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## Effect of 12-Week Senior Qigong TRAINING on Blood Pressure and Blood Lipid Concentration

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### Abstract

*This research aims to find out the effects of the senior program participation based on the training method of Dahn-taekwondo that is inherited with the tradition of the original Korean qigong. The targets of this research are 20 women seniors of older than 60. By the classification of the body mass index into the normal and overweight groups, the senior qigong program was carried out for 1 hour a day 3 times a week for 12 weeks. As a result, there was no change in the systolic and diastolic blood pressures in the neutral fat of a normal person among the blood lipid factors. The total cholesterol decreased significantly for both groups, and the high-density lipoprotein cholesterol increased significantly for the overweight group. Therefore, it is proved that the comparably easier senior qigong program participation causes the positive effects on the blood pressure and blood lipid factors, and it can be used as a seniors' health promotion program.*

**[Keywords]** Dahn-Taekwondo, Qigong Training, Blood Pressure, Blood Lipid Factors, Body Mass Index(BMI)

### 1. Introduction

The medical development and economic growth are accelerating the aging society as well as the life extension of humans[1]. In our country, the over-65-year-old senior population was 7.2% in 2000, which tells it is an aging society. It is expected to reach 20.83% in 2026, which will be the super-aged society. Furthermore, as the increase speed of old people of the age of more than 80 is outstanding, though they were only 1.4% of the total population, they are expected to take up to 14% of the entire population in 2050[2]. Though many problems can occur in the super-aged society, the most representative one is expected to be the increased death rate by the cardio-cerebrovascular diseases. There should be some attentions and appropriate preparations for this matter[3]. The senior health problems have the common characteristic that they are usually complicated and led to the chronic diseases[4]. One

of the factors that cause the senior health problems is the decreased strength due to the insufficient physical activity[5]. The regular physical activity of the seniors can prevent the sarcopenia that appears due to the muscle loss[6], and provide the positive effect on the blood lipid[7][8][9], high level of immunity, and decreased risk of the chronic diseases. It is an effective method to slow down the aging[10]. Especially, for women, the blood cholesterol and neutral fat figures drastically change around the period called the menopause, and this change is found to be in relation with the increased risk of the cardiovascular diseases[11]. The physical inactivity is closely related to the health risk factors[12], and the senior health promotion includes the positive effect on the reduction of medical fees[13]. The aging causes the decrease in the body composition and physical activity[14], and the muscle loss and body fat increase are the main changes of the body composition due to the aging[15]. The age

group that gets the most benefits from the regular exercise is the senescence[16], and the regularly planned exercise program participation are reported beneficial to the increased muscle strength[17][18] and the decreased body fat[19][20]. In the results of the meta-analysis related to the senior exercise effects since 2011, the effects on the risk factors of cardiovascular diseases[21] emphasize on the importance of the exercise program participation and the necessity of the customized exercise programs. Especially, in the senescence, the importance for the healthy body is unconditional[22]. There are various exercise methods for the senior health promotion, but the qigong training among the suitable exercises is the exercise for the increased general physical adaptability, correct posture maintenance, flexibility recovery, and strength training of the abdominal and back muscles. The qigong means the training to reach the complete human state by training and administering the spirit. The basic elements of qigong are Josin(調身: Correct posture and motion to correctly move), Josik(調息: Correct breathing), and Josim(調心: Correct concentration)[23]. Yooasa Yasoh(1992) says the qigong training decreases the pain, injuring ability of the cancer cells, and catecholamine[33]. Xing and Pi(1993) reported there was the mental effect in regard of the physiologic function such as the heart rate, body temperature, sympathetic nerve function, and gastrointestinal function, exercise, and perception[34]. In regard of the qigong, Kim Jong-hyun(2010) said that the air comes in and out in our body, and the breathing is the procedure that confirms the life existence[24]. Yoon Tae-gi(2012) said the qigong can prevent and cure the diseases through the body balance and harmony, and increase the level of immunity[25]. In our country where the aging is progressing faster than in any other country, the feminization of the seniors is also getting serious, and the women health problems and adaptable problems seem to happen differently from the male seniors as well. This research aims to find out the effects of the application of the 12-weeks 'Senior Qigong Program' invented by the Dahn-taekwondo trainer with long training experience, which requires the whole-body

movement for the female seniors mainly, on the blood pressure and blood lipid concentration which are included in the risk factors of the cardio-cerebrovascular diseases.

## 2. Methods

### 2.1. Research target

The target of this research is the group of 20 female seniors of the age over 60, who live in G city, K do. Only the people who volunteer to participate after listening to the sufficient details about the objectives and contents of this research are experimented. The physical characteristics are described in <Table 1>.

**Table 1.** The physical characteristics of the subject.

Group	Age(yrs)	Height(cm)	Weight(kg)	BMI(kg/m <sup>2</sup> )	N
Normal weight	67.80±0.95	156.34±5.63	46.76±7.97	21.18±1.66	12
Over-weight	69.68±0.79	155.99±6.04	61.13±10.23	25.96±2.16	8

Note: Value are mean±SD.

### 2.2. Exercise program

The subjects were trained by the Dahn-taekwondo senior qigong program which is the modernized version of the previous Korean training for an hour a day 3 times a week for 12 weeks at the S senior citizen community, and the training details are described in <Table 2>.

**Table 2.** Dahn-taekwondo senior qigong program.

Time (min)	Contents	Effect	Level
15	Hitting danjeon, intestinal exercise, hitting water curtain, infinite spinning, tapping the whole body	Sooseung-hwagang	Introduction
30	7 Ascetic Gymnastics including 8 Joints Massage and Stretching the whole body	12 Meridian Circulation	In development
15	Wagongyeon-dan, relaxation	Chukgi and relaxation	Finalization

As described in the table, the training hour by disparity was set to be 60 minutes, and the 15 minutes in the first step focused on building the body condition to perform 5 basic dahn-taekwondo motions, and Sooseunghwagang. The 30 minutes in the second step focused on circulating the spirit by 12 meridian system with the 8-joints message and stretch of whole body. In the 15 minutes in the third step, the chukgi was performed by Wagongyeondan and relaxation training, and the mind and body were relaxed as the spirit went down.

### 2.3. Research target

Before and after the application of this program, the height, weight, stabilized blood pressure examinations, and blood collection were performed for the subjects at G health center. The blood was collected through the brachial vein after the 12-hour empty stomach. To prevent the coagulation after the 10 ml blood collection, it was heparinized. Then, it was stored at -70°C until the next analysis after the centrifugation for 10 minutes at 3,000rpm. The blood lipid(Glucose, TG, TC, HDL-C, and LDL-C) concentration was measured by the enzymatic analysis with the use of the Kit of the Sigma company.

### 2.4. Data processing

For the systematic processing, the average and standard deviation of each measurement variable were computed with the use of the SPSS 21.0 program.

To compare the average values before and after the program participate in the normal weight and overweight groups, the paired t-test was executed. To compare the average values after the program participation in two groups, the Analysis of Covariance: ANCOVA was performed. The significance level was set to be  $p < .05$ .

## 3. Results

### 3.1. Blood pressure change after senior qigong training

The changes in the systolic and diastolic blood pressures after the dahn-taekwondo

senior qigong program participation are described in <Table 3>. The significant statistic difference could not be found. The average values of the systolic and diastolic blood pressures before the program participation of two groups have shown the statistically-significant difference. The results of the analysis of covariance that compares the average values of the blood pressures of two groups before and after the program participation didn't show the significant change either.

**Table 3.** Change in blood pressures after senior qigong training.

	SBP(mmHg)		DBP(mmHg)	
	Pre	Post	Pre	Post
Normal weight	125.25±1.256	125.35±15.33	85.75±11.99	82.38±13.19
Over-weight	132.58±17.05	128.58±13.09	92.92±8.87	88.42±13.73

Note: Value are mean±SD.

### 3.2. Change in blood lipid concentration after senior qigong training

1)Change in blood sugar and neutral fat concentration after senior qigong training

The change in the blood sugar and neutral fat concentration after the dahn-taekwondo senior qigong program is shown in <Table 4>. The blood glucose concentrations before and after the training were 112.75±16.62(mg/dl) and 107.96±9.26(mg/dl), respectively, in the normal weight group. In the overweight group, they were 114.58±13.05(mg/dl) and 108.58±8.54(mg/dl), respectively. Taken the advance measurements of two groups as the covariate variables, the analysis of covariance was performed. However, there was no statistically-significant difference. The blood neutral fat concentration was found to be significantly reduced from 113.63±40.81(mg/dl) to 89.47±24.63(mg/dl) after the training in the normal weight group. In the overweight group, it went down from 143.67±48.54(mg/dl) to 142.83±47.36(mg/dl), which is not quite significant in the statistical perspective. Taken the measurements before the program participation in two groups as the covariate variables, the program was executed. In the analysis of covariance that compared the average of the blood neutral fat concentrations

of two groups didn't find any statistically significant-difference.

**Table 4.** Change in blood sugar and neutral fat after senior qigong training.

	Glucose(mg/dℓ)		TG(mg/dℓ)	
	Pre	Post	Pre	Post
Normal weight	112.75±16.62	107.96±9.26	113.63±40.81	89.47±24.63*
Over-weight	114.58±13.05	108.58±8.54	143.67±48.54	142.83±47.36

Note: Value are mean±SD, \*: Significantly different from pre(p<.05).

#### 2)TC, HDL-C, LDL-C changes after senior qigong training

The changes of the total cholesterol, high-density lipoprotein cholesterol, and low-density lipoprotein cholesterol after the dan-taekwondo senior qigong program participation are shown in <Table 5>.

The total blood cholesterol concentrations before and after the senior qigong training are 176.41±32.26( mg / dℓ ) and 140.25±29.97( mg / dℓ ). For the overweight group, it decreased from 197.25±43.76(mg/dℓ) to 169.00±40.15(mg/dℓ). For both groups, it decreased statistic-significantly (p<.05, p<.001). The concentration of the high-density lipoprotein cholesterol seemed to increase from 30.63±8.85( mg / dℓ ) to 36.38±8.14(mg/dℓ) after the program in the normal weight group, but there wasn't any statistically-significant difference. For the overweight group, it significantly increased from 27.58± 10.23(mg/dℓ) to 40.75±16.52(mg/dℓ) in the statistical perspective(p<.05). In the analysis of covariance which compared the averages of two groups after the program participation with the measurements before the program participation of two groups as the covariate variables, the statistically-significant difference was not found. The low-density lipoprotein cholesterol concentrations in the normal weight group and overweight group seemed to decrease from 112.25±46.92(mg/dℓ) and 88.67±49.78(mg/dℓ) to 88.38±75.28(mg/dℓ) and 80.83±33.26(mg/dℓ), respectively. However, there was no statistically-significant difference. There was no significant difference in the averages of the

measurements of two groups in the analysis of covariance as well.

**Table 5.** Changes of TC, HDL-C, LDL-C after senior qigong training.

	TC(mg/dℓ)		HDL-C(mg/dℓ)		LDL-C(mg/dℓ)	
	Pre	Post	Pre	Post	Pre	Post
Normal Weight	176.41±32.26	140.25±29.97*	30.63±8.85	36.38±8.14	112.25±46.92	88.38±75.28
Over-weight	197.25±43.76	169.00±40.15**	27.58±10.23	40.75±16.52*	88.67±49.78	80.83±33.26

Note: Value are mean±SD, \*: Significantly different from pre(p<.05), \*\*: Significantly different from pre(p<.001).

## 4. Discussion

The systolic and diastolic blood pressures before and after the 12-weeks dahn-taekwondo senior qigong program did not have a significant difference, and yet it decreased after the program. For this matter, in comparison with the results of the previous researches, Jeon Yeong-seon(2004) reported the taegeuk health qigong gymnastics participation didn't significantly affect the systolic and diastolic blood pressures, and Lee Gang-ok and Kim Duk-joong(2003) report that the hypogastric breathing could not reduce the systolic pressure of the women of the age over 60 with the high blood pressure[26][27]. However, in the results of other previous research[28][29][30], the blood pressure was founded to be decreasing, which is contradictory to the results of the above research. In the research results of Kim Duk-joong(2004), it was reported that the 12-weeks hypogastric program(4 times a week, 60 minutes a time) statistically lowered the systolic and diastolic blood pressures of the obese males with the high blood pressure by lots[28]. Jeong Yeon-soo also said the systolic blood pressure of female adults could be reduced through the oriental medicine qigong[29]. Choi Jang-yu(2010) reported the oriental medicine qigong can reduce the systolic and diastolic blood pressures of old obese females[30]. In general, the regular and consistent physical activity is known to be bene-

ficial for the blood pressure reduction. However, this effect might not appear in the group of young people with good physical ability or people of the normal blood pressure[31]. This kind of reports agree with the results of this research. The systolic and diastolic blood pressures before and after the program were all found to be normal in the normal weight group, and they were found to be at the normal boundary in the overweight group. The conformity and discordance with the results of the previous researches mean that the exercise program effect can vary depending on its characteristic(exercise period, exercise frequency, exercise type, exercise intensity) and the characteristics of the subjects that participate in the exercise program(metabolic disease condition, gender, age). In this research, the dahn-taekwondo senior qigong program was performed for 60 minutes a day and 3 times a week for 12 weeks. It doesn't directly conform to the research method of the previous researches. Therefore, it is hard to discuss about the exercise program effects directly. Furthermore, the standardization of the exercise program intensity was not conducted, and the research of the initiative and completeness of the individual exercise program participation was not done as well. There is clearly a restriction for the direct discussion. The total cholesterol figure among the factors in blood was found to be significantly reduced in both groups by statistics. Along with the significant increase of the high-density lipoprotein cholesterol concentration in the overweight group, there were some positive changes in other factors in blood. However, there was no significant statistical difference. This kind of results tend to agree with the results of the previous research[25][26][32]. Kwon Ki-ook(2000) reports that the blood lipid and HDL-C of the senior females are significantly reduced after the taekwondo participation based on the measurements before and after the program participation[25]. Jeon Yeong-seon(2004) reports that the participation of the taekwondo health qigong gymnastics did not bring a significant difference in blood sugar[26]. In general, the regular exercise participation is known to help improve the blood pressure and blood elements. However,

many elements such as the food intake behaviors and stress removal are also known to affect the blood pressure and blood lipid concentration. In this research, the regulation for the variables other than the senior qigong program seems to have affected the results of this research. However, through the discussion with the previous researchers, it was found that the dahn-taekwondo senior qigong program was the program that positively affected the blood pressure and blood variables. The dahn-taekwondo senior qigong program is the senior-customized program that includes many dynamic and static motions, and is constituted of dynamic qigong programs, unlike other researches. As confirmed in the results of this research, the dahn-taekwondo senior qigong program did not only increase the concentration of the high-density lipoprotein cholesterol which is known to be a positive factor for the reduction of the blood glucose and neutral fat concentration and the prevention of the hardening of the arteries, but also significantly reduced the cholesterol concentration in both normal and overweight groups.

## 5. Conclusion

The purpose of this research was to analyze the effects of the 12-weeks senior qigong program participation on the blood pressure and blood lipid concentration for a group of 20 female seniors of the age over 60, and the results are as follows. First, the significant systematic difference in systolic and diastolic blood pressures could not be found. Second, in the neutral fat among the blood. The high-density lipoprotein cholesterol was found to be significantly increased in the overweight group. To summarize the results of this research, the senior qigong program participation of comparably low intensity benefits on the blood pressure and blood lipid variables, and therefore, it can be utilized as the senior health promotion program.

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