



UNIVERSITI PUTRA MALAYSIA

**EVALUATION OF TWO ERGONOMIC INTERVENTION PROGRAMS IN
REDUCING ERGONOMIC RISK FACTORS CONTRIBUTING TO
MUSCULOSKELETAL PAIN AMONG SCHOOL CHILDREN**

SYAZWAN AIZAT BIN ISMAIL

FPSK(m) 2010 23

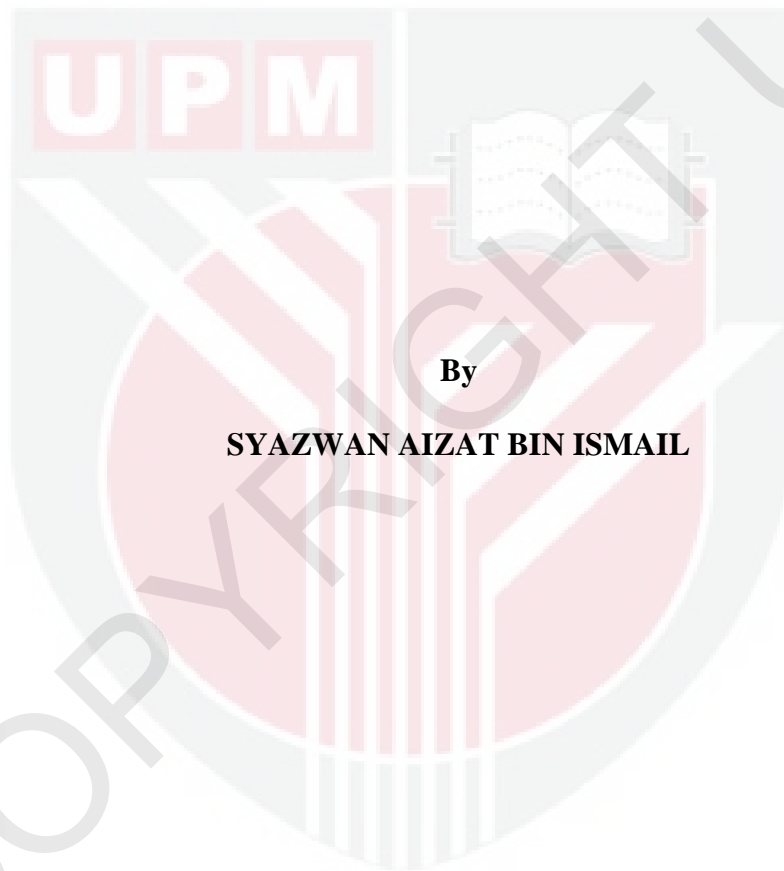
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**MASTER OF SCIENCE
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By

SYAZWAN AIZAT BIN ISMAIL

Thesis submitted to the School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the requirements for the Degree of Master of Science
July 2010

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Master of Science

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July 2010

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Introduction: An intervention study was carried out from February 2009 until August 2009 with the objective of investigating the cost effectiveness of two ergonomics intervention programs in reducing ergonomics risk factors among 229 school children in 2nd Grade (age 8 years) and 5th Grade (age 11 years) from three schools.

Methodology: An intervention study design was carried out, in which for Group 1 ergonomically designed furniture were used in the intervention program together with instructions on the proper usage. Group 2 implemented an ergonomics program with intensive health promotion consisting of exercises, educational materials and lectures to reduce ergonomics risks. Musculoskeletal symptoms were recorded using Standardized Nordic Body Map Questionnaires. In measuring the risk factors of each intervention program, Rapid Upper Limb Assessment (RULA) was used to assess the risk from awkward posture perform while seating. Ergonomics awareness test (EAT)

was performed in evaluating the awareness level of ergonomics risks existed in the school environment. Tanita weight measurement was used to measure the school bag weight of each respondent.

Results: A significant ($p < 0.05$) reduction of RULA score were observed among those in Group 1 and Group 2 (2nd and 5th grader) with no significant changes of risk among those in the control group. School bag weight was significantly reduced from baseline to post intervention assessment among 2nd grader in group 1. Although there is a trend of school bag weight reduction from baseline to post intervention program, no significant reduction of school bag weight were observed among 5th grader of group 1 and 2. The Ergonomics awareness test shows an increasing trend for both groups while control group shows no changes from baseline to post intervention. Cost effectiveness analysis shows that Group 1 is more effective than Group 2 in reducing the risk from school bag weight and improving the knowledge in ergonomics awareness while Group 2 effectively manage in reducing postural risk.

Conclusions: By using ergonomics furniture with proper instructions, the study revealed that the risk from heavy school bag weight was reduced and ergonomics knowledge among the students increases. Health promotion program manage to reduce postural risk among those using current furniture.

Keywords: Schoolchildren, musculoskeletal pain, rapid upper limb assessment, ergonomics intervention programs, bag weight, and ergonomics awareness test

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan ijazah Master Sains

**PENILAIAN DUA PROGRAM INTERVENSI ERGONOMIK BAGI
MENGURANGKAN RISIKO HAZAD ERGONOMIK PENYEBAB
MASALAH OTOT RANGKA DIKALANGAN PELAJAR SEKOLAH**

Oleh

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Pendahuluan: Kajian program intervensi telah dilaksanakan dari bulan Februari 2009 hingga Ogos 2009 dengan tujuan mengkaji keberkesanan dua jenis program intervensi (PI) dalam mengurangkan risiko hazard ergonomik dikalangan 229 pelajar sekolah darjah 2 (umur 8 tahun) dan darjah 5 (umur 11 tahun) dari tiga buah sekolah.

Metodologi: Satu kajian intervensi telah dijalankan dengan memilih Kumpulan 1 dari sebuah sekolah dengan dibekalkan kerusi dan meja yang ergonomik kepada setiap pelajar dengan disertai oleh penerangan cara menggunakan perabot ergonomik terbabit. Kumpulan 2 pula dipilih dari sekolah yang berlainan untuk dilaksanakan program insentif promosi kesihatan mengenai hazard ergonomik disekolah yang merangkumi pembelajaran mengenai senaman mengurangkan sakit badan dan adaptasi perabot yang sedia ada. Simptom Sakit Otot Rangka direkodkan menggunakan Soal Selidik Standard Peta Badan Nordiq. Dalam mengukur risiko kumpulan intervensi, Penilaian Aras Badan Atas Berulang (RULA) digunakan untuk

menilai kedudukan postur terlampau bagi pelajar sekolah semasa duduk. Kesedaran hazad ergonomik diuji menggunakan Soalan Kesedaran Ergonomik (SKE) untuk menilai tahap kesedaran pelajar mengenai isu ergonomik di sekolah mereka. Alat penimbang Tanita digunakan untuk mengukur berat beg sekolah pelajar.

Keputusan: Penurunan yang signifikan (nilai $p < 0.05$) kepada markah RULA dicatatkan dikalangan mereka yang berada di kalangan Kumpulan 1 dan Kumpulan 2 dengan tiada perubahan signifikan ditunjukkan dikalangan Kumpulan Kawalan. Berat beg sekolah menunjukkan penurunan yang signifikan dari perolehan data asas sehingga data selepas intervensi dijalankan dikalangan pelajar darjah dua. Walau perubahan penurunan beg ditunjukkan di Kumpulan 1 dan 2, namun tiada perubahan signifikan ditunjukkan dikalangan semua Kumpulan 1 dan 2 pelajar darjah lima. Perubahan kenaikan markah SKE ditunjukkan dikalangan pelajar Kumpulan 1 dan 2, namun tiada perubahan dikalangan Kumpulan Kawalan. Analisis keberkesanan kos menunjukkan Kumpulan 1 lebih kos efektif daripada Kumpulan 2 dalam mengurangkan risiko beg berat, dan meningkatkan kesedaran ergonomik, Kumpulan 2 pula menunjukkan kos efektif dari sudut pengurangan risiko postur akut.

Kesimpulan: Dengan menggunakan perabot ergonomik bersama tunjuk ajar berkesan, kajian ini menunjukkan risiko beg berat dikurangkan dan kesedaran hazad ergonomik ditingkatkan. Promosi kesihatan pula mampu pengurangkan risiko postur akut dikalangan pengguna perabot sekarang ini.

Kata Kunci: Pelajar sekolah, Sakit otot rangka (MSP), Penilaian Berulang Bahagian Atas Badan (RULA), Program intervensi ergonomik, Berat beg, dan Soalan Kesedaran Ergonomik

ACKNOWLEDGEMENTS

First and foremost, I would like to thank Allah, Al-Mighty for his blessing and making all things happened smoothly during this whole final year of final year project. I would like to take this opportunity to put across my utmost gratitude to my project supervisor, Dr. Shamsul Bahri bin Hj. Mohd Tamrin for all his advice, supervision, guidance, encouragement and dedication throughout this research. His productive criticism and comments have been very valuable in the preparation and writing of this thesis.

Appreciation also goes to Prof. Dr. Zailina Hashim, Head of Environmental and Occupational Health Unit for her comments and ideas in preparing this dissertation. My utmost gratitude also to Ass. Prof. Dr. Hanafiah Juni for his ideas and positive criticism in analysis of the data. Besides that, many thanks to Dr. Juliana Jalaludin who gave full support and ideas in preparing the general ideas of the project design. Not forgetting as well the office staff who gave their fullest cooperation for this project, I thank you all. A token of appreciation goes to Associate Professor Dr. Sharifah Zainiyah Syed Yahya, Head Department of Community Health.

Apart from that, special thanks go to my parents, Mr. Ismail Bin Musa and Mdm. Maznah Bte Ab. Jamal, including my lovely brother Zulfadhli for his endless idea, encouragement and support throughout this project. I would like to thank also my girlfriend, Ms Syahidatussyakirah Katis for her lovely ideas and motivated work for helping my project in data collection period. Thanks also to all my course mates and fellow friends for their kindest assistance. Lastly, I would like to say a very big thank you to all who have worked tirelessly in this project directly and indirectly.

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirements for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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DECLARATION

I hereby declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.

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Date: 26 July 2010



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