UNIVERSITI SAINS MALAYSIA
GERAN PENYELIDIKAN UNIVERSITI
PENYELIDIKAN
LAPORAN AKHIR

EFFECT OF CONTINUOUS AND INTERMITTENT EXERCISE TRAINING PROGRAMS ON PLATELET ACTIVATION OF HEALTHY SEDENTARY MALES

PENYELIDIK

PUAN WAN SORIANY WAN MD. ZAIN

PENYELIDIK BERSAMA

PROF. MADYA ROSLINE HASSAN
PROF. MADYA ASOK KUMAR
DR. TARIQ M. ROSHAN

2013

1. **Nama Ketua Penyelidik:** WAN SORIANY BT WAN MD ZAIN
Name of Research Leader

☐ Profesor Madya/ *Assoc. Prof.* ☐ Dr./ *Dr.* ☑ Encik/Puan/Cik *Mr/Mrs/Ms*

2. **Pusat Tanggungjawab (PTJ):**
School/Department

PUSAT PENGAJIAN SAINS PERUBATAN

3. **Nama Penyelidik Bersama:** Prof Madya Rosline Hassan, Prof Madya Asok Kumar, Dr tariq M. Roshan
Name of Co-Researcher

4. **Tajuk Projek:** *Title of Project*
Effect of Continuous and Intermittent Exercise Training Programs on Platelet Activation of Healthy Sedentary Males

5. **Ringkasan Penilaian/***Summary of Assessment*:	Tidak Mencukupi *Inadequate*		Boleh Diterima *Acceptable*	Sangat Baik *Very Good*	
	1	2	3	4	5
i) **Pencapaian objektif projek:** *Achievement of project objectives*	☐	☐	☐	☑	☐
ii) **Kualiti output:** *Quality of outputs*	☐	☐	☑	☐	☐
iii) **Kualiti impak:** *Quality of impacts*	☐	☐	☑	☐	☐
iv) **Pemindahan teknologi/potensi pengkomersialan:** *Technology transfer/commercialization potential*	☐	☑	☐	☐	☐
v) **Kualiti dan usahasama :** *Quality and intensity of collaboration*	☐	☑	☐	☐	☐
vi) **Penilaian kepentingan secara keseluruhan:** *Overall assessment of benefits*	☐	☐	☐	☑	☐

Abstract of Research

(An abstract of between 100 and 200 words must be prepared in Bahasa Malaysia and in English).
This abstract will be included in the Annual Report of the Research and Innovation Section at a later date as a means of presenting the project findings of the researcher/s to the University and the community at large)

Bahasa Malaysia

Kajian ini bertujuan untuk mengkaji kesan latihan senaman berterusan dan senaman berkala ke atas pengaktifan platelet. Pengaktifan platelet boleh menyebabkan berlakunya trombosis di dalam situasi penyakit jantung. Senaman secara aerobik telah dikenalpasti dapat menurunkan risiko penyakit jantung dan juga boleh mengurangkan pengaktifan platelet. Seramai 24 orang lelaki sihat yang sedentari, purata umur 21.75± 3.73 tahun telah mengambil bahagian dalam kajian ini dan di bahagikan kepada 3 kumpulan iaitu kumpulan kawalan (n=9), kumpulan latihan berterusan (n=7) dan kumpulan latihan berkala(n=8). Pengaktifan platelet ditentukan melalui ujian pengesanan P-selectin dan glikoprotein IIb/IIIa menggunakan mesin flowsitometri dengan kaedah *indirect immunoflourescent*. Berdasarkan kajian ini, didapati kedua-dua senaman menunjukkan perubahan yang baik. Latihan berkala menunjukkan penurunan pada peratusan pengaktifan CD62p manakala latihan berterusan menunjukkan penurunan terhadap kedua-dua pengaktifan CD62p dan PAC-1. Kesimpulannya kedua-dua senaman menghasilkan perubahan positif pada pengaktifan platelet. Kumpulan senaman berkala menunjukkan perubahan yang ketara ke atas parameter pengaktifan platelet manakala senaman berterusan menunjukkan perubahan yang baik pada pengaktifan platelet.

Bahasa Inggeris

The purpose of this study is to investigate the effect of the continuous and intermittent training programs on platelet activation. The hyper-activation of platelet may lead to the development of thrombotic event in cardiovascular disease (CVD). Aerobic exercise is well known to reduce CVD risk and can reduce the platelet activation. There were 24 healthy sedentary males mean aged 21.75±3.73 years old participated in this study and divided into 3 groups which are control group (n=9), continuous group (n=7) and intermittent group (n=8). Platelet activation was measured via detection of the P-selectin and glycoprotein IIb-IIIa using flowcytometry by indirect immunoflourescent. This study observed that, both exercise groups pronounced the better changes. The intermittent type of training showed the decline of the gated percentage of CD62p whereas the continuous group lowering the CD62p and PAC-1 activation. As a conclusion, both types of training programs provided the favorable effect on platelet activation. However, intermittent group pronounced more beneficial effects on platelet activation whereas continuous group provide the beneficial changes on platelet activation.

- Dilampirkan

Senaraikan kata kunci yang mencerminkan penyelidikan anda:
List the key words that reflects your research:

Bahasa Malaysia	*Bahasa Inggeris*
Pengaktifan platelet	*Platelet activation*
Latihan Senaman	*Excersice training*
Flowsitometri	*Flowcytometry*

8. Output dan Faedah Projek
Output and Benefits of Project

(a) * **Penerbitan Jurnal**
Publication of Journals
(Sila nyatakan jenis, tajuk, pengarang/editor, tahun terbitan dan di mana telah diterbit/diserahkan)
(State type, title, author/editor, publication year and where it has been published/submitted)

- *Tajuk: A Comparative Study on Platelet Activation Markers Between Continous and Intermitten Excersice Training Programs in Healhty Males*
- *(sedang membuat pembetulan terakhir untuk penerbitan journal)*

This study provide evidence of the basis of benefit of continuous and intermittent exercise in preventing cardiovascular disease. The results are expected to influence the choice of the type of exercise for cardiovascular health, providing evidence as to whether a particular type has an advantage over the other in improving the risk factors being investigated. This will directly translate to a basis for exercise prescription for the general public.

* Sila berikan salinan/*Kindly provide copies*

(c) **Latihan Sumber Manusia**
Training in Human Resources

i) Pelajar Sarjana:
Graduates Students
(Perincikan nama, ijazah dan status)
(Provide names, degrees and status)

ii) Lain-lain:
Others

9. **Peralatan yang Telah Dibeli:**
Equipment that has been purchased

Tiada

project has been completed successfully and objectives achieved. The output of the project include a published paper in International J of Basic and Applied Medical Sciences 2012

This report has been assessed by an independent assessor and approved by the RMD committee

Tajuk geran: **Effect of Continuous and Intermittent Exercise Training Programs on Platelet Activation of Healthy Sedentary Males**

Penyelidik: **Wan Soriany bt Wan Md Zain**

Jenis geran: **Jangka Pendek**

Tempoh geran: **2 Jun 2008 – 1 Disember 2011**

Jenis laporan: Laporan Kemajuan (setiap 6 bulan) ☐ Alatan di beli ☐ Ya : nyatakan.....

Laporan Akhir*: ☑ ☐ Tidak

OBJEKTIF SPESIFIK KAJIAN (sama spt dalam proposal asal)	SECARA RINGKAS TERANGKAN PENCAPAIAN/HASIL	SEBAB-SEBAB JIKA TAK TERCAPAI
1.To investigate the effect of continuous and intermittent types of training program on platelet activation of healthy males	This study, showed that the intermittent training programs decreased gated percentage CD62p after the exercise training even not significant difference. Platelet activation marker also improved in continuous group by decreased gated percentage CD62p and PAC-1 after the training programs. Nevertheless, the changes also not significantly difference.	
2. To identify which training program, between continuous and intermittent, has a better effect on platelet activation for prevention of coronary heart disease	As a conclusion, intermittent exercise provides the favorable effects on platelet activation and coagulation whereas the continuous exercise gives more beneficial effect on the platelet activation.	
3.		
4.		

** Laporan Akhir perlu disertakan salinan manuskrip dan surat yang dihantar kepada mana-mana jurnal untuk penerbitan.*

Regd. No. [illegible] (Science for Social Cause)

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Dr. R.S. Negi
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Dr. Asok Kumar Ghosh
School of Medical Sciences,
Universiti Sains Malaysia, Kelantan,
Malaysia
E-mail : drashoke.ghosh@gmail.com

Sub: Acceptance Letter Towards Your Manuscript MS No. JMS 2012/02/02/007

Dear **Dr. Asok Kumar Ghosh,**
We are pleased to inform you that your paper (MS No. **JMS 2012/02/02/007**) entitled, **'EFFECT OF CONTINUOUS AND INTERMITTENT EXERCISE TRAINING PROGRAMS ON PLATELET ACTIVATION AND FIBRINOLYTIC PROFILE OF SEDENTARY MALES' by Nur-Hasanah Ruslan, Asok Kumar Ghosh, Adibah Alawiah Abd. Razak, Rosline Hassan, Wan Soriany WMZ** has been accepted for publication in our Journal.
You need to pay an amount of Rs. 2300 that includes 'Submission cum processing fee' (Rs. 300) and 'Publication fee' (Rs. 500 per author per article) before your paper is forwarded to our publication section. Payment can preferably be made directly to our Centre's bank account via online banking/NEFT (National Electronic Fund Transfer) mechanism or by Demand Draft/Cheque/Cash. Via Online payment you can avoid any postal delay and postal charges associated with the payment.
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If you have any querry kindly feel free to contact us.
Thanks and Best Regards,
Sincerely,

Dr. R.S. Negi
Editor-in-Chief
International Journal of Basic and Applied Medical Sciences
Journal's Website: www.cibtech.org/jms.htm

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2012 Vol. 2 (2) May-August, pp.27-39/Ruslan et al.
Research Article

EFFECT OF CONTINUOUS AND INTERMITTENT EXERCISE TRAINING PROGRAMS ON PLATELET ACTIVATION AND FIBRINOLYTIC PROFILE OF SEDENTARY MALES

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ABSTRACT
The purpose of this study was to investigate the effectiveness of continuous and intermittent training program on platelet activation and fibrinolytic profiles in healthy sedentary males. 24 healthy sedentary males of 21.8±3.7 years participated in this study. They were divided into 3 groups, like, control group (n=9), continuous training group (n=7) and intermittent training group (n=8). In 12 week training period, the intensities for both the continuous group and intermittent group, for the first 4 weeks, had been kept low as a familiarization trial, but were increased considerably for the next 8 weeks. Platelet activation and fibrinolytic profiles were measured, at the beginning and at the end of training period, by detecting P-selectin and glycoprotein IIb/IIIa. Concentration of the tissue plasminogen activator (t-PA) and concentration of plasminogen activator inhibitor type-1 (PAI-1) antigen were measured as fibrinolytic profiles. $\dot{V}O_2$ max of each person was evaluated before and after training, following graded exercise protocol till exhaustion. Both the intermittent and continuous type of training did not show any significant change in the gated percentage of CD62p and PAC-1 activation, t-PA and PAI-1 antigen, but improved $\dot{V}O_2$ max significantly. In conclusion, our study found that 12 weeks of continuous and intermittent training had beneficial effect on $\dot{V}O_2$ max, but failed to produce any significant variation in fibrinolytic profile and platelet activation variables. This might be due to the fact that a longer training period might be necessary to get the significant variation in coagulation variables rather than the cardio-respiratory variable like, $\dot{V}O_2$ max.

***Key Words**: Continuous Training, Intermittent Training, Fibrinolytic Profile, T-PA Antigen, PAI-1 Antigen*

INTRODUCTION
Coronary heart disease (CHD) is the leading cause of mortality worldwide with more than 4.5 million deaths occurring in the developing countries. Men are at higher risk than women (O'Connor *et al.*, 2006). In Malaysia, CHD became the commonest cause of death since 1980 (Jeyamalar, 1991). Regarding cardiovascular disease admissions and death, since 1985 to 2004 in Malaysia, ischemic heart disease accounted for 25% to 33% of admissions and 27% to 35% of death (Zambahari, 2004). The mortality rate due to CHD was twice in males than their female counterparts (Khor *et al.*, 1997).
Recently, dysfunction of the haemostatic system in relation to atherosclerosis and CHD has become more recognized (El-Sayed *et al.*, 2004; Abdullah *et al.*, 2009). The cardio protective effect of exercise occurs by improving the haemostatic system, especially coagulation (Lockard *et al.*, 2006) and fibrinolytic system (Stratton *et al.*, 1991; De Geus *et al.*, 1992; Szymanski and Pate, 1994; Wang, 2006). Previous investigations reported that exercise may reduce the CHD by reducing the coagulation potential (Lockard et al.,2006) and promoting the endogenous fibrinolysis activity (Meade *et al.*, 1993; Fernhall *et al.*, 1997; Wannamethee *et al.*, 2002). Furthermore, exercise is found to improve fibrinolytic activity by increasing t-PA activity, reducing t-PA antigen and the PAI-1 antigen (Lowe *et al.*, 1998; Szymanski *et*