studies regarding more expanded subjects including medicine, social psychology and social welfare, but still, it does not depart far from clinical approach about childhood, adolescent insulin independent diabetes patient. This led to lack of in-depth analysis of medical service supplement in institutional dimension, and lower effort to prepare countermeasures.

This study aims to contemplate on the necessity of supplement of medical support service as in institutional dimension and understand the current condition of insulin dependent childhood, adolescent diabetes patient, and enhance the stand of insulin dependent childhood, adolescent diabetes patient who were excluded from beneficiary of medical support service. Therefore, this thesis seeks understanding toward childhood, adolescent diabetes patient and support service for childhood, adolescent diabetes patient.

## 2. Background

### 2.1. Understanding of type-1 diabetes

Diabetes is a disease which the blood sugar increases so that the sugar is discharged through urine in which case, the healthy body secretes insulin from pancreas when the blood sugar is elevated after eating, and the insulin moves glucose to cells to maintain

blood sugar level[7]. however, due to genetic, environment, self-immune system factors damage pancreas cell and make pancreas incapable of secreting insulin which is called type-1 diabetes, while diabetes caused due to the resistance of insulin is called type-2 diabetes. Especially, type-1 diabetes mostly occur during childhood and adolescent, so also named as childhood diabetes[8].

Due to the traits of diabetes, if there is no efficient management, it might cause serious complication, so the diabetes require sufficient management[9]. The psychological burden about blood sugar management can dwarf one's life more than any other disease, and as it is a lifelong symptom, it is understood as not just a simple disease but a concept of disability[10].

As for the type-1 diabetes, many patients are unaware of diseases, feel burden about the lifetime insulin injection and blood sugar

test, while the complication(low blood sugar symptom etc.) causes fear and insecurity, which sometimes lead to anger, fury or aggressive tendency. Moreover, the questions about disuses, limitation of activity causes reality conflict, depression which lead to passive treatment attitude toward type-1 diabetes and even further goes to giving up one's future dream and hope[11].

## 2.2. Current condition of insulin independent childhood, adolescent diabetes patient

The number of childhood diabetes patients has rapidly increased last 10 years. Especially, the childhood diabetes patients were more densely occupied in low-income group. National Health Insurance Corporation has published health insurance payment material analysis result for recent 10 years from 2006 to 2015.

**Table 1.** Current condition of insulin independent childhood, adolescent diabetes patient.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Increase 2006/2015
Total	4,076	4,257	4,528	4,818	4,920	4,929	4,865	4,983	5,268	5,338	31.0
Men	1,968	2,017	2,127	2,291	2,358	2,316	2,283	2,301	2,398	2,459	24.9
Women	2,108	2,240	2,401	2,527	2,582	2,613	2,582	2,682	2,870	2,879	36.6

According to the analysis, child patients under age 18 who are treated with medicine treatment for diabetes increased 31% from 4076 patients in year 2006 to 5338 in year 2015. During the period, when considering the child population decrease, the total number of patient per 100 thousand populations increased from 35.6 patients in year 2006 to 55.3% which is 55.3% increase.

As for the age group, the age 16~18 adolescents occupied almost half of patients in bot male and female patients in year 2015, and child patients under age 10 was about 10% of total patients. The diabetes treatment patients per 100 thousand populations by age group showed continuous increase after age

3. Especially, the attack rate of childhood diabetes showed huge difference regarding the parents' income and disability.

## 3. Conclusion

This thesis seeks understanding toward childhood, adolescent diabetes patient and support service for childhood, adolescent diabetes patient.

### 3.1. Improvement in financial support

On November 2010, the Medical Insurance Deliberative Committee has passed the bill to expand payment for diabetes medicine which in detail include consumables for childhood

diabetes including insulin dependent child and adolescent diabetes, but the benefit is not much. To accomplish better financial support, the bill must be amended regarding the reality of patients who must spend medical expenses for lifetime, and must achieve cast support for specific disease.

### **3.2. Disease recognition improvement and improvement of professional service provision**

As for the insulin dependent childhood, adolescent diabetes patients who spend most of their time in school, the medical service for the disuses is very insufficient. In most cases, there is no nutrition management in case of receiving school meals, and the restrictions regarding injection and blood sugar test which are essential for diabetes management is very serious. Especially, insulin dependent childhood, adolescent diabetes in puberty goes through psychological and emotional turmoil, so the professional counseling program is one of the significant and necessary assignment of medical service[12].

At school, most of the teachers have lower awareness and knowledge toward insulin dependent diabetes, which limits the management of diabetes, so that the lower grade show higher risk of being exposed to disease exacerbation[13].

In order to solve such problems, the medical service should be directly and practically improved to improve recognition toward insulin dependent child, adolescent diabetes, and connect the diabetes related education and medical treatment to daily lives. also, to obtain improvement of physical function which had weakened due to long-term disease, the comprehensive and preventive medical welfare service system must be established.

Also, by the cooperation of school, hospital and family, the various medical service connection model must be developed to lighten the burden of disease during the childhood and adolescent which is very significant period in life.

### **3.3. Clarification and connection of delivery system**

In the aspect of satisfying fundamental demand of study subject and to conduct universal support including saving medical expenses, it would be right to take responsibility of public area, and connect to private organizations for problems occurring from financial shortage and personnel limitation to solve the problem. To do so, the mutual cooperative relationship between public delivery system and private delivery system.

Finally, the various angle of studies for correct recognition toward insulin dependent child and adolescent diabetes patients are required. The insulin dependent diabetes requires various angle of treatment management environment. The financial, social, educational support must be backed for each period of lifetime, not just limiting to the individual pathological problem. Above all, future studies with present senses for the insulin dependent child and adolescent diabetes patients must continue to develop the medical support service they require and provide the service.

This thesis seeks understanding toward childhood, adolescent diabetes patient and support service for childhood, adolescent diabetes patient.

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#### 4.2. Thesis degree

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#### Author

**Park Min-hyang** / Chungbuk Health & Science University  
Professor

B.A. Daejeon Institute of Science and Technology University

M.A. Chungbuk National University

Ph.D. Chungbuk National University  
Korea University

#### Research field

- Regulation Effects of Emotional Leadership in the Relationship between Job Stress and Organizational Commitment of Hospital Nurses, *Crisisonomy*, 11(2) (2015).
- Impact of Parents Attachment Behaviors on Stress Coping Ability and Suicidal Impulse Control among College Students, *Crisisonomy*, 12(3) (2016).

#### Major career

- 2013~present. The Korean Association for Comparative Government, Academic Director
- 2015~present. Crisis and Emergency Management Theory and Practice, Academic Director