

International journal of martial arts

2017 2(1)

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J-INSTITUTE

Publication state: Japan
ISSN: 2423-835X

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

Corresponding author
E-mail: shinhb@gw.kmu.ac.kr

Peer reviewer
E-mail: editor@j-institute.jp

<http://dx.doi.org/10.22471/martialarts.2017.2.1.01>

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The Recognition of TAEKWONDO Demonstration Activities on Safety Management Strategies of TAEKWONDO Gyms in Republic of KOREA

Choi Hwan-suk¹

Keimyung University, Daegu, Republic of Korea

Shin Hong-bum^{2*}

Keimyung University, Daegu, Republic of Korea

Abstract

In this study, taekwondo's image and consumer behavior were analyzed in terms of taekwondo image and consumer behaviors in accordance with taekwondo demonstration recognition for risk management and stable management through securing new trainees and continuously participating in taekwondo. And to provide basic data to help establish management strategies.

In order to achieve the purpose of this study, 418 questionnaires of visitors to taekwondo demonstration were taken as valid samples. For data processing and statistical methods, frequency analysis was performed for general characterization using SPSS. Cronbach's α coefficient was calculated for the reliability of the questionnaire. To classify taekwondo model recognition factor, Taekwondo chapter image factor, and consumer behavior factor for factor analysis.

In order to examine the relationship between the variables, correlation analysis was conducted. Multiple regression analysis was used to examine the effect of taekwondo pilot recognition factor on the image factor and consumer behavior factor of taekwondo (significance level .05).

The following conclusions were obtained through this study.

The effects of training factors, effect factors, interest factors, and knowledge factors of taekwondo demonstration recognition were found to affect image factors. The training factors, effect factors, interest factors, and knowledge factors of taekwondo demonstration recognition. And the intention factors of word of mouth. Also, image factor of taekwondo chapter image influenced purchase intention factor and word of mouth intention factor of consumer behavior.

Comprehensively, it is important to emphasize the importance of training through demonstration, defeat, and protest in taekwondo, and to present objective and scientific results of physical and mental effects through taekwondo participation. Also, in order to provide general knowledge about taekwondo and knowledge about taekwondo, it is necessary to make and distribute relevant books, research materials and images so that many people can share their knowledge. If these activities are carried out, the taekwondo director's education program, the trainees' training style and training skills, and the atmosphere of the taekwondo dojo will be noticed, which will have a positive effect on the image of the painting. Finally, together we will contribute to the revitalization of management.

[Keywords] *Taekwondo, Taekwondo Gym, Taekwondo Demonstration Activities, Recognition, Safety Management Strategy*

1. Introduction

The Korean national flag taekwondo is a sport that has become popular worldwide as

a sport for the Olympic Games. It has not only a great impact on participants' health, lifestyle, stress, and social development, but is also recognized as a representative cultural

products in Korea. With the management quick of the taekwondo gym in the mixed loading of the various threatening elements in which the education is achieved centering around the taekwondo gym and which taekwondo is forming the externally development till now but which threatens the taekwondo gym including the decline of the taekwondo participant population because of the low childbirth, indiscriminate jumble of the taekwondo gym, relaxation of the appearance of the competition event and various regulation, and etc the necessity of the more systematic coating activation plan is raised[1]. In this situation, many taekwondo chapters utilize taekwondo demonstration in order to promote management and stable finances. Taekwondo demonstration shows that taekwondo practitioner introduces taekwondo's basic movements, poomsae, contests, self-defense, and other techniques of taekwondo It promotes the desire to learn and learn about taekwondo[2]. In addition, through the taekwondo demonstration which contains the general meaning of technology and spirit, the person who does not know taekwondo can get the effect of making the interest of taekwondo interested and approaching, and he will continue to practice the taekwondo practitioners can play an important role in motivation. In particular, the taekwondo field requires the introduction of a marketing strategy that requires the advancement of the taekwondo field and the evolution of the contemporary generation as part of the taekwondo field, in particular, in an effort to effectively utilize the movement of the taekwondo fields and to proactively respond to the active response of the past and actively respond to the active response of the past[3].

In this study, we conducted a study on taekwondo image and consumer behavior based on taekwondo demonstration recognition for risk management and stable management through securing new trainees of taekwondo chief, I would like to present basic data that can help establish the management strategy of the director.

2. Method

2.1. Subjects

In this study, 450 people participated in the taekwondo demonstration tournament. The sampling method was the convenience sampling method. Among the 450 questionnaires collected, 418 questionnaires were selected as valid samples.

2.2. Measurement method

The method of constructing the questionnaire in this study is as follows.

First, in taekwondo demonstration recognition, Jung Jae-Hoon(2014) showed Cronbach's α coefficient as a training factor .810, effect factor .840, interest factor .770, knowledge factor .734[4], and Kwon Kyung-Sang, Choi Hwan-Suk and Park Gi-Duck(2014) showed Cronbach's α coefficient training factor .810, effect factor .774, interest factor .708, knowledge factor .684 were found in the study[5].

Second, the image of Taekwondo is used by Pope & Voges(2000)[6], Kim Joon-Hee and Lee Shin-Eon(2013) showed Cronbach's α coefficient .861[7]. And Jung Tae-Sung(2014) showed Cronbach's α coefficient .870 in the study[8].

Third, consumer behavior was developed by Shin & Amine(1994)[9], Lim Seung-Hyun and Nam Kyung-Wan(2011) is Cronbach's α coefficient was the purchase intention factor .821, respectively[10].

Therefore, the questionnaire used in the previous study was revised and supplemented for the purpose of this study because it is known that the definitions or indicators for each factor were measured consistently and reliably.

2.3. Validity and reliability of the questionnaire, correlation

In this study, factor analysis was performed to find out the construct validity of the measurement tools. The factor extraction method was using the maximum method (Eigen value exceeding 1.0) and the factor rotation method was the varimax(orthogonal)

rotation method. The reliability was also verified by calculating Cronbach's α coefficient.

As a result, taekwondo demonstration recognition consisted of 4 factors, training ($\alpha=.873$), effect($\alpha=.825$), interest($\alpha=.740$) the ratio of the factors explained 46.387. The paint image consisted of one factor of image ($\alpha=.913$), and the ratio of factor explained the whole variable was 68.127. Consumer behavior consisted of two factors, purchase intention($\alpha=.915$), word of mouth intention ($\alpha=.902$), and the ratio of two factors explaining the total variable was 74.184. As a result of the correlation analysis using SPSS, most of the constructs were correlated with each other.

2.4. Analysis of data

The SPSS program 23.0 was used for statistical analysis according to the purpose of data analysis as follows.

First, frequency analysis was conducted for general characteristics.

Second, Cronbach's α coefficient was calculated to verify the reliability of the questionnaire. Third, factor analysis was conducted to classify taekwondo demonstration recognition factor, Taekwondo chapter image factor, and consumer behavior factor.

Fourth, correlation analysis was conducted to investigate the relationship between the variables.

Fifth, multiple regression analysis was used (significance level .05) to examine the effect of Taekwondo pilot recognition factor on Taekwondo chapter image factor and consumer behavior factor.

3. Results

3.1. Taekwondo demonstration of recognition affect the image

Table 1. Taekwondo demonstration of recognition affect the image.

Independent Variable \ Dependent Variable	Image			
	<i>b</i>	<i>Std.E</i>	β	<i>t</i>
Training	.254	.059	.265	4.783***
Effect	.272	.056	.312	5.045***
Interest	.231	.057	.237	3.914***
Knowledge	.207	.050	.215	2.768*
<i>R</i> ²	.436			
<i>F</i>	54.438***			

Independent Variable \ Dependent Variable	Purchase intention			
	<i>b</i>	<i>Std.E</i>	β	<i>t</i>
Training	.416	.068	.432	6.389***
Effect	.219	.063	.222	3.546**
Interest	.213	.061	.212	2.284**
Knowledge	.158	.049	.167	3.543***
<i>R</i> ²	.354			
<i>F</i>	36.842***			

Note: *** $p < .001$ ** $p < .01$

<Table 1> shows that the training factor ($\beta=.265$), effect factor($\beta=.312$), interest factor($\beta=.237$), and knowledge factor($\beta=.215$) are significant influences on image factor. And explaining approximately 43.6% of the variance.

3.2. Taekwondo demonstration of recognition affect the consumer behavior

<Table 2> shows that the training factor ($\beta=.432$), the effect factor($\beta=.222$), interest factor($\beta=.212$), and the knowledge factors ($\beta=.167$) are significant influences on Purchase Intention factors. And explaining approximately 35.4% of the variance.

Table 2. Taekwondo demonstration of recognition affect the purchase intention.

Independent Variable \ Dependent Variable	Word of mouth intention			
	<i>b</i>	<i>Std.E</i>	β	<i>t</i>
Training	.502	.064	.415	6.325***
Effect	.239	.059	.224	3.851***
Interest	.211	.062	.219	2.183***
Knowledge	.196	.054	.203	3.672***
<i>R</i> ²	.362			

Note: *** $p < .001$ ** $p < .01$

Table 3. Taekwondo demonstration of recognition affect the word of mouth intention.

Independent Variable \ Dependent Variable	Image			
	<i>b</i>	<i>Std.E</i>	β	<i>t</i>
Training	.502	.064	.415	6.325***
Effect	.239	.059	.224	3.851***
Interest	.211	.062	.219	2.183***
Knowledge	.196	.054	.203	3.672***
<i>R</i> ²	.362			

F	46.761***
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Note: ***p<.001

<Table 3> shows that the training factor ($\beta=.415$), the effect factor($\beta=.224$), interest factor($\beta=.219$), and the knowledge factors ($\beta=.167$) are significant influences on word of mouth Intention factors. And explaining approximately 36.2% of the variance.

3.3. Image affect the consumer behavior

<Table 4> shows that the image factor ($\beta=.576$) is significant influences on Purchase Intention factors. And explaining approximately 35.7% of the variance.

<Table 5> shows that the image factor ($\beta=.583$) is significant influences on word of mouth Intention factors. And explaining approximately 35.7% of the variance.

Table 4. Image affect the purchase intention.

Independent Variable \ Dependent Variable	Purchase intention			
	b	Std.E	β	t
Image	.623	.069	.576	7.238***
R ²	.357			
F	56.672***			

Note: ***p<.001

Table 5. Image affect the word of mouth intention.

Independent Variable \ Dependent Variable	Word of mouth intention			
	b	Std.E	β	t
Image	.631	.066	.583	7.822***
R ²	.436			
F	53.784***			

Note: ***p<.001

4. Discussion

The presiding officer and his parents recognized that taekwondo demonstration team had an important influence on the management, and they increased the interest of the trainees and influence the publicity value of taekwondo chief. In addition, taekwondo demonstration was able to clarify the perception of taekwondo to parents, and it was shown that these demonstration activities

played an active role in promoting taekwondo among parents[11]. In order to enhance the educational effect of the practitioners and the promotion effect of the painting, it is necessary to operate the taekwondo demonstration team effectively from the managerial strategic dimension of the taekwondo director. Activation of the demonstration team has a good influence on the image of the painting[12]. When consumers choose taekwondo, they are most influenced by surrounding invitations and demonstration games[12]. Both practitioners and parents were affected by the demonstration team[13]. This is because participation of taekwondo demonstration teams in various conventions has a psychological strong effect on trust to consumers and taekwondo leader's faith is guaranteed, which has a good effect on forming confidence in customers[14]. The most important factor in the taekwondo program is manners and personality education and taekwondo service quality influences both customer satisfaction and purchase behavior[15]. Therefore, high quality of service means higher customer satisfaction and higher purchase behavior[16].

5. Conclusion

First, the training factors, effect factors, interest factors, and knowledge factors of taekwondo pilot recognition influence image factors.

Second, the training factors, effect factors, interest factors, and knowledge factors of the taekwondo demonstration recognition have an effect on the purchase intention factors and word of mouth intention factors of consumer behavior.

Third, image factor of taekwondo chapter image affects purchase intention factor and word intention factor of consumer behavior. Particularly, the training factors, effectors, interest factors, and knowledge factors have an influence on image and consumer behavior. Therefore, taekwondo emphasizes the importance of training through demonstration, defeat demonstration, and protest demonstration in taekwondo, it is important to present objective and scientific results on mental

effects. Also, in order to provide general knowledge about taekwondo and knowledge about taekwondo, it is necessary to make and distribute relevant books, research materials and images so that many people can share their knowledge. If these activities are carried out, the taekwondo director's education program, the trainees' training style and training skills, and the atmosphere of the taekwondo dojo will be noticed, which will have a positive effect on the image of the painting. Finally, together we will contribute to the revitalization.

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Lead Author**Choi Hwan-suk** / Keimyung University Professor

B.A. Keimyung University

M.A. Keimyung University

Ph.D. Keimyung University

Research field

- The Study on the Status Change of Competition Anxiety Depending on Archery Player's Level, The Korean Journal of Sports Science, 24(2) (2015).
- The Current Status and Development Plan of National Sport Licensing Industry, Journal of Sport and Leisure Studies, 59(1) (2015).

Major career

- 2011~2013. Deagu Haany University, Professor
- 2013~present. Keimyung University, Professor

Corresponding Author**Shin Hong-bum** / Keimyung University Professor

B.A. Myongji University

M.A. Illinois State University

Ph.D. University of New Mexico

Research field

- The Strategic Approaches for Vitalizing Korean Wave of Sport through International Sport Exchange, Journal of Korea Society for Wellness, 10(2) (2015).
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Major career

- 2008~2009. DeSales University, Professor
- 2009~present. Keimyung University, Professor

Publication state: Japan
ISSN: 2423-835X

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

Corresponding author
E-mail: mine7728@hanmail.net

Peer reviewer
E-mail: editor@j-institute.jp

<http://dx.doi.org/10.22471/martialarts.2017.2.1.07>

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Influence of Exercise and Drinking Habits on Their Body Composition and PHYSICAL FITNESS in Middle-Aged Men

Hyun Kwang-suk¹, Park Jung-min^{2*}, Park Sang-kyun³,
Heo Seung-jae⁴

Chungnam National University, Daejeon, Republic of Korea.

Abstract

This study was to investigate the effects of exercise and drinking habits on the body composition and physical fitness in middle-aged men. The participants were divided into two groups: 1 times a week Drinker group (n=15) and 3 times a week Drinker group (n=15). The exercise and drinking habits for 12 weeks. The results of this study were as follows: First, In terms of change in body composition due to drinking and exercise, the group drinking once a week shows a statistically significant decrease in weight, body fat ratio, BMI, and abdominal fat rate, but doesn't show any significant difference in muscle skeletal mass. And the group drinking three times a week doesn't show any significant difference in all variables of body composition. In addition, difference between groups due to drinking and exercise doesn't reveal any statistically significant difference in all variables of body composition at the pretest. However, at the posttest, weight, body fat ratio, BMI, and abdominal fat ratio showed a statistically significant difference. Second, as for the physical fitness, there were significantly increased in left grip strength, right grip strength, muscle endurance, cardiopulmonary endurance, flexibility, quick reaction, and agility the 1 times a week Drinker group. As conclusions, this study confirmed that the exercise and drinking habits could improve the body composition and physical fitness of middle-aged men. However, there is a need for more specific exercise programs to be developed for the continual improvement of athletic performance in exercise and drinking habits along with further studies to confirm the physiological benefits of those programs.

[Keywords] Exercise, Drinking Habits, Body Composition, Physical Fitness, Middle-Aged Men

1. Introduction

Physical activities through regular exercise are required to live a healthy life. However, recent economic development by rapid industrialization spread sedentary life to drastically reduce human physical activities[1]. More seriously, although the decrease in physical activities of modern people accompanied by heavy stress from work, drinking, and smoking expedites the occurrence of chronicle diseases[2], drinking to relieve mental and physical stress continues to increase[3].

According to the publication of the Ministry of Health and Welfare[4], people who do

the medium level of exercise, meaning the exercise of 1 and 30 hours, at least 5 times a week, decreased from 18.7% in 2005 to 14.5% in 2008, and those who drink more than once a month increased from 54.6% in 2005 to 59.5% in 2008. In particular, the drinking rate of men was revealed to be at least twice as high as that of women, and the highly dangerous drinking rate of men in 2011 was reported to soar 4 times higher than that of women, so men were reported to be relatively more easily exposed to risk in health from drinking than women[5].

Heavy stress from work, lack of physical activities, and excessive drinking of modern people not only hinder from living a regular

life but cause chronic diseases such as adult diseases, and regular exercise has been suggested as the solution for this. Regular exercise improves the function of musculoskeletal system enabling repetitive physical activities, enhances physical balance and flexibility, reduces the risk to fall, and improves cardiopulmonary function to decrease cardiovascular mortality[6]. Besides, it enhances physical fitness to improve quality of life, relieves stress, and advances the ability to cope with stress[7].

Reports on exercise and drinking say that sustained aerobic exercise helps alleviate drinking craving and stress[8], and excessive drinking over a certain level brings memory loss, thinking disorder, impaired exercise function, gastrointestinal disturbances, impaired sexual and liver function[9]. In particular, among men, drinking over a certain level is relevant to obesity, and drinking frequency is related to the increase of blood lipid[10].

As seen above, drinking causes metabolic imbalance in the body, recession and disorder of each organ, and becomes a direct and indirect reason for diseases. Although to stop drinking is the best way to resolve the side effects of drinking and smoking, some are using solutions of nutrition or exercise. Among

them, regular exercise is effective in improving cardiovascular function[11][12], reducing the occurrence rate of various chronic diseases, and relieving symptoms of some diseases[13][14]. Therefore, this study aims to identify the influence of drinking and regular physical activities on body composition and physical fitness in middle-aged men.

2. Materials & Methods

2.1. Subject of study

This study was composed of participants in the process of qualification training for a double major of sports education performed by secondary school teacher training center and hosted by the Ministry of Education from March to August, 2016. The subjects of the study were divided by 2 groups of 15 participants drinking less than once a week and another 15 drinking over 3 times a week each. In order to confirm they show same physical and exercise function, the age group over 40 years was randomly selected. As the study aims to identify the influence of exercise and drinking habits on physical composition and fitness, difference due to exercise experience was not considered. The physical characteristics of the participants are shown in <Table 1>.

Table 1. Physical characteristics of subjects.

Mean±SD

Items	N	Age (Years)	Height (Cm)	Weight (Kg)
1 times a week drinker	15	49.96 ±4.14	168.36 ±7.42	73.74 ±13.75
3 times a week drinker	15	46.29 ±5.30	167.66 ±8.48	76.68 ±12.98

2.2. Exercise program

Exercise program classification in accordance with qualification training for a double major of sports is shown in <Table 2>.

Table 2. Exercise program.

	Items	Set/Time(min)

1-8week	1. Football	2/30
	2. Tennis	2/30
	3. Golf	2/30
	4. Gymnastics	2/30
9-16week	5. Athletics	3/45
	6. New sports	2/15
	7. Swimming	2/30
	8. Ping-pong	2/30
17-24 week	9. Badminton	2/30
	10. Basketball	2/30
	11. Dance sports	2/30
	12. Volleyball	2/30

2.3. Measure and method

2.3.1. Measurement of physical composition

On the participants' arrival at the place of test, all the metal they carried on were first removed from their body, and then they were told to relax for 5 minutes after urinating to start the measurement of physical composition. Weight(kg), BMI(kg/m^2), WHR(%), and body fat ratio(%) were measured by using Inbody 729(Biospace Co., Seoul, Korea). To implement the analysis of body composition, participants were told to stand straight with their arms and legs a bit apart, and then to step up the marked position of the instrument with bare feet holding the electrode handle with a hand according to the order of measurement of the instrument.

2.3.2. Fitness test

As the fitness test items of the study are based on Article 2 and 7 of the School Health Law and Article 2, 3, and 6 of the School Fitness Test Regulations(by ordinance of the Ministry of Education), quick reaction(standing long jump), flexibility(sitting forward bending), cardiopulmonary endurance(jump rope), muscle endurance(push up), muscle strength(grip strength), and agility (side step test) were measured according to the fitness test method students.

2.3.2.1. Push-up

The subjects are told to reach their arms apart with shoulder width and then to hold

the push-up rod with the fingertips facing forward putting both feet together. In this posture, arms should be 90 angles to the ground, and head, shoulders, waist, hip, and legs should be straight. When the forearms and shoulders are horizontal by bending arms, tell them to return to the original posture. After a minute of the performance, the total number of repetitions was recorded.

2.3.2.2. Sit-up

The subjects are told to be sure to stand knees lying down with their fingers crossed under the head. They stand their upper body for their elbows to reach their knees and lie down again. At this point both shoulders should touch the ground. When standing up, rebounding action is not allowed. After a minute of the performance, the total number of repetitions was recorded.

2.3.2.3. Side step

3 parallel lines are marked on the floor with 100m apart each other. The subjects are told to stand not stepping on the center line. On the signal of "go", they do side steps on the right to go over the right line with a right foot. This is counted as once. As soon as they go over the right line, they should go back to the original posture. Then it's counted as twice. After returning, they do side steps again to go over the left line this time with a left foot, it's three times. After 2 sets of 10 seconds of the performance, the better result between them was recorded.

2.3.2.4. Sitting forward bending

The subjects are told to sit upright with their knees stretching fully so that their bottoms of both bare feet may touch the vertical face of the measuring instrument. The interval between feet should be less than 5 cm. And they are told to take "ready" action by overlapping the left palm on the back of the right hand with both palms stretching. Testers gently press subjects' knees so that they may not bend when subjects bend forward. After 2 sets of performance, the better result between them was recorded in 0.1 cm increments.

2.3.2.5. Standing long jump

The subjects are told to stand not cross the marked line on the springboard and to do enough preliminary exercise of arms and trunk to jump forward as long as possible. Be sure not to step on the starting line, and to measure the most back part of the landing point. After 2 sets of performance, the better result between them was recorded in 0.1 cm increments.

2.3.2.6. Jumping rope

The subjects first do some preliminary exercise of all parts, such as shoulders, waist, knees, ankles, wrists etc. used when jumping rope. After some application exercise with both hands gripping the rope, they are told to slightly bend their knees and to use the front part of the soles instead of the entire soles when landing to alleviate the impact on their body and knees. After a minute performance, the total number of performance was recorded.

2.4. Data process

To process the data of this study, the mean and standard deviation of all the data collected using SPSS 20.0(window statistical package) were calculated. Paired t-test was conducted to test the significance before and after the experiment in a group while independent sample t-test was used for the significance test before and after between groups. The significance level was $p < .05$.

3. Results

3.1. Change in body composition

<Table 3> shows changes in body composition due to drinking and exercise. The change of the once-a-week drinker group shows statistically significant decrease in weight ($p=.000$), body fat ratio($p =.000$), BMI ($p=.000$), and abdominal fat ratio($p=.000$) but doesn't show any significant difference in terms of musculoskeletal mass($p=.346$). The three-times-a-week drinker group doesn't show any statistically significant difference in all variables. In addition, in the difference between groups due to drinking and exercise, whereas pre-test doesn't show any statistically significant difference in all variables of body composition, post-test shows statistically significant difference in weight($p=.000$), body fat ratio($p =.000$), BMI($p=.000$), and abdominal fat ratio($p=.000$).

Table 3. The changes of body composition.

M±SD

Items	Groups	Pre	Post	t*
Weight (Kg)	1 times a week Drinker (n=15)	73.74±13.75	70.20±12.77	3.059+++
	3 times a week Drinker (n=15)	75.46±16.49	76.12±16.74	-0.555
	t**	-1.098	-3.106+++	
Skeletal muscle mass(kg)	1 times a week Drinker (n=15)	29.21±5.94	29.91±5.78	-0.722
	3 times a week Drinker (n=15)	31.58±5.44	31.87±5.53	-0.814
	t**	-1.083	-1.023	

BMI(kg/m ²)	1 times a week Drinker (n=15)	25.61±3.86	24.34±3.52	3.812†††
	3 times a week Drinker (n=15)	25.25±4.80	25.50±4.96	-0.616
	t**	0.202	-3.089†††	
WHR(%)	1 times a week Drinker (n=15)	0.90±0.04	0.87±0.04	4.141†††
	3 times a week Drinker (n=15)	0.89±0.05	0.90±0.05	-0.380
	t**	0.822	-3.124†††	
Percent body fat(%)	1 times a week Drinker (n=15)	21.33±7.94	16.67±7.50	4.681†††
	3 times a week Drinker (n=15)	19.08±10.71	19.28±10.69	-0.330
	t**	1.102	-4.786†††	

Note: * Paired t-test between pre- and post-values in a group

** Independent sample t-test' results between pre- and post-values in both groups

†, ††, and ††† mean P<0.05, P<0.01, and P<0.001, respectively.

3.2. The change in fitness variables

<Table 4> shows the change of fitness variables due to drinking and exercise. The once-a-week drinker group shows statistically significant change in all variables of left grip strength(p=.000), right grip strength(p=.000), muscle endurance(p=.000), cardiopulmonary endurance(p=.000), flexibility(p=.000), quick reaction(p=.000), and agility(p=.000), while the three-times-a-week drinker group doesn't show any statistically significant change in all variables. Furthermore, at the

pre-test of difference between groups of fitness variables due to drinking and exercise, cardiopulmonary endurance(p=.004) and quick reaction(p=.000) show significant difference while at the post-test all the variables including left grip strength(p=.000), right grip strength(p=.000), muscle endurance(p=.000), cardiopulmonary endurance(p=.000), flexibility(p=.000), quick reaction(p=.000), and agility(p=.000) show statistically significant difference.

Table 4. The changes of fitness variables.

M±SD

Items	Groups	Pre	Post	t*	
Muscular strength	L	1 times a week Drinker (n=15)	33.68±4.06	38.77±4.55	-6.333†††
		3 times a week Drinker (n=15)	33.55±3.73	33.23±3.87	1.252
		t**	0.102	-6.348†††	
	R	1 times a week Drinker (n=15)	32.85±3.54	34.54±1.77	-4.966†††
		3 times a week Drinker (n=15)	32.55±3.63	32.83±2.78	-0.938
		t**	0.210	-4.896†††	
Muscular	1 times a week	32.50±4.23	39.83±3.19	-6.134†††	

endurance	Drinker (n=15)			
	3 times a week Drinker (n=15)	31.58±5.44	36.67±35.55	-4.664†††
	t**	-0.638	-3.634†††	
Cardiorespiratory endurance	1 times a week Drinker (n=15)	99.75±12.69	127.58±11.91	-12.805†††
	3 times a week Drinker (n=15)	102.83±13.37	109.83±11.37	-3.611†††
	t**	-2.688††	-8.884†††	
Flexibility	1 times a week Drinker (n=15)	13.36±4.47	15.17±3.41	-3.395†††
	3 times a week Drinker (n=15)	11.95±4.41	12.39±4.21	-0.822
	t**	-1.022	-3.885†††	
Muscular power	1 times a week Drinker (n=15)	187.92±15.83	206.42±17.67	-10.947†††
	3 times a week Drinker (n=15)	192.67±10.99	197.92±6.52	-1.730
	t**	-3.925†††	-8.922†††	
Agility	1 times a week Drinker (n=15)	46.75±1.76	49.83±1.80	-15.976†††
	3 times a week Drinker (n=15)	47.75±1.91	47.83±2.29	-0.178
	t**	-0.678	-10.006†††	

Note: * Paired t-test between pre- and post-values in a group

** Independent sample t-test[†] results between pre- and post-values in both groups

†, ††, and ††† mean P<0.05, P<0.01, and P<0.001, respectively.

4. Discussion

As the result of analysis of influence of drinking habits and exercise on body composition and fitness for 30 middle-aged men (15 of once-a-week drinker, 15 of three-times-a-week drinker), the study discusses as below.

Regular exercise and sustained physical activity have been reported to have a positive effect on body composition by reducing the body fat of patients suffering from metabolic syndrome and cardiovascular disease as well as healthy adults not having specific medical disorders[15]. This study also shows that regular exercise affects the change of body composition by groups. However, the group with more than three-times-a-week drinking habits has relatively higher obesity and body fat index as well as higher body mass index and abdominal obesity ratio than the group with

less than once-a-week drinking habits. This indicates that even if you regularly exercise, drinking more than a certain period of time makes it difficult to control your body weight and body fat. In particular, drinking has been reported to prevent liver from burning fat and to reduce the metabolism of fat and carbohydrates[16]. Moreover, drinking increases appetite, delays satiety, and increases the amount of intake, ultimately leading to increase weight and body fat[17]. Among previous studies on drinking and exercise, "Research on middle-aged men due to drinking habits[18]" reported that there was a statistically significant difference in the weight, body fat ratio, BMI, and WHR of the alcoholic drinkers compared to the non-alcoholic drinkers, and Im Yeol-lee et al[19] reported that the risk of metabolic syndrome

increased with increasing drinking. These results are consistent with the results of our study in which the body mass index of the group having more than three-times-a-week drinking habits was higher than that of the group having less than once-a-week drinking habits, implying that drinking habits have a great influence on the change in body mass. In addition, it is likely that the high calorie side food consumed during drinking is accumulated in the body rather than being used as an energy source, resulting in weight gain.

Excessive drinking habits may increase the risk of metabolic syndrome and the prevalence of adult diseases and complications due to obesity[20]. And weight control is one of the most proper ways to lower the risk of metabolic syndrome. It's possible to control weight through dietary and exercise regimens, and the effect seems to be maximized when both of the regimens are combined. As effective exercise regimen, low intensity aerobic exercise for a long time such as jogging, climbing, walking, and cycling is widely known to be good, but combined training of aerobic exercise and strength training is more recommended for prevention of yo-yo syndrome, which has shown a positive change in the risk factor of metabolic syndrome[21]. Therefore, it is important clinically to suggest exercise regimens as the most effective preventive and therapeutic methods to address the risk factors of metabolic syndrome[22]. As the results of this study, the group with less than once-a-week drinking habits showed higher muscle strength, muscle endurance, cardiovascular endurance, flexibility, agility and agility than the group with more than three-times-a-week drinking habits.

This is consistent with the findings that drinking and exercise of obese men affect body composition and fitness by Nam Sang-nam and Ahn Sang-hyun[23] and supports the results that drinking over a certain level causes decline of exercise function. As such, drinking increases the risk of metabolic syndrome, such as obesity by excessive caloric intake and causes a social issue of impaired quality of life by heightening the prevalence of cardiovascular diseases through deteriorated physical fitness due to drinking. As the

improvement of lifestyle and adult diseases due to alcoholic drinking can be obtained through regular exercise, this study has identified the relationship between drinking habits and exercise and the influence of drinking and exercise on body composition and physical fitness of middle-aged men.

5. Conclusion

The study draws the conclusion as follows as a result of comparative analysis of influence of drinking habits and exercise on body composition and fitness for 30 middle-aged men(15 once-a-week drinkers and 15 three-times-a-week drinkers).

1. In terms of change in body composition due to drinking and exercise, the group drinking once a week shows a statistically significant decrease in weight, body fat ratio, BMI, and abdominal fat rate, but doesn't show any significant difference in muscle skeletal mass. And the group drinking three times a week doesn't show any significant difference in all variables of body composition. In addition, difference between groups due to drinking and exercise doesn't reveal any statistically significant difference in all variables of body composition at the pretest. However, at the posttest, weight, body fat ratio, BMI, and abdominal fat ratio showed a statistically significant difference.

2. When reviewing the change of fitness variables due to drinking and exercise, the change of fitness variable of the group drinking once a week shows significant difference in all variables, such as left grip strength, right grip strength, muscle endurance, cardiopulmonary endurance, flexibility, quick reaction, and agility while that of the group drinking three times a week doesn't show any statistically significant difference in all variables. Furthermore, at the pretest of inter-group difference of fitness variables due to drinking and exercise shows statistically significant in cardiovascular endurance and quick reaction while the posttest shows statistically significant difference in all variables, such as left

grip strength, right grip strength, muscle endurance, cardiopulmonary endurance, flexibility, quick reaction, and agility.

When seen comprehensively, it is certain that drinking habits of middle-aged men influence the change in body composition and the relationship between drinking and exercise as well. These findings suggest that excessive drinking has a bad effect on body composition and physical fitness. Therefore, if future studies would develop exercise programs proper for each age group and plans to reform bad drinking habits through the examination of drinking habits from a wide range of age groups and their daily exercise habits, it will provide abundant information for prevention and treatment of obesity, metabolic syndrome, and adult diseases due to drinking, which are recently emerging as a social issue.

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Lead Author

Hyun Kwangsuk / Chungnam National University Professor
B.A. Chungnam National University
M.A. Chungnam National University
Ph.D. Korea University

Research field

- Injury Survey in Scuba Divers of British Sub-Aqua Club: A Retrospective Study, *Journal of Exercise Rehabilitation*, 11(6) (2015).
- Analysis of Ipsilateral and Bilateral Ratios in Male Amateur Golfers, *Journal of Exercise Rehabilitation* 15(3) (2016).

Major career

- 2008~present. Chungnam National University, Professor
- 2017~present. International Society for Martial Arts, Member

Corresponding Author

Park Jungmin / Chungnam National University Researcher
Professor

B.A. Yongin University
M.A. Yongin University
Ph.D. Chungnam National University

Research field

- Analysis of Ipsilateral and Bilateral Ratios in Male Amateur Golfers, *Journal of Exercise Rehabilitation*, 15(3) (2016).
- The Effects of Core Stability Exercises on the Balance Abilities of Archers, *Journal of Exercise Rehabilitation*, 25(5) (2016).

Major career

- 2014~2016. Emotion Development Center of Police Training Institute, Professor
- 2016~present. Department of Physical Education, Police Training Institute, Professor

Co-Author

Park Sangkyun / Chungnam National University Graduate Student in Doctoral Program

B.A. Chungnam National University
M.A. Chungnam National University
Ph.D. Chungnam National University

Research field

- Influence of Exercise and Drinking Habits on Their Body Composition and Physical Fitness in Middle-Aged Men, *International journal of Martial Arts*, 2(1) (2017).

Major career

- 2016~present. Chungnam National University Graduate Student in Doctoral Program, Researcher
- 2017~present. International Society for Martial Arts, Member

Co-Author

Heo Seungjae / Postgraduate Student

B.A. Kongju National University
M.A. Kongju National University

Research field

- The effect of Kinesio Taping and Icing on Blood Lactate Density and Heart Rate Recover Pace After Shuttle Run Test, *The Society of Digital Policy & Management*, 14(6) (2016).
- Influence of Exercise and Drinking Habits on Their Body Composition and Physical Fitness in Middle-Aged Men, *International journal of Martial Arts*, 2(1) (2017).

Major career

- 2016~present. Kongju University Postgraduate Student, Researcher
- 2017~present. International Society for Martial Arts, Member

Publication state: Japan
ISSN: 2423-835X

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

Corresponding author
E-mail: eykim@hoseo.edu

Peer reviewer
E-mail: editor@j-institute.jp

<http://dx.doi.org/10.22471/martialarts.2017.2.1.16>

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A Study on the Personality Development of Elementary School Students through HAPKIDO Training

Kim Eui-young

Hoseo University, Asan, Republic of Korea

Abstract

Courtesy is considered especially important in hapkido training. The characteristic of hapkido is that trainees sit upright on their knees and exchange greetings before they start to undergo training, and another characteristic is that they stand up gently and do circular motions when they compete with each other. They feel the energy of their bodies when they train it. The training effects of hapkido is associated with its technical system. There are some differences in that regard among various hapkido organizations, but the technical system of hapkido consists of breathing, break fall and technique in general, which is differentiated from those of other martial arts.

Hankido is a martial art that is good for school children's physical activities. This is viewed as an attractive physical activity that can step up their emotional, social and intellectual development, provide physical education and help them to build up character to grow into good members of society. Accordingly, this study was implemented on the assumption that hapkido training would be of use for personality education for elementary school students.

The subjects in this study were 300 male and female elementary school students who were selected by random sampling from among the male and female trainees in 13 hapkido gyms located in the cities of Daejeon and Incheon. After a survey was conducted by this researcher, the answer sheets from 263 respondents were analyzed except for 37 ones that were incomplete or included unfaithful responses. This scale consisted of five areas and 16 items, which were four on etiquette, four on caring, four on emotion, two on personality and two on life habits.

In this study, what influence hapkido training exerted on the personality development of the elementary school students was analyzed. And the following conclusions were reached:

First, whether hapkido training affected the personality development of the school children in a different way according to gender was analyzed. As a result, there were significant differences in caring among the subfactors. The boys were more caring than the girls.

Second, whether hapkido training affected the personality development of the school children in a different way according to grade was analyzed. The third and fourth graders and the fifth and sixth graders were ahead of the first and second graders in terms of etiquette, personality and life habits, and the fifth and sixth graders excelled the first and second graders in emotion.

Third, whether hapkido training affected the personality development of the school children in a different way according to training frequency was analyzed, and the group that trained three times or more a week were ahead of the group that trained three times or less in every variable that was etiquette, caring, emotion, personality and life habits.

Fourth, whether there were any differences among the school children who trained hapkido in personality development according to training experience was analyzed. As a result, the group that trained for one to four years were ahead of the group that trained for one year or less in terms of etiquette, emotion, personality and life habits, and the group that trained for two to four years were more caring than the group that trained for a year or less.

[Keywords] Hapkido, Personality, Elementary School Student, Physical Education, Marital Arts

1. Introduction

Hankido, judo, kendo and taekwondo are martial arts that can produce such effects of physical activities. Unlike other sport activities, martial art sports are a combination of martial art spirits and sportsmanship. Martial art training can serve to accelerate the development of the body and martial-art skills and exert a positive socioemotional influence. It aims at teaching courtesy and seeks after superb educational effects that are physically and mentally well balanced. In this perspective, hapkido that contributes to well-rounded character building is of greater educational value than any other P.E. activities, and that can be defined as a martial art sport that can make a contribution to the sound emotional cultivation and mental health of school children.

Courtesy is considered especially important in hapkido training. The characteristic of hapkido is that trainees sit upright on their knees and exchange greetings before they start to undergo training, and another characteristic is that they stand up gently and do circular motions when they compete with each other. They feel the energy of their bodies when they train it. The training effects of hapkido is associated with its technical system. There are some differences in that regard among various hapkido organizations, but the technical system of hapkido consists of breathing, break fall and technique in general, which is differentiated from those of other martial arts.

A study found that breathing makes it possible to send the energy gathered into the lower part of the abdomen to every part of the body including peripheral nerves through body movements and consciousness, and the study also found that it places stress on internal training and has positive effects on youth mental health by stimulating them to compete with themselves, not with others, to bolster their own mental power[1].

Break fall is a training method to make the trainee protect his or her own body without being injured as much as possible when he or she fall down himself or herself or by the force of the opponent. This training requires

endurance because the trainee has to make his or her own body keep bumping into the mat. Long break fall and high break fall are expected to contribute to confidence building because the trainee is able to learn how to spring to the hurdle higher and longer to clear while practicing running and making a good landing.

Technique is a method of joint that makes the trainee protect not only himself or herself but also the attacker and suppress the attacker. This is used when the trainee is attacked by the opponent, not when the trainee attacks first, and the trainee can suppress the attacker using the power of the attacker and mainly through the Joint lock of the attacker's joint[2]. When the trainee learn this technique, it may give pain to the opponent because it's done through the Joint lock of joint, and the trainee should flex his or her arms properly not to make the opponent injured. When the opponent uses this technique to the trainee, the trainee can experience and understand how the opponent felt. Hapkido is a martial art that is good for school children's physical activities. This is viewed as an attractive physical activity that can step up their emotional, social and intellectual development, provide physical education and help them to build up character to grow into good members of society[3]. Accordingly, this study was implemented on the assumption that hapkido training would be of use for personality education for elementary school students.

As for studies on the impact of hapkido training on youth personality development, [4]'s study examined the influence of hapkido training on youth personality development and leadership. [5]'s study investigated the influence of hapkido training on school children's personality development and peer relationship, and [6]'s study examined the impact of hapkido training on school children's character building. [7]'s study examined the relationship between hapkido training and the personality development of elementary school students. [8]'s study investigated the awareness of parents on the relationship between school children's hapkido training and

personality development. But studies of hapkido are much smaller in number than those of taekwondo and judo, and they are mostly theses or dissertations, not articles of academic journals.

The purpose of this study was to examine the influence of hapkido training on the personality development of elementary school students in an effort to determine whether hapkido would make a contribution to youth character building as a martial art sport or not. And it's also meant to provide some information on how to teach school children hapkido to achieve the educational mission of personality development without merely focusing on the acquisition of skills. Four research questions were posed:

1. Are there any differences among elementary school students who undergo hapkido training in personality development according to gender?

2. Are there any differences among elementary school students who undergo hapkido training in personality development according to grade?

3. Are there any differences among elementary school students who undergo hapkido training in personality development according to training frequency?

4. Are there any differences between elementary school students who undergo hapkido training in personality development according to training experience?

2. Method

2.1. The subjects

The subjects in this study were 300 male and female elementary school students who were selected by random sampling from among the male and female trainees in 13 hapkido gyms located in the cities of Daejeon and Incheon. After a survey was conducted by this researcher, the answer sheets from 263 respondents were analyzed except for 37 ones that were incomplete or included unfaithful responses. The characteristics of the subjects are shown in <Table 1>.

Table 1. The demographic characteristics of the subjects.

	Classification	Frequency(No.)	Percentage
Gender	Male	201	76.4
	Female	62	23.6
Grade	1-2	83	31.6
	3-4	114	43.3
	5-6	66	25.1
Main training frequency	Three times or less	52	19.8
	Three times or more	211	80.2
Training experience	Less than a year	99	37.6
	One to less than two years	81	30.8
	Two to less than three years	44	16.7
	Three to less than four years	22	8.4
	Four years or more	17	6.5
	Total	263	100.0

2.2. Instrumentation

The instrument used to serve the purpose of the study was structured questionnaires that consisted of 21 items, which were five about personal characteristics (gender, grade, training frequency, training time and training experience) and 16 about personality education. A five-point Likert scale was employed, and one point was given to the answer choice "absolutely not"; two to "scarcely"; three to "average"; four to "slightly"; and five to "very much." Scores for every item for each factor were added to calculate the averages.

As for the questionnaire for personality education, [9]'s Personality Education Inventory and [10]'s Personality Education Inventory

were modified and supplemented to suit this study. This scale consisted of five areas and 16 items, which were four on etiquette, four on caring, four on emotion, two on personality and two on life habits.

As <Table 2> shows, this scale had a 65.979% explainability and was composed of five factors and 16 items. The scale satisfied all the standards for Kaiser-Meyer-Olkin (KMO=.922), sphericity test ($p < .05$) and factor loading ($\geq .50$). When the reliability of the scale was tested, the reliability indexes were all above .60 or close to that, which is the standard suggested by Song (2011).

Table 2. The results of factor analysis and reliability analysis on personality education.

Item	Etiquette	Caring	Emotion	Personality	Life habits	h^2	Cronbach's α
Etiquette 03. It is helpful in greeting someone politely and with civility.	.765	.144	-.001	.194	.275	.719	.766
Etiquette 02. It is helpful in knowing manners and behaving in the right way.	.673	.299	.234	.211	.042	.645	
Etiquette 04. It is helpful in behaving with decency.	.600	.149	.352	.180	-.017	.539	
Caring 02. It is helpful for me to be prudent in my conduct not to offend others.	.599	.330	.281	.031	.211	.545	
Etiquette 01. It is helpful in keeping a civil tongue.	.405	.731	.135	.088	.018	.725	.771
Caring 04. It is helpful in being nice to everybody.	.184	.643	.333	.100	.234	.623	
Caring 01. It is helpful for me to arrange things I've used.	.081	.626	.075	.486	.163	.666	
Caring 03. It is helpful in weighing my words before speaking.	.239	.583	.216	.284	.145	.545	
Emotion 04. It is helpful in understanding others.	.084	.266	.783	.124	.137	.725	.774
Personality education 04. It is helpful in understanding and respecting others.	.279	.117	.679	.247	.171	.643	
Emotion 05. It is helpful in thinking positively.	.258	.073	.580	.482	-.009	.641	
Emotion 02. It is helpful in calmly doing a difficult job.	.227	.465	.564	-.077	.187	.627	
Life habits 03. It is helpful in staying clean and being careful about hygiene in everyday life.	.209	.130	.062	.761	.305	.736	.598
Personality education 01. It is helpful in trying to keeping myself on the straight and narrow..	.177	.235	.320	.640	.043	.601	

Life habits 02. It is helpful in acquiring good eating habits.	.106	.146	.151	.161	.887	.868	.687
Life habits 04. It is helpful in being ready for everything in daily life.	.395	.285	.219	.234	.567	.662	
Eigen value	2.464	2.402	2.345	1.835	1.511		
Variance(%)	15.399	15.010	14.659	11.467	9.443		
Cumulative(%)	15.399	30.409	45.068	56.535	65.979		

KMO=.922 $\chi^2=1666.101$, df=120, sig=.000

2.3. Data analysis

The After the data were collected, only the valid data were analyzed by a statistical package SPSS 18.0 according to the coding guidelines. Descriptive statistics was used to find out the general characteristics of the subjects. As to the validity and reliability of the instruments, exploratory factor analysis was made, and Cronbach alpha coefficients were calculated to make a reliability analysis. Finally, independent- samples t-test and one-way ANOVA were utilized to see if there would be any differences according to the demographic variables of the subjects and their general characteristics. Scheffe test was carried out to make a post-hoc analysis of the results of

the one-way ANOVA, and the level of statistical significance was set at .05.

3. Results

3.1. The level of personality education by gender

Concerning personality education by gender, there were no significant differences in etiquette($t=.763$, $p>.05$), emotion($t=1.776$, $p>.05$), personality ($t=1.000$, $p>.05$) and life habits($t=.529$, $p>.05$), and significant differences were found only in caring($t=-2.124$, $p<.05$). The boys were more caring than the girls.

Table 3. The results of factor analysis and reliability analysis on personality education.

Classification	Gender	N	M	SD	T-value
Etiquette	Male	201	4.21	.64	.763
	Female	62	4.14	.57	
Caring	Male	201	4.19	.56	2.124*
	Female	62	4.00	.71	
Emotion	Male	201	4.08	.65	1.776
	Female	62	3.91	.57	
Personality	Male	201	4.14	.68	1.000
	Female	62	4.04	.69	
Life habits	Male	201	4.02	.72	.529
	Female	62	3.97	.62	

Note: * $p<.05$

3.2. The level of personality education by grade

As for differences in personality education according to grade, there were significant differences in etiquette($F=11.328$, $p<.001$),

emotion($F=4.906$, $p<.01$), personality($F=9.434$, $p<.001$) and life habits($F=4.878$, $p<.001$). According to the results of Scheffe test, the third and fourth graders and the fifth and sixth graders were ahead of the first and

second graders in terms of etiquette, personality and life habits. And the fifth and sixth graders surpassed the first and second graders in emotion.

Table 4. Differences in personality education according to grade.

Classification	Grade	N	M	SD	f-value	sechffe
Etiquette	1-2(a)	83	3.93	.68	11.328***	b,c>a
	3-4(b)	114	4.30	.55		
	5-6(c)	66	4.34	.59		
Caring	1-2(a)	83	4.04	.63	2.598	
	3-4(b)	114	4.17	.60		
	5-6(c)	66	4.26	.57		
Emotion	1-2(a)	83	3.88	.70	4.906**	c>a
	3-4(b)	114	4.05	.56		
	5-6(c)	66	4.21	.63		
Personality	1-2(a)	83	3.87	.70	8.434 ***	b,c>a
	3-4(b)	114	4.23	.62		
	5-6(c)	66	4.23	.67		
Life habits	1-2(a)	83	3.82	.67	4.878**	b,c>a
	3-4(b)	114	4.09	.68		
	5-6(c)	66	4.13	.73		

3.3. The level of personality education by training frequency

Regarding personality education by training frequency, there were significant differences in all the etiquette($t=-3.196$, $p>.01$),

caring($t=-4.574$, $p<.001$), emotion($t=2.944$, $p>.01$), personality($t=-2.474$, $p>.05$) and life habits($t=2.687$, $p>.01$). The trainees who underwent training three times or more were ahead of the others who did it three times or less.

Table 5. Differences in personality education according to training frequency.

Classification	Training frequency	N	M	SD	t-value
Etiquette	Three times or less	52	3.95	0.79	-3.196**
	Three times or more	211	4.26	0.57	
Caring	Three times or less	52	3.82	0.60	-4.574***
	Three times or more	211	4.24	0.58	
Emotion	Three times or less	52	3.81	0.72	-2.944**
	Three times or more	211	4.10	0.61	
Personality	Three times or less	52	3.91	0.71	-2.474*

	Three times or more	211	4.17	0.67	
Life habits	Three times or less	52	3.79	0.70	-2.687**
	Three times or more	211	4.08	0.70	

3.4. The level of personality education by training experience

As to differences in personality education according to training experience, there were significant differences in all the etiquette (F=10.513, p<.001), caring (F=7.212, p<.001), emotion (F=10.177, p<.001), person-

ality (F=9.474, p<.001) and life habits (F=11.722, p<.001). According to the results of Scheffe test, the students who trained for one to four years were ahead of the students who trained for one year or less in etiquette, emotion, personality and life habits. The students who trained for two to four years were more caring than the students who trained for one year or less

Table 6. Differences in personality education according to training experience.

Classification	Training experience	N	M	SD	f-value	sechffe
Etiquette	Less than a year(a)	99	3.94	0.62	10.513***	b,c,d>a
	One to less than two years(b)	81	4.17	0.59		
	Two to less than three years(c)	44	4.40	0.61		
	Three to less than four years(d)	22	4.67	0.33		
	Four years or more(e)	17	4.75	0.35		
Caring	Less than a year(a)	99	4.63	0.42	7.212***	c,d>a
	One to less than two years(b)	81	3.94	0.61		
	Two to less than three years(c)	44	4.16	0.59		
	Three to less than four years(d)	22	4.24	0.57		
	Four years or more(e)	17	4.57	0.48		
Emotion	Less than a year(a)	99	4.69	0.35	10.177***	b,c,d>a
	One to less than two years(b)	21	4.47	0.45		
	Two to less than three years(c)	44	3.78	0.57		
	Three to less than four years(d)	22	4.03	0.70		
	Four years or more(e)	17	4.23	0.53		
Personality	Less than a year(a)	99	4.45	0.45	9.474***	b,c,d>a

	One to less than two years(b)	81	4.75	0.25		
	Two to less than three years(c)	44	4.44	0.55		
	Three to less than four years(d)	22	3.84	0.61		
	Four years or more(e)	17	4.12	0.74		
Life habits	Less than a year(a)	99	4.33	0.61	11.722***	b,c,d>a
	One to less than two years(b)	81	4.59	0.48		
	Two to less than three years(c)	44	4.72	0.36		
	Three to less than four years(d)	22	4.50	0.46		
	Four years or more(e)	17	3.75	0.62		

4. Discussion

As for the results of the analysis of difference among the young male and female hapkido trainees in the level of personality development according to gender, there were significant differences in caring, and the boys were more caring than the girls. [11]'s study found that there were no gender differences in sport personality, and the finding of this study that the boys were more caring was found to be affected by the continuity of hapkido training rather than gender traits. Typically, women were more passive about practicing martial art sports than men in Korean society in general, and the rate of boys who train hapkido is still higher than that of girls. Moreover, the former trains for a longer period of time. Therefore instructors should put their best efforts into the development of hapkigo education programs to encourage students including more girls to train hapkido for a long time to cultivate their personality.

As for the results of the analysis of difference among the young hapkigo trainees in personality according to gender, the third and fourth graders and the fifth and sixth graders were ahead of the first and second graders in terms of etiquette, personality and life habits, and the fifth and sixth graders excelled the first and second graders in emotion. These findings correspond with the finding of

[12]'s study that the older group with more sport experience was ahead of the younger one with less sport experience in terms of the level of personality. School children who are in the lower grades are less focused than those who are in the upper grades, and hapkido training, its environments and subsequent cultivation of emotion may affect personality development. So the development of hapkido education programs that are meant for lower-grade elementary school students who lack attention is urgently required.

Regarding the results of the analysis of difference among the hapkido trainees in personality according to training frequency, the group that trained three times or more a week were ahead of the other group that trained three times or less in terms of the level of personality. This finding coincides with the finding of [13]'s study. Their study examined differences among school children in personality development according to wushu training and found that the group with more wushu training frequency was ahead of the other group with less wushu training frequency in the level of personality. In a word, sustained hapkido training as a martial art sport makes it possible for students to be familiar with the culture of martial-art sports and thereby exerts a positive influence on

personality development thanks to the attributes of martial art sports. Undergoing hapkido training three times or more a week is expected to have positive effects on personality development.

As for the results of the analysis of difference among the hapkido trainees according to training period, the group that trained for one to four years were ahead of the group that trained for one year or less in terms of etiquette, emotion, personality and life habits, and the group that trained for two to four years was more caring than the group that trained for one year or less. These findings correspond with the finding of [14] that the boy group who continued to practice a sport for one year or more surpassed the group that did it for less than six months in terms of sport personality. These findings suggest that continuing participation in a martial art sport activity may exercise a positive influence on the cultivation of personality, and personality education through hapkido is expected to be successful only when it is provided in an integrated way on a long-term basis.

5. Conclusion

First, whether hapkido training affected the personality development of the school children in a different way according to gender was analyzed. As a result, there were significant differences in caring among the sub-factors. The boys were more caring than the girls.

Second, whether hapkido training affected the personality development of the school children in a different way according to grade was analyzed. The third and fourth graders and the fifth and sixth graders were ahead of the first and second graders in terms of etiquette, personality and life habits, and the fifth and sixth graders excelled the first and second graders in emotion.

Third, whether hapkido training affected the personality development of the school children in a different way according to training frequency was analyzed, and the group that trained three times or more a week were ahead of the group that trained three times

or less in every variable that was etiquette, caring, emotion, personality and life habits.

Fourth, whether there were any differences among the school children who trained hapkido in personality development according to training experience was analyzed. As a result, the group that trained for one to four years were ahead of the group that trained for one year or less in terms of etiquette, emotion, personality and life habits, and the group that trained for two to four years were more caring than the group that trained for a year or less.

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Author

Kim Eui-young / Hoseo University Professor

B.A. Yongin University

M.A. Kyunghee University

Ph.D. Myeongji University

Research field

- Influence of Stress on Self-Esteems and the Moderating Effects of Physical Activity in Korean Elderly People, International journal of Sport, 1(1) (2016).

- The Right Directions for Education in Korean Hapkido Dojang, International journal of Martial Arts, 1(2) (2016).

Major career

- 2006~present. Department of Division Sport Science, Hoseo University Professor

- 2016. International Society for Sport Science, Editor in Chief

Publication state: Japan
ISSN: 2423-835X

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

Corresponding author
E-mail: mine7728@hanmail.net

Peer reviewer
E-mail: editor@j-institute.jp

<http://dx.doi.org/10.22471/martialarts.2017.2.1.26>

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Effects of Guard MARTIAL ARTS Education on the Task-Related Physical Fitness and Gait Ability in Private

Park Jung-min¹

Chungnam National University, Daejeon, Republic of Korea

Seo Dea-won^{2*}

Howon University, Gunsan, Republic of Korea

Kwon Tea-il³

Daejeon Institute of Science and Technology, Daejeon, Republic of Korea

Abstract

This study was to investigate the effects of Guard Martial Arts Education on Task-Related Physical Fitness and Gait Ability in the Private Security Guard. In order to achieve the purpose of this study, 40 security guards working at the Y security company in S city were selected. The participants were divided into two groups: Exercise group (n=20) and Control group(n=20), and after observing the effect of the guard martial training on Task-Related physical fitness and functional gait ability, the results were as follows. The participants were divided into two groups: Exercise group(n=20) and Control group(n=20). The Guard Martial Arts Education for 12 weeks. The results of this study were as follows: First, As for the Task-Related Physical Fitness, there were significantly increased in Grasping power, push-up, sit-up, 100m, 1000m in the exercise group. Second, as for the gait Ability, there were significantly increased in speed and step in the exercise group. As conclusions, this study confirmed that the guard martial arts education could improve the task-related physical fitness and gait ability of private security guard. However, there is a need for more specific exercise programs to be developed for the continual improvement of athletic performance in guard martial arts education along with further studies to confirm the physiological benefits of those programs.

[Keywords] *Guard Martial Arts, Task-Related Physical Fitness, Guard Physical Fitness, Gait Ability, Private Security Guard*

1. Introduction

Due to the complicated and rapid process of social development in last few decades, it is difficult to expect a pleasant living environment without protecting the safety of individuals, companies and properties in modern society, and as the society has been developing in all fields due to the social change and the development of information and communication technology nowadays, our society has been experiencing economic imbalance as a result of the rapid industrialization. The social irregularities in this unstable society has increased the desire for safety of the lives and properties of individuals more than ever before, and especially, various social anxiety about the life safety of the individual citizens

is increasing[1]. Furthermore, the crimes and social problems have been increasing rapidly as the economic level of the modern society is growing, and thus private security guard, a private crime prevention organization, serves a very important role in solving the safety problems of the people and fulfilling various security demands from different social stratum[2].

The private security is based on the beneficiary-burden theory as the client makes payment to protect himself or herself from injury or physical harm that may come from crimes, and especially because the security guards are paid from their customers, they are obliged to play a role in preventing crimes or economic loss. In addition, private security is

an individual, organization or for-profit company that is paid from certain clients to provide a service of protecting personal profit, life and property from various dangers, so it is especially necessary to manage and identify the environment and the status of performing security guards[3].

The private security guard has the characteristics of protecting the life, body and property of the citizens in a dangerous situation, and due to the characteristic of the private security guard such as working hours, risk of job and irregular life, their mental, physical, and environmental stresses are relatively high compared to other occupations, and thus these factors are major threat to them[4]. In addition, psychological stresses, which is an unavoidable part of modern people, causes physical changes due to a series of excessive tension and anxiety, which may lead to negative consequence such as decrease in the efficiency of the entire organization and decrease in job performance[5]. Although various educational programs have been implemented to fundamentally solve these problems, yet the most important part of the training is an education that can enhance the physical ability to protect oneself as well as others. The guard means to eliminate the danger and anxiety due to the direct or indirect threat that occurs accidentally against the basic desire of the client to live safely, and to protect the client safely by minimizing the physical attack from the attempter and to serve as safety measure[6], so in order to take an immediate action in an unpredictable situation, the necessity of polishing guard martial training can not be overemphasized at all.

A guard martial has a different characteristic than other marital arts since it has to apply appropriate technique to a situation when a unpredictable threat occurs in various situations to protect the client. The guard martial and the other martial arts are similar in the method of overpowering the opponent, yet differences can be found depends on the situation and the purpose. The purpose of the guard martial is to protect the client from the dangers in various situations such as walking in the street, riding in the car or participating

in the official or informal venues, yet the purpose of the other martial arts is to protect oneself and to promote health through competing with each other according to certain game rules[7]. In addition to guard martial which is to protect the client, the other task that needs to be done for the private security guard is to maintain or improve strong physical ability. The physical strength, which is the foundation of survival and life, can be divided into health related physical strength and technical related physical strength[8], and especially as the importance of the health related physical strength, which decides and improves the quality of the life, has been reported more than before[9], so not only the technical strength, but also the basic physical strength should be emphasized to perform safeguard successfully.

Likewise, the rapid social changes in modern society require security guards more than before, but there are very few studies related to the performance and health of civil security guards, and thus continuing research on job performance and health of them are needed. Therefore the purpose of this study is to compare and analyze the effect of the guard martial on job performance and walking ability, so it can be used to improve work performance and walking ability of the civilian security guards.

2. Materils & Methods

2.1. Subject of study

The subject of this study is composed of civilian security guards working in Y security company from June 2016 to September 2016, and the subject is divided into two groups through random sampling: guard martial trained group(EG/20 people) and non trained group(CG/20 people). Originally 60 people participated in the research for each group early in the study, yet those who abandoned (EG/11 people, CG/14 people) were excluded so 40 people were selected for each group. The physical characteristics of the subjects are shown in <Table 1>.

Table 1. Physical characteristics of subjects.

M±SD

	Age(yrs)	Height(Cm)	Weight(Kg)	BMI(kg/m ²)
Exercise group (N=20)	20.23±3.22	176.43±5.42	68.86±8.83	21.82±2.84
Control group (N=20)	20.62±2.52	175.88±6.62	69.02±9.02	22.02±2.22

2.2. Measure and method

2.2.1. Task-related physical test

Task-Related physical ability is based on physical strength test of police officers, and the measurement variables are shown in <Table 2>.

Table 2. Task-related physical fitness test.

Items	Measuring tools	Manufacture company
Push-Up	DW-732E	Deawoo sports industry, (Seoul, Korea)
Sit-up	DW-731E	
Grasping power	DW-781	
100M running	DW-765E	
1000M running	DW-750A	

2.2.2. Gait ability examination

To examine functional gait Ability, 50M walking test was performed. 50M walking test is a method that can comprehensively assess basic mobility, balance and gait Ability, which measures stride and the time of walking 50 meters. Before and after the experiment, the test was performed 3 times right after each exercise and the average score was calculated.

2.3. Data process

For the data processing of the study, the mean and standard deviation of all collected data was calculated using SPSS 20.0(window statistical package), and for the significance test of before and after the experiment within the group, paired t-test was performed and for the significance test of before and after the experiment between the groups, independent sample t-test was performed. The significance level was $p < .05$ at this time.

3. Results

3.1. Change in task-related physical fitness

Changes in Task-Related physical fitness as a result of guard martial training are shown in <Table 3>. For the changes within the group of EG, statistically significant differences were found in all variables such as grip power of left hand($p=.000$), grip power of right hand($p=.000$), sit-up($p=.000$), push-up($p=.000$), 100m($p=.000$) and 1000m($p=.000$), and for the changes within the group of CG, statistically significant differences were not found in all variables. In addition, there was no statistically significant difference in all variables in the pre-test between the groups of trained and non trained group, yet in the post test, statistically significant differences were found in all physical variables such as grip power of left hand($p=.000$), grip power of right hand($p=.000$), sit-up($p=.000$), push-

up(p=.000), 100m(p=.021) and 1000m(p=.026).

Table 3. The change of task-related physical fitness M±SD.

Items		CG(n=20)			EG(n=20)			t**
		Pre	Post	t*	Pre	Post	t*	
Grasp- ing power	L	38.82±10.82	39.21±9.39	-0.337	40.18±9.28	49.72±8.22	-11.327+++	0.966a 8.228b+++
	R	41.68±9.66	41.32±9.22	0.274	41.36±8.62	56.02±6.88	-16.824+++	0.430a 10.017b+++
Sit-up		42.92±8.28	43.11±7.22	0.455	41.93±8.61	54.66±8.03	-14.429+++	-1.122a 9.166b+++
Push-Up		36.33±11.21	37.07±10.82	0.340	36.63±10.88	52.26±14.22	-21.002+++	0.039a 11.126b+++
100m running		13.88±0.95	13.91±0.89	0.126	13.83±0.76	13.42±0.51	4.887+++	0.105a -2.589b++
1000m running		4.82±0.58	4.72±0.51	-1.041	4.68±0.51	4.36±0.42	2.362++	-0.527a -2.424b++

Note: * Paired t-test between pre- and post-values in a group

** Independent sample t-test results between pre- and post-values in both groups

†, ††, and ††† mean P<0.05, P<0.01, and P<0.001, respectively.

3.2. The change in functional gait ability

Changes in functional gait ability as a result of guard martial training are shown in <Table 4>. For the changes in functional gait ability with in EG group, walking speed (p = .000) was statistically significantly decreased and the stride (p = .000) was statistically significantly increased. For the changes of functional gait ability within CG group, there was

no statistically significant difference in both of the walking speed and stride length. In addition, in the pre-test of functional gait ability as a result of guard martial training between the groups, there was no statistically significant difference in all variables, yet in the post-test, statistically significant differences were found in all physical variables such as the walking speed(p=.000) and stride length(p=.000).

Table 4. The change of gait ability.

M±SD

Items		CG(n=20)			EG(n=20)			t**
		Pre	Post	t*	Pre	Post	t*	
Gait velocity (sec)		36.63 ±6.48	36.48 ±6.36	0.170	37.77 ±6.19	33.92 ±4.96	-3.556†††	-1.004a 3.045b†††
Step length		46.76 ±8.55	47.09 ±7.28	-0.183	46.89 ±7.63	53.49 ±6.72	4.078†††	0.264a 3.875b†††

Note: * Paired t-test between pre- and post-values in a group

** Independent sample t-test results between pre- and post-values in both groups

†, ††, and ††† mean P<0.05, P<0.01, and P<0.001, respectively.

4. Discussion

As a result of comparing and analyzing the effects of the guard martial arts training on the Task-Related physical fitness and gait ability of 40 bodyguards(exercise group of 20 people, control group of 20 people), following discussion is made.

Although the physical strength is the physical ability that underlies and maintains human life, it can also be expressed in terms of athletic ability or work ability depending on the scenes of activity. Yet physical strength is defined in various ways depending on the scholars and times, and Seok[10] explains that physical strength does not simply indicate physical aspect but it is a comprehensive concept that includes all of physical, mental, social, and spiritual aspects and is the sum of all the abilities that are fundamental to human life. Although physical strength consists of behavioral strength, which is the strength required for activities, and defense strength, which is a physical strength that adapts to climate change and resists the invasion of germs, yet in the most studies, physical strength is assessed by cardiovascular endurance, body composition, strength, muscle endurance, flexibility, agility and so on[11].

In this study, in order to improve the chronic diseases of the private security guard and the degradation of the work efficiency due to excessive work stress and the deterioration of physical ability, 5 work related physical strength (grasping power, push-up, sit-up, 100m, 1000m) and 2 functional walking ability (walking speed and stride length) are measured.

Private private security guard work requires a high level of physical strength and strong physical strength enhances work efficiency of bodyguards so the exercise of private security guard are promoted lately[12], and the exercise of bodyguards not only promotes the health of the guards who are member of the organization, but also contributes to the security of the client's properties and safety, so guard martial and fitness promoting program for private security guard are actively progressed. It is reported that partici-

pating in sports activity is effectively improves depression and level of anxiety for private bodyguards, who protects the safety of client, and police officers, who protects safety of the people, and improves their performance and health as well[13]. In addition, the physical variables were higher for those who work outside than those who work in the office[14], and this is because they can participate in the physical management program easily due to the work environment. However, as a result of the long hour of standing or walking with poor posture, many bodyguards are suffering from neurological dysfunction and back pain, and most of them are chronic patients. This is consistent with the findings of this study that the guard martial arts training has an effect on improving the physical strength of the private security guard. Furthermore, this is also consistent with the study that the higher the participation of the bodyguards in the physical fitness program, the better the work efficiency and their physical fitness[15], and thus this supports that the guard martial arts training influences the work performance and physical strength of the private security guard. In addition, due to the characteristic of the work which requires long hours of standing or walking with poor posture, the number of patients of neurological dysfunction and back pain is increasing, and most of them are chronic back pain patients. This has been a factor that affects adversely on the private security guard who are walking or standing for a long time and hinders job performance. The guard martial arts training positively influenced functional walking ability in this study, and this is consistent with a research result of Jeong[16] on the effect of regular spinal stabilization exercise of private security guard on muscle function and gait ability, and this supports the research result that regular exercise helps to stabilize the body and is effective in improving back pain[17]. However, most private bodyguards are aware of the importance of physical fitness and the value of exercise, but they are not able to exercise as much due to the working environment. In addition, although health of private security guard are absolutely critical to the safety of client's property and per-

sonal safety, but they are suffering from various illnesses and injuries due to heavy work and stress. Considering these realities, it is needed to look into the actual exercise condition of the private security guard and to analyze how the exercise affects job performance.

All of these results suggest that the guard martial arts training is helpful for the occupation related fitness and functional walking ability of the private security guard, reduces the work stress of the private security guard, and reduces the incidence of metabolic syndrome and diseases from stress of modern people[18]. Yet the study about the effects of the exercise on job performance of the private security guard is very rare, and it is needed to develop a program that connects the physical strength of the private security guard and their job performance.

5. Conclusion

The purpose of the study was to find out the effects of the guard martial arts training on the Task-Related physical fitness and functional gait ability, and ensured the fact that the improvement of the Task-Related physical fitness and functional gait ability of the private security guard can be achieved through the guard martial training. In order to achieve the purpose of this study, 40 security guards working at the Y security company in S city were selected, and after observing the effect of the guard martial training on Task-Related physical fitness and functional gait ability, the results were as follows.

1. For the changes of Task-Related physical fitness with in group EG as a result of guard martial training, statistically significant differences were found in all variables such as grasping power of left hand, grasping power of right hand, sit-up, push-up, 100m and 1000m, and there was no statistically significant differences in all variables within CG group. In addition, there was no statistically significant difference in all variables in the pre-test between the groups, yet in the post test, statistically significant differences were found in all physical variables such as grip power of left hand, grip power of right hand, sit-up, push-up, 100m and 1000m.

2. For the changes in functional gait ability with in EG group, walking speed was statistically significantly decreased and the stride length was statistically significantly increased. There was no statistically significant differences in both walking speed and stride length within the CG group. In addition, in the pre-test of functional gait ability as a result of guard martial training between the groups, there was no statistically significant difference in all variables, yet in the post-test, statistically significant differences were found in all physical variables such as the walking speed and stride length. As a conclusion of the study, it is confirmed that the guard martial training is an effective exercise for Task-Related physical fitness and functional gait ability of security guards, and the improvement of health variables and the development of professional fitness training will lead to enhancement of job performance of private security guard.

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Lead Author

Park Jung-min / Chungnam National University Researcher
Professor

B.A. Yongin University
M.A. Yongin University
Ph.D. Chungnam National University

Research field

- Analysis of Ipsilateral and Bilateral Ratios in Male Amateur Golfers, *Journal of Exercise Rehabilitation*, 15(3) (2016).
- The Effects of Core Stability Exercises on the Balance Abilities of Archers, *Journal of Exercise Rehabilitation*, 1 (2016).

Major career

- 2014~2016. Emotion Development Center of Police Training Institute, Professor
- 2016~present. Department of Physical Education, Police Training Institute, Professor

Corresponding Author

Seo Dae-won / Howon University Professor

B.A. Kyungwoon University
M.A. Kyonggi University

Research field

- The Relationship between Business Corporation Team Taekwondo Players' Living Environmental Factors and Life Satisfaction and Athlete Satisfaction, *Journal of Korea Sport Society*, 12(4) (2014).
- Effects of Regular Taekwondo Poomsae Training on Physical Fitness and Balance Capability in Elementary School Children, *Journal of Sport and Leisure Studies*, 67 (2017).

Major career

- 1994~1997. Peru Taekwondo National, Head-Coach
- 2016~present. Howon University of Martial Arts & Guards, Professor

Co-Author

Kwon Tea-il / Daejeon Institute of Science and Technology
Professor

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

Research field

- Effects of Police Martial Arts Education on the Body Composition and Physical Fitness on Job Performance of Police Ability to Crime Respond in College Students Majoring Police, *International Journal of Martial Arts*, 1(2) (2016).
- Effects of Physical Fitness Rearing Education on the Task-Related Physical Fitness and Specific Physical Fitness of College Students Majoring Police in Korea, *International Journal of Sport*, 1(2) (2016).

Major career

- 2014~present. Korean Hapkido Federation, Director
- 2016~present. International Society for Martial Arts, Member

Publication state: Japan
ISSN: 2423-835X

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

Corresponding author
E-mail: kimpro@konkuk.ac.kr

Peer reviewer
E-mail: editor@j-institute.jp

<http://dx.doi.org/10.22471/martialarts.2017.2.1.34>

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Aqueous Extract from Fructus Mume Decreases NEUROINFLAMMATION

Park Won-man¹

Feel Cos Chem Co., Ltd, Seoul, Republic of Korea

Kim Ji-su^{2*}

Konkuk University, Seoul, Republic of Korea

Abstract

Lipopolysaccharide(LPS)-induced neuroinflammation is associated with the pathogenesis of Alzheimer's disease(AD), which is a key factor underlying the generation of amyloid beta. Requirements for therapies of neurodegenerative diseases such as AD are not only consistent efficacy for long periods, but also the elimination of potential risks for hepatotoxicity. Thus, this study aimed to evaluate the effect of Frunus mume water extract (FME) on LPS-induced hippocampal damage associated with inflammatory signals. ICR male mice(n=30) were divided into three groups. The normal group remained untreated, LPS group (positive control) was stimulated to express LPS-induced hippocampus damage, and FME group(treatment) was stimulated to express LPS-induced hippocampal damage and administered FME at 40 mg/kg/day. Mouse brain tissues were tested by hematoxylin and eosin staining and immunohistochemistry following inflammation markers such as tumor necrosis factor- α (TNF- α), inducible nitric oxide synthase(iNOS), and cyclooxygenase-2(COX-2). FME administered at 40 mg/kg/day for seven days in saline solution significantly reduced brain inflammation in the hippocampi of LPS-stimulated mice. Moreover, FME regulated the expression of inflammatory proteins such as TNF- α , iNOS and COX-2. Our data exhibits that FME attenuates neuroinflammation and damage in brains of LPS-stimulated mice. These findings suggest that FME is a potential therapeutic agent in treating neuroinflammation and recommend further testing on the matter.

[Keywords] *Frunus Mume, Crude Extract, Microglia, Neuroinflammation, Anti-Inflammation*

1. Introduction

Until now, the major cause of degenerative brain diseases such as Parkinson's disease, Huntington's disease, and Alzheimer's disease(AD), have been reported to be potentially incurable reasons such as the death of neuronal cells, synaptic failures, and abnormal neuronal transmission[1]. More specifically, AD is characterized by the accumulation of β -amyloid(A β) peptides in the brain, which play an important role in the pathogenic changes of the central nervous system(CNS) during A β -induced neurotoxicity[2].

Microglia in the CNS exists to prevent the brain from damage against infection and inflammation. Despite the essential processes microglial responses play for host defense, the excess production of its intermediated signal pathway by interleukin(IL)-1 β and tumor necrosis factor- α (TNF- α),—known as pro-inflammatory cytokines—can lead to the development of the chronic neurodegenerative diseases[3]. This lipopolysaccharide stimulation as a pathogenic infection leads to hyper-stimulated microglia[4]. A β accumulates through continuous or immoderate inflammatory responses of microglia. Therefore,

neuro-inflammation is one of the major contributors to the initial pathogenesis of AD[5][6].

Owing to this, the development of drugs for AD has been difficult because the initial neurodegeneration-related etiology is unknown. Many phytochemicals from herbs and fruits have been studied as potential medication for neuropathological disorders and have been considered traditional medicine[7]. Some studies have reported abundant phytochemical interventions, which have a minimal amount of side effects during long-term treatment[8]. Therefore, the phytochemistry studies should provide various opportunities for the development of drugs against neurodegenerative disease.

Fructus mume is a dry material from the unripe fruit of *Prunus mume*, which is traditionally used to treat digestive problems. Recently, Fructus mume has been reported to have an effect on the underlying mechanisms regarding inflammation of Lipopolysaccharide(LPS)-stimulated macrophages, the colitis model, and neurodegenerative models[9][10][11]. However, the effect of Fructus mume on the pathogenesis of neurodegeneration through the LPS-stimulated AD model has still not been investigated. Thus, in the present study, we explored the biological activity of Fructus mume in LPS-induced neuroinflammation in mouse brains.

2. Methods

2.1. Chemicals

Vectastain ABC Kits were purchased from Vector Laboratories(Burlingame, CA, USA). The following chemicals and antibodies were also used in this study: anti-TNF- α , anti-inducible nitric oxide synthase(iNOS), and anti-cyclooxygenase-2(COX-2) antibodies were purchased from Santa Cruz(Dallas, TX, USA), and LPS and all other reagents were purchased from Sigma(Saint Louis, MO, USA).

2.2. Design of experiments

We performed the histopathological assay to determine the neuroprotective effect of FME.

2.3. Procedure

2.3.1. Preparation of aqueous fructus mume extracts(FME)

One-hundred grams of Fructus mume were blended, and the crude powder was precipitated with 1000 mL of sterile deionized water at 100°C for 3 h. The aqueous extracts were concentrated by evaporation at 60°C in vacuum. The extract was dissolved in 50 mL of sterile deionized water. The aqueous extract was lyophilized at -60°C.

2.3.2. Animal care and in vivo test

Six-week-old male ICR mice were obtained from Orient Bio. Inc., Seoul, Korea. Prior to the experiments, all animals were allowed to acclimate to their new environment for one week at room temperature(24 \pm 2°C; humidity, 50 \pm 15%; 12:12-h light/dark cycle). All experiments and animal care were conducted in conformity with the institutional guidelines of the Konkuk University. The mice were housed individually in ventilated cages with ad libitum access to water and food under specific pathogen-free conditions. To test the anti-neuroinflammatory effect of FME, the animals were randomly divided into three different groups(n = 10 mice/group): normal (normal mice, untreated), LPS-treated(Positive control), and FME treated groups. FME (40 mg/kg/day in normal saline) was administered orally every day for 7 days at a regular schedule. Brain damage was induced by LPS (diluted in normal saline) for 7 days. LPS was administered by a single intraperitoneal injection at a dose of 250 μ g/kg, 1 h after the last FME treatment.

2.3.3. Tissue preparation and histochemical staining

Histochemical staining was performed as previously reported[12]. Briefly, the mice were anesthetized with sodium pentobarbital solution and killed 24 h after acetaminophen injection. Their livers were dissected out and fixed in 10% formalin for 24 h. The livers were embedded in paraffin and 6-mm-thick tissue sections were stained with hematoxylin-eosin

(H&E) stain. Some sections were used for cresyl violet staining for brain histological examination.

2.3.4. Immunohistochemical staining

Immunohistochemical staining was performed as previously reported[12]. Some of the prepared sections were used for immunostaining assays. Samples were treated with 3% H₂O₂ for 5 min to inactivate endogenous peroxidase, then blocked with 10% normal serum for 1 h at 25°C and incubated overnight at 4°C with primary antibodies against TNF- α , COX-2, and iNOS. The following day, the sections were washed and incubated with the corresponding secondary antibodies for 1 h at room temperature. The Vectastain ABC Kit was used to carry out the avidin-biotin complex interaction, in accordance with the manufacturer's instructions. Signal development was carried out in a substrate solution of 0.05% DAB, and the slides were counterstained with hematoxylin. The sample sections were examined using a light microscope (Olympus BX50, Japan) at 200 \times magnification and proteins were visualized and analyzed using the Image J Software.

2.3.5. Statistical analysis

The results are expressed as the mean \pm standard error(SE) of at least three independent experiments($n \geq 3$). The data of the differences were determined by using the t-test between the experimental two groups and one-way analysis of variance(ANOVA). Tukey's test was used for multiple comparisons(GraphPad Prism ver. 4.00 for Windows; San Diego, CA), and P-values < 0.05 were considered statistically significant.

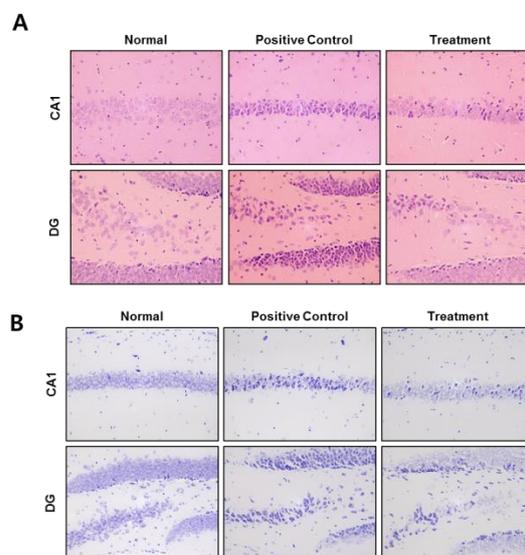
3. Results

3.1. The protective effect of FME on LPS-induced brain damage in mice

First, to examine the protective effect of FME against the LPS-induced brain damage, we histological analysis using H&E staining was performed. As shown in <Figure 1>A, tissue samples treated with LPS(i.p.; 250 μ g/kg) exhibited tissue atrophy with a dark violet color of the Cornu Ammonis area-1(CA1) and

the dentate gyrus(DG) regions in the hippocampus. In contrast, the FME(oral administration; 40 mg/kg) group showed a morphology similar to a normal hippocampus when compared to the untreated(normal) group. Next, a histological analysis using cresyl violet staining was performed. As shown in <Figure 1>B, FME significantly reduced the aggregate cell morphology on the CA1 and DG regions in the hippocampus of LPS-induced brain damage.

Figure 1. The effect of FME in LPS-induced brain injury in mice. The untreated group of animals was provided water only(Normal), one group of animals was treated with LPS(i.p. 250 μ g/kg)(Positive control), the other group was treated with LPS and 40 mg/kg of FME for 7 days(Treatment). The photomicrographs at a magnification of $\times 400$. These brain sections are stained with H&E(A) and cresyl violet(B). Upper panels indicate the Cornu Ammonis area-1(CA1) region and bottom panels indicate the dentate gyrus(DG) regions in mice brain.

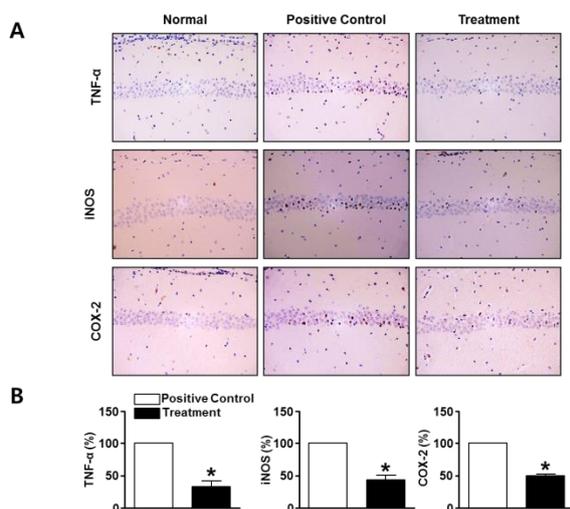


3.2. FME reduced the expression of TNF- α , iNOS and COX-2 in LPS-stimulated brain tissue in mice

Expression of inflammation-related signaling molecules such as TNF- α , iNOS and COX-2 in mice was studied as well. As shown in <Figure 2>, the expression levels of TNF- α , iNOS and COX-2 significantly increased in the injured tissue (positive control panels). An expression level of TNF- α , iNOS and COX-2 to

100% in the positive control group was observed. FME group decreased the each expression of 66% \pm 4.98% of TNF- α , 56.4% \pm 3.96% of iNOS, and 50.41% \pm 1.36% of COX-2, respectively when the compared with positive control group.

Figure 2. Expression of iNOS, COX2, and TNF- α in the Cornu Ammonis area-1(CA1) region of LPS-induced brain damage Immunohistochemical staining of iNOS, COX2, and TNF- α in liver tissue performed with cross-sections obtained from three groups. (A)The samples are photomicrographed at a magnification \times 400 (B)The expression levels of iNOS, COX-2, and TNF- α . Expression changes are relative to the LPS alone-treated group.



4. Discussion and Conclusion

Despite the noble efforts of the past decade, the medicine to cure or control diseases progression against the neurodegenerative disorders underlying AD has not progressed. It is a disease classified as “incurable,” its cause having not been fully elucidated. The inability to control AD may be due to the majority of medications being dependent only on the cholinergic hypothesis. For example, the reversible acetylcholinesterase inhibitor-dependent prescription makes up the majority of AD therapies[1].

However, the prescriptions of neurodegeneration treatment are required to be effective and safe for long periods. Western medicines are known to have a potentially undisclosed side effect. The results of the former

study suggest that the natural product of Fructus mume should be one of the candidates for AD prescription in the foundation of alternative medicine, reinforced by Kim et al[13]. who found the effectiveness of Fructus mume on a chronic cerebral hypoperfusion model. Moreover, Lee et al[11]. showed the effectiveness of Fructus mume on the chronic cerebral hypoperfusion-induced white matter and hippocampal damage. The regulatory effect of FME has not yet been evaluated in A β accumulated model.

The former study clearly demonstrates the anti-neuroinflammatory effect of FME in vivo. Particularly, Lee et al. reported that 250 mg kg of LPS induced brain damage by accumulating A β [4]. The study also showed that FME has an inhibitory effect on brain injury and neuroinflammation in an LPS-stimulated AD mouse model. FME can significantly regulate the TNF- α -related inflammation, and the administration of FME significantly diminished the LPS-induced the overexpressed COX-2 and iNOS. The results of the study suggest that FME may have regulated the accumulation of A β through anti-neuroinflammation. Hence, it can be reasonably suggested that Fructus mume should be one of the candidates of AD prescription.

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Extract Prevents Inflammation and Normalizes the Septohippocampal Cholinergic System in a Rat Model of Chronic Cerebral Hypoperfusion. *Journal of Medicinal Food*, 19, 196-204 (2016).

Lead Author

Park Won-man / FeelCosChem Co. Ltd Researcher
B.S. Kyungpook National University
M.A. Kyungpook National University
Ph.D. Kyungpook National University

Research field

- Proteomic Pattern-Based Identification of Molecular Phenotypes from Arabidopsis Thaliana Ecotypes, *Plant Science*, 177(1) (2009).
- Aqueous Extract from Fructus Mume Decreases Neuroinflammation, *International Journal of Martial Arts*, 2(1) (2017).

Major career

- 2017. FeelCosChem Co. Ltd, Researcher
- 2017~present. International Society for Sport Science, Member

Corresponding Author

Kim Ji-su / Konkuk University Professor
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(3), (2013).
- Silk Peptide Treatment Can Improve the Exercise Performance of Mice, *Journal of the International Society of Sports Nutrition*, 11(1) (2014).

Major career

- 2015~present. National Research Foundation of Korea, Researcher
- 2015~present. International Society for Sport Science, Member