

**UNIVERSITI SAINS MALAYSIA
GERAN PENYELIDIKAN UNIVERSITI
PENYELIDIKAN
LAPORAN AKHIR**

**THE EFFECTS OF COMBINATION BEHAVIOURAL
INTERVENTION OF NUTRITIONAL EDUCATION AND
EXERCISE (COMBINE) ON OXIDATE STRESS MARKERS
IN OBESE SUBJECT**

PENYELIDIK

DR. RAHIMAH ZAKARIA

PENYELIDIK BERSAMA

**DR. ROHANA ABDUL JALIL
DR. CHE BADARIAH ABDUL AZIZ
DR. WAN ZAIDAH ABDULLAH WAN SURIATI WAN NIK**

2012



USM UNIVERSITI
SAINS
MALAYSIA



Pusat Pengajian Sains Perubatan
School of Medical Sciences

Ruj. Fail : USMKG/PPSP/Pelantar Sains Klinik (7)
Tarikh : 7hb. Ogos 2012

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Prof.,

1. Laporan Akhir Geran Penyelidikan Universiti (RU)

1.1 Dr. Rahimah Zakaria
(Jab. Fisiologi)

"The Effects of Combination Behavioral Intervention of Nutritional Education and Exercise (COMBINE) on Oxidative Stress and Haemostatic Markers in Obese Subjects"

Dengan segala hormatnya perkara di atas dirujuk.

Bersama-sama ini disertakan satu Laporan Akhir Geran Penyelidikan Universiti (RU) yang dikemukakan melalui Pengerusi Jawatankuasa Penyelidikan dan Dekan, PPSP untuk tindakan Prof. selanjutnya.

Kerjasama Prof. dalam hal ini saya dahului dengan ucapan ribuan terima kasih.

Sekian.

"BERKHIDMAT UNTUK NEGARA"

"Memastikan Kelestarian Hari Esok"

(MOHD ZAKI SELAMAT)
Pegawai Sains Kanan
Bahagian Penyelidikan, PPSP

s.k. Dekan, PPSP] untuk makluman

Timb. Dekan (Penyelidikan), PPSP] untuk makluman

Penyelidik Berkenaan] untuk makluman

fn: su21/JK-P/ bio-per & kes./Sue



CERTIFIED TO ISO 9001:2008
CERT. NO. 045-0288

BAHAGIAN PENYELIDIKAN
Pusat Pengajian Sains Perubatan

BORANG PENILAIAN UNTUK LAPORAN AKHIR GERAN UNIVERSITI PENYELIDIKAN (RU)

AMA PENYELIDIK : DR. RAHIMAH ZAKARIA

UJUK : The Effects of Combination Behavioral Intervention of Nutritional Education and Exercise (COMBINE) on Oxidative Stress and Haemostatic Markers in Obese Subjects

AMA PENILAI : PROF. MADYA DR. NIK HAZLINA NIK HUSSAIN

	Ada	Tiada	Ulasan Untuk Penilai
1. Latar Belakang	☒	☐	
2. Objektif	☒	☐	
3. Metodologi	☒	☐	
4. Hasil	☒	☐	Pembentangan < 3x di peringkat kebangsaan 1x di peringkat antarabangsa. Penerbitan - Telah terbit

Keputusan Oleh Penilai (sila tandakan ☒ di kotak berkenaan)

- ☒ - Saya mengaku bahawa penilaian ini dibuat berdasarkan merit saintifik dan profesionalisma kepakaran saya tanpa ada kecenderungan kepentingan peribadi Malaysia (UKM)
- ☐ - Saya istiharkan kepentingan saya dalam ruangan komen dibawah

☒ Diluluskan

☐ Tidak Diluluskan

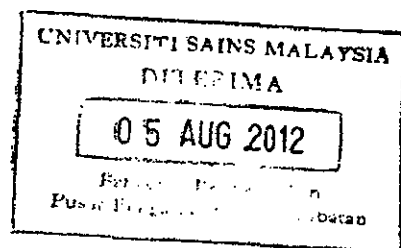
Komen : _____

Undatangan Penilai : _____

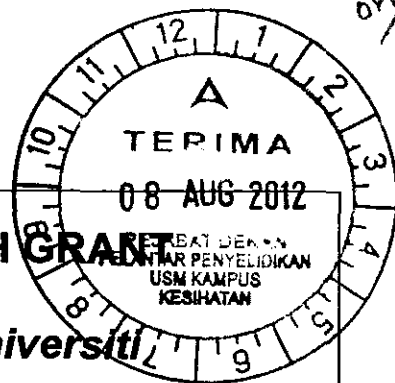
Tarikh : 5/8/12

Format penilaian lap akhir/ver.2/Ogos 2011

PROF. MADYA DR. NIK HAZLINA NIK HUSSAIN
Penyelaras Unit Perkembangan Kesihatan Wanita
(Pensyarah / Pakar Perbidanan & Sains Puan)
No. Pendaftaran Penuh : 29031
Unit Perkembangan Kesihatan Wanita
Hospital USM, 16150 Kubang Kerian, Kelantan.



UNIVERSITY RESEARCH GRANT
FINAL REPORT
Geran Penyelidikan Universiti
Laporan Akhir



A.	PARTICULARS OF RESEARCH / MAKLUMAT PENYELIDIKAN:														
(i)	Title of Research: <i>Tajuk Penyelidikan:</i> The effects of combination behavioural intervention of nutritional education and exercise (COMBINE) on oxidative stress and haemostatic markers in obese subjects														
(ii)	Account Number: 101/PPSP/812031 <i>Nombor Akaun:</i>														
B.	PERSONAL PARTICULARS OF RESEARCHER / MAKLUMAT PENYELIDIK:														
(i)	Name of Research Leader: <i>Nama Ketua Penyelidik:</i> Dr Rahimah Zakaria														
	Name of Co-Researcher <i>Nama Penyelidik Bersama:</i> Dr Rohana Abdul Jalil Dr Che Badariah Abdul Aziz Dr Wan Zaidah Abdullah Wan Suriati Wan Nik														
(ii)	School/Institute/Centre/Unit : <i>Pusat Pengajian /Institut/Pusat/Unit :</i> PPSP														
C.	Research Platform (Please tick (f) the appropriate box): <i>Pelantar Penyelidikan (Sila tanda (f) kotak berkenaan):</i> <table border="0"> <tr> <td>☐</td> <td>A. Life Sciences <i>Sains Hayat</i></td> </tr> <tr> <td>☐</td> <td>B. Fundamental <i>Fundamental</i></td> </tr> <tr> <td>☐</td> <td>C. Engineering & Technology <i>Kejuruteraan & Teknologi</i></td> </tr> <tr> <td>☐</td> <td>D. Social Transformation <i>Transformasi Sosial</i></td> </tr> <tr> <td>☐</td> <td>E. Information & Communications Technology (ICT) <i>Teknologi Maklumat & Komunikasi</i></td> </tr> <tr> <td>☒</td> <td>F. Clinical Sciences <i>Sains Klinikal</i></td> </tr> <tr> <td>☐</td> <td>G. Biomedical & Health Sciences <i>Bioperubatan Sains Kesihatan</i></td> </tr> </table>	☐	A. Life Sciences <i>Sains Hayat</i>	☐	B. Fundamental <i>Fundamental</i>	☐	C. Engineering & Technology <i>Kejuruteraan & Teknologi</i>	☐	D. Social Transformation <i>Transformasi Sosial</i>	☐	E. Information & Communications Technology (ICT) <i>Teknologi Maklumat & Komunikasi</i>	☒	F. Clinical Sciences <i>Sains Klinikal</i>	☐	G. Biomedical & Health Sciences <i>Bioperubatan Sains Kesihatan</i>
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☐	B. Fundamental <i>Fundamental</i>														
☐	C. Engineering & Technology <i>Kejuruteraan & Teknologi</i>														
☐	D. Social Transformation <i>Transformasi Sosial</i>														
☐	E. Information & Communications Technology (ICT) <i>Teknologi Maklumat & Komunikasi</i>														
☒	F. Clinical Sciences <i>Sains Klinikal</i>														
☐	G. Biomedical & Health Sciences <i>Bioperubatan Sains Kesihatan</i>														

D.	Duration of this research : <i>Tempoh masa penyelidikan ini :</i> *Duration : 2 ½ years <i>Tempoh :</i> From : .01/04/2009 To : .30/09/2011..... <i>Dari: Ke :</i>
E.	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) Abstrak Penyelidikan (Perlu disediakan di antara 100 - 200 perkataan di dalam Bahasa Malaysia dan juga Bahasa Inggeris. Abstrak ini akan dimuatkan dalam Laporan Tahunan Bahagian Penyelidikan & Inovasi sebagai satu cara untuk menyampaikan dapatan projek tuan/puan kepada pihak Universiti & masyarakat luar). Attachment (COMPREHENSIVE TECHNICAL REPORT)
F.	SUMMARY OF RESEARCH FINDINGS <i>Ringkasan dapatan Projek Penyelidikan</i> Anthropometric and body composition: Body weight, BMI, waist circumference, waist to hip ratio and fat mass were significantly reduced after compared to before interventions. Lipid profiles: Plasma triglyceride and VLDL-cholesterol were significantly reduced after compared to before interventions. Oxidative stress markers: Plasma glutathione peroxidase (GPx) activity and 4-hydroxynonenal (4-HNE) concentration increased significantly after 12-week interventions compared to before interventions. Haemostatic markers: Plasma HCII activity and fibrinogen levels were significantly increased after compared to before intervention. Plasma FVIIc and TAFI activities were significantly reduced after compared to before interventions.

G. COMPREHENSIVE TECHNICAL REPORT

Laporan Teknikal Lengkap

Applicants are required to prepare a comprehensive technical report explaining the project.

(This report must be attached separately)

Sila sediakan laporan teknikal lengkap yang menerangkan keseluruhan projek ini.

[Laporan ini mesti dikepilkan]

Attachment.

List the key words that reflectour research:

Senaraikan kata kunci yang mencerminkan penyelidikan anda:

English	Bahasa Malaysia
obesity	obesiti
lifestyle modification	pengubahsuaian gaya hidup
oxidative stress markers	penanda stres oksidatif
haemostatic markers	penanda hemostatik

H. a) Results/Benefits of this research
Hasil Penyelidikan

No. Bil:	Category/Number: Kategori/ Bilangan:	Promised	Achieved
1.	Research Publications (Specify target journals) <i>Penerbitan Penyelidikan</i> (Nyatakan sasaran jurnal)	2	1
2.	Human Capital Development		
	a. Ph. D Students		
	b. Masters Students	2	1-graduated 1-thesis writing
	c. Undergraduates (Final Year Project)		
	d. Research Officers		
	e. Research Assistants		1 (temporary)
	f. Other: Please specify		
3.	Patents <i>Paten</i>		
4.	Specific / Potential Applications <i>Spesifik/Potensi aplikasi</i>		
5.	Networking & Linkages <i>Jaringan & Jalinan</i>		
6.	Possible External Research Grants to be Acquired <i>Jangkaan Geran Penyelidikan Luar Diperoleh</i>		

- Kindly provide copies/evidence for Category 1 to 6.

b) Equipment used for this research.
Peralatan yang telah digunakan dalam penyelidikan ini.

Items Perkara	Approved Equipment	Approved Requested Equipment	Location
Specialized Equipment Peralatan khusus			
Facility Kemudahan			
Infrastructure Infrastruktur			

- Please attach appendix if necessary.

I. BUDGET / BAJET

Total Approved Budget : RM 99 100.00
Total Additional Budget : RM 0
Grand Total of Approved Budget : RM 99 100.00

Yearly Budget Distributed

Year 1 : RM 87 950.00
Year 2 : RM 11 150.00
Year 3 : RM 0

Additional Budget Approved

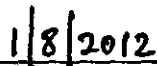
Year 1 : RM 0
Year 2 : RM 0
Year 3 : RM 0

Total Expenditure : RM 98 930.10
Balance : RM 169.90

- Please attach final account statement from Treasury



Signature of Researcher
Tandatangan Penyelidik



Date
Tarikh

3.

COMMENTS OF PTJ'S RESEARCH COMMITTEE
KOMEN JAWATANKUASA PENYELIDIKAN PERINGKAT PTJ

General Comments:

Ulasan Umum:

Research project has been completed successfully and objectives achieved. The output include one publication in the Open Access Journal 2012 and another publication to the Sains Malaysia.

This report has been assessed by an independent assessor and approved by the PTJ PhD committee.



PROFESOR AHMAD SUKARI HALIM
 Timbalan Dekan (Penyelidikan)
 Pusat Pengajian Sains Perubatan
 Kampus Kesihatan
 Universiti Sains Malaysia
 16150 Kubang Kerian, Kelantan.

Signature and Stamp of Chairperson of PTJ's Evaluation Committee
 Tandatangan dan Cop Pengerusi Jawatankuasa Penilaian PTJ

Date : 22/01/12
 Tarikh :

Signature and Stamp of Dean/ Director of PTJ
 Tandatangan dan Cop Dekan/ Pengerah PTJ

Date :
 Tarikh :



PROFESOR ABDUL AZIZ BABA
 Dekan
 Pusat Pengajian Sains Perubatan
 Kampus Kesihatan
 Universiti Sains Malaysia
 16150 Kubang Kerian, Kelantan.

COMPREHENSIVE TECHNICAL REPORT

**The effects of combination behavioural intervention of nutritional education
and exercise (COMBINE) on oxidative stress and haemostatic markers in
obese subjects**

Grant Number: 1001/PPSP/812031

Chief investigator:

Prof Madya Dr Rahimah Zakaria

Co-investigators:

Dr Rohana Abdul Jalil

Dr Che Badariah Abdul Aziz

Prof Madya Dr Wan Zaidah Abdullah

Wan Suriati Wan Nik

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ABSTRACT

Alterations in the levels of oxidative stress and haemostatic markers have been proposed as one of the mechanisms for obesity-related cardiovascular disease. This study aims to evaluate the effect of 12-week behavioral lifestyle modification program on the oxidative stress levels in obese subjects. This is an interventional prospective study conducted from April 2009 through December 2010. Thirty four obese adult recruited from the Obesity Clinic, Hospital Universiti Sains Malaysia participated in the 12-week behavioral lifestyle modification program consisting of diet and exercise interventions. Body weight, BMI and body fat were significantly reduced after 12-week interventions. Plasma GPx activity and 4-HNE concentration increased significantly after 12-week interventions. Other enzymatic antioxidant activities such as CAT and SOD increased, and GSH:GSSG ratio reduced but the changes were not statistically significant. Plasma fibrinogen, factor VII, TAFI, t-PA and PAI-1 levels were significantly decreased and plasma Heparin Cofactor II level was significantly increased after 12-week intervention. In conclusion, diet and exercise interventions reduce cardiovascular risk factors by reducing body fat, increasing enzymatic antioxidant defense and beneficially altering the levels of haemostatic markers in obese adults.

Key words: *cardiovascular disease, obesity, oxidative stress, haemostatic markers, exercise, dietary intervention*

ABSTRAK

Perubahan dalam tahap stres oksidatif dan penanda haemostatik telah dicadangkan sebagai salah satu mekanisme untuk penyakit kardiovaskular berkaitan obesiti. Kajian ini bertujuan untuk menilai kesan program 12-minggu pengubahsuaian tingkah laku gaya hidup terhadap tahap stres oksidatif dalam subjek obes. Ini merupakan kajian prospektif intervensi yang dijalankan dari April 2009 hingga Disember 2010. Tiga puluh empat orang dewasa obes yang direkrut dari Klinik Obesiti, Hospital Universiti Sains Malaysia mengambil bahagian dalam 12 minggu program pengubahsuaian tingkah laku gaya hidup yang terdiri daripada diet dan senaman. Berat badan, BMI dan lemak badan telah dikurangkan dengan ketara selepas intervensi selama 12 minggu. Aktiviti plasma GPx dan kepekatan 4-HNE meningkat dengan ketara selepas intervensi selama 12 minggu. Lain-lain aktiviti antioksidan enzim seperti CAT dan SOD meningkat, dan nisbah GSH:GSSG dikurangkan tetapi perubahannya tidak ketara secara statistik. Tahap plasma fibrinogen, faktor VII, TAFI, t-PA dan PAI-1 menurun dan plasma heparin kofaktor peringkat II meningkat dengan ketara selepas intervensi selama 12-minggu. Kesimpulannya, intervensi diet dan senaman mengurangkan faktor risiko kardiovaskular melalui pengurangan lemak badan, peningkatan pertahanan antioksidan enzim dan perubahan tahap penanda haemostatik secara berfaedah dalam orang dewasa obes.

Kata kunci: penyakit kardiovaskular, obesiti, stres oksidatif, penanda haemostatik, senaman, intervensi diet