

RUJUKAN

Final report For Short Term Grant

A/C :304/PPSP/6131537

**THE EFFECT OF MONOCHROMATIC INFRARED ENERGY
THERAPY ON DIABETIC FEET WITH PERIPHERAL SENSORY
NEUROPATHY - A RANDOMIZED CONTROLLED TRIAL**



Principle Investigator

Dr Abdul Nawfar Bin Sadagatullah

SENARAI SEMAKAN UNTUK BUKU LAPORAN AKHIR GERAN USM JANGKA PENDEK

NAMA PENYELIDIK UTAMA	: Dr Abdul Nawfar Bin Sadagatullah
NAMA CO-RESEARCHER	: Dr Nor Azira Binti Yaacob
TAJUK GERAN	THE EFFECT OF MONOCHROMATIC INFRARED ENERGY THERAPY ON DIABETIC FEET WITH PERIPHERAL SENSORY NEUROPATHY - A RANDOMIZED CONTROLLED TRIAL
NO.AKAUN	304/PPSP/6131537

SENARAI SEMAKAN SEMASA PENYERAHAN BUKU LAPORAN AKHIR
(Sila Tandakan (√) Pada Kotak Yang Berkenaan)

NO	PERKARA	ADA	TIADA
1.	Borang Laporan Akhir Projek Penyelidikan USM Jangka Pendek	√	
2.	Borang Laporan Hasil Penyelidikan, PPSP	√	
3.	i) Salinan Menuskrip	√	
	ii) Salinan surat/email bukti penghantaran kepada mana-mana journal	√	
4.	Penyata Perbelanjaan (Financial Statement) (Sila dapatkan daripada Jabatan Bendahari)	√	
5.	Laporan Komprehensif (termasuk kertas persidangan atau seminar dan penerbitan saintifik hasil daripada projek ini)	√	
6.	Surat pemakluman penghantaran Laporan Akhir ke Bhg. Penyelidikan	√	

Nota:

- * Sila buat 3 salinan buku laporan Akhir
- * No. 1-5 - Perlu dimasukkan dalam Buku Laporan Akhir
- * No.6 - Hantar terus Kepada Cik Amra Othman (RCMO) hanya salinan sahaja kepada Bhg. R&D, PPSP

My doc/checklist borang2/sue



LAPORAN AKHIR PROJEK PENYELIDIKAN JANGKA PENDEK
FINAL REPORT OF SHORT TERM RESEARCH PROJECT

Sila kemukakan laporan akhir ini melalui Jawatankuasa Penyelidikan di Pusat Pengajian dan Dekan/Pengarah/Ketua Jabatan kepada Pejabat Pelantar Penyelidikan

1. Nama Ketua Penyelidik: Dr Abdul Nawfar Bin Sadagatullah <i>Name of Research Leader</i>					
<input type="checkbox"/> Profesor Madya/ <i>Assoc. Prof.</i>		<input checked="" type="checkbox"/> Dr./ <i>Dr.</i>		<input type="checkbox"/> Encik/Puan/Cik <i>Mr/Mrs/Ms</i>	
2. Pusat Tanggungjawab (PTJ): PUSAT PENGAJIAN SAINS PERUBATAN <i>School/Department</i>					
3. Nama Penyelidik Bersama: Dr Nor Azira Yaacob <i>Name of Co-Researcher</i>					
4. Tajuk Projek: <i>Title of Project</i> <u>THE EFFECT OF MONOCHROMATIC INFRARED ENERGY THERAPY ON DIABETIC FEET</u> <u>WITH PERIPHERAL SENSORY NEUROPATHY - A RANDOMIZED CONTROLLED TRIAL</u>					
5. Ringkasan Penilaian/Summary of Assessment:					
	Tidak Mencukupi <i>Inadequate</i>		Boleh Diterima <i>Acceptable</i>	Sangat Baik <i>Very Good</i>	
	1	2	3	4	5
i) Pencapaian objektif projek: <i>Achievement of project objectives</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ii) Kualiti output: <i>Quality of</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii) Kualiti impak: <i>Quality of impacts</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iv) Pemindahan teknologi/potensi pengkomersialan: <i>Technology transfer/commercialization potential</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
v) Kualiti dan usahasama : <i>Quality and intensity of collaboration</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
vi) Penilaian kepentingan secara keseluruhan: <i>Overall assessment of benefits</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. 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).

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)

Rujuk Lampiran

7. Sila sediakan laporan teknikal lengkap yang menerangkan keseluruhan projek ini.

[Sila gunakan kertas berasingan]

Applicant are required to prepare a Comprehensive Technical Report explaining the project.

(This report must be appended separately)

Di Lampirkan

Senaraikan kata kunci yang mencerminkan penyelidikan anda:

List the key words that reflects your research:

Bahasa Malaysia

Neuropathi sisiran;

Terapi gelombang infra merah;

Komplikasi Diabetes

Masalah Kaki Diabetes

Bahasa Inggeris

Peripheral Neuropathy;

Infra red therapy;

Diabetes complication;

Diabetic foot

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)

Submitted for publication review of the Singapore Medical Journal

- (b) **Faedah-faedah lain seperti perkembangan produk, pengkomersialan produk/pendaftaran paten atau impak kepada dasar dan masyarakat.**
State other benefits such as product development, product commercialisation/patent registration or impact on source and society.

Fulfills the objective of evidence based treatment for for peripheral nerve disease in Diabetes mellitus.

Disapproves the said treatment for diabetic peripheral neuropathy as claimed by manufacturer.

* 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)
Dr NORAZIRA M. YAACOB
Passed M.Med (Orthopaedic),
May 2009

ii) **Lain-lain**
Others:

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

Anodyne 120-4H (Anodyne Home System)

Lot no: MH 032459

Harta USM No. 2AK00009530PPSP/2008


Tandatangan Penyelidik
Signature of Researcher

29/8/2010
Tarikh
Date

Lampiran

ABSTRACT (English)

INTRODUCTION:

Peripheral diabetic neuropathy has been a burden to the health and economy with increasing number of the morbidity and mortality following foot ulcer and amputation.

Being an irreversible disease, foot care and glycemic control is the mainstay of treatment. Various adjunct treatments to improve neuropathy had been introduced to the market. Among them was Monochromatic Infrared Energy Therapy (MIRE) which claims to produce promising results. This study focused on the effect of MIRE on the diabetic foot peripheral neuropathy. The main difference compared to other studies done before was the use of a neurometer for neuropathy assessment which is more quantitative and sensitive.

OBJECTIVE:

To assess the effect of MIRE on diabetic feet associated with peripheral neuropathy

METHODOLOGY:

A randomized controlled single blinded study was conducted at Hospital Sains Malaysia from February to October 2008. A total of 30 lower limbs from 24 patients were enrolled into the study. The neuropathy was screened by Michigan Neuropathy Scoring Investigation (MNSI) followed by the assessment of the Current Perception Threshold using a neurometer at 2000Hz, 250Hz and 5Hz frequencies. The limbs were randomized to receive either daily MIRE or placebo treatment for a total of 12 treatments. The foot was reassessed again with neurometer within a week of completion of the treatment and at 6 weeks following treatment

RESULTS:

The data obtained was analyzed with non parametric test to compare between the pre-treatment and post treatment groups. The inter relationship of each result between these 2 groups was confirmed by Chi-Square test. We found that there was no significant difference ($p>0.05$) between the neuropathic foot of diabetic patient in both MIRE and placebo groups.

CONCLUSION:

There was no improvement of neuropathy in the diabetic foot patient following MIRE treatment.

ABSTRAK (MELAYU)

PENGENALAN:

Penambahan kes morbiditi dan mortaliti akibat daripada bertambahnya jumlah kes-kes diabetik neuropati menyebabkan kaki berkudis dan pemotongan anggota telah menambahkan beban perawatan kesihatan dan ekonomi di seluruh dunia. Penjagaan kaki dan pengawalan gula di dalam darah telah menjadi rawatan yang utama sejak sekian lama kerana penyakit neuropati ini tidak dapat sembuh sepenuhnya. Berbagai-bagai rawatan sampingan telah berada di pasaran semata-mata untuk mengurangkan kesan komplikasi neuropati ini. Antaranya adalah Monochromatic Infrared Energy Therapy (MIRE). Kajian ini adalah sebenarnya untuk mengkaji kesan MIRE pada kaki pesakit diabetik yang mengalami neuropati. Perbezaannya berbanding kajian terdahulu adalah kajian ini menggunakan neurometer untuk memeriksa neuropati yang didapati lebih kuantitatif dan sensitif.

OBJEKTIF:

Tujuan kajian ini adalah untuk mengkaji kesan MIRE pada pesakit diabetik yang mengalami neuropati pada kakinya.

KAEDAH KAJIAN DILAKUKAN:

Penyelidikan ini telah diadakan di Hospital Sains Universiti Malaysia dari Februari ke Oktober 2008. Sebanyak 30 kaki pesakit daripada 24 orang pesakit telah dipilih secara rawak untuk kajian. Seterusnya pemeriksaan pengesanan neuropati telah dilakukan dengan menggunakan Michigan Neuropathy Scoring Investigation (MNSI) yang kemudiannya melalui pemeriksaan lanjutan menggunakan neurometer pada frekuensi berbeza iaitu 2000Hz, 250Hz dan 25Hz. Kaki pesakit tersebut telah di bahagi secara rawak kepada kumpulan samada untuk menerima rawatan harian sebanyak 12 kali dengan MIRE atau placebo. Selepas tamat perawatan pemeriksaan selanjutnya dilakukan dalam masa satu minggu dengan menggunakan neurometer bagi kali kedua.

KEPUTUSAN:

Keputusan kajian telah dianalisa dengan kaedah *non parametric test* iaitu untuk membandingkan keputusan bacaan neurometer antara sebelum perawatan dan selepas penerimaan rawatan. Perbandingan antara frekuensi pada kedua-dua kumpulan tersebut telah di kira menggunakan kaedah *Chi-Square test*. Keputusan kajian ini menunjukkan MIRE tidak mempunyai kesan pada kedua-dua kumpulan tersebut iaitu placebo dan MIRE ($p > 0.05$). .

KESIMPULAN

Kajian ini mendapati rawatan MIRE tidak mempunyai kesan kepada kaki pesakit diabetik yang mengalami neuropati.

Manuscript

Status At review panel

Submitted 07, July, 2010

Title page.

THE EFFECT OF MONOCHROMATIC INFRARED ENERGY THERAPY ON DIABETIC FEET WITH PERIPHERAL SENSORY NEUROPATHY – A RANDOMIZED CONTROLLED TRIAL

1. * Abdul Nawfar Sadagatullah
MD;M.Med (Orthopaedic)
Senior lecturer and Consultant orthopaedic surgeon
School of Medical Sciences, Universiti Sains Malaysia
Kota Bharu, Kelantan, Malaysia
2. **Norazira Bt. M. Yacob
MBBS(Bangalore) ; M.Med (Orthopaedic)
Orthopaedic surgeon
Hospital Umum Sarawak,Kuching
Sarawak, Malaysia

Corresponding author:

Abdul Nawfar Sadagatullah,

Add:

Department of orthopaedics,
School of Medical Sciences,
Universiti Sains Malaysia,
16150 Kota Bharu, Kelantan
Malaysia

e-mail : nawfar@kb.usm.my

Tel : +609-7676398

Fax : +609-7676389

THE EFFECT OF MONOCHROMATIC INFRARED ENERGY THERAPY ON DIABETIC FEET WITH PERIPHERAL SENSORY NEUROPATHY – A RANDOMIZED CONTROLLED TRIAL

S. Abdul Nawfar* ,Norazira Bt. M. Yacob **,

*Department of Orthopaedics, School of Medical Sciences, Universiti Sains Malaysia

**Department of Orthopaedics, Sarawak General Hospital, Kuching Sarawak

ABSTRACT

INTRODUCTION: Peripheral diabetic neuropathy has been a burden to the health and economy with increasing number of the morbidity and mortality following foot ulcer and amputation.

Being an irreversible disease, foot care and glycemic control is the mainstay of treatment. Various adjunct treatments to improve neuropathy had been introduced to the market. Among them was Monochromatic Infrared Energy Therapy (MIRE) which claims to produce promising results. This study focused on the effect of MIRE on the diabetic foot peripheral neuropathy. The main difference compared to other studies done before was the use of a neurometer for neuropathy assessment which is more quantitative and sensitive.

OBJECTIVE: To assess the effect of MIRE on diabetic feet associated with peripheral neuropathy

METHODOLOGY: A randomized controlled single blinded study was conducted at Hospital Sains Malaysia from February to October 2008. A total of 30 lower limbs from 24 patients were enrolled into the study. The neuropathy was screened by Michigan Neuropathy Scoring Investigation (MNSI) followed by the assessment of the Current Perception Threshold using a neurometer at 2000Hz, 250Hz and 5Hz frequencies. The limbs were randomized to receive either daily MIRE or placebo treatment for a total of 12 treatments. The foot was reassessed again with neurometer within a week of completion of the treatment and at 6 weeks following treatment

RESULTS: The data obtained was analyzed with non parametric test to compare between the pre-treatment and post treatment groups. The inter relationship of each result between these 2 groups was confirmed by Chi-Square test. We found that there was no significant difference ($p>0.05$) between the neuropathic foot of diabetic patient in both MIRE and placebo groups.

CONCLUSION:

There was no improvement of neuropathy in the diabetic foot patient following MIRE treatment.

Key words:

Peripheral Neuropathy; Infra red therapy; Diabetes complication; Diabetic foot