The Effectiveness of Local Dance Training of the Northeastern Thailand (Champa Sri) to Increase Glomerular Filtration Rate (GFR) in Elderly Women in Mahasarakham Province, Thailand

Nuanprang Duangsawang[1], Chulaporn Sota[2], Ampornpun Theeranut[3], Pongsawat Rattanasang[4], Earmporn Thongkrajai[5], Ampon Sriraksa[6]

[1]Assoc. Prof., Division of Exercise and Sport Sciences, Graduated School, [2]Assoc. Prof., [3]Assoc. Prof., Faculty of Nursing, Khon Kaen University,Thailand, Research and Training Center for Enhancing Quality of Life of Working Age People,Khon Kaen University, Thailand, [4]MD., Mahasarakham University Affairs Board, Mahasarakham University, Mahasarakham, Thailand, [5]Assoc. Prof., [6]Assoc. Prof., Faculty of Nursing, Khon Kaen University,Thailand

Abstract

Renal failure is the deceleration of renal functions and the loss of renal cortex and medulla. Therefore, the exercise by the local dance training of the northeastern Thailand (Champa Sri local dance) may help improve glomerular filtration rate (GFR). This research is a quasi-experimental design with a control group. The objectives were as follows: 1) to compare the differences of the eGFR before and after the dancing training and 2) to compare the differences in the amount of product wastes caused by muscles and were excreted through the kidneys (creatinine) and blood urea nitrogen (BUN) before and after the dance training. The sample group was 60-69 year-old women who were healthy. They were divided into two groups: 35 women in an experimental group and 35 women in a control group. The research tools consisted of 1) the dancing DVD for training, 2) the dancing guideline and 3) the collection record of blood test. The dance training program takes 50 minutes a day, 3 days a week and lasts 16 weeks. The statistics used in the study are paired-t test, Independent T-test, Wilcoxon signed rank test and Mann Whitney U test. The study indicated that the differences of the eGFR and creatinine before and after the dance training between the experimental group and the control group were statistically significant ($p < 0.05$). However, the BUN values before and after experiment of the dance training between the experimental group and the control group were no statistically significant difference. In conclusion, the native dance training of the Champa Sri helped increase the efficiency of the eGFR.

Keywords: *The Effectiveness, Local Dance, Glomerular Filtration Rate (GFR), Elderly Women.*

Introduction

Kidneys are the two organs shaped like beans. The functions of kidneys are to excrete product wastes from the body's metabolism. The functions are measured by the eGFR. The test of creatinine and BUN. If renal failure or renal function deterioration and the loss of renal cortex and medulla continue to severe symptoms, it will result in renal failure and other related complications. During 2015 to 2018, the patients in Maha Sarakham province who have had chronic kidney disease were increased from 11,365 to 21,419 or 88.46%[1]. Thus, the exercise training in healthy people can be useful for the prevention and reduction of acute kidney injuries[2]. Therefore, the local dance training of the northeastern

Corresponding Author:
Dr. Chulaporn Sota
Assoc. Prof., Faculty of Nursing, KhonKaen University, Khon Kaen, Thailand
e-mail: chusot@kku.ac.th

region of Thailand (Champa Sri local dance) may help increase the efficiency of the eGFR. The objectives of the study were as follows:

1. To compare the differences of the eGFR before and after the dancing training between groups.
2. To compare the differences in the amount of creatinine and BUN before and after the dance training between groups.

Method

This research is a quasi-experimental design. The intervention of the research was "Champa Sri local dance" for 60-69 year-old women volunteers, who were healthy and werenot recorded of nephrotic disease.The dance training program had started from week 1-16, 3 days per week for 50 minutes each, starting from 04.10 pm - 05.00 pm. The dance was performed on Wednesday, Thursday and Friday. Also, there was a control group in the study. Then, the calculation of the sample size was provided to compare the average scores between two groups of population[3].The sampleswere divided into two groups includingthe experimental group and the control group. Each group consisted of 35 people, who voluntarily participated in the project. Then, the participants performed the simple randomization.The data of "Champa Sri local dance" in experimental group were collected from April – June 2018. It was divided into two periods including base line and 16 weeks. The data collection was taken at the same place as the dance practice, which was the meeting room of Nadun Sub-district Municipal. However, the data collection of the control group was taken at a meeting room, Khan Thararat Sub-district and Health Promotion Hospital, Kantharawichai district. The clinical examination was submitted to the clinical pathology laboratory at Mahasarakham Hospital. Additionally, the quality test of the tools including the clarification form, consent form and the record form were passed by three experts completely. Moreover, the compensation for female volunteers who participated in the dance training was received transportation fees for every trip of the dance training and every time of the collection of laboratory tests.

The testwithin the group usedthe pair t-test to analyze the differences for the data of normally distributed test. Then, Wilcoxon signed-rank tests were used for non-normally distributed tested data. The test between groups used the Independent T-test by to analyze the differences when the data were normally distributed. Then, Mann Withney U test wasused for the data of non-distributed test. The researcher evaluated volunteers with helping from the community leaders to clarify, persuade, volunteer and sign the consent form.

RESULTS

1. There were 30 participants in the experimental group with the average age of 65.770(SD = 2.12) and the control group were 30 participants with the average age of 64.87(2.675). Five female volunteers participated in experimental group dropedout, control group as same as too.

The comparison of estimated eGFR:

1 The change of eGFR of the participants within the group before and after the dance training using pair t-test found that before and after the experiment in the experimental group were significantly different ($p < 0.05$), control group as same as too. Also, the mean score ofeGFRafter the experiment was lower than the experimental group.

2 The change of eGFR between groupsbefore and after the dancetraining using the Independent T-test showed that the percentage of eGFRintheexperimental group's meanhad a higher value(lower risk) and creatinine had a lower value (lower risk)than the control group. After the experiment of both groups, there was a significant difference in statistic ($p<0.05$), but the BUN valueshad no statistically significant differences ($p > 0.05$) as showed in Table 1-2

3 The changes in physical activity and food dietary at home between groups before and after the experiment were not significantly different ($p> 0.05$). Therefore, the study was indicated that the experimental and the control areas had similar living styles.

Table 1. The comparison of the changes of eGFR, creatinine, BUN and complete blood count (CBC)before andafter"Champa Sri local dance"between groups by using the Independent T-test.

Dependent Variable	Before Training				After Training			
	Exper G. M(SD) n = 30	Control G.M(SD) n = 30	t	p-value	Exper G. M(SD) n = 30	Control G.M(SD) n = 30	t	p-value
eGFR	72.97 (15.55)	73.10 (14.92)	-0.03	0.975	81.67 (11.87)	73.38 (16.58)	2.22	0.030
creatinine	0.85 (0.15)	0.86 (0.16)	-0.32	0.750	0.75 (0.11)	0.88 (0.19)	-3.05	0.004
BUN	12.1 (2.31)	11.40 (2.19)	1.26	0.213	11.06 (2.25)	11.6 (2.35)	-0.89	0.375
White blood cell (WBC)	3.62 (1.10)	4.34 (1.63)	-1.99	0.051	5.00 (1.03)	4.28 (1.62)	2.06	0.044
red blood cell (RBC)	4.43 (0.28)	4.58 (0.30)	-1.97	0.053	4.63 (0.23)	4.46 (0.31)	2.43	0.018
Hemoglobin (HGB)	12.00 (0.74)	12.12 (0.59)	-0.65	0.515	12.92 (0.84)	11.77 (0.74)	5.61	<0.001
Hematocrit (Hct)	40.18 (2.31)	39.18 (1.92)	1.81	0.074	40.04 (2.40)	38.83 (2.34)	1.98	0.052
Platelet count	272,700.00 (58,069.01)	274,866.67 (55,032.11)	-0.148	0.883	275,883.33 (44,270.39)	281,833.33 (50,612.85)	-.489	0.627

Table 2. The comparison of the changes of weight before and after "Champa Sri local dance" between groups by using the Mann-Whitney U test.

Dependent Variable	Before training				After training			
	Exper G. M(SD) n = 30	Control G.M(SD) n = 30	Z	p-value	Exper G. M(SD) n = 30	Control G.M(SD) n = 30	Z	p-value
Weight	56.486 (10.638)	55.570 (9.821)	-0.037	0.971	52.363 (3.589)	55.379 (8.312)	-2.004	0.045

Discussion

This was the first study to support novel evidence about the effects of moderate intensity aerobic exercise by using "Champa Sri local dance" in renal function parameters in healthy elderly female. The study indicated that the differences of the eGFR and cretinine before and after the dance training between the experimental and control groups were statistically significant ($p<0.05$) and the percentage of eGFR and creatinine in the experimental group's mean had a higher value(lower risk) than the control group.

1. To compare the differences in the amount of eGFR, creatinine and BUN before and after the dance training between groups. The eGFR's result had a higher value (lower risk) than control group. It was consistent with eGFR's result by using duration of exercise training in large Chinese population[4,9] and aerobic exercise training in non-dialysis chronic kidney disease[5]. It helps improving the vascular function and maintain the function of the arteries. It also helps reducing renal arterial flow by means of the increased renal sympathetic nerve activity[6]. The strength and balance[7,12] of exercise resulted in increasing the values of eGFR, creatinine, creatine kinase[12] as well as correlating with the proportion of creatinine and weight. In addition, the 4-month period was considered to be appropriate[9,11,12] for training which can result in significant differences between the groups. Also, if the training has been done for 12 months, it may change inversely with pulse wave velocity[10]. This was good for blood

circulation. For the decrease of BUN values in this experimental group was is similar to the results of the cycling exercise and the effects of exercise on laboratory test results[12]. However, the BUN values between the groups did not have the statistical difference as same as the moderate exercise intensity within 6 months[8,14]. This may be due to the increase or decrease of the BUN values which was correlated with muscle mass, dehydration[16,17], uric acid quantity[18, 19], drug use and illness[27], etc.

2. To compare the differences in the amount of CBC before and after the dance training between groups. The result of WBC, RBC, HGB showed a higher value than control group. It was because the regular and continuous exercise with the moderate intensity which will result in increasing of WBC, RBC, HGB and Hct. The platelets were decrease and the immune levels were balanced[13,20,21,22,28]. It also increased the circulation of immunoglobulins, neutrophils and natural killer cells[23,28]. However, the results of strength exercise which were compared with the aerobic exercise found that the values of RBC, HGB, Hct and mean Corpuscular Volume (MCV) were decreased, but the number of platelets was increased[24]. Anyhow, this may be related to Malnutrition[25] and dehydration[26,27] conditions as well as the decreased values of Hct may be related to the anemia condition. However, the values of HGB and MCV values for age and gender must be compared additionally[29,30].

Conclusion

The native dance training of the northeastern region of Thailand (Champa Sri local dance) helped increase the efficiency of the eGFR.

Recommendation in this Research:

1. The duration of the dance training, the frequency and the number of days should be increased in order to check the differences in the change of the other related physical changes.

2. There should be more records of the use of modern and traditional medicines, or even the treatment with other alternative medicines which are available in the area.

3. The risks of diabetes and high blood pressure should be checked as it is one of the factors affecting the rate of renal filtration and other related physical changes.

Recommendation for Further Studies:

1. The training of Champa Sri local dance in the next time should have activities to monitor and control food dietary and medicine. Also, the physical activities at home should be clearly determined together with the assessment of happiness in the activity participation.

2. The training of Champa Sri local dance next time should increase the skills of remembering details in the daily routine, physical activity, good dietary. Thus, the target group will be self-recorder.

Conflict of Interest Statement: No conflict of interest to declare.

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