

CHAPTER IV
RESULTS

A total of 36 subjects enrolled in this study. Only 33 subjects completed the study. Three out of eighteen subjects in the control group had dropped out from the study due to two infection cases and one missing case at the final test. In the experimental group 18 patients enrolled and completed the study. All patients had history of CAD more than 6 months with classified severity as showed in Table 4.1

Table 4.1 Classification of severity of patients who were participating in cardiac rehabilitation program

Severity classes	Control group	Experiment group
Unstable angina	4	2
IHD		
1-vessel disease		
- post PTCA	5	5
- post CABG	-	-
2-vessel disease		
- post PTCA	3	4
- post CABG	-	-
3-vessel disease		
- post PTCA	1	-
- post CABG	2	2
Myocardial infarction	-	5

The baseline demographic data of control and experimental group such as body mass index (BMI), heart rate and VO_{2peak} were showed in Table 4.2. The average age of experimental and control group was 58.0 (7.0), and 58.0 (8.5) years, respectively. There were no significant differences on age, BMI, heart rate, and VO_{2peak} when compared between two groups.

Table 4.2 Demographic data of control and experimental group.

Parameter	Group	
	Control (n=15)	Experiment (n=18)
Age (yr)	58.0(7.0)	58.0(8.5)
BMI (kg/m ²)	27.2(3.2)	25.1(3.2)
Heart rate (beat/min)	73.5(13.5)	73.6(13.4)
VO_{2peak} (mL/kg/min)	22.1(7.6)	19.9 (6.8)

In the experimental group, the average attention rate was 90%, ranging from 80% to 100% of training program. After the cardiac rehabilitation program we found a significant lower resting heart rate and higher VO_{2peak} when compared to baseline.

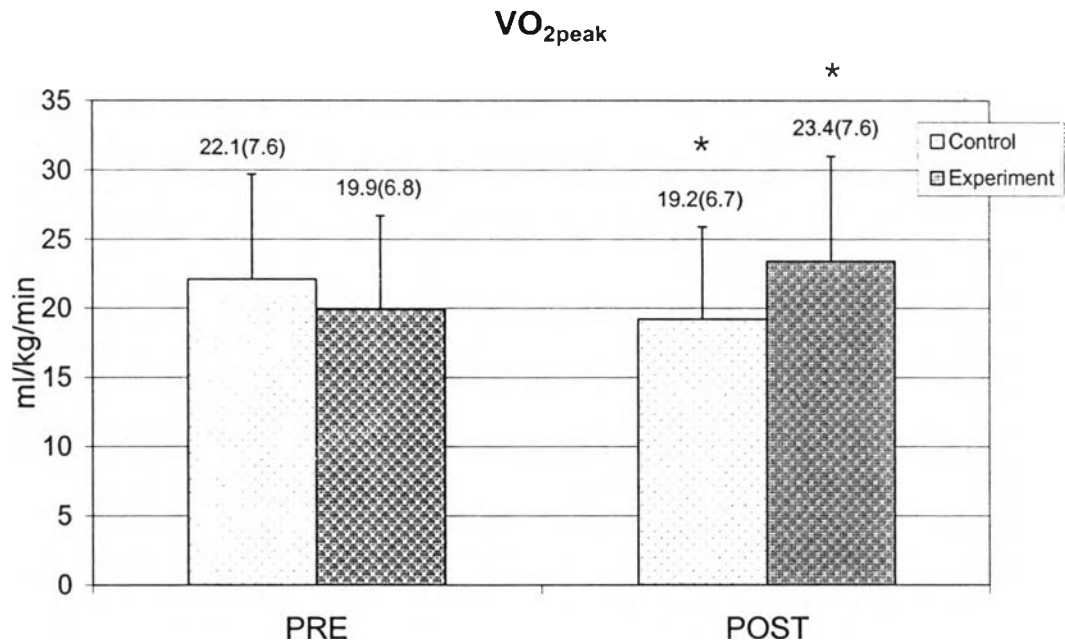
Table 4.3 Physical characteristics of control and experimental groups before and after 8 weeks of cardiac rehabilitation program.

Parameter	Control		Experiment	
	Pre	Post	Pre	Post
Heart rate (beat/min)	73(13.5)	69(10.7)	73(13.4)	68(13.0)
BMI (kg/m ²)	27.2(3.3)	27.3(3.5)	25.1(3.3)	24.9(3.2)*
VO_{2peak} (mL/kg/min)	22.1(7.6)	19.2(6.7)*	19.9(6.8)	23.4(7.6)*

* Significant difference within group ($p < 0.05$)

4.1 Effect of cardiac rehabilitation program on VO_{2peak}

Effect of cardiac rehabilitation program on VO_{2peak} was determined at pre-training and post-training in all subjects. The result showed the significant improvement of VO_{2peak} from 19.9 (6.8) to 23.4 (7.6) ml/kg/min in experimental group ($p < 0.05$) and significant decrease from 22.1 (7.6) to 19.2 (6.7) ml/kg/min in control group ($p < 0.05$).



* Significant difference within group ($p < 0.05$)

Figure 4.1 Comparison of pre-training and post-training VO_{2peak} in control and experimental groups. Data were expressed as mean(SD).

4.2 Effects of cardiac rehabilitation program on lipid profile

Comparison of serum lipid profile (total cholesterol, triglycerides, LDL-cholesterol, HDL-cholesterol) between control group and experiment group showed no significant difference before training but after training in both groups. However triglyceride levels in experimental group were decreased from 135.3(67.9) mg/dl in pre-training to 108.1(39.9) in post-training with the significant difference at $p < 0.05$ as shown in Table 4.4 and Fig.4.2.

Table 4.4 Lipid profile parameter before and after 8 weeks training at the cardiac rehabilitation program. Data were expressed as mean(SD).

	Control		Experimental	
	Pre	Post	Pre	Post
Cholesterol	181.0(33.1)	173.7(29.1)	167.3(35.8)	164.2(35.8)
TG	130.3(73.7)	111.7(55.4)	135.3(67.9)	108.1(39.9)*
HDL-C	48.9(9.7)	48.2(10.4)	48.4(12.1)	50.2(12.0)
LDL-C	106.6(26.9)	114.9(24.8)	98.4(30.4)	99.5(28.7)

*Post-test triglyceride was significantly decrease from pre-test at the level $p < 0.05$

LIPID PROFILE IN EXPERIMENT GROUP

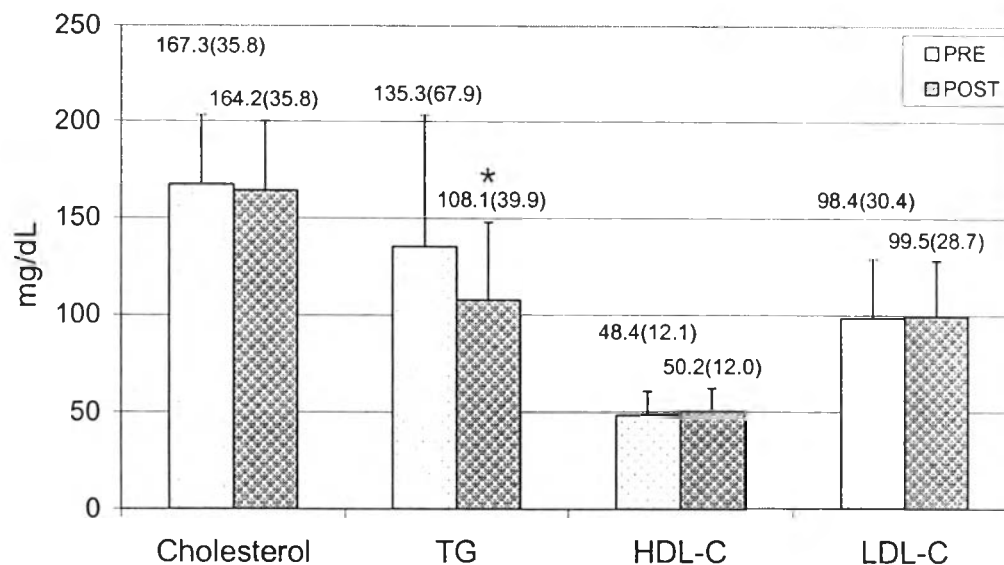


Figure 4.2 Comparison of pre-training and post-training lipid profile of experimental group who were participated in the cardiac rehabilitation program. Data were expressed as mean(SD) (* $p < 0.05$).

4.3 Effects of cardiac rehabilitation program on fibrinolytic parameter.

No significant differences in t-PA levels (both antigen and activity), and PAI-1 levels (both antigen and activity) were observed in experimental and control groups at after the exercise training for 8 weeks as compared to the baseline as shown in Table 4.5. However, significant improvement of fibrinolysis, via decrease of PAI-1 activity level and increase of t-PA activity and t-PA antigen in experiment group were observed when compared between pre-acute submaximum exercise ($65\%VO_{2peak}$) and post-acute submaximum exercise ($65\%VO_{2peak}$) after 8 week training at the cardiac rehabilitation program as show in Table 4.6.



Table 4.5 Fibrinolysis parameters before and after 8 weeks training at the cardiac rehabilitation program.

Parameter	Control		Experimental	
	pre	post	pre	post
t-PA antigen (ng/mL)	8.2(4.3)	7.6(3.1)	7.4(3.9)	7.5(2.9)
t-PA activity (IU/mL)	2.1(1.7)	1.9(0.9)	2.2(0.5)	2.3(0.8)
PAI-1 antigen (ng/mL)	51.4(14.7)	51.7(20.8)	51.2(19.1)	51.5(16.1)
PAI-1 activity (AU/mL)	17.1(7.6)	17.7(11.4)	17.9(10.8)	16.3(3.7)

Table 4.6 Fibrinolysis parameters compared between pre and acute post-acute submaximum exercise ($65\%VO_{2peak}$) after 8 week training at the cardiac rehabilitation program in experimental group.

Parameter	Pre	Post
t-PA antigen (ng/mL)	7.5(2.9)	9.2(2.7)*
t-PA activity (IU/mL)	2.3(0.8)	2.7(0.5)
PAI-1 antigen (ng/mL)	51.5(16.1)	45.7(16.1)*
PAI-1 activity (AU/mL)	16.3(3.7)	14.8(6.3)*

* Significant difference at the level $p < 0.05$

No significant differences in t-PA activity of control group from 2.1(1.7) to 1.9(0.9) IU/ml ($p < 0.955$) and experimental groups from 2.2(0.5) to 2.3(0.8) IU/ml ($p < 0.206$) after 8 weeks cardiac rehabilitation program as shown in Fig 4.3.

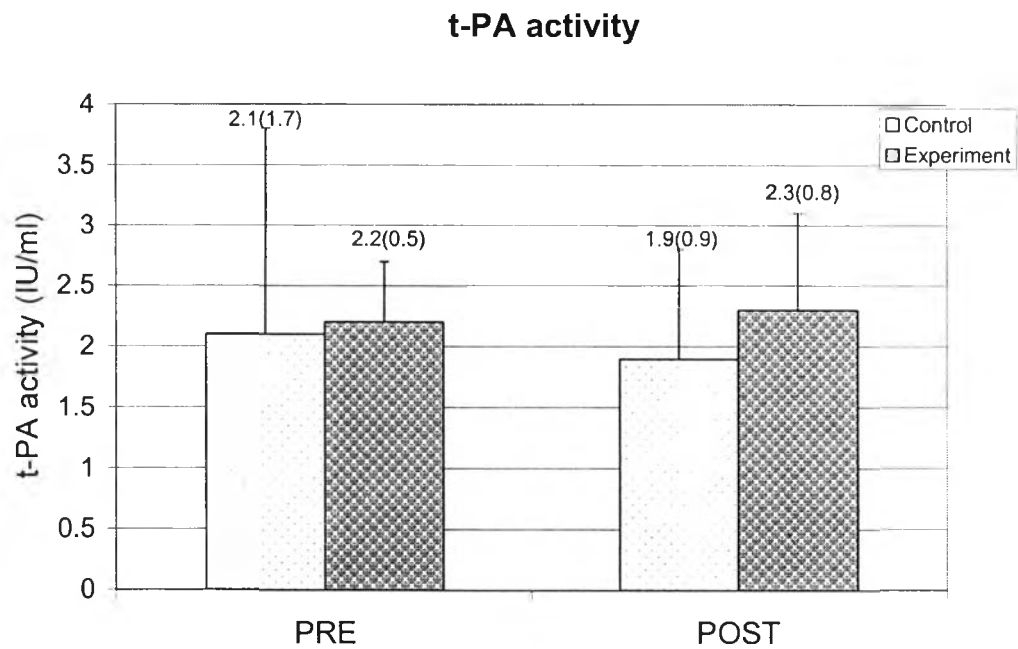


Figure 4.3 Comparison of pre-training and post-training t-PA activity of control and experimental groups who were participated in the cardiac rehabilitation program. Data were expressed as mean(SD).

No significant differences in t-PA antigen of control group from 8.2(4.3) to 7.6(3.1) ng/ml ($p < 0.427$) and experimental groups from 7.4(3.9) to 7.5(2.9) ng/ml ($p < 0.442$) after 8 weeks cardiac rehabilitation program as shown in Fig 4.4.

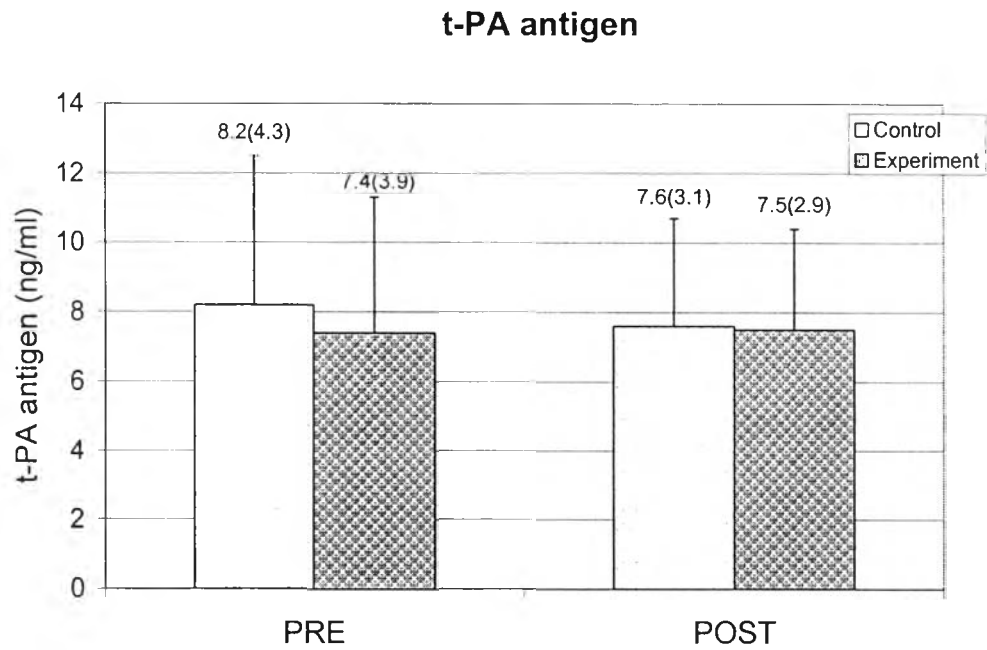


Figure 4.4 Comparison of pre-training and post-training t-PA antigen of control and experimental groups who were participated in the cardiac rehabilitation program. Data were expressed as mean(SD).

No significant differences in PAI-1 antigen of control group from 51.4(14.7) to 51.7(20.8) ng/ml ($p < 0.909$) and experimental groups from 51.2(19.2) to 51.5(16.1) ng/ml ($p < 0.982$) after 8 weeks cardiac rehabilitation program as shown in Fig 4.5.

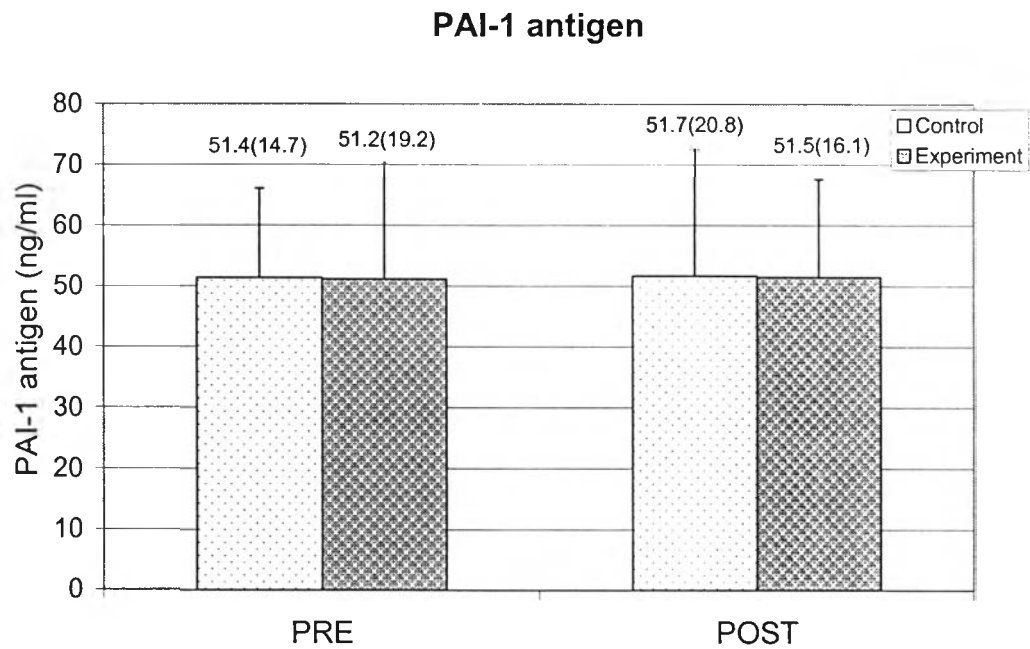


Figure 4.5 Comparison of pre-training and post-training PAI-1 antigen of control and experimental groups who were participated in the cardiac rehabilitation program. Data were expressed as mean(SD).

No significant differences in PAI-1 activity of control group from 17.1(7.6) to 17.7(11.4) AU/ml ($p < 0.776$) and experimental groups from 17.9(10.8) to 16.3(3.7) AU/ml ($p < 0.844$) after 8 weeks cardiac rehabilitation program as shown in Fig 4.6.

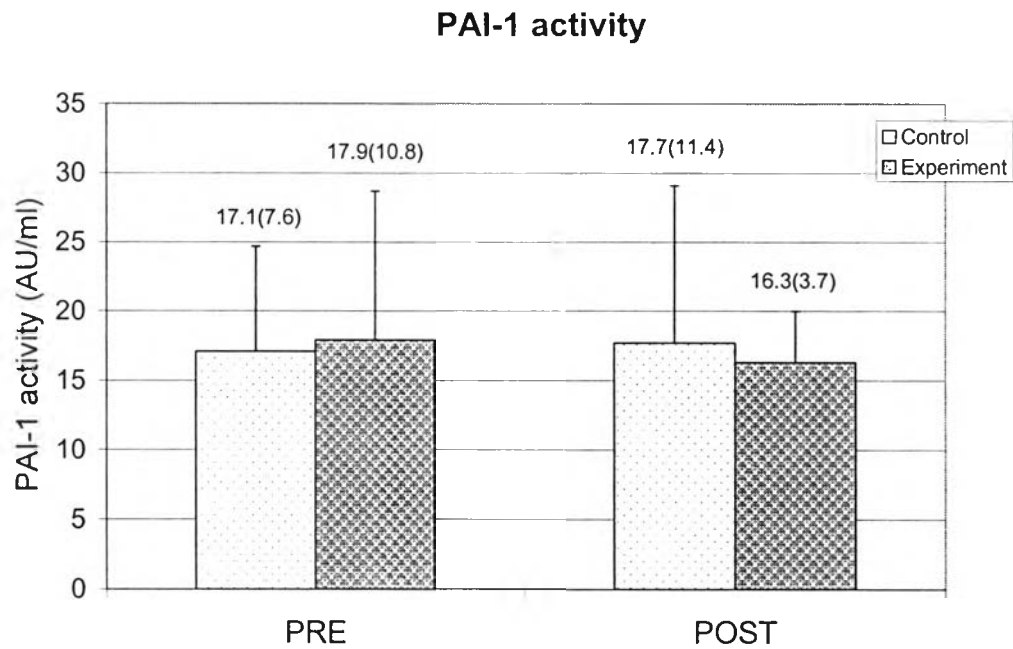


Figure 4.6 Comparison of pre-training and post-training PAI-1 activity of control and experimental groups who were participated in the cardiac rehabilitation program. Data were expressed as mean(SD).

In the acute exercise at 65% VO_{2peak} , the PAI-1 activity was significant difference decrease from the baseline. It was changed from 16.3(3.7) to 14.8(6.3) AU/ml ($p < 0.05$).

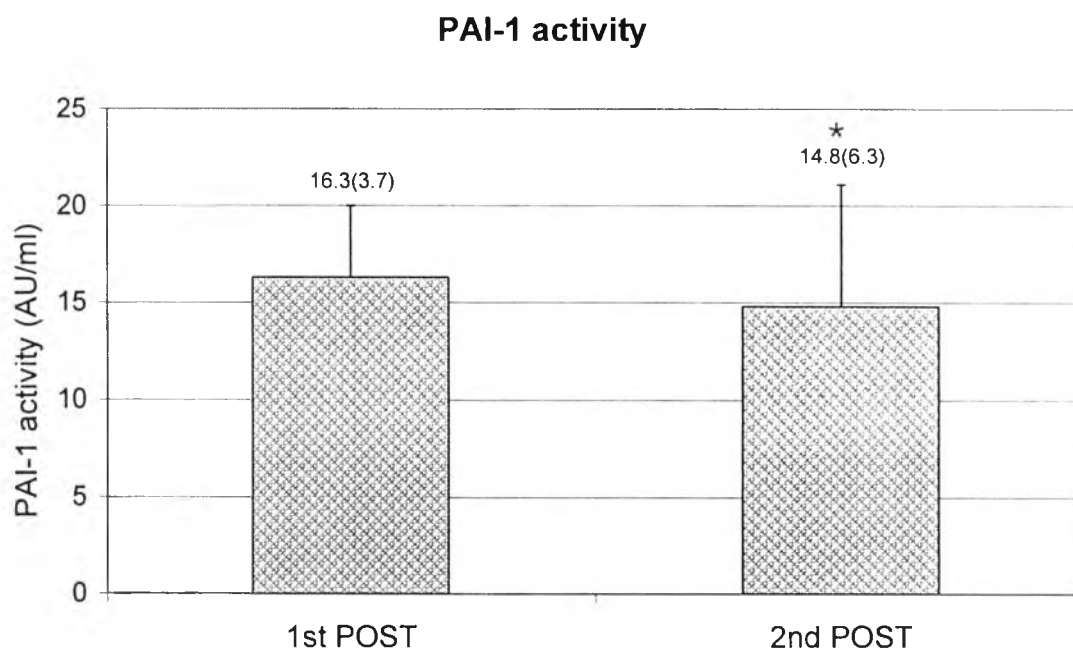


Figure 4.7 Comparison of PAI-1 activity of experimental group at 8-weeks training (1st post) and post acute submaximum exercise (65% VO_{2peak}) (2nd post). Data were expressed as mean(SD).

In the acute exercise at 65% $VO_{2\text{peak}}$, there was no significant difference of PAI-1 antigen level when compared between pre and post acute exercise as show in Fig 4.8. The PAI-1 antigen level was changed from 51.5(16.1) to 45.7(16.1) ng/ml ($p < 0.77$)

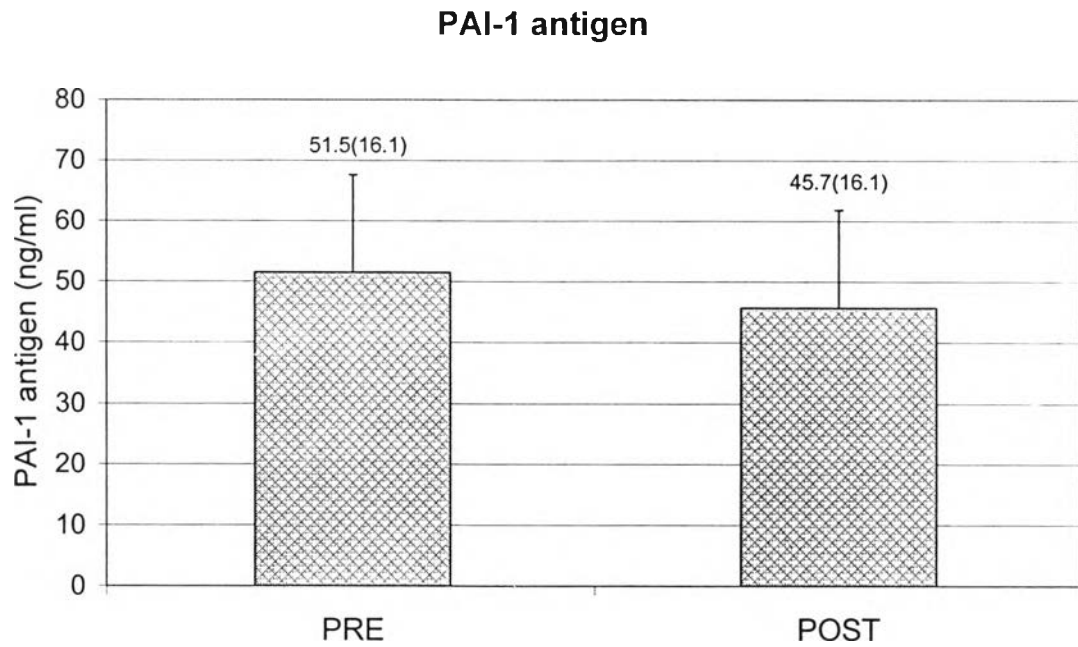


Figure 4.8 Comparison of PAI-1 antigen of experimental group at 8-weeks training (1st post) and post acute submaximum exercise (65% $VO_{2\text{peak}}$) (2nd post). Data were expressed as mean(SD).

In the acute exercise at 65% VO_{2peak} , the t-PA activity was significant difference increase from the baseline (Figure 4.9). It was changed from 2.3(0.8) to 2.7(0.5) IU/ml ($p < 0.05$).

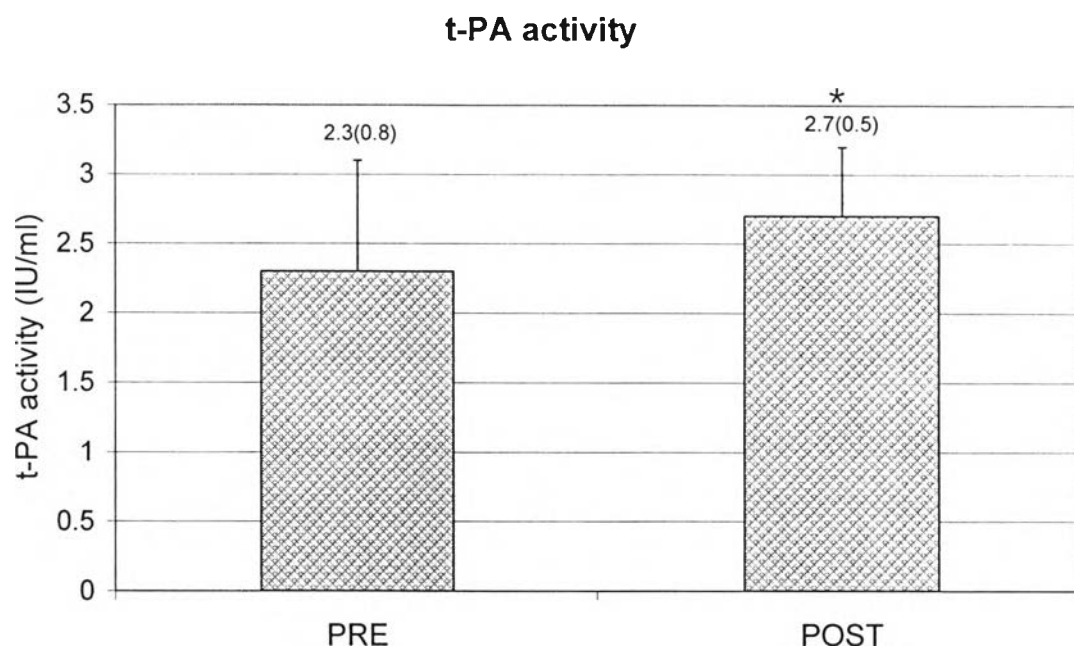


Figure 4.9 Comparison of t-PA activity of experimental group at 8-weeks training (1st post) and post acute submaximum exercise (65% $VO_{2 peak}$) (2nd post). Data were expressed as mean(SD).

In the acute exercise at 60% VO_{2peak} , the t-PA antigen was significant difference increase from the baseline (Figure 4.10). It was changed from 27.5(2.9) to 9.2(2.7) ng/ml ($p < 0.043$).

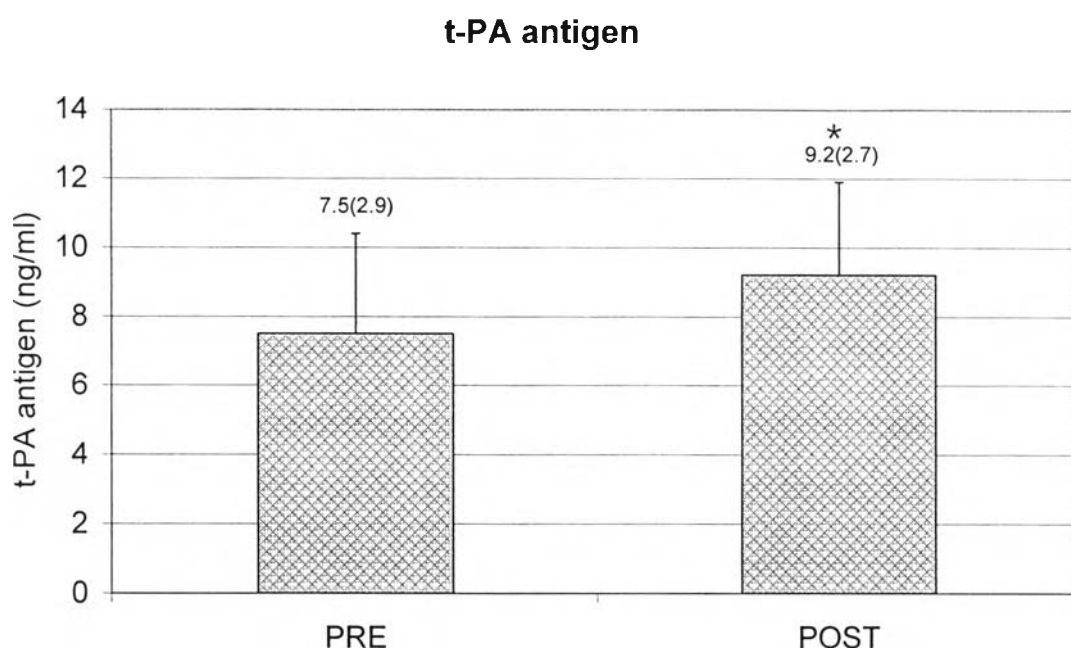


Figure 4.10 Comparison of t-PA antigen of experimental group at 8-weeks training (1st post) and post acute submaximum exercise (65% VO_{2peak}) (2nd post). Data were expressed as mean (SD).