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Corresponding author
E-mail: hyoungkeun.oh@hotmail.co.kr

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Current Status and Prospects of TAEKWONDO's Globalization

Oh Hyoung-keun^{1*}

Keimyung University, Daegu, Republic of Korea

Choi Seong-kon²

Keimyung University, Daegu, Republic of Korea

Abstract

As of 2018, as evidenced by 209 member states of the World Taekwondo Federation and 10,023,090 black belt holders, Taekwondo today is loved as a sport of the world beyond being Korea's traditional martial art. Together with the economic development, Korea has been able to utilize its position and honor as the originator country of Taekwondo for the last half century, and has continued to grow while strengthening its values and functions as an Olympic sport. However, the rapid growth of Taekwondo through sport has caused issues such as undermining the value of traditional martial art, and the need for qualitative growth such as the development of in depth related contents has emerged. This study examined the globalization process and the current status of Taekwondo, analyzed the current status of the Taekwondo's globalization project and Taekwondo's dissemination, and contemplated on the globalization and sustainable development of Taekwondo through it. As alternatives for the continued development and globalization of Taekwondo are, first, to maintain Taekwondo as an official Olympic game, second, to seek plans for long term trainers of Taekwondo, and third, systemic improvements for the globalization project of Taekwondo and other related policy.

[Keywords] *Taekwondo, Globalization of Taekwondo, Globalization of Sport, Globalization of Martial Art, Current Status of Taekwondo's Globalization*

1. Introduction

As of 2018, as evidenced by 209 member states of the World Taekwondo Federation and 10,023,090 black belt holders[1], Taekwondo today is loved as a sport of the world beyond being Korea's traditional martial art. Together with the economic development, Korea has been able to utilize its position and honor as the originator country of Taekwondo for the last half century, and has achieved technical and cultural development of Taekwondo around the 4 major institutions of Taekwondo classified into the Korea Taekwondo Association, Kukkiwon(World Taekwondo Headquarters), World Taekwondo Federation, and Taekwondo Promotion Foundation, while continuing the growth and enhancing the value and functions as a sport[2].

The Taekwondo Demonstration Team of Armed Forces' overseas demonstration in Vietnam in the 1950s was the first entry made overseas by Taekwondo, which may also be seen as the starting point of its globalization[3]. Ever since, Taekwondo's dissemination activities through the overseas entry of Korean leaders have provided opportunities to expand Taekwondo's foundation in each of the countries abroad. While the Korean wave, or Hallyu, has globalized beyond Asia around Korea's popular culture such as K-pop and TV dramas, the dissemination of Korean culture through Taekwondo in the 1950s may be deemed to be the origin of the Korean wave expanding across the world[4].

Furthermore, Taekwondo was chosen as an official event for the Olympic Games since the

Sydney 2000 Summer Olympic Games, which turned out to be an important occasion for Taekwondo to become a cornerstone for the globalization of Taekwondo. This may be said to be a new great leap which Taekwondo proposed as a sporting event[5]. Examining the results of the previous Olympic Games, it can be seen that the rate of medal acquisition relative to the number of participating countries has standardized, such as reaching approximately 35% since the Beijing 2008 Summer Olympic Games. In particular, Gabon of Africa attained the first Olympic medal in the history of Gabon by Anthony Obame's winning a silver medal in the men's 80kg category at the London Olympic Games in 2012, and in 2016, during the Rio Olympic Games, developing countries such as Cote d'Ivoire, Nigeria and Azerbaijan acquired medals, demonstrating that it is not a sport which only a few countries dominate for medals, but for all as a global sport[6].

However, it has been noted that as Taekwondo accelerates sporting around the Olympic Games, side effects such as the deterioration of traditional Korean martial art's values are occurring. That is, Taekwondo, which is centered around sport techniques, is prioritized and its original value is fading away, and it is necessary to continuously improve the excellence of Taekwondo's unique spirit, philosophy and functions. According to the research results of the "Development of Taekwondo's Top 10 Cultural Contents," Taekwondo has achieved a quantitative growth such as training of 100 million people across 20,000 Taekwondo clubs around the world, but it was proposed that it is necessary to achieve qualitative growth such as job creation and in deep contents development of high quality.

As such, Taekwondo compensates for the side effects that have arisen during its rapid development, and the importance of qualitative growth has emerged beyond its quantitative growth. Accordingly, this study examines the globalization process and the current status of Taekwondo, analyzes the current status of Taekwondo's globalization project and Taekwondo's dissemination, through which, it offers recommendations for the globalization and sustainable development of Taekwondo.

2. Process and Significance of Taekwondo's Globalization

In 1959, Choi Hong-Hee led the Taekwondo Demonstration Team of Armed Forces and offered demonstrations in Vietnam and Taiwan, among other locations, which may be said to be the first overseas demonstrations of Taekwondo and the starting point for its globalization[3]. Starting with the first overseas activities of the armed forces, the Korean Taekwondo instructors disseminated Taekwondo to local people across the world, through which Taekwondo's overseas activities have expanded[7].

Choi Hong-Hee supported the founding of Taekwondo associations such as Malaysia, Singapore, and Italy for the internationalization of Taekwondo and laid out the foundation for its overseas entries, and after inaugurating in 1965 as the chairman of Taekwondo associations, renamed the Korea Taesodo Association to the Korea Taekwondo Association[8]. And on March 22, he founded the International Taekwondo Federation(ITF) after obtaining the consent of Vietnam, Malaysia and the United States.

At the end of 1960, the Korea Taekwondo Association confronted the ITF due to the promotion test of overseas trainees and the competition rules, and accordingly, the Korea Taekwondo Association integrated various factions at the time and founded Kukkiwon, thereby implementing a globalization strategy around sport Taekwondo as a sport differentiated from the ITF[9].

Thereafter, after the World Taekwondo Federation was founded in 1973, it became the first Asian martial art to join the General Assembly of International Sports Federation(GAISF) in 1976, and at the 103rd IOC General Assembly held in Paris in September 1994, it was recognized as a global sport by being chosen as an official event for the Sydney 2000 Summer Olympics[10].

As such, as Taekwondo played a central role in the globalization of Taekwondo, various changes surfaced, and its being a different martial art from Karate of Japan and through sport organization, it provided an opportunity for the organizational connection for Taekwondo practitioners from various countries. Furthermore, a significant technological development was

achieved, and while the early Taekwondo emphasized the combat aspect and martial art aspect around poomsae training, the sport Taekwondo emphasized the spectacular kicking techniques and sparring, thereby breaking away from the standardized form of the past and developing diverse techniques[9].

Song[11] claimed that Taekwondo's globalization process may be divided into the 3 stages of the 1st globalization process through which the ITF was founded around Choi Hong-Hee in the 1960s and Taekwondo began to be introduced by the Taekwondo Demonstration Team of Armed Forces' offering demonstration tour in Southeast Asia, the 2nd globalization process through which the World Taekwondo Federation was founded and the sport Taekwondo grew into a global sport, and the 3rd globalization process through which efforts to enable Taekwondo to be chosen as an official event for the Olympic Games were made in and after the 1980s.

In the related previous studies, the factors that enabled Taekwondo to achieve globalization were classified into the performance results of the Korean Taekwondo instructors in disseminating Taekwondo, proactive support of the Korean government, technical features of Taekwondo highly advanced around kicking techniques and sparring, globalization progressed around sport, and systematization of Taekwondo organization, among others[12][13].

Meanwhile, Song[12] pointed out that the existing studies on the success factors of Taekwondo's globalization are limited to identifying such external factors as the dedication of the Taekwondo instruction stationed overseas, roles and activities of Taekwondo related organizations, and the proactive support of the Korean government, and clarified Taekwondo's own strengths and features as follows. In addition, he claimed that Taekwondo's strength and unique points from the view of invasion biological perspective. Taekwondo is a cultural phenomenon which is well equipped with such cultural characteristics of 'uniqueness' and 'essential diversity' relative to other martial arts. Taekwondo techniques are unique in that they are faster and more dynamic than other martial arts, which gained dynamism by breaking away from the routines accepted to be natural in the existing

martial arts. Furthermore, Taekwondo is equipped with the essential diversity to satisfy the various needs of the environment, and the main reason for being equipped with the essential diversity is the weak tradition, he claimed. A strong tradition makes a cultural phenomenon closed, whereas a weak tradition makes it open.

Therefore, by maintaining the openness, it absorbed the heterogeneous factors, that is, the areas irrelevant to Taekwondo and branched out into variations, and such uniqueness of techniques and essential diversity were said to be the key factor which facilitated the successful globalization of Taekwondo.

It may be that the performance achievements of Taekwondo through globalization were made possible across various aspects such as society, culture, and diplomacy. Yoon[14] claimed that Taekwondo's diplomatic performance achievement for Korea attributes to, first, the acquisition of civil and diplomatic efficacy of building a Korea friendly human network, second, natural dissemination of Korean traditions and norms through the process of training Taekwondo following the achievements of propagating traditional Korean culture, and third, as performance achievements in the economic and diplomatic aspects, manpower exports of capital, exports of supplies and gears, to profit from the belt promotion test, and the effects of tourist resources, among others.

3. Korea's Taekwondo Globalization Projects

As such, Taekwondo, which is Korea traditional martial art, is recognized as a key asset contributing to enhance the national brand image of Korea as the originator of a global sport, and Korean government is promoting and supporting the globalization of Taekwondo through various projects. As illustrated in <Table 1>, it is apparent that the current status of the allocation of budget for Taekwondo's globalization project for the recent 3 years as of 2017 indicates that it is continuously increasing to 7,020 million won in 2015, 8,602 million won in 2016 and 9,900 million won in 2017, respectively.

Table 1. Changes and trends in the project budget for Taekwondo's Globalization[15].

Year	2015	2016	2017
Amount	7,020 million won	8,602 million won	9,900 million won

Examining the Taekwondo's globalization projects in progress, various projects are operated, such as the overseas dispatch of Taekwondo instructors, education of foreigners residing in Korea, and the support for Taekwondo related events, and they are being carried out to help strengthen the sports diplomacy through the dissemination and facilitation of Taekwondo overseas and for building base for expanding the Korean wave[15].

Examining the amount of budget allocated to each project, the order is 3,650 million won for dispatching Taekwondo instructors, 2,200 million won for operating demonstration teams and dispatching them overseas, 2,000 million won for dispatching Taekwondo volunteer corps overseas, etc., indicating that the Taekwondo's globalization projects are implemented primarily around the overseas dispatch projects. The budget for the globalization of Taekwondo for each project is illustrated in <Table 2>.

Table 2. Current status on the budget allocation for each globalization project of Taekwondo[15].

Classification	Allocated amount of budget (million won)
Dispatch of Taekwondo instructors	3,650
Operation of Taekwondo demonstration team and overseas dispatch	2,200
Overseas Dispatch of Taekwondo Volunteer Corps	2,000
Overseas facilitation project of Taekwondo (Implemented by diplomatic offices in each country)	750
Taekwondo training for foreigners residing in Korea	400
The world Taekwondo cultural festival	400
Globalization of Taekwondo's Poomsae	500
Total	9,900

4. Current Status on the Dissemination of Taekwondo

As of 2017, there are 209 members of the World Taekwondo Federation, and examining in terms of continents, the order turned out to be Africa(52 countries), Europe(50 countries), Pan America(45 countries), Asia(43 countries) and Oceania(19 countries), respectively. <Table 3> illustrates the current status of the World Taekwondo Federation for each continent.

Table 3. Current status of the member states of the world Taekwondo federation[16].

Classification	Number of member states
Asia	43
Europe	50
Pan America	45
Africa	52
Oceania	19
Total	209

Examining the current status of the black and poom belt holders across the world, as of 2018, there are total of 5,069,051 people, of which a total of 4,954,039 people are black belt holders. Accordingly, a total of 10,023,090 people have been gathered to be black belt holders across the world, whose details are illustrated in <Table 4>.

Table 4. Current status of the black belt holders domestic and abroad[1].

Classification	No. of black and poom belt holders
1 poom	2,562,854
2 poom	1,668,386
3 poom	689,010
4 poom	148,801
Subtotal	5,069,051
1 dan	3,862,234
2 dan	566,467
3 dan	320,578
4 dan	142,939
5 dan	42,376

6 dan	11,304
7 dan	5,291
8 dan	1,925
9 dan	925
Subtotal	4,954,039
Total	10,023,090

5. Discussion

Taekwondo is a martial art of Korea which has succeeded in globalization and is recognized as a major asset contributing to enhance the national brand image of Korea as its originator, and Korea is promoting and supporting the globalization of Taekwondo through various projects at the national level. However, the rapid growth of Taekwondo through sport event has caused issues such as undermining its value as a traditional martial art.

Among the factors which threaten the globalization and sustainable development of Taekwondo are the expanding tendency of the population training Taekwondo to be lower aged and the controversies about the identity of Taekwondo being weakened as a martial art as the sport Taekwondo grew to be mainstream, weakening of the pivotal significance as the mother country of Taekwondo in the globalization and localization processes of Taekwondo, and the emergence of similar martial arts as competing events[17]. The countermeasures for these are as follows.

First is maintenance of Taekwondo as an official event for the Olympic Games. If Taekwondo no longer maintains its status as an official event for the Olympic Games, it will not only deteriorate as an elite sport representing Korea but will also affect the survival of Taekwondo clubs which have entered into various corners of the world, ultimately resulting in a contraction of Taekwondo, and furthermore, such could lead to weakening Korea's position as the originator of Taekwondo and the power of sports diplomacy[10]. Maintaining Taekwondo as the Olympic Games will enable not only the development of Taekwondo as a sport, but also the continued

growth of Taekwondo by building the globalization for it, among others[6].

Second is a measure for increasing the number of long-term Taekwondo trainers. Examining the current status of the black and poom belt holders across the world, as of 2018, there are a total of 10,023,090 people in the world, among which a total of 6,425,088 people hold 1st poom and 1st dan, who comprise 64% of the total poom and black belt holders. That is, when the majority acquire 1st poom and 1st dan, they seem to quit Taekwondo training, which is attributable to the lack of programs for the higher dan holders. Accordingly, continuous training and development of appropriate contents for higher level belt holders will be a way to help increase the number of Taekwondo's long-term practitioners.

Third is the improvement of related policies and systems such as Taekwondo's globalization projects. The Taekwondo's promotion projects of Korea are operated for the development and promotion of Taekwondo at the national level pursuant to Article 18 of the National Sports Promotion Act and Article 8 of the Act on the Promotion of Taekwondo and Creation of Taekwondo Park, and strategic projects have been unfolded for the purposes of enhancing the status of Taekwondo's originator country and consolidating the basis for the maintenance of Taekwondo as an official event for the Olympic Games through fostering global talents for Taekwondo and disseminating Korean culture overseas through Taekwondo and supporting the construction of Taekwondo systems within developing countries[15]. The ineffectiveness of the "Act on the Promotion of Taekwondo and Creation of Taekwondo Park" is an issue for Taekwondo related policies and systems[2].

The direction of Taekwondo's promotion related laws should be presenting various support policies for the promotion of Taekwondo domestic and abroad and directions for the related projects, yet they are limited to supporting the activities of Taekwondo related organizations overall. Accordingly, matters to consider at the policy level for resolving current issues facing Taekwondo are, first, the need to supplement the Act on the Promotion of Taekwondo and Creation of Taekwondo Park, second, the need for the harmonization of Taekwondo leaders by

generation, third, the need to strengthen support measures for the universalization of Taekwondo clubs and Taekwondo, and fourth, the need to strengthen support measures for facilitating industries related to Taekwondo[2].

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Lead Author

Oh Hyoung-keun / Keimyung University Lecturer
 B.A. Keimyung University
 M.A. Russian International Olympic University
 Ph.D. Keimyung University

Research field

- Ethical Issues Confronting Korean Sport Organizations, *International Journal of Sport*, 3(1) (2018).
- Uses of Taekwondo in Strategies for Improving Korea's International Development Cooperation Projects, Keimyung University, Doctoral Thesis (2018).

Major career

- 2013~present. Gyeongju University, Lecturer
- 2018~present. Keimyung University, Lecturer

Corresponding Author

Choi Seong-kon / Keimyung University Professor
 B.A. Kyungpook National University
 M.A. Keimyung University
 Ph.D. Hiroshima University

Research field

- About the Adverbial Functions of Japanese Onomatopoeia, *日本語文學*, 31 (2005).
- About Martial Art Education Organization of Korea · Japan School Curriculum Comparative Study, *日本語文學*, 53 (2011).

Major career

- 2002~present. Keimyung University, Professor
- 2016~present. International Society for Crisis & Safety, Vice President

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Corresponding author
E-mail: mine7728@hanmail.net

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Effects of Combined EXERCISE Training on Obesity Indices and VEGF and Endothelin-1 in Obese Middle-Aged Women

Park Jung-min¹

Chungnam National University, Daejeon, Republic of Korea

Park Sang-kyun²

Chungnam National University, Daejeon, Republic of Korea

Lee Myung-sun^{3*}

Chungnam National University, Daejeon, Republic of Korea

Abstract

The purpose of this study was to examine the effects of combined exercise training for 16 weeks on obesity indices and artery intima media thickness and cardiovascular risk factors in obese middle-aged women. The subjects of this study were obese middle-aged women of 45-48 years old. They were divided into a control group(n=17) and a combined exercise group(n=14). In the combined exercise group, a combined exercise consisting of walking and resistance exercise for 16 weeks has been conducted. The results showed that there was no significant difference of change in the BMI but WHR was significantly decreased in the combined exercise group compared to the control group. VEGF levels were significantly increased after the exercise in the combined exercise group compared to before the exercise. Endothelin-1 levels were significantly decreased after the exercise in the combined exercise group compared to before the exercise.

[Keywords] Training, Combined Exercise, VEGF, Endothelin-1, Women

1. Introduction

In Obesity is the excess accumulation of body fat, resulting in various diseases, structural and functional changes of vessels such as vascular wall thickening, vascular flexibility reducing, and abnormal vascular endothelial cell[1]. Also increases the risk of cardiovascular disease, prevalence of chronic diseases such as hypertension, diabetes, cerebrovascular disease, cardiovascular disease.

In Korea, cerebrovascular and cardiovascular diseases are high risk and major causes of death. According to the National Statistical Office, 25% of all deaths in 2010 were reported to be brain vessel disease and cardiovascular disease, ranking second among the causes of all deaths and ranking first among the causes of deaths by single illness[2].

The vascular endothelial growth factor(VEGF) is a potent creating blood vessel

factor in obesity associated with fat tissue reproduce[3]. The increase in blood triglycerides(TG) is reported to cause disorders in vascular endothelial cell, causing ischemic cerebral blood vessel disease and cardiovascular disease[4].

Endothelin(ET-1) is produced in vascular endothelial cell. However, it is confirmed that ET-1 receptor is not only in a smooth muscle but also in other many tissues and cells. Heart cells and endothelial cells produce ET-1 which causes contraction of blood vessel and heart thickening[5]. ET-1 levels of the heart tissue increase significantly in cardiovascular disorders such as myocardial infarction and cardiac insufficiency[6].

Therefore, this study aims to provide basic data for preventing and eliminating obesity in middle-aged women by presenting the need of complex exercise program for preventing and managing cardiovascular disorders among complications which is a complication

caused by obesity, by studying the effects of complex exercise program on plasma VEGF and ET-1 of middle-aged women with obesity.

2. Materials and methods

2.1. Subject of study

The study participants were obese middle-aged women aged 45 to 48 years old in K city, who have not participated in a program with a planned exercise program in the past 12 months with a body mass index of more than 26 kg/m², the ratio of waist and hips of more than 0.8, and were categorized into complex exercise group(EG/20 people) and non-training group(CG/20 people). In the beginning, 20 people took part in the exercise group, but 6 people gave up because of their personal illness and suspension of exercise, and 3 people gave up in the control group. Their physical traits of participants are shown in <Table 1>.

Table 1. The physical characteristics of subject.

Items	N	Age (Years)	Height (Cm)	Weight (Kg)	BMI (kg/m ²)	WHR (%)
Exercise group	14	47.12±1.25	163.21±2.23	66.13±2.14	26.70±0.47	0.87±1.01
Control group	17	47.38±1.88	162.93±1.79	67.12±2.18	26.78±0.41	0.87±0.01

Note: Value are mean±SD.

2.2. Exercise program

2.2.1. Walking exercise program

Aerobic exercise program uses the methods of Kim Hyung-Don et al[7]. Performed on the treadmill for 45 to 70 % HRmax of the recommended American Sport Medical Association[8], 4 times in a week for 16 weeks. The specific walking exercises are shown in <Table 2>.

Table 2. Walking exercise program.

Items	1 week	2-4 week	5-8 week	9-12 week	13-16 week
Exercise	Walking	Walking	Walking	Walking	Walking
Speed (km/h)	4-5	5.5	6	6.5	7
Stage	0	1	2	3	4
Time (min)	40	45	50	55	60
Frequency (day/week)	4	4	4	4	4
Intensity (bpm)	45~50% HRmax	51~55% HRmax	56~60% HRmax	61~65% HRmax	66~70% HRmax

2.2.2. Resistance exercise program

Resistance exercise program(chest press, lat pull down, shoulder press, leg curl, leg extension) uses the methods of Hur sun[9]. After completing the Walking exercise, the resistance exercise program performed 4 times in a week for 16 weeks. In order to measure 1RM, the participants were selected mass to perform repetitive exercise which exercise of 7 to 8 times in each event. At this time, 1RM was calculated with the weight and number of repetitions applied. The intensity of the exercise was 50 % of 1RM for the 1st to 6th weeks. Rest time between each event was 30 seconds, and the rest time between each set was 60 seconds. The exercise ability was evaluated every 5 weeks to readjust exercise time and exercise intensity. Specific resistance programs are shown in <Table 3>.

Table 3. Resistance exercise program.

Items	1-5 weeks	6-10 weeks	11-16 weeks
1RM(%)	50	55	60
Repetition	10-15	10-15	10-15
Set	2	3	3
Time(min)	20	25	30

2.3. Measure and method

2.3.1. BMI

Measurements of body mass index were used by Inbody(Biospace Co., Seoul, Korea). After participants held an erect posture that spread arms and legs slightly on measured positions barefoot. And held the electrode

handle, then analyzed body mass index in order to the measurement sequence. BMI was used in this study.

2.3.2. WHR

Measurements of the waist measurement and hip circumference were measured with a tapeline. Based on WHO criteria, it was measured in a standing posture that breathe calmly. Waist measurement was measured the middle section of the lowest rib and crista iliaca(navel). Hip circumference was measured by the most prominent area. The waist to hip ratio(WHR) was obtained using the formula to calculate the abdominal obesity rate.

2.3.3. VEGF concentration in plasma

Immediately after blood collection, VEGF concentration was measured by 3000rpm centrifugation at 4 °C for 5minutes and analyzed by human ELISA kit(enzyme-linked immunosorbent assay, ELISA, R&D systems minneapolis, USA) which include Monoclonal VEGF Antibody. The unit was made of pg/l.

2.3.4. Endothelin-1 concentration in plasma

ET-1 concentration in plasma was analyzed by Sandwich enzyme-linked immunosorbent assay(Sandwich ELISA). At first, target antibody(mouse polyclonal antibody; abnova, USA) diluted coating buffer(100 mM NaHCO₃ + 0.02 % NaCO₃, pH 9.6) with 1:500. After putting 50ul into each well, let them to 96 well plate(corning incorporated, USA) at 4 °C for 12hours, then washed them 4 times with 200ul buffer(0.05 % PBST). Then after adding 100ul blocking buffer(1 % BSA in PBS), let them at 37 °C for 2hours. Then after adding 50ul standard solution(sigma-aldrich, USA) and 50ul at 37 °C for 1hours, then washed them 4 times. After detection antibody(rabbit polyclonal antibody; abnova, USA) diluted PBS with 1:1000, putting 50ul into each well at 37 °C for 2hours. Then washed 4times. After anti-rabbit IgG HRP(Dako, USA) diluted PBS with 1:3, putting 50ul into each well at 37 °C for 90minutes. Then washed 4times. After substrate solution(Tetra methyl benzidine; TMB, usb, USA) putting 50ul into each well at

37 °C for 30 minutes in darkroom. After adding 50ul stop solution(2NH₂ SO₄; Junsei chemical, Japan), measured at 450nm absorbance.

2.4. Data process

The data of this study has been processed with SPSS 20.0 program. After calculating average and standard deviation of all collected data, analysed for interaction between group and measurement timing by two-way repeated measures(ANOVA). The p-value less than 0.05 was taken as significant.

3. Results

3.1. The change of obesity index

The change in body composition according to balance training and stretching training are shown in <Table 4>. Weights decreased both pre-training and post-training in balance training and stretching training, but was not shown a significant change statistically. BMI and WHR increased both pre-training and post-training, but were not shown a significant change statistically.

Table 4. The changes of obese index.

Item	Control group(n=17)		Exercise group(n=14)		F	P-value
	Pre	Post	Pre	Post		
BMI (kg/m ²)	26.78±0.41	26.89±0.44	26.70±0.47	26.01±0.58	23.833	<.001 ^a
					44.141	<.001 ^b
					8.768	=.060 ^c
					30.516	<.001 ^a
WHR	0.87±0.01	0.88±0.01	0.87±0.01	0.82±0.02	57.450	<.001 ^b
					23.181	<.001 ^c

3.2. The change of VEGF

After 16 weeks of complex exercise, the change of VEGF is as shown in <Table 5>. VEGF of exercise group increased significantly, VEGF of time and time group were shown a significant difference statistically(p<.05).

Table 5. The changes of VEGF levels.

Item	Control group(n=17)		Exercise group(n=14)		F	P-value
	Pre	Post	Pre	Post		
VE	44.72±	44.59±	44.56±	45.55±	16.8	<.001 ^a
GF	1.11	1.16	1.07	1.39	29.2	<.001 ^b
					18	=.35
					.898	1 ^c

3.2. The change of VEGF

After 16 weeks of complex exercise, the change of ET-1 is as shown in <Table 6>. ET-1 of exercise timing group decreased significantly. In particular, ET-1 of time and time group were shown a significant difference statistically($p<.05$).

Table 6. The changes of endothelin levels.

Item	Control group(n=17)		Exercise group(n=14)		F	P-value
	Pre	Post	Pre	Post		
En-					38.7	<.001 ^a
do-	1.74±0.	1.75±0.	1.75±0.	1.67±0.	78	<.001 ^b
thel	03	03	04	04	56.5	=.01
in					6.65	5 ^c
					6	

4. Discussion

Obesity causes multiple complications. In particular, there is a lot of research in the cardiovascular system, and studies have been conducted in various fields to prevent.

The study was conducted to demonstrate the need for a complex exercise to prevent and control cardiovascular disease among many complications caused by obesity. In order to achieve this goal, after we conducted a complex exercise in obese middle-aged women, and observed VEGF and Endothelin of Cardiovascular risk factor. As a result, effect of complex exercise was shown improvement in the obesity index and plasma therapy and Endothelin.

Obesity is a major risk factor for cardiovascular disease, cerebral stroke, diabetes, hypertension, hyperlipidemia, musculoskeletal system disorder, cancer, and serious threats

to national health. Because Obesity and ischemic heart disease are the most significant factor in obesity, the importance of obesity management is very large for chronic diseases prevention and health promotion[10]. In this study, measured and compared BMI and WHR to observe effect of complex exercise on obesity. As a result, complex exercise group showed that decreased BMI and WHR, making it a suitable exercise for obesity. These results are consistent with research which 10 weeks of aerobic exercise(Tae-bo) improved BMI and WHR of overweight women by Mathunjwa et al[11]. In addition, with these changes, this study observed the change of plasma VEGF and Endothelin among many cardiovascular risk factors to determine whether the complex exercise improve in cardiovascular risk factors caused by obesity.

VEGF is a factor that creates a strong vein[12], which help permeability of blood vessels and promotes angiogenesis[13]. The report showed that caused vasovaglion disorder from lack of VEGF in rat's skeletal muscle[14]. Regular exercise induces adaptive of skeletal muscles. Repeated muscle contractions increase the blood flow rate and shear forces by arteriolar expansion[15]. Capillary density increased by microcirculation increase[16]. VEGF is reported to play a very important role in changes of capillary blood vessels due to exercise or training[17]. Similar to this prior study, complex exercise in this study also contributed to the increase in the growth factor of VEGF.

Endothelin, a substance that has a strong contraction effect, was first discovered in the main artery of the pig's aorta in 1988[18]. It is peptide that contract blood vessel and consist of 21 amino acid[19]. Up to now, there are three types(ET-1, ET-2, ET-3) of mammals that include humans. They are expressed separately by individual genes and exhibit unique organizational distribution patterns[20]. Among them, ET-1, strong factor, is the only Endothelin that has been separated from the human blood cell, and has been known to be secreted from vascular endothelial cell[21]. The eight weeks of aerobic exercise aimed at healthy adults reported that the effects of ET-1 decrease and nitrogen oxide(NOx) increase

had a positive effect on blood vessel relaxation and antiatherogenic. In 2003, when regular aerobic exercise was conducted to senior for three months, ET-1 decreased significantly[22]. In addition, ET-1 has also had to do with exercise time, whereas ET-1 has not decreased in exercise for less than 30 minutes, but decrease in more than 30 minutes[23]. Concentration of coronary artery patients is higher than normal significantly. When the elderly woman with normal blood pressure conducted an aerobic workout for 12 weeks, ET-1 and blood pressure decreased significantly. NOx increased, but were not shown a significant difference statistically[24]. After 12 weeks of aerobic exercise for adult smokers, the blood NOx increased and ET-1 decreased. As a result, this study found that complex exercise effect on blood NOx increase and ET-1 decrease[25].

5. Conclusion

This study was conducted to demonstrate the need for a complex exercise to prevent and control cardiovascular disease among many complications caused by obesity. To accomplish this goal, 40 obese middle-aged women performed complex exercise for 16 weeks, and The following conclusion was drawn after observing the BMI, carotid intima-media thickness, and Cardiovascular risk factor.

1. After complex exercise program, The change in BMI and WHR of obese middle-aged women decreased significantly($p < .05$).

2. After complex exercise program, The change in VEGF of obese middle-aged women increased significantly($p < .05$).

3. After complex exercise program, The change in ET-1 of exercise group increased significantly($p < .05$).

In conclusion, it is found to be true that complex training is an effective way of exercise for obesity improvement, vascular endothelial cell function and ET-1 decrease. However, it is expected to require more research on various forms of exercise to improve the cardiovascular disease resulting from obesity.

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Lead Author

Park Jung-min / Hannam 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, 12(2) (2016).

- The Effects of Core Stability Exercises on the Balance Abilities of Archers, Journal of Exercise Rehabilitation, 12(6) (2016).

Major career

- 2014~2016. Chungnam National University, Researcher Professor

- 2016~present. Hannam University, Researcher Professor

Corresponding Author

Park Sang-kyun / Chungnam National University Post-Doc.

B.A. Chungnam National University

M.A. Chungnam National University

Ph.D. Chungnam National University

Research field

- The Effects of Drug Treatment and Vestibular Rehabilitation Exercise for Pains, Dizziness and Balancing Capabilities of Middle-aged Women with Migraine Related Vertigo (2017).

- 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, Researcher

- 2017~present. International Society for Martial Arts, Member

Co-Author

Lee Myung-sun / Chungnam National University Post-Doc

B.A. Chungnam National University

M.A. Chungnam National University

Research field

- Effects of Naegong-chesool Exercise on Physical Fitness and Balance Abilities in Male Elderly, International Journal of Sport, 3(2) (2018).

Major career

- 2013~present. Chungnam National University, Researcher

- 2018~present. International Society for Martial Arts, Member

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Corresponding author
E-mail: jsilove75@hanmail.net

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Effect of the KOREAN Adult TAEKWONDO Trainees' Physical Self Efficacy on the Quality of Life

Park Su-ul¹

Kyungwoon University, Gumi, Republic of Korea

Jeang Soon-il^{2*}

Donggeui University, Pusan, Republic of Korea

Abstract

This study was begun to help facilitate adult Taekwondo as part of the blue ocean strategy in the face of the declining number of Taekwondo trainees in Taekwondo studios in Korea. The adult Taekwondo is a task which needs to be improved in order to overcome the deterioration of the management of Taekwondo studios while enhancing the status of Taekwondo by diversification of trainee classes.

Previous studies for facilitating the adult Taekwondo to date have focused on the development of adult Taekwondo training programs and diverse marketing strategies, yet lack studies on the academic approaches to the trainees' behavioral characteristics such as the effect and value of the adult Taekwondo training.

Examining the previous studies on the physical self-efficacy of the participants in various sports, there are implications that there is a relationship between the physical efficacy and the quality of life.

Accordingly, the purpose of this study is to analyze the effect of the physical self-efficacy of adult Taekwondo trainees on the quality of life at the present point in time when the roles of physical recreational activities are diversely expanding, verify the value and effect of Taekwondo training as a recreational activity for adults, and provide the foundational data necessary for facilitating adult Taekwondo along with building a theoretical framework for the practical areas for the adults' participation in Taekwondo training.

To this end, we have collected data of 300 copies on Taekwondo trainees of age 19 or older residing in Daegu and Gyeongbu regions of the Republic of Korea as of 2018, and the final 209 copies of data were used for the actual analysis. As for the data processing method, SPSS 22.0 statistical program was used to perform the frequency analysis, exploratory factor analysis, reliability analysis, correlation analysis and the multiple regression analysis, respectively, to arrive at the following results.

First, physical attractiveness among the physical self-efficacies was found to have a positive influence on the family's cohesion and changes of life among the subfactors of the quality of life.

Second, physical confidence among the physical self efficacies was found to have a positive influence on the sense of self, family's cohesion, and changes of life among the subfactors of the quality of life.

Third, physical strength among the physical self-efficacies was found to have a positive influence on the sense of self among the subfactors of the quality of life.

That is, a continuous Taekwondo training induces positive changes in the physical self-efficacy for adults, whereby more positive results for their bodies can be expected. Accordingly, it helps to produce a healthy body and realize self in a balanced manner based on the effects of the health maintenance and fitness improvement, thereby implying that the desire for the quality of a happy life within daily life can be raised.

[Keywords] Taekwondo, Adult Taekwondo, Trainee, Physical Self-Efficacy, Quality of Life

1. Introduction

Taekwondo represents a unique Korean martial art and currently has over 80 million people in 209 countries practicing it while growing into a physical culture loved by people across the world beyond race, ideology and religion[1]. It has been recognized as an internationally recognized sport by being formulated in the Republic of Korea and adopted as a formal game for the Asian Games and Olympic Games[2].

In particular, Taekwondo was enacted as a national sport of the Republic of Korea on March 30, 2018, and was selected as one of the three major brands of the Republic of Korea, along with Hangeul and Arirang, and grew into a representative culture symbolizing the traditional culture of the Republic of Korea.

It may be said that the role of Taekwondo studios in the background of the quantitative growth of Taekwondo is quite large. However, the current Taekwondo studios in Korea are faced with such difficult environments as low fertility, aging, and low age of the trainee classes. If the phenomenon of the sudden decline of Taekwondo studio trainees should continue as in the present, the foundation of Taekwondo of the Republic of Korea may run into a serious crisis[3].

As such, facilitation of adult Taekwondo has emerged as a means to overcome the deterioration of management of Taekwondo studios in the situation where Taekwondo training population is naturally decreasing. The expansion of the foundation through facilitating adult Taekwondo is an inevitable task of improvement even for enhancing the status of Taekwondo.

Previous studies for facilitating the adult Taekwondo to date have focused on the development of adult Taekwondo training programs and diverse marketing strategies, yet lack studies on the academic approaches to the trainees' behavioral characteristics such as the effect and value of the adult Taekwondo training.

Examining the previous studies on the physical self-efficacy of the participants in various sports, there are implications that

there is a relationship between the physical efficacy and the quality of life.

Accordingly, this study intends to examine the value and effect of Taekwondo training as a recreational activity by clarifying the physical self-efficacy and quality of life following the participation in adult Taekwondo training at the present point in time when the roles of physical recreational activities are diversified, and build a theoretical framework for the practical areas of participation and present the foundational data needed for the facilitation of adult Taekwondo.

Table 1. General information of the samples.

Feature	Classification	N	%
Age	Under 30	73	34.9
	30 ~ 39	102	48.8
	40 ~ 49	23	11.0
	Over 50	11	5.3
Participation period	Less than 6 months	15	7.2
	6 months to less than 1 year	75	35.9
	1 to 2 years	67	32.1
	2 to 3 years	20	9.6
	3 years or longer	32	15.3
Participation frequency	Less than twice per week	10	4.8
	Three times per week	133	63.6
	Four times per week	36	17.2
	Five times or more per week	30	14.4
Participation time	Less than 1 hour	15	7.2
	1 to 2 hours	146	69.9
	Over 2 hours	48	23.0
Subjective intensity of exercise	Weak	23	11.0
	Normal	87	41.6
	Strong	86	41.1
	Very strong	13	6.2
Preferred program	Sparring	44	21.1
	Pumse	63	30.1
	Self defense skills	23	11.0
	Physical training	56	26.8
	Others	23	11.0

2. Methodology

2.1. Research subjects

Table 2. Results of correlation analysis.

Variable	1	2	3	4	5	6
1. Physical attractiveness	-					
2. Physical confidence	-.064	-				
3. Physical strength	-.198**	.389**	-			
4. Self Esteem	-.043	.638**	.433**	-		
5. Family's cohesion	.135	.634**	.279**	.687**	-	
6. Changes of life	.168*	.385**	.064	.615**	.586**	-

* p<.05, ** p<.01

In this study, adult Taekwondo trainees of age 19 or older residing in Daegu and Gyeongbuk regions were selected and a cluster random sampling method was applied for the questionnaire survey. The survey was conducted by the researcher in consultation with the relevant personnel, and they visited the field together with one assistant researcher. First, after briefly mentioning the purpose of the questionnaire survey, the survey was conducted and the questionnaires were collected upon their completion. Through the above process, the questionnaire data of 300 people were collected and a total of 209 copies were used for the actual analysis excluding 21 copies of the questionnaire data which were considered to be unanswered or unfaithfully answered. The demographic characteristics were analyzed as in <Table 1> below.

2.2. Measurement tool

2.2.1. Physical self-efficacy

In this study, physical self-efficacy was created by Ryckman[4] and adapted by Hong Sun-Ok(1996), and the questionnaires used by Kim HL[5] and Lee Kyeong-Ju[6] were revised and supplemented to suit this study. These questionnaires consisted of a total of 12 questions with a total of 3 subfactors, with 5 questions for physical attractiveness, 3 questions for physical confidence, and 4 questions for physical strength, and was assessed through a 5 point Likert Scale. In the subfactor reliability of Cronbach's α , the physical attractiveness turned out to be

α =.761, physical confidence α =.826, and physical strength α =.736.

2.2.2. Quality of life

In this study, as for the quality of life, the questionnaires used by Yoo Ji-Young[7] were revised and supplemented for use. These questionnaires consisted of a total of 18 questions with 3 subfactors with 9 questions for Self-esteem, 5 questions for family's cohesion, and 4 questions for changes of life, and was assessed through a 5 point Likert Scale. In the subfactor reliability, sense of self turned out to be α =.894, family's cohesion α =.838, and changes of life α =.725.

2.3. Data analysis

The data processing method of this study was computerized according to the purpose of data analysis using SPSS 22.0 Version for Window. The significance level of all statistical values was p<.05, and the specific data processing methods for the hypothesis were Frequency Analysis, Exploratory Factor Analysis, Reliability Analysis, Correlation Analysis, Correlation Analysis and Multiple Regression Analysis, respectively.

3. Results

3.1. Correlation

The Pearson's correlation analysis was conducted to clarify the correlation between the adult Taekwondo trainees' physical self-effi-

cacy and the quality of life. As <Table 2> illustrates, the absolute value of all correlation coefficients did not exceed 0.8, so the possibility of the occurrence of multi-collinearity issues between independent variables was not discovered.

3.2. Effect of physical self-efficacy on the quality of life

3.2.1. Effect of physical self-efficacy on self esteem

<Table 3> illustrates the multiple regression results of the self-esteem, which is the subfactor of the physical self-efficacy and the quality of life, and among the subfactors of the physical self efficacy, the physical confidence($\beta=.552$) and physical strength($\beta=.225$) had a positive influence on the sense of self and demonstrated an explanatory power of 44.8%, respectively.

Table 3. Effect of Physical Self-Efficacy on Self esteem.

Model	b	SE	β	t
(Constant)	1.609	.242		6.650***
physical attractiveness	.031	.044	.036	.689
physical confidence	.415	.042	.552	9.804***
physical strength	.188	.048	.225	3.932***
R2			.448	
F			55.487***	

*** p< .001

3.2.2. Effect of physical self-efficacy on the family's cohesion

<Table 4> illustrates the results of the multiple regression of family's cohesion, which is a subfactor of physical self efficacy and the quality of life, and among the subfactors of physical self efficacy, physical attractiveness($\beta=.189$) and physical confidence($\beta=.616$) had a positive influence on the family's cohesion and demonstrated the explanatory power of 43.7%, respectively.

Table 4. Effect of physical self-efficacy on the family's cohesion.

Model	b	SE	β	t
(Constant)	1.292	.274		4.715***

physical attractiveness	.178	.050	.189	3.545***
physical confidence	.519	.048	.616	10.826***
physical strength	.072	.054	.077	1.325
R2			.437	
F			53.076***	

*** p< .001

3.2.3. Effect of physical self-efficacy on the changes of life

<Table 5> illustrates the results of the multiple regression of the changes of life, which is a subfactor of physical self-efficacy and the quality of life, and among the subfactors of physical self-efficacy, physical attractiveness($\beta=.182$) and physical confidence($\beta=.421$) had a positive influence on the family's cohesion and demonstrated the explanatory power of 18.9%, respectively.

Table 5. Effect of physical self-efficacy on the changes of life.

Model	b	SE	β	t
(Constant)	2.422	.296		8.172***
physical attractiveness	.155	.54	.182	2.841**
physical confidence	.320	.052	.421	6.164***
physical strength	-.053	.059	-.063	-.911
R2			.189	
F			15.881***	

** p< .01, *** p< .001

4. Discussion

This study has analyzed the effects of the adult Taekwondo trainees' physical self-efficacy on the quality of life. The discussion of the main results around the related variables is as follows.

Among the adult Taekwondo trainees' physical self-efficacies, physical attractiveness turned out to have a positive influence on the family's cohesion and the changes of life among the subfactors of the quality of life, and among the physical self-efficacies, physical confidence turned out to have a positive

influence on the sense of self, family's cohesion, and changes of life among the subfactors of the quality of life, and among the physical self-efficacies, the physical strength turned out to have a positive influence on the sense of self. What was learned through these was that the physical self-efficacy directly or indirectly influenced the quality of life, and so the higher the physical self-efficacy of the adult Taekwondo trainees, the higher the quality of life.

Quality of life refers to a satisfactory life, among others, and it may be said that it is evaluated based on the individuals' subjective judgment. That is, the physical satisfaction felt by the physical self-efficacy of the adult Taekwondo trainee is through to increase the desire for the happy quality of life in daily life by creating a healthy body and self-realization in a balanced way.

Such results are supportive of the previous studies such that the continued participation in recreational activities positively influences the physical self-efficacy[8], physical self-efficacy positively influences the quality of life and a high self-efficacy induces a continued participation in the health promotion programs to raise the quality of life[9][10][11].

As such, a large number of previous studies have confirmed that the physical self-efficacy is a key variable which can induce a positive change in the individuals' subjective life, satisfaction of life, happiness, and the quality of life. The physical self-efficacy plays a positive role in a variety of psychological and social adaptations, and in particular, it may be understood that the higher the physical self-efficacy, the more positive the influence on the satisfaction of life and adaptation[12][13].

Accordingly, it was ascertained that Taekwondo training is not only an important recreational activity which can be used to maintain health through the psychological stability in life as well as a means of recreation for the changes in the quality of life following physical and mental changes of adults.

5. Conclusion & Recommendation

As per the purpose of this study, we have analyzed the collected data by using various research methods and derived the following conclusions based on the analytical results and details from the discussions held.

First, the physical attractiveness of the adult Taekwondo trainees turned out to have a positive influence on the family's cohesion and changes in life, which are subfactors of the quality of life.

Second, the physical self-confidence of the adult Taekwondo trainees turned out to have a positive influence on the self-esteem, family's cohesion and changes in life, which are subfactors of the quality of life.

Third, the physical strength of the adult Taekwondo trainees turned out to have a positive influence on the sense of self.

Gathering the conclusions thus far, it can be ascertained that the physical self-efficacy of the adult Taekwondo trainees has a positive influence on the quality of life. That is, we achieved the purpose of the this study by confirming that the positive response to the physical image through Taekwondo training has a influence direct or indirect on the quality of life, which is a subjective measure.

In this study, the difference in the physical self-efficacy following the level of participation was not examined, and we were not able to validate details for each region and age group. In the future studies, if studies considering such points are conducted with a focus on a variety of variables, it will be helpful to understand the behavioral characteristics of the adult Taekwondo trainees more specifically.

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Author
Park Su-ul / Kyungwoon University Professor
 B.A. Keimyung University
 M.A. Keimyung University
 Ph.D. Keimyung University

Research field
 - Influence of Exercise Desire of Golf Participants on Fun Factor & Continued Participation Intention, Korea Journal of Golf Studies, 9(1) (2015).
 - Analysis and Research on Occurrence of Safety Accident in Taekwondo Training center in Korea, International Journal of Sport, 1(2) (2016).

Major career
 -2006~2010. Wooksuk University, Adjunct Professor
 -2017~present. Kyungwoon University, Professor

Corresponding Author
Jeang Soon-il / Donga University Lecturer
 B.A. Dongeui University
 M.A. Dongeui University
 Ph.D. Dongeui University

Research field
 - Learning Effect of Self-controlled Feedback by Physical Self-efficacy Level in Task of Elementary School Student's Taekwondo Side Kick, Journal of the Korean Society for Wellness, 11(3) (2016).
 - New Proposal of Self-controlled Feedback for Low-physical Self-efficacy Level Learner, The Korean Journal of Sport, 15(1) (2017).

Major career
 - 2009~2017. Dongeui University, Adjunct Professor
 - 2017~present. Donga University, Lecturer

6.2. Thesis degree