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The Effect of Self-Management of Juvenile TAEKWONDO Breaking Athletes on Sports Competitive Anxiety

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Abstract

Purpose: The study was conducted for the purpose of analyzing the effects of self-management on sports competition anxiety for youth breaking athletes who belong to the national Taekwondo demonstration team and have participated in the defeat contest. In order to achieve the purpose of this study, a questionnaire was conducted on 312 youth breaking athletes who have participated in the national breaking competition and analyzed the collected data.

Method: In the study, a frequency analysis(Frequencies) to determine the general characteristics of the study participants and a correlation analysis(Correlation analysis) to determine the influence relationship between the variables of the measurement tool using SPSS 26.0 were conducted with the data collected through the questionnaire. In addition, Multiple regression analysis was performed to analyze the effect of self-management on sports competition anxiety. All statistical significance levels were set to .05.

Results: This study was conducted to verify how self-management of Taekwondo breaking athletes affects sports competition anxiety. The results are as follows. First, as a result of analyzing the differences in self-management and sports competition anxiety of Taekwondo-breaking athletes according to the gender of youth Taekwondo-breaking athletes, there was no statistically significant difference. Second, there was no statistically significant difference as a result of analyzing the differences in self-management and sports competition anxiety of Taekwondo-breaking athletes according to middle and high school of youth Taekwondo-breaking athletes. Third, there was no statistically significant difference as a result of analyzing the differences in self-management and sports competition anxiety of Taekwondo-breaking athletes according to the winning experience of youth Taekwondo-breaking athletes. Fourth, as a result of analyzing how the self-management of youth Taekwondo breaking athletes affects sports competition anxiety, statistically significant differences were found in some factors.

Conclusion: In the study, it was found that the self-management of taekwondo breaking athletes affects sports competition anxiety in some factors. Based on the results of this study, subsequent studies require research on the relationship and influence of more diverse factors and development of self-management programs to lower competition anxiety, and attempts of qualitative research are needed.

[Keywords] Juvenile, Taekwondo Technical Breaking, Self-Management, Competition State Anxiety, Taekwondo Demonstration

1. Introduction

Taekwondo is a unique martial art and cultural heritage of our nation. It is globally spread as a martial art representing Korea. It also played a role in improving the image of the country[1]. Taekwondo is divided into three areas: sparring, form, and demonstration. Among them, Taekwondo demonstration plays a large role in national public relations and diplomatic activities.

The Taekwondo demonstration combines form and sparring, mechanical gymnastics, self-defense, breaking, and basic movements to shape a form of contest. The Taekwondo Demonstration Contest started with the Taekwondo Hanmadang Competition in 1992, and the current World Taekwondo Hanmadang and other pilot management competitions were held in Korea University Taekwondo Federation, including World Taekwondo Hanmadang, Sponsored by Presidents of Universities. Then, the Taekwondo Demonstration Team, which specializes in Taekwondo demonstrations, was newly founded and the number of Taekwondo demonstrators increased[2][3].

As the Taekwondo Technical Breaking Competition is held every year, the number of athletes participating in the competition increases and new breaking techniques are emerging, and the technology is developing, but problems also occurs[4]. In the recent Taekwondo demonstration, high-level breaking techniques have appeared by applying mechanical gymnastics and acrobatics[5]. Due to these high-level techniques, athletes complain of unstable emotions in the competitive situation such as physical injuries, and to overcome these unstable emotions, various trainings such as technical training and self-management are being attempted[3]. In particular, anxiety is the representative psychological factor that athletes suffer most during a competition[6].

Competitive anxiety is the most obvious anxiety in sports situations where competition is the main factor[7]. In sports psychology research, the subject of competition anxiety is one of the most studied subjects[8]. Competitive anxiety is also a concept constructed by applying the theory of anxiety[9] to a sports event situation, and it is reported that even though it shows a good record, it has a negative effect on the performance due to various anxiety factors in the actual game, and it has been found that it affects the performance of athletes during the game[10]. Athletes with excellent athletic performance minimize learning time or increase efficiency through repetition of strategies and techniques through imagery, and make changes in their thoughts, feelings, and behavior[11]. In addition, they practice consistently to achieve achievement-oriented and narcissistic tendencies and perfect preparation and action[12]. For perfect performance, self-management can be said to be an element to make a successful performance, and perfectionism itself can be said to be the secret to success[13].

It has been reported that athletes' self-management in the sports field is an essential factor for successful performance and has a very close relationship with improving their performance[14]. As such, through mental self-management, self-management can strengthen positive aspects such as increased confidence and confidence in victory, and at the same time bring a buffering effect of negative factors. It is very important for athletes to learn excellent physical abilities and motor skills through practice and training in competitions, but it is also important to build self-confidence[15].

Therefore, the study investigates how the anxiety in the sports situation caused by self-management of youth Taekwondo breaking athletes, that is, competition anxiety affects the performance of the athletes, and it is intended to be studied with significance in providing the results as basic data for improving athletes' performance by providing them to field leaders.

2. Research Method

2.1. Research participants

Participants in this study were selected as purposive quota sampling for students who belonged to the national Taekwondo demonstration team and had participated in the breaking contest, and a survey was conducted on 312 youth Taekwondo breaking athletes. The characteristics of the study participants were classified into gender, middle school and high

school, and the status of winning experience, and the results of frequency analysis on the general characteristics of the study participants are shown in <Table 1>.

Table 1. General characteristics of the study participants.

Division	Division	Frequency	Percentage(%)
Gender	Male	234	75.0
	Female	78	25.0
Middle school/ high school	Middle school	105	33.7
	High school	207	66.3
Winning experience	Yes	148	47.4
	No	164	52.6
Sum		312	100.0

2.2. Date collection

2.2.1. Competitive state anxiety inventory-2: CSAI-2

Competitive State Anxiety Inventory-2(CSAI-2) developed by Martens & Vealey & Burton[16] was used to measure the competition anxiety of youth breaking athletes. The competitive state anxiety scale can measure three factors: cognitive state anxiety, physical state anxiety, and state confidence[17]. Consisting of a total of 27 questions, the question of 'I care about this game' is composed of 9 questions of cognitive state anxiety, 9 questions of physical state anxiety, and 9 questions of state confidence on the Likert 4 point scale. The questionnaire was conducted by configuring only cognitive and physical state anxiety factors excluding state confidence.

2.2.2. Self-management scale

In order to measure the self-management of youth Taekwondo breaking athletes, a questionnaire developed by Heo[18] and revised by Han[19] was used after revising and supplementing it appropriately for the study. As the sub-factors of self-management, it was classified into 4 sub-factors: 5 questions of interpersonal management, 4 questions of training management, 4 questions of mental management, and 5 questions of body management, and consisted of a total of 18 questions. The self-management questionnaire was evaluated on a 5-step Likert scale.

2.3. Data analysis

In this study, the data collected through the questionnaire were analyzed using SPSS 26.0 and a Frequency analysis was performed to find out the general characteristics of the study participants. Correlation analysis was conducted to determine the influence relationship between the variables of the measurement tool. In addition, Multiple regression analysis was performed to analyze the effect of self-management on sports competition anxiety. All statistical significance levels were set to .05.

3. Result and Discussion

3.1. Correlation analysis

As a result of verifying the factors of self-management and anxiety in sports competition of youth Taekwondo breaking athletes through the Pearson correlation coefficient, most of the variables were found to be correlated under .01. However, the interpersonal manage-

ment and body management of self-management showed no correlation between cognitive anxiety and physical anxiety of competitive state anxiety. On the other hand, the correlation coefficient between mental management, cognitive anxiety, and physical anxiety shows a statistically negative(-) relationship. This means that the higher the mental management, the lower the cognitive and physical anxiety, and the results of the correlation analysis between the variables are shown in <Table 2>.

Table 2. The results of the correlation analysis between the variables.

Division	1	2	3	4	5	6
1. Personal management	1					
2. Training management	.681**	1				
3. Mental management	.578**	.626**	1			
4. Body management	.320**	.361**	.333**	1		
5. Cognitive anxiety	-.011	-.106	-.280**	.076	1	
6. Physical anxiety	-.024	-.070	-.249**	.024	.789**	1

Note: **p<01

3.2. Differences in self-management and sports competitive anxiety among juvenile taekwondo breaking athletes

A t-test was conducted to analyze differences in self-management and sports competition anxiety of youth Taekwondo breaking athletes according to gender, and the results are shown in <Table 3>. As a result of analyzing the differences in self-management and sports competition anxiety among Taekwondo breaking athletes according to gender, there was no statistically significant difference. In self-management, interpersonal management($t=1.483$, $p=.085$) factors, training management($t=3.050$, $p=.149$) factors, and mental management($t=6.429$, $p=.228$) factors showed no significant difference. However, there was a significant difference in body management factors($t=.079$, $p=.021$). On the other hand, sports competition anxiety has no significant difference with cognitive anxiety($t=-2.780$, $p=.950$) factors and physical anxiety($t=-2.636$, $p=.215$) factors. This is consistent with the results of Lee & Kim[20] results that there is little difference according to gender of athletes participating in the Asian Junior Badminton Championship.

Table 3. The results of analyze differences in self-management and sports competition anxiety of youth taekwondo breaking athletes according to gender.

Area	Gender	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	
Self-management	Interpersonal management	Male	234	4.3222	.65166	1.483	.085
		Female	78	4.2000	.56015		
	Training management	Male	234	4.0983	.64101	3.050	.149
		Female	78	3.8494	.57029		
	Mental management	Male	234	3.9989	.80119	6.429	.228
		Female	78	3.3333	.76305		
Body management	Male	234	3.1427	.68907	.079*	.021	
	Female	78	3.1359	.55875			
Sports competition anxiety	Cognitive anxiety	Male	234	2.4639	.64959	-2.780	.950
		Female	78	2.7023	.67396		
	Physical anxiety	Male	234	2.3490	.57160	-2.636	.215

anxiety	Female	78	2.5527	.64614
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A t-test was conducted to analyze differences in self-management and sports competition anxiety among youth Taekwondo breaking athletes according to the school they are attending, and the results are shown in <Table 4>. As a result of analyzing the differences in self-management and sports competition anxiety among Taekwondo-breaking athletes according to the current school, there was no statistically significant difference. In self management, interpersonal management($t=-4.503$, $p=.062$) factors, training management($t=-3.079$, $p=.248$) factors, mental management($t=-1.163$, $p=.764$), body management($t=.144$, $p=.716$) there was no significant difference in all of the factors. In addition, there was no statistically significant difference between cognitive anxiety($t=-1.443$, $p=.618$) factors and physical anxiety($t=-2.130$, $p=.870$) factors in sports competition anxiety. This is consistent with the results of a study on the relationship between self-management and anxiety in competition status of Taekwondo Form athletes by Lee & Hong[21]. Among the self-management, the training management factor showed a difference in which the average value of high school athletes was higher than that of middle school athletes, but it was not statistically significant.

Table 4. The results of analyze differences in self-management and sports competition anxiety among youth taekwondo breaking athletes according to the school they are attending.

Area	Middle and high school	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	
Self-management	Interpersonal management	Middle school	105	4.0724	.66282	-4.503	.062
		High school	207	4.4029	.58575		
	Training management	Middle school	105	3.8833	.66962	-3.079	.248
		High school	207	4.1135	.59968		
	Mental management	Middle school	105	3.7548	.85554	-1.163	.764
		High school	207	3.8720	.83385		
Body management	Middle school	105	3.1486	.69505	.144	.716	
	High school	207	3.1372	.64017			
Sports competition anxiety	Cognitive anxiety	Middle school	105	2.4476	.64668	-1.443	.618
		High school	207	2.5620	.66906		
	Physical anxiety	Middle school	105	2.2995	.57655	-2.130	.870
		High school	207	2.4509	.60151		

A t-test was conducted to analyze differences in self-management and sports competition anxiety according to the winning experience of juvenile Taekwondo athletes, and the results are shown in <Table 5>. As a result of analyzing the differences in self-management and sports competition anxiety among Taekwondo breaking athletes according to the winning experience, there was no statistically significant difference. In self-management, interpersonal management($t=-.616$, $p=.621$) factors, training management($t=.432$, $p=.263$) factors, mental management($t=1.320$, $p=.310$), body management($t=. t=.228$, $p=.723$) there was no significant difference in all of the factors. On the other hand, in the case of sports competition anxiety, there was no significant difference in cognitive anxiety($t=-.025$, $p=.063$) factors, but there was a significant difference in physical anxiety factors($t=1.168$, $p=.013$). This is consistent with the results of Jang & Kim[22] that there is a significant difference according to the winning experience of tennis players.

Table 5. The results of analyze differences in self-management and sports competition anxiety according to the winning experience of juvenile taekwondo athletes.

Area		Winning experience	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Self-management	Interpersonal management	Yes	148	4.3149	.61725	.616	.621
		No	164	4.2707	.64504		
	Training management	Yes	148	4.0524	.62082	.432	.263
		No	164	4.0213	.64435		
	Mental management	Yes	148	3.8986	.82264	1.320	.310
		No	164	3.7729	.85659		
Body management	Yes	148	3.1500	.67365	.228	.723	
	No	164	3.1329	.64562			
Sports competition anxiety	Cognitive anxiety	Yes	148	2.5225	.71145	-.025	.063
		No	164	2.5244	.61779		
	Physical anxiety	Yes	148	2.4414	.66211	1.168*	.013
		No	164	2.3625	.52993		

3.3. The influence of self-management of juvenile taekwondo breaking athletes on sports competitive anxiety

Multiple regression analysis was conducted to analyze the effect of self-management on sports competition anxiety of youth Taekwondo-breaking athletes. As a result of it, it was found to be appropriate for the regression model and the tolerance limit was also 0.1 or more in all factors, indicating that there was no problem with multicollinearity. Details are shown in <Table 6>.

First, as a result of regression analysis on the effect of self-management on sports competition anxiety of youth Taekwondo-breaking athletes, interpersonal management and body management factors were statistically significant, and it is found that cognitive anxiety had a positive(+) effect and mental management factors had a negative(-) effect. The F value of the regression model shows a value of 12.057 at $p < .001$, and $R^2 = .136$ for the regression equation shows 13.6% of the explanatory power of the total variance. However, among the sub-factors of self-management, the training management factor did not have a statistically significant effect.

Second, as a result of regression analysis on the effect of self-management on sports competition anxiety of youth Taekwondo breaking athletes, it was found that mental management factors had a negative(-) effect on physical anxiety at a statistically significant level. The F value of the regression model shows a value of 7.814 at $p < .001$, and $R^2 = .092$ for the regression equation shows 9.2% of the explanatory power of the total variance. However, among the sub-factors of self-management, interpersonal management, training management, and body management were found to have no statistically significant effect.

These results are consistent with the results of Cho & Yun & So[23] study of high school bowling players that self-management had a positive effect on competition anxiety. It supports the results of having a positive effect on sports competition anxiety in the study.

Table 6. The results of analyze the effect of self-management on sports competition anxiety of youth taekwondo-breaking athletes.

Cognitive anxiety			Physical anxiety		
<i>B</i>	<i>Beta</i>	<i>t</i>	<i>B</i>	<i>Beta</i>	<i>t</i>

(a constant)	2.512		9.346	2.454		9.900
Interpersonal management	.224	.214	2.833**	.132	.140	1.814
Training management	-.042	-.040	-0.502	.043	.045	.555
Mental management	-.341	-.434	-6.096***	-.276	-.389	-5.336***
Body management	.168	.166	2.886**	.083	.092	1.553
	R ² =.136, F=12.057***			R ² =.092, F=7.814***		
	Durbin-watson=1.765			Durbin-watson=1.826		

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

4. Conclusion and Suggestions

This study was conducted for the purpose of analyzing the effects of self-management on sports competition anxiety for youth breaking athletes who belong to the national Taekwondo demonstration team and have participated in the breaking contest. In order to achieve the purpose of the study, a questionnaire was conducted on 312 youth breaking athletes who have participated in the national breaking competition and analyzed the collected data. The conclusion through the analysis is as follows.

First, as a result of analyzing the differences in self-management and sports competition anxiety of Taekwondo-breaking athletes according to the gender of youth Taekwondo-breaking athletes, there was no statistically significant difference.

Second, there was no statistically significant difference as a result of analyzing the differences in self-management and sports competition anxiety of Taekwondo-breaking athletes according to middle and high school of youth Taekwondo-breaking athletes.

Third, there was no statistically significant difference as a result of analyzing the differences in self-management and sports competition anxiety of Taekwondo-breaking athletes according to the winning experience of youth Taekwondo-breaking athletes.

Fourth, as a result of analyzing how the self-management of youth Taekwondo breaking athletes affects sports competition anxiety, statistically significant differences were found in some factors.

Based on the results of the study, suggestions for the follow-up studies are proposed as below.

First, the study was conducted only on adolescents. It will be a meaningful study to expand the unit of the population to university students, not just adolescents.

Second, in this study, it was found that the self-management of Taekwondo-breaking athletes influenced sports competition anxiety in some factors. Based on the results of the study, follow-up studies, such as research on the relationship and influence of more diverse factors and development of self-management programs to lower competition anxiety are necessary, and also attempts of qualitative research will be needed.

5. References

5.1. Journal articles

- [1] Kim J & Lee S & Park J. Differences in Protection for Sports Imagery Ability of High School Taekwondo Breaking Athletes. *Protection Convergence*, 5(2), 50-59 (2020). [\[Article\]](#)
- [2] Lim YR. The Mediating Effects of Leader Trust on the Relationship Between Team Cohesion and Perceived Performance in Taekwondo Demonstration Competitions Players. *Taekwondo Journal of Kukkiwon*, 9(3), 41-57 (2018).

- [3] Lee S & Kim J & Park J. The Effect of Sports Motivation of Middle School Soccer Players on the Sports Goal Orientation. *Kinesiology*, 5(2), 12-20 (2020). [Article]
- [4] Kwack HT & Shin HC. A Narrative Study on the Preparation Period for the Performance Improvement of the Winner of Taekwondo Demonstration Competitions. *Kinesiology*, 5(1), 33-47 (2020). [Article]
- [5] Kim JS & Jang K. Time Series Trends in the Change of Competition Rules in Taekwondo TechnicalBreaking: Targeting Technical Breaking. *The Korean Journal of Sport*, 17(4), 1197-1208 (2019).
- [6] Kim JS & Cheon WK & Park JS. Exploring the Motives of College Taekwondo Poomsae Athletes for Participating in the Poomsae Competitions. *International Journal of Martial Arts*, 5(1), 1-13 (2020). [Article]
- [7] Lee YO & Park HS. A Study on Competitive Anxiety of Unemployed Taekwondo Athletes. *The World Society of Taekwondo Culture*, 1(6), 1-43 (2013).
- [10] Landers DM. The Arousal Performance Relationship Revisited. *Research Quarterly for Exercise and Sport*, 51(1), 77-90 (1980).
- [11] Kim SJ & Lee JB. Effects of Imagery Ability on Competitive State Anxiety of Taekwondo Poomsae Players, The Korean Journal of Sport. *The Korean Journal of Sport*, 16(4), 1185-1197 (2018).
- [12] Kim YH & Seo SG. A Review of Perfectionism: Assessment and Treatment. *The Korean Journal of Counseling and Psychotherapy*, 20(3), 581-613 (2008).
- [13] So YH & Jung JH. Relationship Between Perfectionism, Exercise Stress, and Goal Orientation of College Athletes. *The Korean Journal of Physical Education*, 49(4), 153-165 (2010).
- [14] Shin H & Kim J. The Effects of University Taekwondo Demonstration Team's Self-management on Exercise Commitment and Perceived Performance. *International Journal of Martial Arts*, 5(2), 20-30 (2020). [Article]
- [15] Lee KP. The Effect of Kumdo Players's Self-management on Game Stress and Competitive Anxiety. *The Korean Journal of Kumdo*, 28(1), 15-26 (2017).
- [17] Iosifidou P & Doganis G. Confirmatory factor Analysis of the Greek Version of the Competitive State Anxiety Inventory-2. *International Journal of Sport Psychology*, 32(4), 400-405 (2001).
- [18] Heo JH. Development and Validation of Athletes' Self-management Questionnaire(ASMQ). *Korean Journal of Sport Psychology*, 14(2), 95-109 (2003).
- [20] Lee DS & Kim YN. Study on Self-management, Competitive State Anxiety and Psychological Skills of the Players who Participated in Asian Junior Badminton Championships. *Journal of Coaching Development*, 18(3), 43-51 (2016).
- [21] Lee HJ & Hong MS. Taekwondo Poomsae Athletes' Self-control, Their Trust in Instructor, Fairness of Referees Decision, Competition Anxiety and Perceived Athletic Performance. *The Korea Journal of Sports Science*, 25(5), 245-259 (2016).
- [22] Chang BW & Kim BD. The Influence of Self-management on Competition Anxiety of Soft Tennis Player. *Journal of Physical Education & Lifetime Sports Science*, 26(1), 1-17 (2014).
- [23] Cho HI & Yun BM & So YH. The Influences of Self-management on Self-confidence and Competition Anxiety of High School Bowling Players. *Korean Journal of Sport Psychology*, 19(4), 21-34 (2008).

5.2. Thesis degree

- [19] Han SY. The Influence of Self-management Strategy and Tenacity upon Athletic Performance in University Taekwondo Players. Seonam University, Doctoral Thesis (2013).

5.3. Books

- [8] Woodman T & Hardy L. Stress and Anxiety. Handbook of Sport Psychology (2001).

[16] Martens R & Vealey RS & Burton D. Competitive Anxiety in Sport. Human Kinetics Books (1990).

5.4. Conference proceedings

[9] Martens R & Burton D & Vealey RS & Bump LA & Smith DE. Competitive State Anxiety Inventory-2. In Symposium Conducted at the Meeting of North American Society for the Psychology of Sport and Physical Activity (1982).

6. Appendix

6.1. Authors contribution

	Initial name	Contribution
Lead Author	SL	<ul style="list-style-type: none"> -Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/>
Corresponding Author*	JK	<ul style="list-style-type: none"> -Make a significant contribution to collection <input checked="" type="checkbox"/> -Final approval of the paper <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/> -Play a decisive role in modification <input checked="" type="checkbox"/>
Co-Author	JP	<ul style="list-style-type: none"> -Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/> -Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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Application of Community Based Group Validation Therapy for DEMENTIA PATIENTS in Korea: A Pilot Study

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Abstract

Purpose: The purpose of this study is to assess the feasibility and effectiveness of a Community Based Group Validation Therapy developed to promote behavioral and emotional outcomes in community-dwelling dementia patients in Korea.

Method: A multi-center nonequivalent control group pretest-post test design was used to measure the effect of the program on the mental and behavioral symptoms of dementia patients. Twenty-four individuals participated in a Validation Therapy program for 10 weeks, attending 10 sessions of approximately 50 minutes each. The effects were evaluated through pre-and posttest tests that examined the level of depression, emotional status, behavioral problems, and cognitive function. Independent t tests and repeated measures analysis of variance were used to examine the effectiveness of the program.

Results: A statistically significant reduction in depression was found among participants. However, no significant changes in emotional state, behavioral problems, and cognitive function were revealed.

Conclusion: The validation therapy was found to reduce symptoms of depression in older adults with dementia. It can therefore be considered as a program that could improve quality of life in this population.

[Keywords] Dementia, Validation Therapy, Dementia Symptoms, Non-Pharmacologic Therapy, Nursing

1. Introduction

1.1 Background

Dementia is a progressive disease that initially presents as relatively mild cognitive or memory dysfunction such as absent-mindedness. However, a variety of additional neurological symptoms can develop that produce cognitive and behavioral symptoms as the disorder progresses. Eventually, individuals with dementia lose their ability to live independently and their sense of dignity is negatively affected as a result[1].

Between the onset of symptoms and acceptance of their disease, dementia patients suffer from a sense of worthlessness, become withdrawn and their self-esteem is shattered[2]. Dementia patients suffer more depression, anxiety, lethargy, despair, and worthlessness than their normal counterparts[3]. As many as 40–60% of patients with Alzheimer's disease reportedly experience symptoms of depression[4].

The mental and behavioral problems of dementia patients aggravate the burden placed on the family members who support them. This comes not only at great social cost to these individuals, but can also eventually lead to permanent admission into a long term care facility. Therefore, it is critical to address the emotional needs and cognitive and behavioral symptoms of these patients.

Many pharmacologic therapy have been developed to treat dementia and/or minimize its symp-

toms. However, these conservative measures have only palliative effects or merely slow the progression of disease[1]. However, many non-pharmacologic therapies that can be used in combination with pharmacologic treatments have been developed to treat the various emotional and psychological symptoms of dementia. In addition, great deal of research is being conducted to verify the multi-lateral effects of these treatments[1][5][6]. Observation and treatment of existing depression in dementia patients before they start standard treatment can be beneficial. Patients with mild dementia respond to cognitive and behavioral therapies well; therefore, the value of such non-drug therapies should be explored[7].

One non-pharmacologic approach used to improve cognitive function and behavior in dementia patients is reality orientation. In this treatment, patients are asked basic questions about themselves and their environment. This method seeks to improve patients' awareness by reinforcing the correct answers to these questions. This has been one of the most widely used forms of treatment in dementia patients worldwide[8][5]. However, doubts have been raised regarding its effectiveness in severe cognitive impairment. Patients are often required to react in a realistic and accurate way, which can aggravate the patient's stress despite their severely impaired cognitive functions. In some studies, this therapy was found to be associated with worsening symptoms[9][10]. To solve these problems, Feil developed validation therapy as a new method of approaching the problem[11]. Instead of correcting the patient's perception, Feil focused her treatment on the positive effects that were seen when the patient's emotions were acknowledged. Many studies on validation therapy have been conducted. Some have shown that it improves patients' cognitive function, everyday life, behavioral problems, depression, and quality of life[11][12][13]. while others have shown that it has little effect[14][15][5][16][17]. The discrepancies in these findings can be explained by small sample size, changes in subjects during the study, advanced age of the subjects, and other variables. These inconsistencies suggest a need for further research.

Feil's validation therapy is a treatment program that was developed on the basis of the theories of Rogers, Freud, Maslow, Frans-Hillman, and Erikson, in which patients are treated with dignity and empathy[8]. This approach aims to help patients resolve conflicts from their past, restore their dignity, and prevent them from experiencing deep depression during the last stage of their lives. The most dominant symptoms of dementia are memory loss and cognitive impairment, followed by speech impairment. Memory disturbances in combination with impaired speech can cause a reduction in self-confidence; this in turn can lead to depression and anxiety. The subsequent emotional instability and loss of motivation can then develop into further cognitive disturbance, thereby compounding and worsening the problem primary symptom problem. Though the ability to communicate may be impaired in older adults with dementia, their reactions to nonverbal messages seem to remain intact[18]. Validation therapy helps them reconnect with others, manage conflict, and restore their self-confidence.

As previously discussed, the development of non-pharmacologic therapies to improve quality of life and reduce the impact of low self-confidence, depression, anxiety, and other comorbidities in individuals with dementia is of great importance. Increasing patients' ability to communicate and emotional stability will allow patients and their caretakers to develop an amicable relationship[19]. These results emphasize that the validation therapy could reduce depression and behavior problem improving quality of life of dementia patients.

1.2. Purpose

This study developed a program to assess the feasibility and effectiveness of a Community Based Group Validation Therapy developed to promote behavioral and emotional outcomes in community-dwelling dementia patients in Korea. The specific goals are listed below.

- To develop a Community Based Group Validation Therapy that is specific to community-dwelling dementia patients in Korea
- To evaluate the feasibility and effectiveness of the program on depression, emotional status, behavioral problems, and cognitive function of community dwelling dementia patients.

2. Research Method

2.1. Research design

A multi-center nonequivalent control group pretest-posttest design was used to measure the effect of validation therapy on mental and behavioral symptoms and cognitive function in dementia patients residing in the community. The specific research design is explained below.

Table 1. Research design.

Experimental Group	O1 X O2
Control Group	O1 Y O2

Note: O1, O2: measurement.

X: Validation Therapy Y: Standard Care.

2.2. Research subjects and period

Subjects were selected from dementia patients who registered the district dementia centers in Seoul, Korea and were receiving regular checkups. Those who met the inclusion criteria were assigned to one of two groups, with the goal of retaining 20 subjects per group, to detect differences between groups with a power of .80, and effect size of 0.70 at an alpha of .05. Thirty subjects per group were recruited based on subject characteristics and the predicted dropout rate.

Data were either anonymous (i.e. self-report instruments and surveys) or confidential (assessment of inclusion criteria). Individual subjects were not identified in the analyses or in reporting of data and results. All study participants and their guardians were asked to sign an informed consent form that was read to them and explained, if needed.

A total of 41 subjects, consisting of 21 experimental subjects and 20 control group, completed the study. Three subjects from the experimental group and six from control group were unable to complete the study because of illness or personal reasons. Members of the control group participated in the usual dementia care and did not receive the validation therapy.

2.3. Instrument

2.3.1. Depression

The Korean version of the SGDS (Short-Form Geriatric Depression Scale, original version developed by Yesavage et al) was used to measure depression in the participants [20]. The scale comprises fifteen yes/no questions (yes = 0, no = 1) with an optimal cut-off score of 8; scores over 8 indicate increasingly severe symptoms of depression. Cronbach's α for the SGDS-K was .88 in this study, indicating good internal consistency reliability.

2.3.2. Emotional state

The Apparent Emotion Rating (AER) Instrument was used to assess the emotional state of patients with impaired cognitive functions [21]. The items assess three positive emotions (pleasure, interest, and tranquility) and three negative emotions (anxiety, depression, and anger). Each emotion has verbal and nonverbal examples. The subject is asked to see if any examples correspond to the emotions. A score of 1 is given if an example is present and 0 if it is not; 15 points are allotted for every positive emotion and another 15 points are added in the absence of a negative emotion. A score of 0 indicates a very negative emotional state, and a score of 90 indicates a very positive emotional state. In a previous study [13], the Cronbach's α of this scale was .74, and in this study, was .76.

2.3.3. Behavior rating scale

The Behavior Rating Scale developed was administered to measure patients' behavioral problems [22]. This scale consists of 22 questions that address 4 areas: 7 on abnormal behavior, 6 on cog-

nitive function, 5 on abnormal delinquency, and 4 on emotional anxiety. A 4-point scale is used for scoring: 3 for "severe," 2 for "often," 1 for "sometimes," and 0 for "never." Higher scores indicate more severe behavioral problems. In a previous study[22], Cronbach's α of this scale was .89, and in this study, .87.

2.3.4. Cognitive function

The MMSE-KC[23] was used to measure participants' cognitive function. This test assesses orientation to time(5points), orientation to place(5points), registration(3points), recall(3points), attention and calculation ability(5points), language ability(7points), and comprehension and judgment(2points); the highest possible score is 30 points.

2.4. Data collection

This study was divided into 3 parts: the development of community based group validation therapy for dementia patients, research assistant training, and evaluation of the effectiveness of the program.

2.5. Development of community based group validation therapy for dementia patients

Feil's validation therapy was applied to develop a protocol tailored to Korean participants[19]. The outline of the program is shown in Table 1. The program consists of 10 sessions focused on the following topics: Orientation and Introductions; My Hometown; Friends; Old Songs and Movies; Those were the Days; Marriage; My Dear Children; My Family; Thoughts in My Head; and the Hope Tree. Each session consisted of the introduction(5minutes), main activity(35minutes), and conclusion(10minutes). The program incorporated a variety of activities such as music, body gestures, discussions, watching photographs, art therapy, ball exercises, and sharing refreshments. The main topics of the sessions focused on relationships with family and friends and the expression of emotions. Conversations were unforced, fluid, and natural, and the atmosphere was calm and comfortable.

Table 2. Outline of the community based group validation therapy.

	Topic	Content	Action
1	Orientation & introductions	Program orientation (Having time to promote friendship among members/ self introduction)	<ul style="list-style-type: none"> All participants play Yoot(Korean traditional board game)in teams
2	My hometown	Home town stories, Childhood games and songs / reminiscence therapy, music and art therapy, exercise therapy	<ul style="list-style-type: none"> Drawing and painting pictures of hometown on the paper Playing childhood games(a game of slap-match, marbles, top spinning)
3	Friends	Memories of big events and incidences happened in their childhood(primary school memories, friends and teachers) / reminiscence therapy, music and art therapy, exercise therapy	<ul style="list-style-type: none"> Singing children's songs Writing down a favorite childhood friend on a paper airplane and flying them in the air
4	Old songs & movies	Old songs, fashions, actors/actresses and movies from their youth / reminiscence therapy, music and art therapy, exercise therapy	<ul style="list-style-type: none"> Completing puzzle posters of old movies and sharing the story of movies and actor/actresses in the movie
5	Those were the days	The dreams of youth and things that were once popular in the past / reminiscence therapy, music and art therapy, exercise therapy	<ul style="list-style-type: none"> Recollecting the memories of the past using their own pictures and stuff Completing the picture of hometown using colored paper and sharing it with other members

6	Marriage	The stories of their marriage / reminiscence therapy, music and art therapy, exercise therapy	<ul style="list-style-type: none"> • Talking about the first impression of their partner and stories of their first meeting • Taking wedding photos in traditional wedding clothes
7	My dear children	The stories about their children / reminiscence therapy, music and art therapy, exercise therapy	<ul style="list-style-type: none"> • Talking about the dream of the forthcoming conception of their babies / sharing childbirth experience • Speaking with members about the meaning of a table laid in celebration of a baby's first birthday
8	My family	Family stories / reminiscence therapy, music and art therapy, exercise therapy	<ul style="list-style-type: none"> • Drawing self centered family tree and sharing thoughts about how important family is in Korea
9	Thoughts in my head	The stories about their life / reminiscence therapy, music and art therapy, exercise therapy	<ul style="list-style-type: none"> • Completing 'If' sentences('If I were a millionaire, I would....', 'If I were a president of this country, I would.....') • Constructing a brain diagram with their current thoughts
10	The hope tree	The meaning of life (program completion) / reminiscence therapy, music and art therapy, exercise therapy	<ul style="list-style-type: none"> • Planting a hope tree to hang cards with hope of individual participants and all participants are gathered hoping wishes come true

2.6. Procedures for data collection

This study was approved by the National Evidence-Based Healthcare Collaborating Agency's Internal Review Board review(PIRB12-002-02). After consent had been obtained from the directors in each dementia center, we began to recruit participants with the help of their staff. The program was held from April 12 to June 11, 2012. After developing the protocol for the program, five research assistants recruited and all of were nurses from local dementia centers. Assistants received a 4-hour training about administration of the tests. The research assistants and the researchers formed 3 two-person teams to conduct the program in each center.

The research assistants administered pretest and posttest measurements in the homes of the dementia patients.

2.7. Data analysis

Statistical analysis was performed using SPSS WIN version 18.0. χ^2 test and t-test was used to analyze the homogeneity of the experimental and control groups. Repeated measures analysis of variance was performed to assess the effect of the intervention program on depression, emotional state, behavioral problems, and cognitive function.

3. Results

3.1. Homogeneity test for general characteristics and outcome variables

The general characteristics of the participants are listed in Table 2. There were more men(47.6%) in the experimental group and more women(70.0%) in the control group, however, this difference was not significant($\chi^2 = 1.149$, $p = 0.258$). The most common age group in both the experimental and control groups was 70–79 years($\chi^2 = 0.463$, $p = 0.988$). The average age of participants in the experimental group and the control group was 76.38 ± 5.58 and 75.88 ± 5.71 years, respectively and there was no significant difference in age($t = 0.061$, $p = 0.951$), The difference in average number of years of education of both groups was not significant($t = 0.710$, $p = 0.481$). There was no significant differ-

ence in CDR($\chi^2 = 1.852, p = 0.498$).

Table 3. Homogeneity test for general characteristics between groups(N=41).

Variables	Category	Experimental(n = 21)	Control(n = 20)	χ^2 or t	p
Variables	Category	n (%)	n (%)	χ^2 or t	p
Gender	Male	10(47.6)	6(30.0)	1.149	0.258
Gender	Female	11(52.4)	14(70.0)	0.898	0.638
Age(yr)	60–69	1(4.8)	2(10.0)	0.463	0.988
Age(yr)	70–79	14(66.6)	13(57.0)	2.700	0.100
Age(yr)	≥80	6(28.6)	6(30.0)	2.700	0.100
Age(yr)	Mean(±SD)	76.38±5.58	75.88±5.71	0.061	0.951
Education period(yr)	Mean(±SD)	7.79±3.08	8.63±5.15	0.710	0.481
CDR	0.5	4(19.0)	5(25.0)	1.852	0.498
	≥1	13(61.9)	12(60.0)		
	≥2	4(19.1)	3(15.0)		

The results for the homogeneity test of the outcome variables for the experimental and control groups are shown in Table 3. The emotional status scores were 52.85±11.24 and 54.75±11.24 for the experimental and control groups, respectively and the difference was not significant($t = 0.540, p = 0.592$). Depression scores were 7.23±3.96 and 6.70±3.65, respectively. The depression scores of the respectively and the difference was not statistically significant($t = -0.452, p = 0.654$). Mean scores for behavioral problems were 0.75±0.38 and 0.69±0.30, respectively and this difference was not significant($t = -0.622, p = 0.537$). Cognitive function scores were 18.61±5.79 and 17.95±5.51, respectively and the difference was not statistically significant($t = -0.378, p = 0.707$).

Table 4. Homogeneity test for outcome variables between groups at pretest(N=41).

Measurement	Variables	Experimental (n = 21)	Control (n = 20)	t	p
Measurement	Variables	M±SD	M±SD	t	p
Emotional status	Total score(0~90)	52.85±11.24	54.75±11.24	0.540	0.592
Depression	Total score(0~15)	7.23±3.96	6.70±3.65	-0.452	0.654
Behavior problems	Mean score(0~3)	0.75±0.38	0.69±0.30	-0.622	0.537
Cognitive function	Total score(0~30)	18.61±5.79	17.95±5.51	-0.378	0.707

3.2. Effectiveness of the validation therapy

The performed a repeated measures analysis of variance to examine the effect of the intervention on depression, emotional status, behavioral problems, and cognitive function <Table 4>. Depression scores in the experimental group dropped from 7.23±3.96 pretest to 3.19±1.86 posttest. Control group scores increased slightly from 6.70±3.65 to 7.30±4.01. The time variant depression score difference was statistically significant($F = 12.658, p = 0.001$). As well as the difference between the groups was significant($F = 6.956, p = 0.012$), the time × group interaction was significant($F = 4.201, p = 0.047$).

The emotional status scores for the experimental group were 52.85±11.24 pretest and increased 65.71±11.10 posttest. In the control group, scores were 54.75±11.17 pretest and 42.75±10.60 posttest. Both the group($F = 0.083, p = 0.775$) and time variant($F = 69.563, p = 0.001$) emotional status scores show a significant difference. The emotional status scores were significantly higher in the experimental groups. And the time/group relationship was significant($F = 11.800, p = 0.001$).

The behavioral problem-scores decreased from 0.75±0.38 to 0.64±0.35 in the experimental group. In the control group, they decreased from 0.69±0.30 to 0.65±0.33. Although the difference between the groups was not statistically significant($F = 2.437, p = 0.127$), the time variant behavioral problem scores were significant($F = 0.582, p = 0.450$). The time/group relationship, however, was not significant($F = 0.094, p = 0.761$).

Neither the time variant($F = 0.507, p = 0.481$) nor group($F = 0.289, p = 0.594$) cognitive function scores were found to be insignificant. The group/time relationship was not significant($F = 0.434, p = 0.514$).

Table 5. Comparisons of measurements between experimental and control groups(N=41).

Variables		Pretest	Post-test	Source	F	p
		M±SD	M±SD	Source	F	p
Depression	Exp(n = 21)	7.23±3.96	3.19±1.86	Group	6.956	0.012*
	Cont(n = 20)	6.70±3.65	7.30±4.01	Time	12.658	0.001*
				G×T	4.201	0.047*
Emotion status	Exp(n = 21)	52.85±11.24	65.71±11.10	Group	0.083	0.775
	Cont(n = 20)	54.75±11.17	42.75±10.60	Time	69.563	0.001*
				G×T	11.800	0.001*
Behavior problems	Exp(n = 21)	0.75±0.38	0.64±0.35	Group	2.437	0.127
	Cont(n = 20)	0.69±0.30	0.65±0.33	Time	0.582	0.450
				G×T	0.094	0.761
Cognitive function	Exp(n = 21)	18.61±5.79	19.33±5.60	Group	0.289	0.594
	Cont(n = 20)	17.95±5.53	17.85±5.17	Time	0.507	0.481
				G×T	0.434	0.514

Note: G×T: Group×Time.

4. Discussion

This study was designed to assess the feasibility and effectiveness of a Community Based Group Validation Program developed to promote behavioral emotional outcomes in community-dwelling dementia patients in Korea. Conducting an intervention study, a total of 41 participants was recruited from dementia centers located in three different districts in Seoul. Individuals in the control group participated in standard care under the same conditions as the experimental group to analyze the effectiveness of validation therapy in specific. Most previous studies were uniformly implemented and recruited their subjects from nursing homes[24][13][5][15]. This study is significant because of its contribution to the body of intervention studies that address community-dwelling dementia patients. In addition, the program developed in this study focused on music and art therapy considering the historical background that the Korean adult had grown up. To help patient recollect old time memories, old music and childhood pictures were used in the course of the validation program.

Our results show a significant reduction in patients' depression. This program seemed to be effective in reducing depression, as well as there was a mild effect on emotional status. Despite the improvement in patients' emotional state both within over time, the group × time interaction effects were statistically significant. The reduction in behavior problem scores over time was statistically not significant. And the group × time interaction effects were also not significant.

The program used in the present study was effective in reducing depression in the participating dementia patients. These results confirmed those of the validation therapy studies of Chang(40 participants, 2 sessions per week over 6 weeks)[24], Toseland(12 months)[15] and Harris(9 participants, 2 sessions per week)[12]. Participants in these studies became more active and less depressed. The

validation therapy in all of these studies was conducted in groups. Interaction among participants reduces intimidation and encourages them to continue to attend the program. Further, they respect each other when discussing their experiences, which helps them restore not only their self-worth but also their independence[19].

Although the validation therapy had success in improving the emotional status of the subjects, its effect on cognitive and behavioral problems was not statistically significant. These results matched those of Veron[25]. However, Veron stated that although the effect on behavioral problems was not significant, he did observe positive changes in the subjects on a clinical scale. Behavioral problem scores were more reduced in the experimental group than in the control group, but the difference in reduction was not statistically significant. This is because despite their dementia, participants start to control their negative actions as they become acquainted with the social structure of the group and regain their self-esteem[19]. The results on cognitive function also matched those of Scanland and Emershaw(comparative study of reality orientation therapy and validation therapy, 5 days per week over 4 months)[16].

Brack[26], however, noted that validation therapy increased concentration, language use, and cognitive function. Tondi[17] compared validation therapy and sensory stimulation therapy and found that both approaches improved cognitive conditions and emotional behavior. In 2002, Feil argued that group validation therapy promoted improvements in concentration through the interactions of the group, sometimes for over an hour. Although we could not verify these studies, they suggest a need for future research in this area.

Validation therapy helps ease the burden on family members supporting their loved ones. The patients, in the last stages of their lives, deal with the conflicts of the past, recover their lost dignity, and do not fall into despair. It is imperative that we develop a validation therapy for these patients. Caring for dementia patients is a very stressful task that places a great burden on their families. In addition, caregiver burden is a leading cause of unnecessary institutionalization of dementia patients, thus the development of these interventions would also be of great benefit to family caregivers. Finding effective measures to combat the symptoms of depression and emotional disturbances of these patients could be very valuable. Continued development of effective community programs that support improved quality of life for these patients is the ultimate goal.

5. Conclusion

Based on the results of this study, the researcher suggests a few directions for future research. Structured as a group program, this program was effective in reducing depression and improving the emotional status. but did not address individual cognitive function and behavioral symptoms It is necessary, therefore, to develop a multi-phased program that could address the individual needs of the patient. When this program was first implemented, it was limited to a 10-session format owing to time- and financial constraints, but in their evaluations, participants reported an interest in a continuous long-term program. This suggests a need to develop a long-term program(over 6 months) that considers long-term effects. This program focused on community-dwelling dementia patients. In the future, programs must be developed for patients residing in nursing homes.

This study was carried out by a single research director. In the future, a program manual should be developed and used to train healthcare workers. After they have received specialized training, they would be qualified to implement and deliver customized programs specific to their current situation. Because this program is designed for dementia patients, specialized training must be provided so that nursing staff can adequately respond to the physical and psychological conditions of this population. Not only should we extend this program, but a specialized training system also warrants the production of competent health care professionals to deliver the program, helping patients ease their anxiety and depression and improve their quality of life.

6. References

6.1. Journal articles

- [1] Lee SB & Kim KW. Nonpharmacological Interventions for Alzheimer's Disease. *Journal of the Korean Medical Association*, 52(11), 1069-1076 (2009).
- [3] Starkstein SE & Jorge R & Petracca G & Robinson RG. The Construct of Generalized Anxiety Disorder in Alzheimer Disease. *The American Journal of Geriatric Psychiatry*, 15(1), 42-49 (2007).
- [4] Starkstein SE & Jorge R & Mizrahi R & Robinson RG. The Construct of Minor and Major Depression in Alzheimer's Disease. *The American Journal of Geriatric Psychiatry*, 162(11), 2086-209 (2005).
- [6] Song JA & Park JW. Effects of an Institution-based Group Walking Program(IGWP) to Manage Wandering Behavior of Persons with Dementia Residing in Nursing Homes: A Pilot Study. *Journal of Korean Gerontological Nursing*, 13(1), 37-47 (2011).
- [7] Kim SY. Depression in Dementia. *Journal of the Korean Dementia Association*, 3(1), 18-23 (2004).
- [9] Bleathman C & Morton I. Validation Therapy: A Review of Its Contribution to Dementia Care. *British Journal of Nursing -London-*, 5(14), 866-868 (1996).
- [13] Kim KA & Hah YS. The Effect of Validation Therapy on Behavior and Emotion of Elderly Demented People. *Journal of Korean Academy of Psychiatric and Mental Health Nursing*, 7(2), 384-399 (1998).
- [15] Toseland RW & Diehl M & Freeman K & Manzanares T & Naleppa M & McCallion P. The Impact of Validation Group Therapy on Nursing Home Residents with Dementia. *Journal of Applied Gerontology*, 16(1), 31-50 (1997).
- [16] Scanland SG & Emershaw LE. Reality Orientation and Validation Therapy: Dementia, Depression and Functional Status. *Journal of Gerontological Nursing*, 19(6), 7-7 (1993).
- [17] Tondi L & Ribani L & Bottazzi M & Viscomi G & Vulcano V. Validation Therapy(VT) in Nursing Home: A Casecontrol Study. *Archives of Gerontology and Geriatrics*, 44(12), 407-411 (2007).
- [18] Seignourel PJ & Kunik ME & Snow L & Wilson N & Stanley M. Anxiety in Dementia: A Critical Review. *Clinical Psychology Review*, 28(7), 1071-1082 (2008).
- [20] Yesavage JA & Brink TL & Rose TL & Lum O & Huang V & Adey M. Development and Validation of a Geriatric Depression Screening Scale: A Preliminary Report. *Journal of Psychiatric Research*, 17(1), 37-49(1982).
- [21] Mariah Snyder & Muriel B. Ryden & Patricia Shaver & Jing Jy Wang & Kay Savik & Cynthia R Gross & Valinda Pearson. The Apparent Emotion Rating Instrument: Assessing Affect in Cognitively Impaired Elders. *Clinical Gerontologist*, 18(4), 17-29 (1998).
- [23] Lee DY & Lee KU & Lee JH & Kim KW & Jhoo JH & Youn JC. A Normative Study of the Mini-mental State Examination in the Korean Elderly. *Journal of Korean Neuropsychiatric Association*, 41, 508-525 (2002).
- [25] Schrijnemaekers V & Van Rossum E & Candel M & Frederiks C & Derix M & Sielhorst H & Van den Brandt P. Effects of Emotion-oriented Care on Elderly People with Cognitive Impairment and Behavioral Problems. *International Journal of Geriatric Psychiatry*, 17, 926-937 (2002).
- [26] Han SY. A Study on Nursing College Students' Knowledge, Attitude, Confidence in Performance and Practice on Patient Safety Management in Korea. *International Journal of Crisis & Safety*, 3(4) 18-26 (2018). [\[Article\]](#)
- [27] Kim JE. A Study on People's Recognition of the Effect of Community Policing on Crime Prevention in Korea: Focusing on Sociodemographic Characteristics. *International Journal of Police and Policing*, 2(2), 18-25 (2017). [\[Article\]](#)
- [28] Chang IS. Security Policy of Police according to Increase of Elder Crimes. *International Journal of Police and Policing*, 2(2), 1-6 (2017). [\[Article\]](#)
- [29] Byeon Mk & Park SJ & Choi EY. Effects of a Wonderful Life Program on the Wellbeing Behaviors, Life Satisfaction and Subjective Quality of Life of Community Elderly People in Korea: Wonderful Life Program Includes Safety. *International Journal of Crisis & Safety*, 4(1), 1-7 (2019). [\[Article\]](#)

[30] Choi SK. Analysis and Suggestion for Safety When Using Physical Education Facilities in Rural Areas in Korea. *International Journal of Crisis & Safety*, 3(3), 6-9 (2018). [Article]

6.2. Thesis degree

- [2] Hah J. Disease Awareness Process in Elderly with Early Dementia. Hanyang University, Doctoral Thesis (2007).
- [5] Miller MJ. The Effects of Reality Orientation and Validation Therapy with Disoriented Nursing Home Residents. University of Memphis State, Doctoral Thesis (1987).
- [8] Doyle E. Validation Therapy: A Description of the Process. University of Missouri, Doctoral Thesis (1992).
- [10] Hosey JM. Effectiveness of Validation Therapy: Perceptions and Opinions of Certified Validation Therapists. University of California, Master's Thesis (1999).
- [12] Harris R. Group Validation Therapy with Elderly Demented People. University of London, Master's Thesis (1995).
- [14] Brack H. Validation Therapy with Disoriented Very Old Persons: Impact of Group Interventions on Activities of Daily Living, on Aspects of Behaviour, Cognition and General Well-being. University of Montreal, Doctoral Thesis (1997).
- [22] Yoon YO. Effect of the Group Art Therapy on Behavior Problems of Old Man with Dementia. Department of Art Therapy Graduate School, of Rehabilitation Science. Daegu University, Master's Thesis (2001).
- [24] Chang WS. The Effect of Group Validation Therapy(V/T) on Cognition, ADL(Activity of Daily Living), Depression, Problematic Behavior and Quality of Life in the Elderly with Dementia. Catholic University of Daegu, Master's Thesis (2008).
- [26] Brack H. Validation Therapy with Disoriented Very Old Persons: Impact of Group Interventions on Activities of Daily Living, on Aspects of Behavior, Cognition and General Well-being. University of Montreal, Doctoral Thesis (1997).

6.3. Additional references

- [11] Feil N (1992). V/F Validation the Feil Method. Feil Productions.
- [19] Feil N (1993). Validation Breakthrough: Simple Techniques for Communicating with People: with Alzheimer`s-Type Dementia. Health Professions Press.

7. Appendix

7.1. Authors contribution

	Initial name	Contribution
Lead Author	MS	-Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/> -Make a significant contribution to collection <input checked="" type="checkbox"/> -Final approval of the paper <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/>
Corresponding Author*	SP	-Play a decisive role in modification <input checked="" type="checkbox"/> -Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/> -Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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Application of FUNCTIONAL TRAINING to Improve the Performance of Elite Judo Athletes

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Abstract

Purpose: This study analyzed the effect of an application of a short-term functional training for 120 minutes a day, twice a week, for five weeks, and for total 10 times, targeting a male elite Judo Athlete attached to Daegu.

Method: A functional training program in this study consisted of 8 types of dynamic stabilization, 9 types of cardiopulmonary endurance and muscular endurance, and 12 types of functional training focusing on muscle power considering judo game situation. The intensity of exercise varied according to the training session (HRR 80% - 100%), and total consumed exercise calories per one time were applied to be consumed 800-1000cal with apple watch.

Results: After organizing and applying the functional training program optimized to the participant on this study, body composition, basic physical strength, aerobic exercise capacity, anaerobic exercise capacity and isokinetic muscle function of the knee joint and waist were measured. As a result, most of the measured list brought a positive change after applying the functional training.

Conclusion: After all the results above, optimized training program plan and application, considering the features of judo itself, of the build or physical strength of the athletes participating the game, are thought to be fully considered to improve the performance of the judo athletes, although intensive training, intensive training frequency and intensive quantity of training for elite judo athletes are significant.

[Keywords] Judo Athlete, Functional Training, Aerobic Exercise Capacity, Anaerobic Exercise Capacity, Isokinetic Muscle Function

1. Introduction

Judo is a representative combat sports which determines the game by throwing the opponent player to the ground with hand techniques, waist techniques, and leg techniques or by a hold which makes the opponent immobile on the floor, choking techniques, or twisting techniques[1][2]. Judo training has been reported to have a positive effect on a confidence improvement and self-management as well as a positive value formation[3][4][5][6]. Since suzerain states hardly engross medals in judo in olympic and world championship like taekwondo, it became real that athletic performance has been equalized. As all sports do, in order to improve performance, effective training methods for physical strength improvement which suits sports features with technique training are having been required[7][8]. In particular, judo requires diverse intensive physical strength factors, as techniques for achieving points should be done with perfect timing with Intermittent High Exercise[9][10]. Another preceding research[11] reports that 30 seconds activity and 10 seconds rest are repeated in most Judo games, and an accurate technique should be made using strength,

speed and power in order to realize an effective scoring technique. A preceding research[12] on kinematic analysis of hanging upper thigh according to the judo holding-together type reports that a shoulder throwing and hanging upper thigh, which are used most often among diverse attack techniques, require strong muscle function which uses joints of waist, muscle quadriceps femoris of the knee joint and hamstring and that anaerobic exercise capacity also largely affects performances[13]. A preceding research[14] on physical Strength Comparison related to the Performances according to the Ranking of Winning Prizes of World-Class Domestic Male Judo Athletes reports that anaerobic power is a highly significant physical strength factor, as strong power should be intermittently used within limited time during a judo game. Looking into preceding research results, many researchers are trying diverse sports scientific access for athletes' performance improvement[15][16][17][18], and are analyzing direct relation with performance[19]. Psychological factors as well as physical strength and techniques affect Judo Athletes' performance[20][21][22][23]. After all the results of preceding research, diverse factors are affecting athletes' performance improvement, but the most fundamental content can be summarized with physical strength, techniques, and psychological factors. However, this study intended to understand pros and cons of physical strength through basic and professional physical strength measurement in Local Sports Science Center and to identify an effect of application of physical strength training considering features of judo game, targeting a Judo Athlete in a business team who has a career of being a member of the national team.

2. Research Method

2.1. Subject of this study

Subject of this study is targeted at a Judo Athlete attached to Daegu, and the physical features are like <Table 1>.

Table 1. Physical features of the subject of the study(N=1).

Age(yr)	Height(cm)	Weight(kg)	Fat(%)	FFM(kg)	BMI(cm/m ²)
24	163.2	65.1	13.9	55.7	24.6

2.2. List of measurement

Body composition, stomach strength, grip force of left and right, push-ups, visual perception reaction(coordination), repetitive jumps, standing long jump, sound and light reaction, sidesteps, standing on one foot with closed eyes, trunk forward and backward flexion, aerobic and anaerobic exercise capacity, and Isokinetic Muscle Function of the knee joint and waist were measured according to the measurement manual of Local Sports Science Center. Images for better understanding of measurement method are like <Figure 1>.

Figure 1. Images related to measurement.



2.3. Functional training program

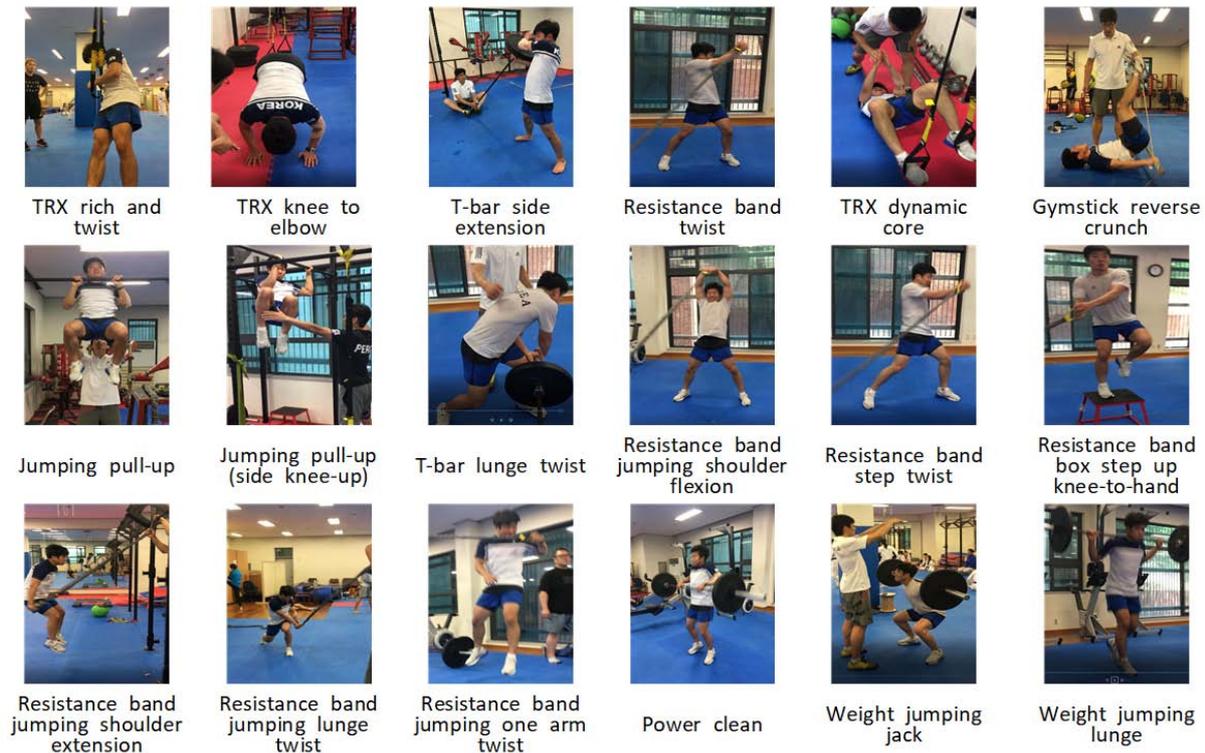
A functional training program in this study consisted of 8 types of Dynamic Stabilization, 9 types of Cardiopulmonary Endurance and Muscular Endurance, and 12 types of functional training focusing on muscle power considering judo game situation. Functional training was done 10 times except for the measurement day before and after the application of the program, for twice a week and 120 minutes per day. Warm-up and warm-down aren't included in the exercise hours. The intensity of exercise varied according to the training session (HRR 80% - 100%), and total consumed exercise calories per one time were applied to be consumed 800-1000cal with Apple Watch, and details of the training program are like <Table 2> and <Figure 2>.

Table 2. Functional training program.

Type	Action organization	Exercise hours
Dynamic stabilization training	Pedasan, lunge twist, side lunge, get up, hamstring stretch, toe to elbow, resistance band knee elbow, TRX leg row, TRX elbow core(8 types)	About 20min (10 × 2set)
Endurance training (cardiopulmonary endurance and muscular endurance)	400m run, 500m rowing, gymrope, TRX rich and twist, TRX knee to elbow, t-bar side extension, resistance band squat & twist, TRX dynamic core, gymstick reverse crunch(9 types)	About 60min (cardiopulmonary endurance 3set, muscular endurance 15 × 3set)
Muscular power training (functional training related to judo game)	Jumping pull-up, jumping pull-up & side knee-up, t-bar lunge twist, Resistance band jumping shoulder flexion, resistance band step twist, resistance band box step up knee-to-hand, resistance band jumping shoulder extension, resistance band jumping lunge twist, resistance band jumping one arm twist, power clean, weight jumping jack, weight jumping lunge (12 types)	About 40min (2sets * 12 types, increasing by steps, last 1min challenge)

Figure 2. Functional training program image.





2.4. Information handling

Information handling in this study was done by comparing and analyzing the measured value, and didn't execute extra statistical processing.

3. Result

3.1. Result of the measurement of physical characteristics

Changes in physical features between before and after the application of the program are like <Table 3>.

Table 3. Change in physical characteristics.

Weight(kg)		Fat(%)		FFM(kg)		BMI(cm/m ²)	
Before	After	Before	After	Before	After	Before	After
66.1	65.1	13.9	13.8	55.7	56.6	24.6	24.3

3.2. Result of the measurement of basic physical strength

Changes in the basic physical strength between before and after the application of the program are like <Table 4>.

Table 4. Result of the measurement of basic physical strength.

Items	Stomach	Grip force (kg)	Push-ups	Visual perception	Repetitive	Standing	Sound	Light reaction	Side-steps	Standing on	Trunk forward	Trunk back	Lung capacity

	strength (kg)	Left	Right	(times)	reaction (sec)	jumps (times)	long jump (cm)	reaction (sec)	reaction (sec)	(times)	one foot with closed eyes (sec)	ward flexion (cm)	ward flexion (cm)	FVC (ℓ)	FEV 1.0 (ℓ)
Pre	152	47.9	43	70	52.37	47	240.8	0.236	0.249	48	91.41	17.9	49.7	4.26	3.46
Post	164	49.2	45.5	102	51.83	50	256	0.191	0.227	49	150.25	18.1	50.7	5.16	3.63

3.3. Result of the measurement of aerobic exercise capacity

Changes in the result of the maximum movement load inspection between before and after the application of the program are like <Table 5>.

Table 5. Result of the maximum movement load inspection.

Items	All-out time (min)	VO2max (ml/kg /min)	HRres (beat /min)	HRmax (beat /min)	LTres (mmol)	LTmax (mmol)	LTpost 3min (mmol)	LTpost 5min (mmol)	LTpost 10min (mmol)
Pre	16.59	53.21	73	193	2.00	7.95	9.13	9.52	9.00
Post	17.39	55.2	72	192	1.90	8.92	9.31	9.62	8.37

3.4. Result of the measurement of anaerobic exercise capacity

Changes in the anaerobic exercise capacity between before and after the application of the program are like <Table 6>.

Table 6. Result of the measurement of anaerobic exercise capacity.

Items	Peak power (W)	Peak power (W/kg)	Average power (W)	Average power (W/kg)	Total energy (J)	Peak drop(%)
Pre	502.86	7.61	403.47	6.104	11787	47.02
Post	525.33	8.07	420.90	6.283	12505	38.57

3.5. Result of the measurement of isokinetic muscle function

Changes in the isokinetic muscle function between before and after the application of the program are like <Table 7>, <Table 8>, and <Table 9>.

Table 7. Result of the measurement of isokinetic muscle function of the knee joint(60°/sec).

Items	Right extensor muscle (Nm)	Left extensor muscle (Nm)	Right extensor muscle (%BW)	Left extensor muscle (%BW)	Right beuger (Nm)	Left beuger (Nm)	Right beuger (%BW)	Left beuger (%BW)	Left beuger/extensor muscle Ratio	Right beuger/extensor muscle Ratio
Pre	213	213	328	328	107	107	164	164	52	48
Post	222	207	343	319	115	119	176	185	56	54

Table 8. Result of the measurement of isokinetic muscle power of the knee joint(180°/sec).

Items	Right extensor muscle (Nm)	Left extensor muscle (Nm)	Right extensor muscle (%BW)	Left extensor muscle (%BW)	Right beuger (Nm)	Left beuger (Nm)	Right beuger (%BW)	Left Beuger (%BW)
Pre	142	124	224	189	74	75	111	113
Post	152	129	232	197	77	77	119	119

Table 9. Result of the measurement of isokinetic muscle strength of the waist(60°/sec).

Items	Peak torque(Nm)	Total work(Nm)	Average power(W)
Pre	222	1699	186
Post	259	1738	188

4. Discussion

This study analyzed the effect of an application of a short-term functional training for 120 minutes a day, twice a week, for five weeks, and in total 10 times, targeting a male elite Judo Athlete attached to Daegu.

A functional training program of this study deduced physical strength factors for performance improvement of Judo Athletes based on the results of diverse preceding research[14][24][25][26], and was organized around physical strength factors which can most largely affect performance improvement based on the result of the face-to-face talk with a leader and an athlete and of the physical strength measurement. According to the result of the face-to-face talk with a leader and an athlete and of the physical strength measurement, the subject of this study was identified to have superior muscular endurance and cardiopulmonary endurance and weak grip force and muscular power, and also to rather lack recovering ability, not reaching the maximum exercise ability, considering blood lactate density in the result of the maximum movement load inspection. A functional training program of this study focused on 3D movement which can make good use of real personal physical strength factors in judo game situation with an improvement of physical strength factors. After applying a functional training, regarding the physical features increased muscle mass and decreased percentage of body fat were partially identified, but it is thought to be rather deficient to induce any significant change of physical features with the functional training program applied in this study. The subject of this study, however, is a greatly excellent athlete who has superior physical strength level and physical features, thus with only little change in this study the functional training program applied in this study is thought to be able to be positively evaluated.

Regarding the basic physical strength, positive changes appeared in every measured lists, but especially positive results came out in stomach strength which is the muscular power measurement list, in push-ups which is the muscular endurance measurement list, standing long jump which is the muscular power(quick adaptation) measurement list, standing on one foot with closed eyes which is the parallelism measurement list after applying a functional training. Since muscular power(quick adaptation), which was reported to be closely connected to the improvement of performance of Judo Athletes in results of preceding research[11][12][14][19], turned up to be improved most largely among basic physical strength measurement lists, a functional training program applied in this study is thought to

be able enough to be applied to the field. Conducting an maximum movement load inspection for evaluation of aerobic exercise capacity, exercise duration increased 16 minutes 59 seconds to 17 minutes 39 seconds, and maximum aerobic capacity also increased 53.21 ml/kg/min to 55.20 ml/kg/min. It was identified that the subject in this study who was judged to rather lack revelation of maximum movement ability and recovering ability was improved in blood lactate density directly after exercise and for 10 minutes' recovery after applying functional training. This result is thought to be an effect of functional training program of step 2 and step 3 which were applied to this study, and was same with the result of preceding research[24][26][27]. Measuring anaerobic exercise capacity, positive result was identified in every measured lists after applying functional training. However, comparing with the results of preceding research[14] result, it is thought that an improvement of anaerobic exercise capacity through more training would be required, even though considering the weight difference. Measuring the muscular function of the knee point and waist, positive results came out in every measured lists. Especially isokinetic muscular power of the knee point measured in angular speed 180°/sec and muscular strength of waist measured in angular speed 60°/sec were largely improved considering training period and frequency. Direct comparison would be hard due to the lack of the preceding research results which analyzed application effect of functional training, but it was identified that isokinetic muscular power of the knee point and muscular strength of the waist were largely improved, though not enough, after the application of the program in the subject in this study who lack muscular power before the application of the program. Moreover, as a preceding research result[28] reported, the normal rate of an extensor and hamstring of the knee point is reported 50-70%, thus as the result of applying a functional training using TRX to the subject in this study to enhance right hamstring, a meaningful result was deduced in a short period. Comparing with a preceding research[29] result, which targeted a Judo Athlete having a career of victory, and with a preceding research[14] result, which targeted world-class domestic male Judo Athletes, the subject in this study is judged to have a superior isokinetic muscular strength of the knee point. A functional training program of this study for an effective use[30] of kinetic chain through dynamic stabilization in judo game situation is thought to have a positive effect on every physical strength factors. After all the contents above, a functional training program for an elite judo athlete is judged as an optimized program for an improvement of deficient physical strength factor of an athlete who participated in this study, but not inducing changes in physical features due to the lack of the application period and frequency of the program rather left regret.

5. Conclusion

This study analyzed the effect of an application of a short-term functional training for 120 minutes a day, twice a week, for five weeks, and in total 10 times, targeting a male elite judo athlete attached to Daegu. After organizing and applying the functional training program optimized to the participants on this study, body composition, basic physical strength, aerobic exercise capacity, anaerobic exercise capacity and isokinetic muscle function of the knee joint and waist were measured, and as a result, most of the measured list brought a positive change after applying the functional training. After all the results above, optimized training program plan and application, considering the features of judo itself, of the build or physical strength of the athletes participating the game, are thought to be fully considered to improve the performance of the judo athletes, although intensive training, intensive training frequency and intensive quantity of training for elite judo athletes are significant.

6. References

6.1. Journal articles

- [1] Jo SG & Kim BC & Park JS. Self-protection Sport: An Analysis of the Connection Between the Experience of Winning a Competition and the Experience of Being Selected as a Representative Player of Middle and High School and College Judo Players. *Protection Convergence*, 5(2), 27- 37 (2020). [\[Article\]](#)
- [3] Han SI & Kim J & Lee GM. The Effects of Sports Personality of Judo Athletes on Self-control and Non-violence. *Journal of the Korean Physical Education Association-Humanities and Social Sciences*, 51(2), 135-146 (2012).
- [5] Jo SG & Choi HS. A Study on the Application Changes of Judo Techniques Depending on the Winning Experience and Being Selected Experience as a Representative Player. *International Journal of Martial Arts*, 5(1), 14-25 (2020). [\[Article\]](#)
- [6] Jeon SH & Choi GY. The Relationship Between Self-management and Performance Strategies According to the Maturity of Judo Athletes. *Journal of the Korean Society of Sports Science*, 22(6), 1031-1042 (2013).
- [7] Kim TW & Song HS & Kim YS & Lee GB & Lee KH. A Comparison of Kumi-kata Related Muscle Strength by World Ranking Level in Korea Elite Female Judoists. *Korean Journal of Sport Science*, 27(4), 932-940 (2016).
- [8] Park JS & Yoon DK & Kim KJ & Kwon KL. Comparison of Physical Fitness and Lower Extremity Isokinetic Muscular Functions Characteristics of High School Soccer Players and Taekwondo Players. *Journal of Coaching Development*, 22(1), 131-139 (2020).
- [9] Degoutte F & Jouanel P & Filaire E. Energy Demands during a Judo Match and Recovery. *British Journal of Sports Medicine*, 37(3), 245-249 (2003).
- [10] Franchini E & Sterkowicz S & Meira Jr CM & Gomes FRF & Tani G. Technical Variation in a Sample of High Level Judo Players. *Perceptual and Motor Skills*, 106(3), 859-869 (2008).
- [12] Kim EH & Cho DH & Kwon MS. A Kinematic Analysis of Uchi-mata (Inner Thigh Reaping Throw) by Kumi-kata Types in Judo [I]. *Korean Journal of Sport Biomechanics*, 12(1), 63-87 (2002).
- [13] Serresse O & Ama PF & Simoneau JA & Lortie G & Bouchard C & Boulay MR. Anaerobic Performances of Sedentary and Trained Subjects. *Canadian Journal of Sports science*, 14(1), 46-52 (1989).
- [14] Seo TB & Kim TW & Song HS & Kim YS. Comparative Analysis of World Class National Male Judo Players` Athletic Performance Related Physical Fitness Factors. *Exercise Science*, 23(2), 171-179 (2014).
- [15] Adam M & Smaruj M & Tyszkowski S. The Diagnosis of the Technical-tactical Preparation of Judo Competitors during the World Championships(2009 and 2010) in the Light of the New Judo Sport Rules. *Archives of Budo*, 7(1), 5-9 (2011).
- [16] Kim TH & Kim SY & Kim YH. A Study on the Analysis and Development of the Solidification Techniques of Elite Female Judo Players. *The Korean Journal of Sport*, 17(4), 1609-1616 (2019).
- [17] Franchini E & Sterkowicz S & Meira Jr CM & Gomes FRF & Tani G. Technical Variation in a Sample of High Level Judo Players. *Perceptual and Motor Skills*, 106(3), 859-869 (2008).
- [18] Miarka B & Cury R & Julianetti R & Battazza R & Julio UF & Calmet M & Franchini E. A Comparison of Time-motion and Technical-tactical Variables Between Age Groups of Female Judo Matches. *Journal of sports sciences*, 32(16), 1529-1538 (2014).
- [19] Kons RL & Krabben K & Mann DL & Fischer G & Detanico D. The Effect of Vision Impairment on Competitive and Technical-tactical Performance in Judo: Is the Present System Legitimate?. *Adapted Physical Activity Quarterly*, 36(3), 388-398 (2019).
- [2] López Díaz-de-Durana A & Bello FD & Brito CJ & Miarka B. High level Performance in World Judo Circuit: Notational Analyzes of Combat Phase by Weight Categories. *Journal of Human Sport and Exercise*, 13(2), 329-338 (2018).
- [20] Park SB & Jeon YT & Kang H. Effect of the Exercise Passion of Middle School and High School Judo Players on the Psychological Needs and Coaching Effectiveness. *Journal of the Korean Wellness Society*, 14(4), 317-329 (2019).

- [21] Sang SH & Nam KW. The Relationship Between the Leader's Image and Performance Strategy Perceived by Judo Athletes: The Mediating Effect of Athletic Attitude. *Korean Sports Association*, 17(2), 1029-1038 (2019).
- [22] Yoon SJ & Jang TS & Lee JH. The Effect of Social Support on Sport Commitment among Judo Athletes: The Mediating Effect of Resilience. *Korean Journal of Physical Education*, 58(5), 71-80 (2019).
- [23] Kim HY & Chung EJ & Lee BH. The Compare Physical and Psychological Functioning by Sex, Weight and Age in Judo Athletes. *The Korea Contents Society*, 20(3), 678-686 (2020).
- [24] Park JS. The Effect of Functional Training on the Physical Strength Factor of Elite Taekwondo Athletes. *Kinesiology*, 4(1), 1-7 (2019). [\[Article\]](#)
- [26] Hong CB & Park JS & Cheon WK. Effects of 12-week Functional Training on Physical Fitness and Isokinetic Muscle Function in High School Taekwondo Players. *Journal of Coaching Development*, 22(2), 107-114 (2020).
- [27] Kim TH & Kim KJ. The Comparison of Muscle Power Related Main Techniques and Exercise Ability according to the Athletic Capacity of Male Middle School Handball Player. *Kinesiology*, 5(2), 70-78 (2020). [\[Article\]](#)
- [29] Jo SG & Choi HS. A Study on the Application Changes of Judo Techniques Depending on the Winning Experience and Being Selected Experience as a Representative Player. *International Journal of Martial Arts*, 5(1), 14-25 (2020). [\[Article\]](#)

6.2. Thesis degree

- [4] Cho YI. The Relationship Between Parents' Social Support, Self-efficacy, and Intention to Continue Exercise Perceived by Secondary School Judo Athletes. Pusan University of Foreign Studies. Master's Thesis (2016).

6.3. Books

- [30] Kang J & Kim DH & Kim SS & Park IB & Ahn YD & Jung H & Kim H & Kim SD & Kim HS & Park JS & Um WS & Hong Y & Kim KH & Kim JC & Do SJ & Ahn GH & Lee CH & Hong JK & Kim KJ & Kim CG & Park YC & Ahn NY & Lee CG. Nasm Essentials of Personal Fitness Training. Hanmibook (2018).
- [28] Zeevi D. Isokinetics. Muscle Testing, Interpretation and Clinical Application. Churchill Livingstone (1995).

6.4. Conference proceedings

- [11] Sikorski W & Mickiewicz G & Majle BY & Laksa C. Structure of the Contest and Work Capacity of the Judoist. Judo Union (1987).

6.5. Additional references

- [25] Kang SJ & Cho JH. Analysis of Determinants of Competition for Asian Games Winners. Sports Science Research Project Comprehensive Report(II), 89-156 (1986).

7. Appendix

7.1. Authors contribution

	Initial name	Contribution
Lead Author	JP	<ul style="list-style-type: none"> -Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/>
Corresponding Author*	CH	<ul style="list-style-type: none"> -Make a significant contribution to collection <input checked="" type="checkbox"/> -Final approval of the paper <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/> -Play a decisive role in modification <input checked="" type="checkbox"/>
Co-Author	WC	<ul style="list-style-type: none"> -Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/> -Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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Effect of Fun of Elderly Women Participating in Health Qigong on RESILIENCE

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Abstract

Purpose: This study was conducted to find out how each factor of the health Qigong training fun variable of elderly females has a structural relationship to the resilience variable. Recent studies showing that among the health promotion behaviors of the elderly, participation and activation of sports activities are the most effective as an alternative to active health intervention in order to increase health life, have highlighted the importance of physical activity in old age.

Method: In order to analyze the relationship between the health Qigong training fun and resilience of elderly women, a total of 140 questionnaires were conducted as final analysis data. Specifically, first, correlation analysis was conducted to analyze the intensity and direction between the fun variable and the resilience variable. Second, multiple Regression Analysis was conducted to analyze the relationship between the independent variable, fun, and the dependent variable, resilience. All statistical levels were verified at $p < .05$.

Results: As a result of the first study, the five sub-factors of the fun variable were found to be statistically significant in both the resilience sub-factor and the causal relationship. Second, it was analyzed that the sub-factors of the fun variable had an influence at the statistical significance level in the overall relationship with the resilience variable. In the standardization coefficient representing the relative contribution of the independent variable, interpersonal relations, family support, and learning relations were in the order.

Conclusion: This study clarifies that the fun factors of Health Qigong performed by elderly women have a significant relationship with self-regulation ability, interpersonal relationship ability, and positivity in the life of old age. These results confirmed that oriental Qigong is a scientifically appropriate program as an elderly health program, and acts as an effective mechanism to maintain and restore the mental and physical health of the elderly women, and further improve them

[Keywords] Fun, Elderly Women, Health Qigong, Resilience, Old Life

1. Introductions

In a rapidly changing modern society, many people encounter situations where they conflict and drift about their relationship with others and their own path. These situations are expressed as stress, and life skills to cope with in everyday life are required for psychological health. In general, stress refers to the body's response to the stress factor that causes it[1][2]. Factors that cause psychological reactions to stress include emotional temperament, emotional intensity, and self-esteem, and by these factors, psychological state may go from the alert stage to the resistance stage to exhaustion[3][4].

The human body continuously tries to maintain a state known as homeostasis so that the physical and psychological stability system is in a stable or equilibrium state. However, if the stress persists for a long time and becomes stronger due to external stimuli, a state of lack of

balance occurs and the body's defenses are activated. If this condition persists for a long time, physical reactions such as skin problems, headaches, gastrointestinal problems, changes in the immune system, high blood pressure and heart disease follow[5][6]. These stresses are not exclusive to the younger generation, but are common phenomena that occurs in all people throughout their lives. In particular, in the modern society, where life expectancy has increased due to rising living standards and the development of medical technology, stress-related problems may not be an exception for the elderly[7][8].

IAG(International Association of Gerontology) divides the definition of the elderly into five categories: first, the organizational function that can properly adapt to changes in the environment decreases; second, the body's ability to integrate itself decreases; third, people who are in a period of decline in organs, tissues, and functions of the human body; fourth, those whose adaptive ability of the living body is gradually deficient; and fifth, lastly, those who are unable to adapt properly to environmental changes due to the decline in the organization's reserve capacity[9]. In this way, in old age, physical, psychological, emotional, physiological, and social changes are greatly experienced, and various problems such as disease, loss of social role, and generational conflict are encountered.

Currently, Korea's life expectancy is 79.4 years for men and 85.7 years for women, which is 1.4 years higher for men and 2.3 years for women than those of OECD member countries, and the life expectancy excluding the period of illness is expected to continue to increase. In particular, from the present time when the generation named as baby boomers enter the mass elderly generation, the super aging society where more than 20% of the population is composed of the elderly has arrived[10][11]. Therefore, the health problems of the elderly in our country are appearing as an important problem at the present time, not a story of the future. Therefore, this study aims to find out the effect of fun of elderly women participating in Health Qigong on resilience of coping with stress. Health Qigong is known as an Oriental exercise method that can be practiced by meditating in a small space regardless of time and place, and it has a higher understanding of intimacy and health compared to other Western sports because it is based on Chinese medicine[12][13][14]. The long-standing pore movement is characterized by its slow and simple movement, which makes it easy to learn and has excellent health effects[15][16].

Fun is a very comprehensive concept that includes both internal and external motivations as positive emotional reactions felt during assignment activities, and a very light feeling obtained from the disappearance of mental and physical stress spreads throughout the body and mind, making movement easier. It is felt and enjoyed by itself[17]. Also, the focus of this study as a dependent variable is resilience. Resilience is defined variously by scholars in terms of mental immunity to stress and adversity, the ability to grow mentally by overcoming it and adapting to the environment when faced with difficulties, and the ability to convert adversity into the power and experience of growth and advance, and so on[17][18]. Therefore, in this study, we aim to find out how each factor of the elderly women's Health Qigong fun variable has a structural relationship to the resilience variable. The results of this study can be used to find out whether Health Qigong is a scientifically suitable program as a health program for the elderly, and it will serve as an opportunity to confirm how the fun factor of Health Qigong works on resilience.

2. Methods

2.1. Participant

Participants in the study were selected as elderly women participating in the elderly exercise class conducted by the Welfare Center located in Siheung-si, Gyeonggi-do, and the National Health Insurance Service(NHIS) in Korea, and the participants were selected by the convenience sampling method and the judgmental sampling method. As for the general character-

istics of the study subjects, of the total 140 subjects, 75 to 84 years old accounted for the most 46.4% with 65 people, 65 to 74 years old for 34.3% with 48 people, and 85 years old for 19.3% with over 27 people.

2.1. Instruments

In this study, in order to verify the influence of the fun of the elderly women participating in Health Qigong on resilience, the measuring tool for fun set as an independent variable was modified, supplemented and used to fit the survey of elderly women based on the research by Choi & Lee[19]. Five factors were extracted for the fun of the elderly women participating in Health Qigong, and it was found that they had good explanatory power of 73.767%. Specifically, the questions for each factor consisted of 5 questions on physical fitness and health, 5 questions for praise and enjoyment, 4 questions for family support, 4 questions for interpersonal relations, and 4 questions related to learning, and the reliability of these factors was Cronbach's α 0.915, 0.847, 0.826, 0.805, 0.939, indicating reliable levels.

In order to verify the effect of fun of elderly women participating in Health Qigong on resilience, the Korean-style resilience index(Korean Resilience Quotient-53; KRQ-53) developed by Kim which is based on Reivich & Shatte's RQT(The Resilience Quotient Test) was used as a measure of resilience as a dependent variable[20][21]. The sub-factors of resilience were classified into three categories: self-regulation ability, interpersonal relationship ability, and positivity. The items on the resilience of elderly women participating in Health Qigong were extracted into 3 factors and 29 items, and it was found to have 69.875% of explanatory power. Specifically, the questions for each factor consisted of 9 questions for self-regulation ability, 9 questions for interpersonal relationship ability, and 11 questions for positivity, and the reliability for these factors was judged to be reliable, as Cronbach's α showed self-regulation ability of .874, interpersonal relationship ability of .843, and positivity of .786.

2.1. Data analysis

In order to analyze the relationship between the health Qigong training fun and resilience of elderly women, a total of 140 questionnaires were conducted as final analysis data. Specifically, first, correlation analysis was conducted to analyze the intensity and direction between the fun variable and the resilience variable. Second, multiple Regression Analysis was conducted to analyze the relationship between the independent variable, fun, and the dependent variable, resilience. All statistical levels were verified at $p < .05$.

3. Results

3.1. Correlation analysis of measurement variables

In order to confirm the direction of the fun and resilience of the elderly women participating in the Health Qigong program, the results of the Correlation Analysis were shown in <Table 1>. The relationship between the sub-factors of fun and resilience showed a positive(+) correlation, and the enjoyment factor of fun and the interpersonal ability factor of resilience($r=.588^{**}$) showed the highest correlation. And learning-related factors of fun, self-regulating ability factor of resilience($r=.480^{**}$), physical strength and health factor and interpersonal ability factor($r=.463^{**}$), interpersonal relationship factor and interpersonal ability factor($r=.437^{**}$), the family support factor and the learning-related factor($r=.409^{**}$) showed a positive correlation in that order, indicating that the conceptual relationship between each variable is high. Looking at the results of this correlation analysis, it can be said that the positive relationship between the variables is shown and there is no problem of multicollinearity.

Table 1. Analysis results of the correlation between fun and resilience.

Division	1	2	3	4	5	1	2	3
Physical fitness and health	1							
Pleasure	.339*	1						
Fun								
Family support	.122	.406**	1					
Interpersonal factor	.395**	.295*	.131	1				
Learning-related	.299**	.120	.409**	.378*	1			
Resilience								
Self-regulation ability	.265*	.573**	.078	.107	.480**	1		
Interpersonal ability	.463**	.588**	.294**	.437**	.367**	.256*	1	
Positivity	.372*	.122	.208*	.278**	.037	.276**	.292**	1

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

3.2. Analysis on the influence of the fun and self-regulation ability of elderly women participating in health qigong

Multiple Regression Analysis was conducted to analyze the effect of the fun factors of the elderly women participating in Health Qigong on the factors of self-regulation among the factors of resilience. The analysis shows that the F statistic is 15.735 and the significance is 0.031, which significantly describes the effect of the self-regulating factor at the significance level of 0.05, with 46% of the total changes in the factor being self-regulating being explained by the independent variable. Durbin-Watson was 1.839, showing no autocorrelation. Looking at the results of testing the statistical significance of the dependent variable of the individual independent variable, the independent variables that significantly influenced the significance level of .05 were the physical fitness and health factors (t=2.477, p=0.42), and the pleasure factor (t=3.705, p=.002), interpersonal factors (t=4.652, p=.000), learning-related factors (t=2.056, p=0.32). According to the standardization coefficient representing the relative contribution of the independent variable, enjoyment ($\beta = .360$), interpersonal relationships ($\beta = .260$), learning-related ($\beta = .231$), and so on. <Table 2> below shows the results of Multiple Regression Analysis of fun for self-regulation.

Table 2. Multiple regression analysis of fun for self-regulation ability.

Dependent variable	Independent variable	B	SE	β	t	Probability of significance
Self-regulation ability	Constant	4.108	.605		6.791	.000
	Physical fitness and health	.180	.088	.194	2.477	.042
	Pleasure	.059	.084	.360	3.705	.002
	Family support	.078	.069	.095	1.123	.263
	Interpersonal factor	.046	.070	.260	4.652	.000

Learning-related	.112	.076	.231	2.056	.032
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Note: F=15.735, R²=.461, Durbin-watson=1.839, p<.05.

3.3. Analysis on the influence of the fun and interpersonal ability of elderly women participating in health qigong

The results of the analysis of the fun and interpersonal skills of elderly women participants in Health Qigong training show that the F statistic is 13.305, with a significant probability of .000, and the independent variable included in the model significantly describes the impact on interpersonal skills factors at significance level 0.5.33% of the total variation in interpersonal capacity factors is explained by the independent variables included in the model. Durbin-Watson was 2.153, indicating no autocorrelation.

Looking at the results of testing the statistical significance of the dependent variable of individual independent variables, the independent variables that significantly affect the significance level of .05 were the pleasure factor(t=4.286, p=.001), and the family support factor(t=3.024), p=.003), interpersonal relationship factors(t=4.698, p=.000), learning-related factors(t=3.533, p=.001). According to the standardization coefficient representing the relative contribution of independent variables, interpersonal relationships(β =.366), enjoyment(β =.352), learning-related(β =.265), and so on.

Table 3. Results of multiple regression analysis of fun on interpersonal relationship ability.

Dependent variable	Independent variable	B	SE	β	t	Probability of significance
Interpersonal ability	Constant	2.048	.645		3.174	.002
	Physical fitness and health	.011	.094	.009	.119	.606
	Pleasure	.115	.090	.352	4.286	.001
	Family support	.223	.074	.217	3.024	.003
	Interpersonal factor	.352	.075	.366	4.698	.000
	Learning-related	.286	.081	.265	3.533	.001

Note: F=13.305, R²=.332, Durbin-watson=2.153, p<.05.

3.4. Analysis of the relationship between fun and positivity of elderly women participating in health qigong

Looking at the results of the fun and positive analysis of the elderly women participating in the Health Qigong training, the F statistic is 15.185 and the significance probability is .001, indicating that the independent variables included in the model significantly affect positive factors at the significance level of 0.05. 36% of the total change in positive factors is explained by the independent variables included in the model. Durbin-Watson was 1.993, indicating no autocorrelation.

If you look at the results of testing the statistical significance of dependent variables for individual independent variables, the independent variables that significantly affect the significance level of 0.05 are the physical and health factors(t=2.120, p=.047), fun factors(t=1.940, p=.050), family support factors(t=2.228, p=.028), interpersonal factors(t=3.398, p=.001), learning-related factors(t=3.421, p=.000) was significantly shown in the overall independent variable. Looking at the standardization coefficient representing the relative contribution of the independent variable, it was found that learning-related(β =.336), interpersonal relationships(β =.302), physical fitness and health(β =.265) were in order.

Table 4. Results of multiple regression analysis of fun on positivity.

Dependent variable	Independent variable	B	SE	β	t	Probability of significance
Positivity	Constant	4.218	.483		8.741	.000
	Physical fitness and health	.050	.070	.265	2.120	.047
	Pleasure	.130	.067	.258	1.940	.050
	Family support	.123	.055	.182	2.228	.028
	Interpersonal factor	.190	.056	.302	3.398	.001
	Learning-related	.225	.060	.336	3.421	.000

Note: $F=15.185$, $R^2=.368$, Durbin-watson=1.993, $p<.05$.

3.5. Analysis of the effect of fun of elderly women participating in health qigong on resilience

Looking at the overall analysis of the fun of women in Health Qigong training on resilience, the F statistic is 13.170 and the probability of significance is .000, which explains the effect of the recovery elasticity variable at the significance level of 0.05. 39% of the total variation in the recovery elasticity variable is explained by the independent variables included in the model. Durbin-Watson was found to be 2.019 and not self-correlated.

Looking at the results of testing statistical significance for dependent variables of individual independent variables, independent variables have been significantly shown in pleasure factors ($t=2.288$, $p=.024$), family support factors ($t=3.760$, $p=.000$), interpersonal factors ($t=4.424$, $p=.000$), and learning-related factors ($t=3.588$, $p=.006$) except for physical and health factors ($t=1.513$, $p=.133$). Looking at the standardization coefficient representing the relative contribution of the independent variable, it was found that interpersonal relations ($\beta=.355$), family support ($\beta=.277$), and learning-related ($\beta=.214$) were influential in order.

Table 5. Results of multiple regression analysis of resilience to fun.

Dependent variable	Independent variable	B	SE	β	t	Probability of significance
Resilience	Constant	3.510	.326		10.781	.000
	Physical fitness and health	.071	.047	.124	1.513	.133
	Pleasure	.103	.045	.169	2.288	.024
	Family support	.140	.037	.277	3.760	.000
	Interpersonal factor	.167	.038	.355	4.424	.000
	Learning-related	.114	.041	.214	3.588	.006

Note: $F=13.170$, $R^2=.394$, Durbin-watson=2.019, $p<.05$.

4. Conclusion and Recommendations

This study was conducted to find out how each factor of the health Qigong training fun variable of elderly females has a structural relationship to the resilience variable. Recent studies showing that among the health promotion behaviors of the elderly, participation and activa-

tion of sports activities are the most effective as an alternative to active health intervention in order to increase health life, have highlighted the importance of physical activity in old age.

In general, fun is a concept that encompasses both intrinsic and extrinsic motivations as positive emotional responses felt during an activity, and fun is a major factor in the involvement of all physical activities[22][23]. Resilience elasticity explains in a comprehensive sense that 'the ability to overcome difficulties and grow mentally by adapting to the environment', the ability to effectively utilize internal and external resources, or to transform adversity into mature experiences[18][24][25]. Therefore, the investigation of the relationship between the fun and resilience of the elderly women's participation in Health Qigong training can reveal causal and empirical content about the elderly's health intervention and stress overcoming.

Looking at the results of the study, according to the results of the Multiple Regression Analysis conducted to confirm the influence of the independent variable, the fun, on the dependent variable, the resilience, the improvement of physical strength and health intervention through the Health Qigong training has a positive effect on self-regulation mechanisms such as controlling emotions, relieving stress and problem solving. In other words, the fun of Health Qigong training can improve interpersonal skills, and it is said that it is positively acting on improving skills and the joy of participation, relationships with family members, meeting new people, cooperation, and various experiences. These results are similar to those of previous studies that analyzed the factors related to the elderly's participation in sports activities[26][27][28].

Health Qigong is a traditional health exercise program based on the principles of Chinese medicine. It is a slow exercise method that emphasizes oriental slow breathing and movement [11][29][30]. This study clarifies that the fun factors of Health Qigong performed by elderly women have a significant relationship with self-regulation ability, interpersonal relationship ability, and positivity in the life of old age. These results confirmed that oriental Qigong is a scientifically appropriate program as an elderly health program, and acts as an effective mechanism to maintain and restore the mental and physical health of the elderly women, and further improve them.

Falls and injuries are the greatest risk factors for the elderly's continuing exercise. Therefore, in future studies, research and development of a safe Health Qigong program for health intervention for the elderly will be needed, and the scope should be expanded not limited to female elderly, and expanded to all elderly including male elderly.

5. References

5.1. Journal articles

- [1] Seo IK & Cho HC. Mediation Effects of Depression in the Relationship Between Stress and Suicidal Ideation of the Elderly: A Comparative Study on People Who Live Alone and Those who Live with Family. *Korean Journal of Gerontological Social Welfare*, 61, 135-162 (2013).
- [2] Jeong HS & Maeng JH. The Influence of Stress of Critical Life Events on Self-neglect in Elderly Living Alone: The Mediating Effect of Sense of Mastery. *Korean Journal of Gerontological Social Welfare*, 75(3), 63-83 (2020).
- [3] Paek HH & Jeong M. Effects of Physical Activity in the Elderly with Osteoarthritis on Stress and Health-related Quality of Life(EQ-5D): Using Data from the 2018 National Health and Nutrition Survey. *Journal of the Korea Entertainment Industry Association*, 14(5), 267-276 (2020).
- [4] Lee JH & Yang SJ. On the Moderating and Mediating effects of Ego-integrity and Resilience in the Relationship Between Daily Stress and Depression in the Elderly. *The Korean Journal of Developmental Psychology*, 32(4), 151-169 (2019).

- [6] Jeong JH & Pyo KS & Kim JS. The Earthquake-related Stressors and Mediators of the Elderly Living Alone: Focusing on the Elderly in Pohang. *Korean Journal of Gerontological Social Welfare*, 74(2), 35-60 (2019).
- [7] Kim BG. The Effect of Stress on Depression of the Elderly: Focusing on the Moderating Effect of Social Support and Mediating Effect of Sense of Self-respect. *Journal of The Korea Contents Association*, 19(6), 281-291 (2019).
- [8] Seo IK & Lee YS. The Effect of the Social Resources of the Elderly Living Alone on the Suicidal Ideation and the Mediating Effect of the Stress by the Multiple Group Analysis: Comparison Between Urban and Rural Areas. *Health & Welfare*, 21(1), 75-96 (2019).
- [10] Jung JS & Lee JB & Oh JM. The Relation Between the Female Elderly's Satisfaction of Oriental Medicine Qigong Exercise Program Participation and Successful Aging Perception. *International Journal of Human Movement Science*, 12(3), 33-46 (2018).
- [11] Park SH & Lee JB & Byeon YS. A Phenomenological Study on the Elderly's Experience of Participating in National Based Health Exercise. *Public Value*, 5(2), 23-31 (2020). [Article]
- [12] Lee SH & Lee JB & Park JH. Universality and Differentiation on the Sports Training Methods of Health Qigong Exercise and Yoga. *International Journal of Sport*, 1(1), 20-25 (2016). [Article]
- [13] Byeon YS & Lee JB. Chinese Health Qigong's Healing Principle and Kinematic Discourse. *International Journal of Martial Arts*, 5(2), 31-37 (2020). [Article]
- [14] Kim ES & Park JS. Effects of Qigong Training on Body Composition, Fitness and Bone Mineral Density in the Elderly. *International Journal of Martial Arts*, 3(1), 20-27 (2018). [Article]
- [15] Park JS & Park JH. Effect of 12-week Senior Qigong Training on Blood Pressure and Blood Lipid Concentration. *International Journal of Sport*, 3(1), 29-39 (2018). [Article]
- [16] Lee JB. Application Process of Qigong Training for Elders: A Grounded Theory Approach. *International Journal of Human Movement Science*, 6(1), 217-235 (2012).
- [17] Luthar SS. Vulnerability and Resilience: A Study of High Risk Adolescents. *Child Development*, 62, 600-616 (1991).
- [18] Polk LV. Toward a Middle-range Theory of Resilience. *Advances in Nursing Science*, 19, 1-13 (1997).
- [19] Choi YS & Lee SB. The Relationship Between Fun Factors and Health-related Quality of Life of Elderly Women Participating in the Oriental Medicine Qigong Movement. *The Journal of Natural Healing*, 3(1), 9-20 (2018).
- [22] Lee SH & Kwak JH & Seok R. Structural Relationship Between Fun Factors, Physical Self-efficacy, and Subjective Happiness of the Elderly Participating in Life Sports. *The Korean Journal of Growth and Development*, 28(4), 537-544 (2020).
- [23] Hwang JH. Constructive Relationships among Sport Enjoyment Source, Participations Motivation, Leisure Satisfaction, and Exercise Consistent Intention of the Old Participants in Physical Fitness. *Korean Journal of Sports Science*, 22(5), 825-836 (2013).
- [24] Nam BH & Jung SS. Affect the Characteristics of the Elderly on the Quality of Life -The Resilience and Social Activity Mediated Effects-. *Journal of Social Welfare Management*, 3(1), 279-301 (2016).
- [25] Waters E & Sroufe LA. Social Competence as Developmental Construct. *Developmental Review*, 3, 79-97 (1983).
- [26] Kwon JY. Improvement and Promotion Plan of Dance Fitness Program for Senior. *Journal of the Korean Society for Wellness*, 13(2), 43-56 (2018).
- [27] Kim JS & Kim CJ. Effect of a Physical Activity Promoting Program Based on the IMB Model on Obese-metabolic Health Outcomes among Obese Older Adults with Knee Osteoarthritis. *Journal of Korean Academy of Nursing*, 50(2), 271-285 (2020).
- [28] Kim DJ & Oh TH. Relationship Between Social Support, Health Promoting Behaviors and Happiness of Elderly People participating in Physical Activity. *Journal of the Korean Society for Wellness*, 14(1), 301-312 (2019).
- [29] Lee JB & Lee DJ. Values of Qigong as Elderly Exercise. *The Korean Society of Growth and Development*, 23(1), 77-82 (2015).

[30] Lee J K & Lee JB & Lee DJ & Park SU. A Proposal for Setting the Direction for Scientific Research Methods on Qigong Exercise. *International Journal of Human Movement Science*, 10(1), 5-19 (2016).

5.2. Books

[5] Lee JB & Cho HT. Preventive and Management of Back Pain. Aone (2015).

[9] Yang YN & Kim HK & Kim MS & Jeong SD. Elderly Welfare Theory. Book Publishing Community (2008).

[20] Reivich K & Shatte A. The Resilience Factor: Seven Essential Skills for Overcoming Life's Inevitable Obstacles. Broad way Books (2002).

[21] Kim JH. Resilience: A Delightful Secret that Turns Trials into Good Luck. Wisdom House (2011).

6. Appendix

6.1. Authors contribution

	Initial name	Contribution
Lead Author	IY	-Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/>
Corresponding Author*	JL	-Make a significant contribution to collection <input checked="" type="checkbox"/> -Final approval of the paper <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/> -Play a decisive role in modification <input checked="" type="checkbox"/>
Co-Author	JK	-Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/> -Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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The Impacts of the Winter Olympic Games on SPORT Tourism: A Systematic Review

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Abstract

Purpose: Sport Tourism is a driving force for sustainable economic development of tourism destinations. The Winter Olympic Games is a catalyst for this momentum. In order to clearly sort out the impacts of the Winter Olympic Games on sport tourism of the host city, this paper employed a systematic review. This study allowed to provide some enlightenment for the development of sport tourism in the host cities of the Winter Olympic Games in the future, and proposed the corresponding reference for the continued research in this field.

Method: This paper adopted systematic review, more rigorous than the traditional literature review, to explore the impacts of the Winter Olympic Games on sport tourism in host cities. Through the literature search of selected data, 369 articles in English language was retrieved and finally narrowed down to 17 articles according to the set research criteria. The information extracted from the remaining articles was used to present the types of impacts the Winter Olympics have had on sport tourism in host cities and in how it impacted.

Results: Through the review and summary of the literature, current Winter Olympic Games had both positive and negative impacts on sport tourism in host cities. According to its specific manifestation, this paper classified the impact factors. Positive impacts could be summarized into three parts: improving sport tourism revenue, improving city image and promoting urban reform. Negative impacts were mainly reflected in two aspects: the excessive cost leads to excessive burden and the unsatisfied sustainable development sustainable development.

Conclusions: This paper clearly stressed that the Winter Olympic Games had both positive and negative impacts on the development of sport tourism in host cities, and further analyzed the aspects in which these impacts are found. Based on research results, it proposed the enlightenment on the development planning and ecological environment in order to ensure the sustainable development of sport tourism for the upcoming Beijing Olympic Games. It is a pity that there were still some limitations in the research scope and methods, and it hoped that they can be solved in the following research.

[Keywords] Winter Olympic Games, Sport Tourism, Sustainable Development, Economic Impact, Systematic Reviews

1. Introduction

Sport Tourism is a type of tourism activity that people take part in or watch, which focus on sports[1]. It mainly contains three types: Sport Event Tourism, Celebrity and Nostalgia Sport Tourism, and Active Sport Tourism[2]. Since the World Tourism Organization(UNWTO) and the International Olympic Committee(IOC) held the First World Conference on Sport and Tourism in Barcelona in February 2001, the relationship between sport and tourism were connected close and the benefits and contributions of sport tourism were known by the world[3]. Therefore, sport tourism has become one of the fastest developing sectors in the tourism industry

in recent years[4]. More and more tourists were interested in sport activities during their trips. They were attracted as participants or spectators by various kinds and sizes of sport events. The tourist attractions add their local distinctiveness to provide authentic local experiences[5]. In particular, the hosting of the Olympic Games and other mega sport events have become a catalyst to promote the development of sport tourism[6].

As a typical event, the Winter Olympic Games was the sum of a series of important activities related to the Winter Olympics in a period of time, which directly promoted the development of the city and sport tourism[7]. Although its influence was not as great as that of the Summer Olympic Games[8], the success of the Winter Olympics could not be ignored in promoting the development of sport tourism in host cities. After the 1992 Winter Olympics in Albertville, France, the number of winter visitors increased significantly the following year[9]. After the 2002 Salt Lake City Winter Olympics, Utah experienced a surge in winter sport tourism, with a record number of ski visitors in 2005. According to statistics, Utah received 4.1 million skiers in 2005, compared to 3 million skiers in 2002[10]. However, with the further study, some scholars believed that the Winter Olympic Games also led to the unstable development of sport tourism in host cities. Although the 2014 Winter Olympic Games brought a new atmosphere to the sport tourism in Sochi at the beginning, it subsequently became a burden on the national finance, with the annual interest and tax income from operation, maintenance and abandonment of about 1.2 billion US dollars, directly leading to the decline of domestic support for this project[11]. A lot of debate have been triggered about the impact of sport tourism in the host cities for the similar cases existing. Many scholars have also studied this issue and made a lot of achievement. However most studies focused on the impacts of a certain Winter Olympics on sport tourism in host cities. Only few studies analyzed the impacts of every Winter Olympics. Even though a few studied on the impacts of multiple Winter Olympics, they aimed at urban heritage, urban regeneration and others. Therefore, this paper believes that it is necessary to study how the Winter Olympic Games impacted the host city's sport tourism. This paper was generated in this scientific and empirical context.

In order to clearly sort out the impacts of the Winter Olympic Game on sport tourism of host cities, systematic review was used in this study as the research method to explore and analyze the impacts of the previous Winter Olympics on sport tourism of host cities, and discussed the results. Some enlightenment were proposed for the development of sport tourism in the host cities holding Winter Olympic Games in the future, and relevant references for the continued research in this field were also conducted.

2. Research Methods

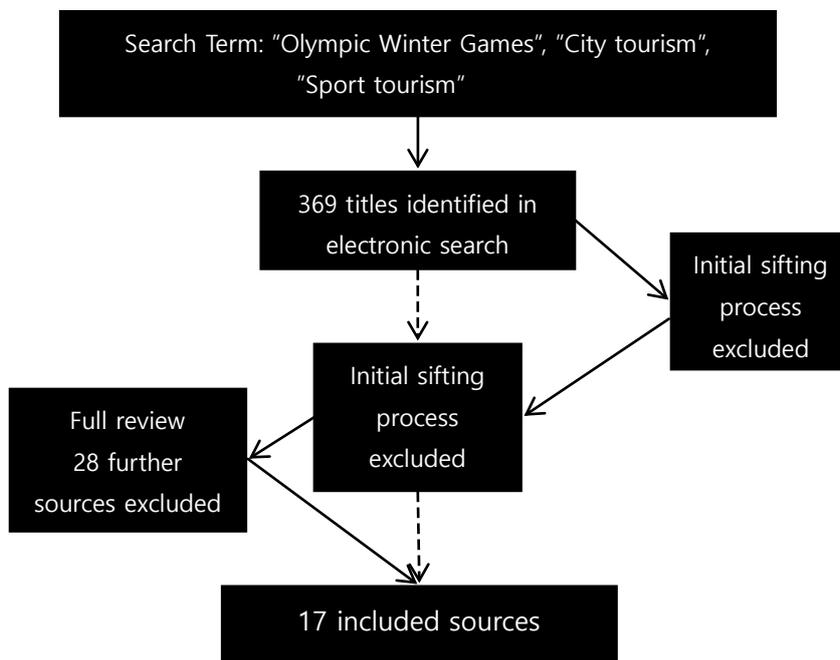
Systematic review aims to provide a complete, exhaustive summary of current literature relevant to a research question[12]. There are two main types of literature review: narrative literature reviews and systematic reviews. Compared with traditional literature review methods, systematic review is more scientific and objective, which can ensure the accuracy of results[13]. The systematic review can be divided into qualitative and quantitative comments. Qualitative research is mainly the qualitative evaluation and summary of the results and conclusions of the original literature, while quantitative research integrates the results of the literature with statistical methods, also known as Meta-analysis[14]. Pickering and Byrne(2014) recommended quantitative literature review for “emerging areas and for areas where methodological approaches are so diverse that there is limited potential for other types of quantitative reviews”[15]. Sport tourism is a relatively new area of academic research that spans multiple disciplines, topics, and methodological approaches and quantitative literature reviews. Therefore, to explore the impacts of the Winter Olympic Games on sport tourism in host cities, this paper took Winter Olympic Games and sport tourism as research objects, and

puts forward the following research questions: What kind of impacts will the Winter Olympics have on sport tourism in host cities? What are the specific aspects of these effects?

2.1. Search strategy and study inclusion criteria

As an important part of systematic review, literature standard plays a decisive role in the final result. The data on the impact of the Winter Olympics on sport tourism came from a broader systematic review. The initial search was conducted via three databases: the WOS Core Collection, Taylor & Francis, and EBSCO. Considering the influence of the PyeongChang Olympic Games, the Korean Journal Database has also been added to the WOS, but only as a reference. Although the research on sport tourism began in the early 1990s, people began to organize the Winter Olympics in large urban areas as a means of promoting development in the early 21st century[16], so the literature search time was set after 2001. Literature search was conducted with "Winter Olympics", "urban tourism" and "sport tourism" as key words. The initial search was conducted by a researcher. The limitation of data collection process was set by (1)Articles in English and published in journals after 2001; (2)They discussed the relationship between the Winter Olympic Games and sport tourism of host cities or the influence of the Winter Olympic Games on sport tourism of host cities; (3)The thesis was related to the topic and drew a clear conclusion. The initial search returned 369 articles and 324 were eliminated based on title and abstract by one researcher. The remaining 45 articles were cross-examined by two other researchers. Through full text screening, it narrowed down to 17 articles. Details are shown in <Figure 1>.

Figure 1. Process followed to construct literature sample.



The following information were collected from the fully scanned papers: (1)The impact types of winter Olympic Games on sport tourism, (2)The specific performance of winter Olympic Games on sport tourism in host cities. The information above were collected and scanned by two researchers and reexamined by another one. All the information were collected by a single researcher. The information extracted was identified by another researcher. As shown in the following <Table 1>.

Table 1. The information of summary.

No.	Author	Year	Topic relevant	Impact type	Corresponding contents
1	Hillier	2006	Yes	Negative	- Long-term benefit and comprehensive benefit are not ideal
2	Andranovith & Burbank	2011	Yes	Positive	- Expansion of the offer and quality of sport infrastructures
3	Bondonio & Guala	2011	Yes	Positive	- Increasing the attractions for both its citizens and visitors - Successfully reshaped a cultural city
4	Dansero & Putilli	2010	Yes	Positive	- Reconversion of certain Olympic sites - Enhancement of transportation infrastructures
5	Dansero & Putili	2010	Yes	Negative	- Sport wasteland
6	Bondonio & Guala	2011	Yes	Positive	- Improve city image - Increasing the attractions for both its citizens and visitors
7	Black	2007	Yes	Negative	- Increase problem of poverty and homeless - Increase financial burden
8	Mccarthy	2012	Yes	Negative	- Long-term benefit and comprehensive benefit are not ideal
9	Pentifallo & Wynsberghe	2015	Yes	Positive	- Development of environmental standards - Improve city image - Increasing visitors
10	Wynsberghe Et al.	2012	Yes	Positive	- Promote urban change - Urban regeneration
11	Teigland	2012	Yes	Negative	- 40% of the full-service hotels have gone bankrupt
12	Alberts	2011	Yes	Positive	- Expansion of the offer and quality of sport infrastructures - Promote urban change
13	Müller	2014	Yes	Mix	- Expansion of the offer and quality of sport infrastructures - Improve city image - Promote urban change - Increase financial burden - Long-term benefit and comprehensive benefit are not idea
14	Kaplanidou & Karadakis	2010	Yes	Positive	- Expansion of the offer and quality of sport infrastructures - Urban regeneration
15	Sant & Mason	2015	Yes	Positive	- Expansion of the offer and quality of sport infrastructures - Promote urban change
16	Wood & Meng	2020	Yes	Positive	- Promote the growth of tourism economy - Increase in tourism demand
17	Lee	2020	Yes	Negative	- The most development and construction projects are too large and too expensive to sustain in the post-event setting - Leisure industry in PyeongChang is at odds with the surrounding local communities

3. Results

Through literature review, it found that the current Winter Olympic Games had both positive and negative impacts on host cities. According to its specific performance, this paper classified the impact factors. Positive impacts can be summarized into three parts: improving sport tourism revenue, improving city image and promoting city reform. Negative impacts were mainly reflected in two aspects: the excessive cost leads to excessive burden and the unsatisfied sustainable development. In order to make it clearer, the mixed impacts were bro-

ken down and put into positive and negative impacts respectively. See Table 2 for details. In order to understand these contents deeply, this article will be elaborated in detail.

Table 2. Summary of impacts.

Impact type	Category	Frequency	Description
Positive impact	Improving sport tourism revenue	4	- Increasing visitors - Increase in tourism demand
	Improving city image	4	- Reshaped a cultural city. - Improve city image.
	Promoting city reform	7	- Expansion of the offer and quality of sport infrastructures - Reconversion of certain Olympic sites - Development of environmental standards - Promote urban change - Urban regeneration
Negative impact	Excessive cost leads to excessive burden	2	- Increase financial burden
	Unsatisfied sustainable development	6	- Long-term benefit and comprehensive benefit are not ideal - Sport wasteland - Increase problem of poverty and homeless - 40% of the full-service hotels have gone bankrupt - The most development and construction projects are too large and too expensive to sustain in the post-event setting - Leisure industry in PyeongChang is at odds with the surrounding local community

3.1. Positive impacts of winter olympic games on sport tourism

3.1.1. Improving sport tourism revenue

The result showed that the Winter Olympic Games increased the sport tourism revenue in host cities mainly by increasing tourists and stimulating the positive growth of sport tourism demands. The increase in tourists was undoubtedly the most direct means to increase the revenue of sport tourism. The increase in the demands for sport tourism was a necessary condition for the increase in tourists. This result was also confirmed in the literature investigated in this paper. Andranovich and Burbank(2011) found that after Salt Lake City held the Winter Olympic Games, the tourists increased by 19% compared with the same period last year[17], which created great benefits for the economic growth of local sport tourism. Dansero and Puttilli(2010) pointed out that the Winter Olympics might not bring long-term changes to the host city's international tourism industry, but the Turin Olympic Game stimulated public's understanding of this issue[18]. Bondonio and Guala(2011) proposed that during the four years before the Winter Olympic Games, the number of tourists living in hotel increased and reached the peak in 2006, which provided a good boost for the development of local sport tourism economy[19]. The PyeongChang Winter Olympics was also considered to have contributed to the growth of tourism economy[20]. So, according to successful cases, the Winter Olympics can indeed generate significant revenue for the host city's sport tourism and affiliated industries, which is one of the main motivations for these cities to host the Games.

3.1.2. Improving city image

There were two main ways to improve the image of the host cities by Winter Olympic Games: enhancing the city's cultural literacy and promoting the positive image of the city. Tourists could get better sport tourism services and experience via the two ways. It was a direct means to promote the development of sport tourism. Like a virtuous cycle, they contributed to the development of sport tourism through their mutual positive influence. The media

also played a crucial role in this process. Host cities of the Winter Olympics used the Olympic as media to create a positive image of themselves as a tourist destination in order to promote local sport tourism. The result showed that this point was confirmed by many articles, such as: Ferrari and Guala confirmed this idea in 2015, believing that the Winter Olympics, as a mega national event, could enhance the reputation of a city and also build a brand image[21]. Pentifallo and Wynsberghe(2015) also agreed on this point in their research in the same year[22]. In addition, they believed that the Winter Olympics had a positive impact on the appearance of the host cities and the cultural literacy of residents. Full Equipped sport facilities could improve tourists' evaluation of sport tourism. In general, a successful Winter Olympics can promote a city's image, but it also can be tarnished by bad behavior. As a consequence, the Winter Olympics can be a double-edged sword for the image of host cities, which should be paid attention to by host cities.

3.1.3. Promoting city reform

The large-scale construction of sport facilities was a normal part of hosting the Winter Olympics and the fundamental reason why the Winter Olympics could promote urban renovation. This process is mainly reflected as, expansion of the offer and quality of sport infrastructures, Reconversion of certain Olympic sites, Development of environmental standards, Promote urban change and Urban regeneration. Expansion of the offer and quality of sport infrastructures and Improving city image was a bit similar, but there was no denying that it does drive the transformation of the city. The others were the direct ways for the Olympics to promote urban reform. As we all know, the Winter Olympic Games could bring great changes to the local urban construction, which was of great benefit to urban renewal[23]. The result in this paper also showed that many scholars agreed with this point by research, such as, Alberts(2011) believed that the exhibition of Olympic stadiums in Salt Lake City and tour guides generated significant tourism benefits for the local economy[24]. At the same time, it also made a great contribution to city renewal. Kaplanidou and Karadakis(2010) pointed out that the Winter Olympic Games were indeed beneficial to the transformation of host cities and thus promoting the development of sport tourism[25]. Sant and Mason(2015) also agreed on this point after research[26].

3.2. Negative impacts of winter olympic games on tourism

3.2.1. The excessive cost leads to excessive burden

A large amount of fund in the early stage was invested in previous Winter Olympic Games. And the maintenance costs of venues and facilities after the Games are also a severe test of the host city's finance. Lee(2020) believed that most construction projects for the PyeongChang Winter Olympics were too large and expensive to sustain in the post-event environment. The leisure industry in PyeongChang was in conflict with the surrounding communities[27]. If this problem was not solved properly, it could be the next Sochi Winter Olympics mentioned above. In the beginning, it was created as a world-class tourist destination, even called symbol of the revival of the Russian nation. In the later period, it became a typical failure due to excessive financial pressure. But PyeongChang Winter Olympics just ended, everything was still to be judged. According to the current situation after the PyeongChang Winter Olympics, development here was still in good shape.

3.2.2. Unsatisfied sustainable development

The result showed that the long-term unsatisfactory benefits, sport wasteland, increasing poverty and hotel bankruptcy were the concrete manifestations of the unsustainable development of the host cities after the Winter Olympics. These problems have appeared many times in different host cities but have not been completely solved. As a result, how to maintain the sustainable development seems always the problem for the host cities. Some of the

host cities after the Game still keep the stable development of sport tourism industry, while sport tourism in some host cities declined year by year. Sport tourism and its affiliated industry in host cities even have to face a serious crisis at the end of the winter Olympic. These problems were mentioned in many articles investigated in this paper. The point proposed by Teigland was the most typical one. Teigland(2012) pointed out in a study that after the 17th Winter Olympic Games in Lillehammer, the local sport tourism industry did not flourish, and 40% of the full-service hotels went bankrupt[28]. Sustainability, among other issues, is the key to a city's success in hosting the Winter Olympics. Even successful Turin Winter Olympic Games also presented a gradual weakening of the development of sport tourism in the aftermath. That seems to be one of the reasons cities do not bid for Winter Games.

4. Conclusions

As a more rigorous and systematic review, this paper clearly emphasized the positive and negative impacts of the Winter Olympic Games on sport tourism in host cities, and further analyzed the causes of these impacts. It is a pity that only part of the databases are extracted this time. It is possible that some articles related to this issue that have been investigated and cited in other subject databases have not been confirmed yet. In addition, only international English articles were selected as the included literature, which may also lead to the limitation of the research results. For example, most of the studies related to the PyeongChang Winter Olympics exist in the Korean Journal Database, but this search did not include the articles in the candidate literature, and only served as a reference after query. Finally, this study only used qualitative research. There may be some methodological limitations. It is hoped that the above situation can be improved in the following research.

As the 2022 Winter Olympic Games will soon be held, Beijing, as the first city to host both summer and winter Olympic Games, has been attracting much attention. This is not only the first international mega sport events in China after the spread of Covid-19[29], but also a good opportunity for the sport tourism transformation in Beijing. In order to ensure the good development of sport tourism in Beijing after the Winter Olympic Games, this paper proposed the following enlightenment. First, a good sport tourism development plan is essential. A key factor in Turin's success was the host country's ability to make plan for mega sport events and align them with the long-term goals, capabilities and amenities of the host country. Although based on the experience of the Beijing Summer Olympics, long-term planning is not the main factor impacting the good development of sport tourism. But now epidemic still exists, how to ensure the smooth development of sport tourism is still a key issue to be considered. In addition, the protection of ecological environment is the basis of the sustainable development of sport tourism. The Winter Olympic Games will more or less have an impact on the local ecological environment. Only when the ecological environment is guaranteed, can sport tourism have a prerequisite for sustainable development. Nowadays, "environment" and "sustainable development" have been mentioned in every Olympic Games, but the specific structure remains to be considered[30]. Hosting mega sport events can benefit various areas, including the economy, society, culture, and environment[31]. So the issue still deserves attention.

5. References

5.1. Journal articles

- [2] Gibson HJ. Active Sport Tourism: Who Participates?. *Leisure Studies*, 17(2), 155-170 (1998).
- [3] Gibson HJ. Small-scale Event Sport Tourism: A Case Study in Sustainable Tourism. *Sport Management Review*, 15, 160-170 (2012).

- [4] Ayres R. Tourism as a Passport to Development in Small States: Reflections on Cyprus. *International Journal of Social Economics*, 27(2), 114-133 (2000).
- [5] Hinch TD. Sport Tourism: A Framework for Research. *International Journal of Tourism for Research*, 3, 45-58 (2001).
- [6] Trevor H & Sofield B. Sports Tourism: From Binary Division to Quadripartite Construct. *International Journal of Sport & Tourism*, 8, 144-165 (2010).
- [7] Sun PY. The Interaction Between the Winter Olympic Games and Urban Tourism. *Tourism Tribune*, 35(4), 5-7 (2020).
- [8] Song WH. Impacts of Olympic on Exports and Tourism. *Journal of Economic Development*, 35(4), 93-109 (2010).
- [9] Spilling OR. Mega Event as Strategy for Regional Development: The Case of the 1994 Lillehammer Winter Olympics. *Entrepreneurship & Regional Development*, 8, 321-344 (2006).
- [10] Jiang Y. Influence and Enlightenment of Winter Olympic Games on Tourism and Leisure of Host Cities: A Literature Review. *Tourism Tribune*, 35(4), 1-3 (2020).
- [11] Müller M. After Sochi 2014: Costs and Impacts of Russia's Olympic Games. *Eurasian Geography and Economics*, 55, 628-655 (2014).
- [12] Bai XF & Zhao XM & Shin HB. Analysis on the Risks Ensued during the 2022 Beijing Olympic Winter Games to Protect the Social Security. *International Journal of Protection, Security & Investigation*, 5(1), 32-41 (2020). [Article]
- [13] Bai XF & Zhao XM & Shin HB. The Influencing Factors on the Development of Chinese Sport Industry in Digital Era: A Systematic Review. *Kinesiology*, 5(2), 54-64 (2020). [Article]
- [14] Zhao XM & Bai XF & Shin HB. The Impacts of Olympic Legacy on Urban Regeneration: A Systematic Review. *Public Value*, 5(2), 39-48 (2020). [Article]
- [15] Pickering C & Byrne J. The Benefits of Publishing Systematic Quantitative Literature Reviews for Ph.D. Candidates and Other Early-career Researchers. *Higher Education Research & Development*, 33, 534-548 (2014).
- [17] Andranovich G & Burbank MJ. Contextualizing Olympic Legacies. *Urban Geography*, 32(6), 823-844 (2011).
- [18] Dansero E & Puttilli M. Mega-events Tourism Legacies: The Case of the Torino 2006 Winter Olympic Games-A Territorialization Approach. *Leisure Studies*, 29(3), 321-341 (2010).
- [19] Bondonio P & Guala C. Gran Torino? The 2006 Olympic Winter Games and the Tourism Revival of an Ancient City. *Journal of Sport & Tourism*, 16(4), 303-321 (2011).
- [20] Wood J & Meng SM. The Economic Impacts of the 2018 Winter Olympics. *Tourism Economics*, 52(2), 253-273 (2020).
- [21] Ferrari S & Guala C. Mega-events and their Legacy: Image and Tourism in Genoa, Turin and Milan. *Leisure Studies*, 36(1), 1-19 (2015).
- [22] Pentifallo C & Van Wynsberghe R. Mega-event Impact Assessment and Policy Attribution: Embedded Case Study, Social Housing, and the 2010 Winter Olympic Games. *Journal of Policy Research in Tourism*, 7(3), 266-281 (2015).
- [23] Rodrigues JM. Urban Mobility in the Olympic City: A Transportation Revolution in Rio de Janeiro? *Territorio*, 64, 40-47 (2013).
- [24] Alberts HC. The Reuse of Sports Facilities after the Winter Olympic Games. *American Geographical Society's Focus on Geography*, 54(1), 24-32 (2011).
- [25] Karadakis K & Kaplanidou K. Legacy Perceptions among Host and Non-host Olympic Games Residents: A Longitudinal Study of the 2010 Vancouver Olympic Games. *European Sport Management Quarterly*, 12, 243-264 (2012).
- [26] Sant SL & Mason DS. Framing Event Legacy in a Prospective Host City: Managing Vancouver's Olympic Bid. *Journal of Sport Management*, 29(1), 42-56 (2015).
- [27] Lee JW. A Thin Line between a Sport Mega-event and a Mega-construction Project: The 2018 Winter Olympic Games in PyeongChang and its Event-led Development. *Managing Sport and Leisure*, 25, 1-18 (2020).

- [28] Teigland J. Mega-events and Impacts on Tourism: The Predictions and Realities of the Lillehammer Olympics. *Impact Assessment and Project Appraisal*, 17, 305-317 (2012).
- [29] Bai X & Zhao X & Shin HB. The Reflective Research on the Impact of the Public Health Crisis on Chinese Sport Industry by the Covid-19 Pandemic. *International Journal of Crisis & Safety*, 5(2), 28-37 (2020). [\[Article\]](#)
- [30] Dendura B. Olympic Infrastructure: Global Problems of Local Communities on the Example of Rio 2016, PyeongChang 2018, and Krakow 2023. *Sustainability*, 12(1), 1-19 (2020).
- [31] Shin HB. Developing Sport Legacy through Post Use of Mega-sport Event Facilities: The Case of Winter Sport. *Public Value*, 5(1), 17-28 (2020). [\[Article\]](#)

5.2. Books

- [1] Liu BL & Tao YP. Introduction to Sports Tourism. People's Sports (2003).
- [16] Gold JR & Gold MM. Olympic Cities, City Agendas, Planning, and the World's Games. Routledge (2011).

6. Appendix

6.1. Authors contribution

	Initial name	Contribution
Lead Author	XB	-Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/> -Make a significant contribution to collection <input checked="" type="checkbox"/>
Corresponding Author*	HS	-Final approval of the paper <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/> -Play a decisive role in modification <input checked="" type="checkbox"/> -Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/>
Co-Author	SL	-Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>