

# Effectiveness of the Retro Thai Dancing Exercise Program to Reduce the Body Composition among Overweight Adults in Central Region of Thailand: A Quasi-Experimental Study

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**Abstract**—The Retro Thai dancing exercise program was designed as the group exercise program to reduce the body composition among overweight adults in central region of Thailand. The aim of this study was to compare before and after the 3-month intervention program of overweight adults in central region of Thailand. They were divided into 2 groups, intervention group, and control group, by using the purposive sampling. The overweight 65 adults who were participated in this study. Both groups were assessed the body mass index, the body fat percentage, the waist circumference and the exercise behavior at the baseline and after 3-months intervention program. The independent *t*-test and paired sample *t*-test were used for comparison before and after 3-months intervention program between and within the group, respectively. The results showed that the body mass index, the body fat percentage, the waist circumference in the intervention group were decreased significantly more than the control group ( $p < 0.001$ ) and the exercise behavior was increased significantly in the intervention group more than the control group ( $p < 0.001$ ) after a 3-months intervention program. The comparison of the main parameter (mean  $\pm$  SD.) within the intervention group at the baseline and after a 3-months intervention program found that the body mass index was at  $25.46 \pm 1.56$  to  $21.77 \pm 1.32$  and decreased significantly to  $21.77 \pm 1.32$  ( $p < 0.001$ ). In conclusion, the Retro Thai dancing exercise program can reduce the body composition on weight and body and lead to decrease risky on the chronic diseases in the future

**Keywords**—Retro Thai Dancing Exercise, Overweight, Intervention

## I. INTRODUCTION

Being overweight is a global public health problem, which is a silent threat to the health and well-being of the people around the world [1]. Health problems are diverse and the overweight is the major cause of chronic diseases including diabetes, hypertension, high cholesterol, stroke, heart disease, certain cancers and arthritis [1]. The prevalence of overweight was increased between 2010 to 2019 worldwide. The prevalence of the overweight in adult's population was 35.1 % in the year 2010 and increased to 35.8 % in the year 2011, 36.5 % in the year 2012, 37.1% in the year 2013, 37.7% in the years 2014, 38.4 in the year 2015, and 39.0 in the year 2019, respectively [2]. Furthermore, when considering the prevalence of the overweight was separated by the region, WHO reported that in

2018, Americans have the highest prevalence of overweight (63.4%) and it is nearly with Europe (62.3% followed by Eastern Mediterranean, Western Pacific, Africa and South-East Asia (46.5%, 33.0%, 27.7% and 21.5%, respectively). For the South-East Asia region, it was found that Malaysia is the highest prevalence of the overweight (42.5%) followed by Thailand as the second rank of the overweight in South-East Asia region [3].

In Thailand, the World Health Organization [4] reported that the prevalence of the overweight in Thailand was 26.7% in the year 2010 and increased to 27.6 % in the year 2011, 28.6 % in the year 2012, 29.6% in the year 2013, 30.6 in the years 2014 and 31.6% in the year 2018, respectively. The findings are consistent with the body mass index reports from WHO [5] that the body mass index of Thai adults' population has increased between 2010-2018 by 23.8 kg/m<sup>2</sup> in the year 2010 and increased to be 23.9 kg/m<sup>2</sup> in the year 2011, 24.0 kg/m<sup>2</sup> in the year 2012, 24.1 kg/m<sup>2</sup> in the year 2013, 24.2 kg/m<sup>2</sup> in the year 2014 and 24.6 in the year 2015. Furthermore, Thai National Health Examination Survey by physical examination in 2016, the prevalence of overweight in Thai adults' population was 32.6% and the mean of body mass index was 24.4 kg/m<sup>2</sup>. This situation makes Thailand being an "Overweight Society" because the total mean of BMI is more than 23.0 kg/m<sup>2</sup> [6]. The result showed that the prevalence of overweight is highest in central region was 37.8% in the year 2009 and increased to 40.4% in the year 2016, respectively [6]. Thailand is a low-middle-income country which is also experiencing a rapid upsurge in noncommunicable diseases risk factors such as obesity and overweight, particularly in the urban settings [3].

Overweight and obesity are caused by the sustained energy imbalance, where dietary energy intake exceeds energy expended through physical activity. The behaviors could lead to overweight include nutrition, lack of physical activity, lack of daily water intake, sleep inadequately, genetics and family history of overweight, and the other exposures. Additional contributing factors in our society include the environment, education and skills, and food marketing promotion [7].

Furthermore, the health education is very important, to have sufficient knowledge about overweight in several aspects such as nutrition, physical activity, sleep, and water drinking. The health information can facilitate people to change their health behavior related to overweight to achieve long term health benefits and prevention of chronic diseases [7].

From the previous interventions, they were used the regular exercise including aerobic dance, jumping, walking and etc. for reducing BMI, but prevalence of the overweight in central region is still high and lack of coverage comprehensive intervention for reducing BMI. In addition, another intervention did not proper for reducing BMI and did not appropriate for overweight people in the globalization which they had the behaviors change and affecting from economic problem. This intervention was integrated Thai dance into the exercise because everyone had the experience on Thai dance when they were conducted the ceremony activities. This intervention program was based on a health belief model [8], the protection motivation theory [9] to develop the model for changing in behavior. The Retro Thai dancing is the funny dance with the folk song and it has many steps and movement both of slow and fast posture, for example; Rumwong, Patanga, Cha Cha Cha, Samba, Talung and etc. The steps can help to promote the muscle strength and reduce the BMI and the fat accumulate. The objective of this study was to compare the body composition value and the exercise behavior before and after 3-months intervention program in the overweight adult's population at the central region of Thailand.

## II. METHODOLOGY

This is a Quasi-experimental study to compare the body composition and the exercise behaviour before and after 3-months intervention program. This study was carried out in the central region of Thailand. This is a rural area of Thailand with low-economic status. It was separated into 2 groups: intervention group who were received the Retro Thai dance exercise program and control group who were received the self-exercise and education booklets. The data collection was conducted between May 2020 to December 2020 through an interview and assessment forms. This program was designed to 8-weeks intervention and used 3 months to follow-up. This study did not blind.

### A. Participants

The participants were recruited from 2 districts in AngThong Province. AngThong Province is locating at the central region of Thailand with the high proportion of overweight adults who were aged range from 18-59 years (53.64%) [10]. Moreover, the participants were registered in AngThong Municipality at least 1 year and who were measured the body mass index level more than 23.0 kg/m<sup>2</sup>. The participants were participated in this study with the consent from and signed the name. The purposive sampling random was used to recruit the respondents as per the inclusion and separated into 2 groups. The exclusion criteria consisted of 1.) the participants had been diagnosed as having chronic diseases including cardiovascular diseases, osteoarthritis, COPD and etc. 2.) the participants who were

received another exercise program in as the same time with study or the previous 3-months. In addition, they were excluded when they had physical problems that limited to exercise.

Based on the purposive random sampling, the overweight adults in Mueng district were placed into intervention and the overweight SawaengHa district were placed into the control group. At beginning, the total 35 of participants from the intervention group and 40 participants from the control group were recruited to this study by voluntary. After the baseline measurement, total 70 participants who met the criteria were selected to this study (intervention group; n=35 and control group; n=35). After 3-months interventions, 32 participants from the intervention group who were finished Retro Thai dancing exercise program. Thus, the total 65 participants were performed post-test measurement. (intervention group; n=32 and control group; n=33).

As the sample size of this study was calculated by the G-power program which using the confidence interval was 95% study, allowable error was 5% and effect size was 0.5 [11]. After calculation the sample size by the G-power program, the total sample size was used 70 participants separated by using 1:1 ratio between the intervention and control groups.

### B. Material and Procedure

The overweight adults were approached by interview. At the beginning, the participants were checked the body mass index and the other body composition by using the TANITA body composition machine DC-587 and the recruitment criteria without the diseases that limited for exercise by the researcher. All participants were recruited to complete a questionnaire. The total number of 70 participants aged 18-59 years old whose waist circumference was higher than height divided by two [12], had BMI more than 23.0 kg/m<sup>2</sup> [13] were included to the study.

The Retro Thai dancing exercise program was integrated the Retro Thai dance with the Thai folk song by Thai folk dancer as the leader instructors and researcher's team as the supervisors was monitored and joined the Retro Thai exercise sessions. It was specified program that focused on reduce the body mass index and the other body compositions in overweight adults.

The Retro Thai exercise program consisted of 3 steps: First step was the stretching or warm-up for body with slow Thai Folk song. This step was used Rak-Nong-Porn Song with 5 positions of Thai dance by using 2 rounds per position on 8 set per rounds. Second step was the Retro Thai dancing exercise period. This step was used 4 Thai Folk songs such as Rumwong song, Khon-Pao-tan song, Rumtey song and Kid-Tueng-Ban-Gert song with 5 positions of Thai dance by using 2 rounds per position on 8 set per rounds. Third step was stretched for cool-down in slow Retro Thai posture with slow folk songs such as Chuey-Nong-thum-Na with 5 positions of Thai dance by using 2 rounds per position on 8 set per rounds. The intervention group was scheduled to perform exercise 3 days/week on Monday, Wednesday and Friday between 4 p.m. to 5 p.m. for 150 minutes/week by 5 trained Thai dancer and

co-researcher followed by the Retro Thai dancing exercise schedule and sessions. The exercise program was considered by social distancing and prevent to infect the Coronavirus pandemic and distribution to each other. The control group did the leisure exercise activity by themselves and received the health education and exercise practice booklet. The study area was placed at the primary health care in Mueang District, AngThong Province for intervention group and their own place for control group at SawangHa District.

The trained co-researchers were measured, recorded and collected all tool and all parameters at the baseline and 3-months intervention program. Body mass index, waist circumference, body fat percentage and exercise behavior are the primary outcomes.

### C. Instruments

The Retro Thai dancing exercise program were used the measurement tool for assessing the parameters. The instrument was used the paper recorded form and the structural interview form by face to face interview with the social distancing for preventing the Coronavirus-19 distribution and the mask was used along with the interview period. The detail of tool can describe as follows:

*Part I: The Socio-demographic data questionnaire:* The total of this part was 16 questions. This part was to record socio-demographic data such as gender, age, marital status, education level, occupation, income sufficiency, living arrangement and health problem conditions.

*Part II: The paper record form of body composition:* This study was used TANITA body composition machine DC-587 to measure the weigh, body mass index, body percentage and was used waist tap to measure the waist circumference in both groups.

*Part III: The exercise behavior assessment form;* The total of this part was to 26 question. Each question has 4 answers choice: "Usually", "Often", "Sometimes", and "Noting". This part was used to access the exercise behavior before and after whose joined the program by face-to-face interview. The score ranged from 26-104 points. The high total scores indicated good level of exercise behavior. The scores were rated in 3 level [13] as follows: scores 26-61 (<60%) points represented lack of exercise behavior, scores 63-83 (60-80%) points represented moderate of exercise behavior and 84-104 (>80%) points represented good of exercise behavior

The Retro Thai dancing exercise program was measured the validity by peer from 3 experts on exercise and public health and reported the IOC value. The IOC value was more than 0.5. The reliability was tested in 30 overweight adults in SingBuri province which it is located at the Central region same as the study area whose characteristics were similar to those of the participants. The reliability of Cronbach's alpha coefficients was more than 0.90, it was acceptable of tool.

### D. Ethical Consideration

This study was approved by the ethics review committee for health research. Researcher and co-researchers were told the participants about the study protocol and risk of exercise before they signed a consent form.

### E. Statistical Analysis

The data analysis was performed using SPSS 22.0 for windows. Socio-demographic data were analyzed by descriptive statistics' including frequency, percentage, range and standard division. The Chi-square test and Pearson's correlation coefficients were used to estimate baseline characteristics between groups. The Kolmogorov-Simirnov Goodness of Fit test was used to measure the normality test and normal distribution. The results showed that there was the normal distribution in all variables. As the objective of this study was to compare the body mass index, other body composition parameter and the exercise behavior before and after 3-month intervention program. Thus, the Independent t-test was used to compare before and after 3-months intervention program between the group and the paired sample t-test was used to compare before and after 3-months intervention program within the group. All results with  $p < 0.05$  was considered statistically significant.

## III. RESULT

A total of 70 participants had 3 dropouts from intervention group and 2 dropouts from control group during the 3-months intervention program. During the last week of the program, some participants could not join the Retro Thai dancing exercise because they were visited at the hospital with their continental diseases and some participants had the barrier from their work. So, there were 65 participants (intervention group;  $n=32$  and control group;  $n=33$ ) in the total who participated in this study.

The socio-demographic, economic, health profile and outcome variables were similar between both groups showed in table I. The results showed a total of 65 participants were  $45.32 \pm 9.9$  years old with an average of weight was  $66.30 \pm 4.65$  kilograms and the average of height was  $161.46 \pm 4.99$  centimeters. The participants were female more than male (83.1% and 16.9%, respectively). Most of them had a secondary school (35.4%) and 70% were merchanted or employed. Their monthly income had less than 10,000 baths (63.1%) and were sufficiency of income (56.9%) The majority of the samples who never smoked accounted for 92.3% and 53.8% of them were drank alcohol. They drank 1-2 times of alcohol per week, representing 41.5%. They mostly had exercise for last month accounted for 84.6% with 34.4% of intervention group and 36.4% of control group went jogging as their other choice of exercise. The majority of the participants had diseases/health problems (73.8%). Frequent diseases were hypertension, followed by diabetes, (59.9% and 32.9%, respectively) (see TABLE 1)

At the baseline, the mean change of all parameters (Mean $\pm$ SD.) between the intervention group and control group were not difference significantly ( $p > 0.05$ ). The mean change of all the parameters (Mean $\pm$ SD.) within group and between groups after a 3-months intervention program were compared. The results showed that all parameters between intervention group and control group were decreased significantly (BMI, body fat percentage, waist circumference,  $p < 0.001$ ) and increased significantly on the exercise behavior ( $p < 0.001$ ). The Table 2 presented mean change of all parameters between 2 groups

and within the group.

The comparison of all parameters within the intervention group at the baseline and 3-months intervention program found that the BMI was at 25.46±1.56 and decreased significantly to 21.77±1.32 (p<0.001). The body fat percentage

was at 35.15±5.53 and decreased significantly to 23.88±4.79 (p<0.001). The waist circumference was at 84.28±10.90 and decreased significantly to 71.75±6.60 (p=0.001). The exercise behavior was at 78.59±5.86 and increased to 96.09±6.61 (p=0.001).

TABLE 1. The baseline characteristics and outcome variable at the baseline between intervention and control, p-value=0.05.

Variables	Total	Intervention group	Control group	p-value
<b>Age (Years)</b>				
Mean± SD.	45.32±9.9	42.44±11.67	48.12±6.91	0.078
<b>Gender</b>				
Female	54 (83.1%)	27 (84.4%)	27 (81.8%)	0.783
Male	11 (16.9%)	5 (15.63%)	6 (18.2%)	
<b>Educational Level</b>				
Primary School	14 (21.5%)	7 (21.9%)	7 (21.2%)	0.982
Secondary School	23 (35.4%)	11 (34.4%)	12 (36.4%)	
Vocational certificate	13 (20.0%)	6 (18.8%)	7 (21.2%)	
Bachelor degree	15 (23.1%)	8 (25.0%)	7 (21.2%)	
<b>Occupational</b>				
Merchants/Employee	46 (70.8%)	24 (75.0%)	22 (66.6%)	0.815
Agriculturist	15 (23.1%)	6 (18.9%)	9 (27.3%)	
Government Officer	4 (6.1%)	2 (6.1%)	2 (6.1%)	
<b>Income</b>				
<10,000 Baths or equal	41 (63.1%)	21 (65.6%)	20 (60.6%)	0.656
>10,000 Baths	24 (36.9%)	11 (34.4%)	13 (33.4%)	
<b>Income Sufficiency</b>				
Insufficiency	37 (43.1%)	16 (50.0%)	21 (63.6%)	0.267
Sufficiency	28 (56.9%)	16 (50.0%)	12 (36.4%)	
<b>Smoking</b>				
Yes	5 (7.7%)	2 (6.3%)	3 (9.1%)	0.982
No	60 (92.3%)	30 (93.7%)	30 (90.9%)	
<b>Alcohol Drinking</b>				
Yes	35 (53.8%)	17 (53.1%)	18 (54.5%)	0.909
No	30 (46.2%)	15 (46.9%)	15 (45.5%)	
<b>Health problem*</b>				
Yes	48 (73.8%)	24 (75.0%)	24 (72.7%)	0.835
No	17 (26.2%)	8 (25.0%)	9 (27.3%)	
<b>History of Exercise last month</b>				
Yes	55 (84.6%)	27 (84.4%)	28 (84.8%)	0.958
No	10 (15.4%)	5 (15.6%)	5 (15.2%)	

REMARK: Data were analyzed with Chi-square test and independent t-test.

\*Statistically significant level at the 0.05 level (p<0.05).

TABLE 2. Mean difference of all parameter between intervention group and control group.

Variable	Baseline (Mean± SD.)	3-months Intervention (Mean± SD.)	p-value (a)
<b>Body Mass Index</b>			
Intervention group	25.46± 1.56	21.77± 1.32	<0.001*
Control group	25.40± 1.48	24.96± 1.91	0.002*
p-value (b)	0.873	<0.001*	
<b>Body Fat Percentage</b>			
Intervention group	35.15± 5.53	23.88± 4.79	<0.001*
Control group	33.79± 5.83	31.32± 6.36	<0.001*
p-value (b)	0.339	<0.001	
<b>Waist Circumference</b>			
Intervention group	84.28± 10.90	71.75± 6.60	0.001*
Control group	88.15± 8.15	78.81± 9.64	0.006*
p-value (b)	0.109	<0.001	
<b>Exercise Behavior</b>			
Intervention group	78.59± 5.86	96.09± 6.61	0.001*
Control group	78.57± 5.89	85.63± 7.16	0.009*
p-value (b)	0.990	<0.001	

REMARK: Data were analyzed with paired sample t-test within group (p-value (a)) and independent t-test between group (p-value (b))

\*Statistically significant at the 0.05 level p-value<0.05.

The comparison of all parameters within the control group at the baseline and 3-months intervention program found that the BMI was at 25.40±1.48 and decreased significantly to 24.96±1.91 (p=0.002). The body fat percentage was at

33.79±5.83 and decreased significantly to 31.32±6.36 (p<0.001). The waist circumference was at 88.15±8.15 and decreased significantly to 78.81±9.64 (p=0.006). The exercise behavior was at 78.57±5.89 and increased to 85.63±7.16

( $p=0.009$ ).

#### IV. DISCUSSION

The study design was experimental and controlled, which suitable for measuring the effectiveness of intervention program [14]. The baseline value of all variable and outcome was no difference between 2 groups. The intervention groups showed the body mass index, the body fat percentage and the waist circumference were decreased significantly between 2 groups after the 3-months intervention program ( $p<0.001$ ) and the exercise behavior was increased significantly between 2 groups after 3-months intervention program ( $p<0.001$ ).

The result showed there was significant different between 2 groups on changing of the body mass index, body the fat percentage and the waist circumference after 3-months intervention program. The result is consistent with the study of Wilaipron, K. [15] whose study the effectiveness of the applied folk art Plong Stick of the elderly exercise program in Nongki district. BuriRam Province. This program was modified to Boonmee long stick exercise to develop the exercise session program. The study found that the body mass index, the waist circumference and the body fat percentage was decreased scientifically after significantly between 2 groups after the 3-months intervention program ( $p<0.001$ ). Similarly, Kanokthip, K. [16] whose study the effects of retro dancing exercise on physical fitness and balance in women with metabolic syndrome. This finding found that after 8 weeks of Retro dancing exercise, there were statistically significant improvement on body fat percentages, the waist hip ratio and the body mass index between experimental group and control group ( $p<0.05$ ).

Moreover, Natchanon, P. [17] whose study the effect of self-regulation program in retro-line dancing exercise on blood sugar level and physical fitness of persons at high risk to type 2 diabetes mellitus. The results showed that after they were received in the program, participants in the experimental group had significantly decreased in the blood sugar level, the waist circumference, the body fat percentage, and the systolic blood pressure than those in the comparison group. Similarly, Patchamol, M, and Kanchana, R. [18] whose study the effectiveness of 3-month exercise program on body composition in overweight adult's army male officer at support unit of army forces development command, Bangkok, Thailand. The finding showed that the body weight, the body mass index, the waist line, the waist hip ratio, the fat percentage was decreased significantly within the intervention group by comparing at the baseline and after 3-months intervention program.

This finding might explain that; firstly, this program was designed on 8-weeks intervention and used 3 months follow-up. The Retro Thai dancing exercise program was integrated the retro Thai dance with the Thai folk song. The participants in the experimental group was performed the Retro Thai dancing exercise for 60 minutes per day, 3 days per week, for 8 consecutive weeks. The program was followed the standard of physical activity from World Health Organization [19] mentioned that everyone should have the moderate-intensity exercise or taken time on 150 minutes/week because, this can

help to prevent the chronic diseases, promote the work of the body system, stimulate the blood circulation and reduce the body composition. Thus, the control group was continued their normal daily activity. From the coronavirus pandemic, the social distancing and mask prevention should be concerned to conduct the retro Thai dancing exercise program. Secondly, this study chose to study in the rural area which the participants had higher participate with the program more than the urban area. Thirdly, the majority of participants was female (83.1%). They mostly were committed to exercise and conscious about their health and body shape. The program is funny activity, this may cause the participants were participated until the end of the program and caused them can reduce the body mass index and another body composition value.

Fourthly, overweight can cause the physical performance of muscle strength lower than usually. The Retro Thai dance exercise is an aerobic exercise may occur the participants had the better of metabolic system includes; nutrients metabolism, blood markers, fat burning and etc. [20]. The finding was consisted with Jeong-Ah et al [21] whose study effects of aerobic exercise on serum blood lipids, leptin, ghrelin, and HOMA-IR factors in postmenopausal obese women. The results showed that the intervention group was decreased significantly on the weight, the body mass index, the fat percentage, the abdominal fat accumulate, the blood pressure more than the control group ( $p<0.05$ ). Fifthly, when considering the waist circumference, due to regular exercise by taking the appropriate time can help to improve the metabolisms and dissolve nutrients for energy resulting the body to use more energy. The Retro Thai dance exercise program was assessed waist circumference before and after the intervention program along with reinforcing motivation from the exercise leader and friends who were exercised together, this could lead to reduce waist circumference. Sixthly, when focusing on the body fat percentage, the result can be explained that the Retro Thai dance exercise can reduce insulin hormone and improve glucagon hormone which was stimulated enzymes in muscle to improve the capacity of muscle and inhibit the lipoprotein lipase in fat tissue. So, the retro Thai dance exercise was able to crumble the triglyceride that accumulates in the muscles, this demonstrates that the exercise may help to stimulate lipoprotein lipase for reducing LDL.

Considering the exercise behavior, it was found that there was significant different between 2 groups ( $p<0.001$ ). The participants from the intervention group had the scored of behavior more than the control group. The overweight adults who were received the Retro Thai dance exercise had more changed of the behavior to be better than the control group who were received the self-exercise. The result may be explained that [22] people who have not yet thought of changing their behavior, because they were thought that it was affected to their health and doesn't receive any negative effects or some people was tried to change the behavior but it failed. The finding is consistent with the behavior theory of Bandura [23] said that the individual behavior is not caused by only reinforcement and punishment by external factor, but the

person can do to control their thinking, feeling and acting by using 3-step of self-regular process includes;

1.) Self-observation; the experimental group was given information on their own body composition values, including BMI, the body fat percentage, the waist circumference, the knowledge about overweight and process to reduce their risk to overweight. After that, the participants were observed their exercise behavior and found that they had outlier about the body composition values and tried to build better physical fitness through Retro Thai dance exercise followed by the intervention program. This may be caused that the participants have awareness of exercise by setting their goal to reduce the body compositions based on 60 minutes per day, 3 days per week, for 8 consecutive weeks.

2.) Judgment process; from the evaluation of the exercise behavior that was successfully compared to their goals and member. This may be caused the participants to realize the value of exercise. Thus, they can decide to plan the exercise and remind themselves by recording exercise behavior. It makes the sample can clear and continue to exercise until 8 weeks.

3.) Self-reaction; it is an incentive or reinforcement process in the experimental group to achieve continually exercise behavior by receding self-appreciation, expressing the feelings through social media, reward their belongings when able to achieve the fitness goals including a reduction in the waist circumference and the body weight. A person can exercise to lose weight, they will be the great role models for people who have not been able to exercise successfully. This study is consistent with the previous study [24] whose study was about the Retro Thai dance exercise to reduce the body mass index in overweight adults. The result found that the intervention group had the good level of exercise behavior more than the control group ( $p < 0.001$ ).

The Retro Thai dance is an event held during various festivals of the community. This activity can remind them on the culture and has been seen the power of the community or cooperation with each other. Moreover, the retro Thai dance is a traditional performance which expresses joy, fun, stress relief or break to relieve lethargy during work. This exercise program can increase physical activity and takes pride in enhancing their exercise performance. Thus, the compliment was encouraged to exercise and help for promoting the sustainable exercise behavior.

#### V. LIMITATION AND RECOMMENDATIONS

There were 3 limitation in this study. Firstly, both study areas from intervention and control group are in rural area. Thus, the results of this study cannot generalize to the urban area duo to differences in lifestyles, socio-demographic and economic status. Secondly, the intervention program was consisted of only exercise session. However, any components such as food intake, sleeping quality, water intake, stress therapy and etc. should be concerned and designed to the program because, weigh loss or BMI reduction are occurring by regularly exercise with food intake control. Thirdly, the participants were conducted 8-weeks of exercise sessions by Thai dancer and co-researcher and used 3-month follow-up.

This study had short duration of the program; the future study should apply this program to longer follow-up time (6-months) after finishing the program to determine sustain ability of the exercise program. Moreover, the future study should focus on the muscle strengthening and muscle mass with overweigh adult's population because the exercise posture of the Retro Thai dancing can make the muscle strength and improve the muscle mass, the body balance movement or the muscle flexibility [25].

#### VI. CONCLUSION

The Retro Thai dancing exercise program was designed as the group exercise program, was easy and simply to perform this program at the community. The results showed the participants had overweight with BMI more than  $23.0 \text{ kg/m}^2$  at the beginning of both of 2 group. The intervention program can reduce the body mass index, the body fat percentage, the waist circumference and improve the exercise behavior. For this program implementation, the result from this study can be used for developing the campaign or group integration Thai dance with exercise program for preventing the chronic diseases that occurring from overweight status and their behavior. Therefore, this finding indicated that a public health provider could integrate the Retro Thai dancing exercise program with usual care to decrease the body compositions in overweight population. The future study should add other components to design the program for reduce the outcomes

#### ACKNOWLEDGMENT

The authors are grateful to all participants for their willing participation in this study. We would like to give a special thanks to the head of Provincial health office and head of primary health care unit in Anghong and SingBuri Province of Thailand for the generosity location to conduct the retro Thai dancing exercise program.

#### REFERENCES

- [1] M. Johnson, et al. "Interventions for reducing body mass index and other weight-related indicators: A review of systematic reviews", U.S: Institutes for population health improvement, 2016.
- [2] K. Kearns, et al. Chronic disease burden associated with overweight and obesity in Ireland: the effects of a small BMI reduction at population level, *BMC Public Health*, vol 14, issue 143, pp. 1-10, 2014.
- [3] World Health Organization. Prevalence of overweight among adults,  $\text{BMI} \geq 25$ , age-standardized estimates by country, 2018 [online] Available:<http://apps.who.int/gho/data/view.main.CTRY2430A?lang=en>
- [4] World Health Organization. Mean Body Mass Index (BMI), 2018 Available from: [http://www.who.int/gho/ncd/risk\\_factors/bmi\\_text/en/](http://www.who.int/gho/ncd/risk_factors/bmi_text/en/).
- [5] World Health Organization Obesity and overweigh, 2017 Available from: <http://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
- [6] World Health Organization. Prevalence of overweight among adults,  $\text{BMI} \geq 25$ , age-standardized estimates in Thailand. 2018 Available from: <http://apps.who.int/gho/data/view.main.BMI25AWBv?lang=en>.
- [7] W. Aekplakorn. "Dietary pattern and metabolic syndrome in Thai adults", *Journal of nutrition and metabolism*, pp. 1-10, 2018.
- [8] Ajzen. "The theory of planned behavior". *Organizational Behaviors and Human Decision Processes*, vol 50, issue 2, pp. 179-211, 1981.
- [9] Becker, et al. "The Health Belief Model and Prediction of Dietary Compliance: A Field Experiment", *Journal of Health and Social Behavior*, vol 18, issue 4, pp. 348-367, 1977.
- [10] Anghong Provincial Health Office. "Population Statistic in AngThong Province", SingBuri, 2020.

- [11] F. Mangeri, L. Montesi, G. Forlani, R.D. Grave, G. Marchesini. "A standard ballroom and Latin dance program to improve fitness and adherence to physical activity in individuals with type 2 diabetes and in obesity", *Diabetology & Metabolic Syndrome*, vol 6, pp. 74, 2014.
- [12] World Health Organization. "Waist circumference and waist-hip ratio, Report of a WHO expert consultation", Geneva. p. 39, 2011.
- [13] N.A. King, M. Hopkins, P. Caudwell, R.J. Stubbs, J.E. Blundell. "Individual variability following 12 weeks of supervised exercise: identification and characterization of compensation for exercise-induced weight loss" *Int J Obes (Lond)*, vol 32, issue 1, pp. 177-184, 2008.
- [14] F. Mangeri, L. Montesi, G. Forlani, R.D., Grave, G. Marchesini. (2014). "A standard ballroom and Latin dance program to improve fitness and adherence to physical activity in individuals with type 2 diabetes and in obesity". *Diabetology & Metabolic Syndrome*, vol 6, pp. 74, 2014.
- [15] C. Wiliporn. "The effectiveness of the applied folk art Plong stick of the elderly exercise program in Nongki district, Buri Ram province". M.P.H. thesis, NakornRatchasima Rajabhat University, 2007.
- [16] K. Kanokthip, K. "the effects of retro dancing exercise on physical fitness and balance in women with metabolic syndrome" *journal of physical therapy*, vol 40, issue 3, pp. 55-62, 2018.
- [17] P. Natchanon. "The effect of self-regulation program in retro-line dancing exercise on blood sugar level and physical fitness of persons at high risk to type 2 diabetes mellitus", thesis M.N.S. community nurse partitioner, Burapha university, 2012.
- [18] M. Patchamol masakul, R. Kanchana. The effectiveness of 3-month exercise program on Body composition in overweight adult's army, ale officer at support unit of army forces development command, Bangkok, Thailand: A Quasi-Experimental Study *International journal of multidisciplinary research and publication*, vol 3, issue 3, p.p. 31-36, 2020.
- [19] WHO, "Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies" *THE LANCET*, vol 363, pp. 157-163, 2004.
- [20] R. Alsamir Tibana R, D. Da Cunha Nascimento D, N.M. Frade de Sousa, et al. "Enhancing of Women Functional Status with Metabolic Syndrome by Cardioprotective and Anti-Inflammatory Effects of Combined Aerobic and Resistance Training", *PLOS ONE*, vol 9, issue 11, 2014.
- [21] L. Jeong-Ah, K. Ji-Hyeon, K. Jong-Won, K. Do-Yoen, K. "Effects of aerobic exercise on serum blood lipids, leptin, ghrelin, and HOMA-IR factors in postmenopausal obese women" *Journal of the Korea Academia-Industrial Cooperation Society*, vol 18, issue 2 pp.549-558,2019.
- [22] JR. Churill. "The metabolic syndrome: the crucial role of exercise prescription and diet", *ACSM's health & fitness journal*, vol 13, issue 1, 2008.
- [23] A. Bandura A. (1986). *Social foundation of thought and action: A social cognitive theory*. Migigan: Prentice-Hall. '
- [24] S. Kurasawa, et al. "Assessment of the Exercise Intensity of Short Stick Exercises in Elderly Individuals". *Rehabilitation Research and Practice*, vol 37, issue 14, pp. 1-6, 2014.
- [25] C. Salila, P. Usaneya. "Effectiveness of a self-static stretching strengthening program in work-related musculoskeletal disorder in market-vendors: A quasi experimental study" *International Journal of Multidisciplinary Research and Publication*, vol. 2, issue 12, 2020.