



MALAYSIAN ASSOCIATION FOR THE STUDY OF OBESITY
Persatuan Kajian Obesiti Malaysia

MASO 2009
SCIENTIFIC CONFERENCE ON OBESITY
‘Obesity & Our Environment’

Souvenir Programme & Abstracts

12 – 13 August 2009

Best Western Premier Seri Pacific Hotel

Kuala Lumpur

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MINISTER OF HEALTH MALAYSIA

Message from Minister of Health Malaysia

I would like to extend a warm welcome to all the participants of MASO 2009. On behalf of the Ministry of Health Malaysia, I would also like to congratulate the Malaysian Association for the Study of Obesity (MASO) and the Organizing Committee for their fine effort in convening this biennial Scientific Conference which has attracted participants from 13 foreign countries, including Professor Philip James, the President of the International Association for the Study of Obesity (IASO), to Kuala Lumpur. A conference such as this will undoubtedly provide a platform for both speakers and participants to share common experiences and to update their knowledge on obesity.

The theme of this year conference, “*Obesity and Our Environment*” is not only timely but also serves as a crucial reminder to us of the importance of a healthy environment. Despite considerable advances in our knowledge of the etiology of obesity and its management, the diseases associated with being obese continue to pose great challenges to our researchers, health experts and policy makers.

It is my sincere hope that this conference will highlight and discuss some of the current thoughts, why we should treat obesity seriously, and more importantly, how the government can cope with this ever escalating epidemic.

May I wish all the participants of MASO 2009 a fruitful meeting and to our foreign participants, have an enjoyable stay in Malaysia.

(DATO' SRI LIOW TIONG LAI)

MINISTRY OF HEALTH MALAYSIA
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Message from President

It gives me great pleasure to welcome you to Kuala Lumpur for MASO's biennial conference (MASO 2009). We are indeed honoured to have the presence of YB Dato' Sri Liow Tiong Lai, Minister of Health Malaysia to grace the official opening of the conference.

It is most gratifying to note that despite the H1N1 outbreak, several eminent researchers in the field of obesity and participants from no less than 15 countries have brave the journey to be with us here today.

The theme of this year conference "Obesity and our Environment" serve to update our members and all related professionals of the growing concern our environment plays in relation to the Obesity epidemic from a broad perspective and to highlight some recent local and global efforts and actions for their prevention and control.

We have a busy 2-day programme which include 1 Keynote address by Professor Philip James, President, IASO, 1 Plenary lecture by Professor John Reilly, 31 Symposia papers and more than 40 Poster presentations that will allow participants to update themselves of the current state of the art and science of obesity.

MASO would like to express our sincere gratitude to YB Dato' Sri Liow Tiong Lai for taking time off his hectic schedule to declare open MASO 2009 and to launch MASO's Pre-diabetic screening campaign. A special thanks goes to all the speakers for accepting our invitation and all the participants of MASO 2009. We would also like to acknowledge the support of the sponsors and other contributors and last but not least, members of the Organising Committee for their undivided support.

May you all have a fruitful meeting and to our foreign colleagues an enjoyable stay in Malaysia.

Professor Dr Mohd Ismail Noor *FASc, FIUNS*

Chairman, Organizing Committee

Organising Committee

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Prof Dr Mohd Ismail Noor

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Mr Ong Wei Wen

Conference Information

Registration Desk

The registration desk will be located at the entrance to Pacific Ballroom, Level 2, Best Western Premier Seri Pacific Hotel, Kuala Lumpur. Registration will be open during the following hours:

Wednesday, 12 August 2009	0800-0900, 1000-1100
Thursday, 13 August 2009	0800-0900

All delegates may collect their conference materials at the registration desk during the hours. Participants and accompanying persons are required to wear their badges throughout the conference for identification purposes and for admission to conference hall and dining room.

Lunch and Tea / Coffee Breaks

Tea/coffee breaks will be served at the Foyer of Pacific Ballroom, Level 2 while lunch will be served at Bunga Room, Level 3, Best Western Premier Seri Pacific Hotel, Kuala Lumpur.

Secretariat Room

The Secretariat Room is located at Bunga Lily, Level 3, Best Western Premier Seri Pacific Hotel, Kuala Lumpur. Oral presenters may preview their slides at the Secretariat Room from 0900 till 1700 hours on both conference days.

Poster Session

Posters will be displayed throughout the conference days at the back foyer of the Pacific Ballroom, Level 2, Best Western Premier Seri Pacific Hotel, Kuala Lumpur. Posters should be put up by 0830 hours on Wednesday, 12 August 2009, and should be taken down by 1730 hours on Thursday, 13 August 2009. Poster

presenters should be in attendance next to their posters during the indicated Poster sessions for discussion and interaction with other participants. Three best posters by student presenters shall be awarded cash prizes.

Opening Ceremony

The Opening Ceremony of MASO 2009 will be held at 0900 hours on Thursday, 13 August 2009, at Pacific Ballroom, Level 2, Best Western Premier Seri Pacific Hotel, Kuala Lumpur. Participants are requested to be seated inside the Ballroom by 0850 hours.

MASO Conference Dinner Lecture

The conference dinner lecture will be held on Wednesday, 12 August 2009, at 8 pm in Bunga Room, Level 2, Best Western Premier Seri Pacific Hotel, Kuala Lumpur. Please confirm and collect your ticket to the conference dinner lecture at the registration desk during registration.

Trade exhibitions

Abbott Laboratories (M) Sdn Bhd
DSM Nutritional Products (M) Sdn Bhd
Nestle Malaysia Berhad
Neucor Alliance (M) Sdn Bhd
Nova Nutritional Supplies Sdn Bhd
Totalife (M) Sdn Bhd

Display of products and services in the trade exhibition and advertisements in this Souvenir programme, do not necessarily imply endorsement of these products and services by the Malaysian Association for the Study of Obesity.

Opening Ceremony

Official Opening by YB Dato' Sri Liow Tiong Lai,
Hon. Minister of Health Malaysia

Thursday 13th August 2009
0900 hours
Pacific Ballroom, Best Western Premier
Seri Pacific Hotel,
Kuala Lumpur

8.00 a.m.	Registration of delegates
8.45 a.m.	Arrival of YB Dato' Sri Liow Tiong Lai, Honorable Minister of Health Malaysia
9.00 a.m.	Welcome address by Professor Dr Mohd Ismail Noor, President MASO
9.10 a.m.	Speech by Professor Dr Phillip James, President, International Association for the Study of Obesity (IASO)
9.20 a.m.	Speech and Official Opening by YB Dato' Sri Liow Tiong Lai, Hon. Minister of Health Malaysia
9.40 a.m.	Launching of 'Pre-diabetic Screening Campaign'
9.50 a.m.	Tour of Exhibition / Posters by Guest of Honour

Scientific Programme

Day 1 (12 Aug 2009, Wednesday)

Time	Programme
8.00 a.m.	Registration
9.00 a.m.	Welcome by Professor Dr Mohd Ismail Noor, President MASO
9.10 a.m.	PLENARY LECTURE <i>Chair: Professor Dr Fatimah Harun, Universiti Malaya</i> Treatment of child and adolescent obesity: Present and future <i>Professor Dr John Reilly, University of Glasgow, U.K.</i>
10.10 a.m.	Coffee break Posters / Exhibition
10.40 a.m.	SYMPOSIUM 1 Causes and Consequences of Obesity <i>Chair: Assoc Professor Dr Nik Mazlan Mamat, International Islamic University, Malaysia</i>
10.40–11.00 a.m.	S1.1 Obesity and metabolic syndrome in Japan <i>Professor Dr Shuji Inoue, Kiryu University, Japan</i>
11.00–11.15 a.m.	S1.2 Relationships between obesity and abdominal muscular endurance in an middle-aged female population <i>Dr Hsu CH, National Pingtung University of Science and Technology, Taiwan</i>
11.15–11.30 a.m.	S1.3 Prevalence of obesity, metabolic syndrome and its components among older adults in rural areas <i>Assoc Professor Dr Zaitun Yassin, Universiti Putra Malaysia</i>

11.30–11.45 a.m.	<p>S1.4 Obesity and hypoventilation syndrome: A biomechanical prospective <i>Praveen Jayaprabha Surendran, INTI University College</i></p>
11.45–12.00 p.m.	<p>S1.5 Dietary influences on obesity in a rural population of Tamilnadu, South India <i>Dr Usha Rani, Bharathiar University, India</i></p>
12.00–12.15 p.m.	<p>S1.6 Serum adiponectin and central adiposity in Malay adults <i>Dr Hamid Jan JM, Universiti Sains Malaysia</i></p>
12.15 p.m.	Poster session / Exhibition
12.45 p.m.	LUNCH
2.00 p.m.	<p>SYMPOSIUM 2 Epidemiology of Obesity <i>Chair: Assoc. Professor Dr Zaitun Yassin, Universiti Putra Malaysia</i></p>
2.00 – 2.20 p.m.	<p>S2.1 Prevalence and trends of overweight and obesity in two cross-sectional studies of Malaysian children, 2002-2008 <i>Professor Dr Mohd Ismail Noor, Universiti Kebangsaan Malaysia</i></p>
2.20 – 2.35 p.m.	<p>S2.2 Prevalence of overweight and obesity and their correlates - A cross sectional study among medical students of India <i>Dr M Athar Ansari, Aligarh Muslim University, India</i></p>
2.35 – 2.50 p.m.	<p>S2.3 Cultural and social perception of obesity in Southeast Asia: A preliminary survey among overweight adults in Indonesia, the Philippines, and Thailand <i>Professor Dr Wan Abdul Manan Wan Muda, Universiti Sains Malaysia</i></p>
2.50 – 3.05 p.m.	<p>S2.4 Obesity and metabolic syndrome of a wellness cohort in Kuala Lumpur <i>Dr Moy Foong Ming, Universiti Malaya</i></p>

3.05 – 3.20 p.m.	<p>S2.5 Physical activity and sedentary behaviours among Malaysian schoolchildren <i>Assoc Professor Dr Poh Bee Koon, Universiti Kebangsaan Malaysia</i></p>
3.30 p.m.	<p>SYMPOSIUM 3 Childhood Obesity <i>Chair: Dr Zawiah Hashim, MASO Council Member</i></p>
3.30 – 3.50 p.m.	<p>S3.1 Why we must prevent childhood obesity in Malaysia <i>Professor Dr Fatimah Harun, Universiti Malaya</i></p>
3.50 – 4.05 p.m.	<p>S3.2 Association of sugar intake and sweetened beverage consumption with body mass index among primary school children in Klang Valley <i>Assoc Professor Dr Norimah A Karim, Universiti Kebangsaan Malaysia</i></p>
4.05 – 4.20 p.m.	<p>S3.3 Diet and physical activity profile of the obese children attending the obesity clinic of Yangon Children Hospital <i>Dr Phyu Phyu Aung, Universiti Malaysia Sarawak</i></p>
4.20 – 4.35 p.m.	<p>S3.4 A case study on snacking frequency amongst obese male teenagers at regular national school in Shah Alam, Selangor <i>Assoc Professor Dr Raja Saidatul Hisan Raja Azam, Universiti Teknologi MARA</i></p>
4.35 – 4.50 p.m.	<p>S3.5 A randomised controlled trial of childhood obesity treatment in Malaysia (MASCOT) – Preliminary results <i>Sharifah Wajihah Wafa SST Wafa, Universiti Kebangsaan Malaysia</i></p>
4.50 – 5.20 p.m.	Poster session / Exhibition
5.20 p.m.	Tea break

8.00 p.m.

Conference Dinner Lecture (Sponsored by Abbott Malaysia)

Chair: Dr Kumararajah Tambyraja, Medical Director, Abbott Malaysia

The importance of weight management in preventing and managing diabetes

Professor Phillip James, President IASO, U.K.

Day 2 (13 Aug 2009, Thursday)

Time	Programme
9.00 a.m.	OPENING CEREMONY
9.40 a.m.	Tour of Exhibition / Posters by Guest of Honour Coffee break
10.30 a.m.	KEYNOTE ADDRESS <i>Chair: Professor Dr Mohd Ismail Noor, President, MASO</i> Obesity and its major societal implications <i>Professor Dr Phillip James, President IASO, U.K.</i>
11.30 a.m.	SYMPOSIUM 4 Behavioural Aspects of Obesity <i>Chair: Rokiah Don, Ministry of Health Malaysia</i>
11.30–11.50 a.m.	S4.1 Self-esteem, life satisfaction and weight measures in the Malaysian urban community <i>Dr Ng Lai Oon, Universiti Kebangsaan Malaysia</i>
11.50–12.05 p.m.	S4.2 The differences in attitudes toward and beliefs about obese persons among Malaysian Chinese and Malaysian Indian <i>Dr Priyadarshini Moharkonda Srinivasan, Sunway University College</i>
12.05–12.20 p.m.	S4.3 Dietary, exercise and mental attitude patterns in subjects' 6-months into a weight management program <i>Dr Priya M Miranda, Madras Diabetes Research Foundation, India</i>
12.20–12.35 p.m.	S4.4 Relationship between weight and mental health <i>Cheong Sau Kuan, Sunway University College</i>
12.35–12.50 p.m.	S4.5 Transtheoretical Model of Change and weight control among Sarawak natives <i>Chang Ching Thon, Universiti Malaysia Sarawak</i>

12.50 p.m.	Poster session / Exhibition
1.00 p.m.	LUNCH
2.00 p.m.	SYMPOSIUM 5 Management and Treatment of Obesity <i>Chair: Professor Dr Fatimah Arshad, International Medical University, Malaysia</i>
2.00 – 2.20 p.m.	S5.1 Can food solutions win the war against obesity <i>Dr Peifang Zhang, Nestlé R&D Centre Beijing, China</i>
2.20 – 2.35 p.m.	S5.2 A successful dieting through avoiding high-fat diets and performing light-resistance exercise to prevent metabolic syndromes and sarcopenia <i>Professor Masashige Suzuki, Waseda University, Japan</i>
2.35 – 2.50 p.m.	S5.3 Paediatric obesity: Outpatient management in a district general hospital <i>Dr Chinyelu Menakaya, Fairfield General Hospital, UK</i>
2.50 – 3.05 p.m.	S5.4 Promoting weight loss among obese participants through a community-based behavioural intervention program in Kelantan <i>Wan Suriati Wan Nik, Universiti Sains Malaysia</i>
3.05 – 3.20 p.m.	S5.5 Balance in obesity – Rehabilitation perspective <i>Rajkumar KV, Kuala Lumpur Metropolitan University College</i>

3.30 p.m.	<p>SYMPOSIUM 6 Emerging issues & technologies related to Obesity <i>Chair: Assoc. Professor Datin Dr Safiah Mohd Yusof, Universiti Teknologi MARA, Malaysia</i></p>
3.30 – 4.00 p.m.	<p>S6.1 Feeding regulation and energy metabolism in brain – Novel GPCR ligands <i>Professor Dr Shioda Seiji, Showa University School Medicine, Japan</i></p>
4.00 – 4.15 p.m.	<p>S6.2 BMI, a better predictor of hypertension among a tribe of Sikkim, India: Evidence of gene-lifestyle interaction <i>Dr Sovanjan Sarkar, Vivekananda College for Women, India</i></p>
4.15 – 4.30 p.m.	<p>S6.3 Obesity screening for young Japanese males and females using skin fold measurements: The classification revisited <i>Dr Masaharu Kagawa, Queensland University of Technology, Australia</i></p>
4.30 – 4.45 p.m.	<p>S6.4 A framework of web-mobile intelligence monitoring system in the management of obesity for Malaysian community <i>Dr Nasriah Zakaria, Universiti Sains Malaysia</i></p>
4.45 – 5.00 p.m.	<p>S6.5 Body mass index, waist hip ratios and novel phenotypic markers: A triad for detecting diabetes in a population of Tamilnadu, South India <i>Shajithanoop Selvakumar, Bharathiar University, India</i></p>
5.00 p.m.	<p>Poster Prize Presentation Closing Ceremony</p>
5.20 p.m.	<p>Tea break</p>
5.30 p.m.	<p>End of Conference</p>

Biography of Keynote Speaker

W Philip T James

CBE, MD, DSc, FRCP, FRSE

Professor of Nutrition, London School of Hygiene & Tropical Medicine
President, International Association for the Study of Obesity, London,
UK

Professor James, after science and medical qualifications in London, worked in Jamaica and Harvard before returning to head the teaching program for global nutritional problems at the London School of Hygiene and Tropical Medicine. He then became the Assistant Director for the Medical Research Council's Dunn Nutrition Unit in Cambridge before, in 1982, becoming Director of the Rowett Research Institute in Scotland.

He wrote the first UK government and Royal College reports on obesity before developing for WHO the first nutritional strategies for the multiple problems of diseases throughout the European Region in 1986. He then chaired and wrote the WHO's first global analysis of the integrated food and nutritional needs for combating chronic diseases in malnourished populations in 1990 (WHO technical report 797). He has since chaired and written for the UK Government and WHO the first reports on obesity as a public health problem and its prevention and management. Tony Blair asked him to propose a solution to the BSE and the E Coli food safety crisis in the UK: his proposals for restructuring government were implemented by Tony Blair as Prime Minister. He then advised the European Commission on the formation of a Health Policy Directorate and produced their global strategy for dealing with the risk of BSE and other food borne diseases. He was the author for the EU Commission's "Three Wise Men" report on the need to develop a Food and Public Health Authority in Europe before being asked to chair the United Nations Millennium Report on global nutrition and health challenges.

He established in 1996 the International Obesity TaskForce which drafted a) the first WHO report on obesity, b) produced the current global classification of childhood obesity, c) the report highlighting the intrinsic societal drivers in the development and control of obesity, d) specified the Asian susceptibility to obesity, e) established with WHO the remarkable burden of weight gain for global disability and premature death and f) has proposed to numerous governments appropriate strategies for combating the epidemic. He currently chairs the Presidential Council of the WHO-linked Global Prevention Alliance involving the World Heart Federation, the International Diabetes Federation, the International Union of Nutritional Sciences, the International Paediatric Association and IASO. He also Chairs the Executive Steering Committee of the SCOUT trial of weight management in high risk cardiology patients.

Keynote Address

Obesity and Its Major Societal Implications

W Philip T James

CBE, MD, DSc, FRCP, FRSE

Professor of Nutrition, London School of Hygiene & Tropical Medicine
President, International Association for the Study of Obesity, London,
UK

Malaysia has the highest obesity rates in Asia but since this is a recent development the full health and societal impact of the problem is not yet manifest. The importance of the emerging childhood obesity epidemic has also not yet been properly recognised. The three main ethnic groups, however, provide a further major clinical and public health challenge because the Malays, Indians and Chinese may have different susceptibilities to the co-morbidities of weight gain. New World Bank, CDC/WHO analyses reveal the escalating importance of obesity as the epidemic progresses with obesity being the third biggest risk factor for disability and premature death now in affluent countries. Furthermore the UK government's recent Foresight analyses highlight obesity as a normal "passive" biological response to overwhelming environmental factors which have to be altered before the normal human physiological controls of food intake can possibly cope. The major findings that as people become overweight there is a hypothalamic adaptation which "resets" the normal responsiveness of both intake and activity to maintain the excess weight means that major preventive measures are needed for both children and adults. Combating childhood obesity alone is not an option for overwhelmed medical services - only a substantial reduction in adult obesity will save much money in the next two decades. The susceptibility to weight gain in different ethnic groups may be genetic but recent studies from several low income countries including India, Philippines and China show that early nutritional and other influences during pregnancy and the first two years of life are particularly detrimental if followed by weight gain: DM and hypertension are then much more likely complications. Thus prevalent low birth weights in Malaysia 40-70 years ago mean that the whole middle aged population's vulnerability to diabetes may relate to their early childhood experience. Those of Indian origin are particularly susceptible to abdominal obesity with greater fat/lean proportions, insulin resistance and a propensity to hypertension. Epigenetic changes, particularly

linked to the one carbon pool metabolism with distortions in the folate/B12 availability in Indian vegetarians are probably causal. However, the intrinsic lack of animal protein in many Indian diets parallels all the animal studies which show the induction of diabetes in offspring who had restricted protein intakes during pregnancy. Therefore a fundamental lack of essential and limited amino acids e.g. glycine may have profound implications for the susceptibility of the Indian ethnic group in Malaysia. Combating this with better low fat milk supplies may turn out to be the simplest way of combating these deficiencies and will have a marked beneficial effect on the still prevalent rates of stunting. In Malaysia the secular changes in physical activity and particularly in diet have been profound with two major features: the marked increases in sugar and fat consumption driven by immense industrial forces and fast food chains within Malaysia. This is occurring when Malays should be eating much less as a result of their physical inactivity. How to combat this societal challenge requires novel and courageous approaches but without them the impact of obesity on the Malaysian economy is bound to increase progressively.

Biography of Plenary Speaker

John J Reilly

Personal Professor, University of Glasgow Division of Developmental
Medicine

Professor Reilly, BSc PhD, is Personal Professor in Paediatric Energy Metabolism at the University of Glasgow and Yorkhill Hospitals, Glasgow, Scotland. He leads a large Research Group focused on a number of aspects of childhood obesity: diagnosis; consequences; aetiology; prevention; treatment. He has published over 140 peer-reviewed papers. He is on the Editorial Board of the British Journal of Nutrition, and is Associate Editor of the International Journal of Pediatric Obesity. He has won a number of awards for his research, notably the Sir David Cuthbertson Medal from the UK Nutrition Society in 2001 and the Royal Society of Edinburgh Personal Research Fellowship in 2003.

Plenary Lecture

Treatment of Child and Adolescent Obesity: Present and Future

John J Reilly

Personal Professor, University of Glasgow Division of Developmental
Medicine

Child and adolescent obesity are now very common across the developed and developing world. In the UK for example approximately one third of adolescents are obese, and prevalence of obesity is even higher among some sub-groups of the population. Obesity in childhood and adolescence has many adverse effects, both for the obese child and for the adult who was obese as a child. High prevalence of obesity, combined with adverse consequences, makes treatment interventions a high priority for health services. The presentation will take an evidence-based approach to several aspects of paediatric obesity treatment: diagnosis; screening for co-morbidities; the issues of when and who to treat; choosing appropriate behavioural targets of treatment; methods of ensuring that behavioural changes are made; what are the appropriate aims of treatment ?; promising treatment approaches. The presentation will be based on recent systematic reviews and evidence-based guidelines, as well as recent randomised controlled trials of child and adolescent obesity treatment interventions. The generalisability to Malaysia of current evidence on the treatment of paediatric obesity-evidence obtained largely from the USA and Europe- will also be considered.

Abstracts of Papers

Symposium Day 1

Symposium 1: Causes and Consequences of Obesity

S1.1 Obesity and Metabolic Syndrome in Japan

Inoue S

Dept of Clinical Nutrition, Kiryu, University Gumma, Japan

Obesity is originally defined as excessive body fat accumulation now assessed by BMI. Two other types of obesity are defined in the respect of risks for obesity-associated diseases (lifestyle-related disease): upper body obesity or abdominal obesity and visceral obesity. It had been recognized that obesity as a disease should be treated and 5-10% reduction of body weight is enough to normalize obesity-associated abnormalities, while simple obesity itself is not necessarily to be treated from a view point of medical problems. After concept of metabolic syndrome appeared, the situation has changed and it is considered that it should be treated although it is not a disease. Metabolic syndrome is a cluster of high blood glucose, high blood pressure, and dyslipidemia (hypertriglyceridemia and hypoHDL-cholesterolemia) based on abdominal obesity or visceral obesity, and is proposed to be a high risk syndrome for coronary heart disease and diabetes mellitus. Utilizing the concept of metabolic syndrome, national task force for preventing lifestyle-related diseases especially diabetes mellitus have initiated last year in Japan. 3 kg of body weight reduction with 3 cm of waist circumference reduction is targeting for the purpose of this task force. This paper discusses how these three obesities and obesity as a disease were defined in Japan, and recent status of the Japanese national task force.

S1.3 Prevalence of Obesity, Metabolic Syndrome and Its Components among Older Adults in Rural Areas

Zaitun Y^{1,2}, Hazizi AS², Norimah AK³, Fatimah A⁴, Rokiah MY², Nawalyah AG² & Abdul Rashid AR⁵

¹Medical Gerontology Laboratory, Institute of Gerontology, UPM, Serdang, Selangor

²Dept of Nutrition & Dietetics, Faculty of Medicine & Health Sciences, UPM, Serdang, Selangor

³Dept of Nutrition & Dietetics, Faculty of Allied Health Sciences, UKM, Kuala Lumpur

⁴Nutrition & Dietetics, School of Pharmacy & Health Sciences, IMU, Kuala Lumpur

⁵Cyberjaya University College of Medical Sciences, Cyberjaya

The purpose of this paper is to present the distribution of obesity, metabolic syndrome and its components among older adults (50+ years) from selected rural areas. Data from the study on “Development and Validation of CVD Risk Calculator for Malaysian Population” carried out in 2004-2006 were used (n=2696; men=1148; women=1548). Information on demographics and health-related characteristics were collected using a questionnaire during face-to-face interviews. Height, weight, waist circumference (WC), hip circumference (HC) and blood pressure were measured using standard procedures and appropriate instruments. Blood samples were collected after 8 to 10 hours of overnight fasting and analysed using the Chemical Analyser (Hitachi 902). Respondents were classified as having MS based on the International Diabetes Federation (IDF) consensus worldwide definition that is central obesity plus any two of the other four diagnostic criteria (high triglycerides, low HDL-cholesterol, high blood pressure and impaired fasting glucose). The results showed that the distribution of overweight and obesity were 36.3% and 16.7%, respectively. Metabolic syndrome was present in 56.4% of the respondents representing almost equal proportion of the males (53.2%) and females (58.8%). The most common metabolic abnormality was high blood pressure in 68.7% of the respondents. About 3% of the respondents did not have any of the components of MS, while 54.8% had three or more. The study revealed a high distribution of overweight, obesity, dyslipidemia, high blood pressure and metabolic syndrome among the older adults. Strategies and actions need to be initiated to prevent and treat the components of metabolic syndrome. Older adults diagnosed with MS should receive increased attention with the aim of reducing the risk for CVD and Type 2 diabetes. Prevention of modifiable risk factors, such as obesity and

other lifestyle risk factors should be the key approach. Appropriate promotive and preventive programmes, including dietary and lifestyle intervention should be targeted at those at high risk.

S1.4 Obesity and Hypoventilation Syndrome (OHS) – A Biomechanical Prospective

Praveen JS, Sunitha C Nair, Nagarajan M & Aravind K Kannan

School of Physiotherapy, Faculty of Medical & Health Sciences, INTI University College, Nilai, N. Sembilan

An extensive literature review was carried out using Ovid, Science direct, Pubmed and Proquest to find the baseline biomechanical alterations leading to Hypoventilation Syndrome in obesity. The World Health Organization (WHO) estimates that, by 2015, nearly 2.3 billion adults will be overweight and more than 700 million will be obese. Obesity impairs health-related quality of life and is a major cause of morbidity and premature mortality because of an increased risk of developing cardiovascular as well as metabolic complications and now recognized as an important risk factor for developing several respiratory diseases. This alteration in respiratory mechanics causes major respiratory compromises and increasing susceptibility for respiratory disorders. Obesity–hypoventilation syndrome (OHS) is characterized by a triad of obesity, daytime hypoxemia, and diurnal hypoventilation, as defined by $\text{PaCO}_2 > 45 \text{ mmHg}$ in the absence of other causes of hypoventilation. Total respiratory system resistance is elevated in OHS 100% during inspiration when compared to simple obesity which is only 30%. This further reduces the lung volumes, but FEV_1/FVC ratio remains normal. There is increased pulmonary loading and further reduction in FRC. Studies show reduced lung, chest wall, and total respiratory system compliance due to increased pulmonary blood volume and closure of dependent airways, excess elastic load posed by excess weight on the thorax and abdomen, as well as by an enhanced threshold load, wherein a greater (more negative) pleural pressure must be generated by the respiratory muscles to initiate airflow. In people OHS have 25% greater respiratory rate and 25% lower V_T causing impaired alveolar ventilation leading to abnormal ventilatory control/drive. Studies showed blunted mouth occlusion pressure responses to CO_2 and by the ability to correct PaCO_2 during a voluntary hyperventilation maneuver.

S1.6 Serum Adiponectin and Central Adiposity in Malay Adults

Hamid Jan JM, Nur Firdaus I, Laila Ruwaida MZ & Wan Manan WM

Nutrition Programme, School of Health Sciences, USM Health Campus, Kubang Kerian, Kelantan

Adiponectin protein is proposed to play an important role in obesity. Low level of serum adiponectin is associated with low physical activity, high caloric diet intake and increased risk of type 2 diabetes mellitus. Several studies have shown the above mentioned associations and also its variations between ethnicity such as in European and Japanese. Hence, the aim of this study was to investigate the level of serum adiponectin and its association with adiposity in Malay population. A total of 156 Malay adults (71 male, 85 females) were randomly recruited from four rural villages in Kelantan, Malaysia. Socio-demography information, anthropometry measurements, body composition (TANITA, Japan) and fasting blood samples were collected for serum adiponectin analysis. Serum adiponectin was measured using a commercial human adiponectin ELISA kit (Millipore, USA). Serum adiponectin concentration ranged from 0.1 $\mu\text{g/ml}$ to 42.6 $\mu\text{g/ml}$ with the mean of 9.9 $\mu\text{g/ml}$. Adiponectin level was significantly higher ($P < 0.001$) in female (12.3 $\mu\text{g/ml}$) compared to male (6.9 $\mu\text{g/ml}$) subjects. Serum adiponectin was moderately and significantly correlated with body weight ($r = -0.3$, $P < 0.001$), waist circumference ($r = -0.3$, $P < 0.001$), waist-hip-ratio ($r = -0.3$, $P < 0.001$) and visceral fat ($r = -0.4$, $P < 0.001$). However no significant correlation was found between serum adiponectin with body mass index and percentage body fat. This study shows sexual dimorphism characteristic of adiponectin which is lower in males suggesting higher susceptibility for type 2 diabetes. It also shows that adiponectin is associated with measures of central obesity and it could be proposed as a good biological marker for central adiposity in adults.

Symposium 2: Epidemiology of Obesity

S2.1 Prevalence and Trends of Overweight and Obesity in Two Cross-sectional Studies of Malaysian Children, 2002-2008

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Childhood obesity previously thought as an unusual condition associated with genetic disorders has, since the late 1990's, been recognized as an emerging public health concern with increasing worldwide prevalence. The estimation of the prevalence and secular trends in childhood obesity, both within and between countries has been severely restricted by the wide range of different definitions and cut-off points for overweight and obesity in different populations of children. Cross-sectional studies can often be useful in providing a "snapshot" view of the prevalence of obesity at a given time. This paper reports prevalence and trends of overweight and obesity among primary school children aged 6 to 12 years old in four regions of Peninsular Malaysia in two separate studies – survey I (2001/02) involving 11,264 children and survey II (2007-08) involving 9987 children. The prevalence was estimated using both the Cole et al. (2000) cut-off points and the recently introduced WHO (2007) growth reference. The prevalence of overweight children increased by 5% using the Cole et al. (2000) as compared to only 1.8% using WHO (2007). Obesity prevalence among the children recorded an increase of 2.5% (Cole et al. 2000) as compared to 3.9% (WHO 2007). Overall, the increase in prevalence of overweight and obesity using Cole et al. (2000) was 1.8% higher as compared to (WHO 2007). However, the study also revealed that the percentage of obesity in both surveys increased markedly using the WHO (2007) growth reference. This paper will also highlight differences between region, sex, ethnic and urban and rural settings. In conclusion, there is an apparent trend of a steady rise in prevalence of overweight and obesity among children aged 6-12 years from 16.4% to 24% using (Cole et al. 2007) and from 20.7% to 26.4% using (WHO 2007),

between 2002 and 2008. Further studies to compare trends in childhood obesity using appropriate reference cut-off points are still required.

S2.3 Cultural and Social Perception of Obesity in Southeast Asia: A Preliminary Survey among Overweight Adults in Indonesia, the Philippines and Thailand

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Once associated exclusively with rich industrialized countries, obesity is now a serious problem throughout the developing world, including Southeast Asia. The growing double burden of under-nutrition and obesity will be the major challenge in the near future in all Southeast Asian countries. The modern phase of globalization as an important determinant of global eating pattern interacts directly on population through the fast food globalizing processes. The presence of fast food also is linked to the increasing availability of foods high in fats, sugar and salts is changing diets globally which in turn is linked to changes in the production, retailing and marketing of foods. The objective of this project is to examine perceptions about obesity in relation to globalization and changing lifestyles in Southeast Asia. A survey was carried out in Indonesia, the Philippines and Thailand to solicit the perception regarding obesity and quality of life. A total of 350 respondents from both urban and rural population participated in the study. Results of the survey revealed that self-perception regarding obesity among Southeast Asian show common similarities, particularly in self reporting on health, dietary habit and also the concept of beauty and a beautiful body. Character and behavior are highly regarded in evaluating a person's self-worth in society. The findings also show that Filipinos frequented fast food outlets more than respondents from Indonesia and Thailand. In terms of quality of life among respondents, respondents in Thailand have a better quality of life than in the Philippines and Indonesia.

S2.4 Obesity and Metabolic Syndrome of a Wellness Cohort in Kuala Lumpur

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A worksite wellness program was initiated in a public university in Kuala Lumpur. All employees aged 40 years and above were invited to participate. Ethics approval and informed consent were obtained from the employees who participated. Baseline measurements included weight, height, waist and hip circumference, blood pressure, fasting blood glucose, uric acid and lipid profile were collected by trained staff. All health indicators were categorised into normal or abnormal groups. Following the NCEP ATP III, Metabolic Syndrome (MetS) was defined when three of the relevant parameters were abnormal. A total of 1278 employees aged 40 years and above participated in the programme. Using the WHO cut off criteria, the overall prevalence of overweight (BMI: 25 – 29 kgm²) and obesity (BMI > 30kgm²) was 41.8% (95% CI: 39.1, 44.5) and 23.1% (95% CI: 20.9, 25.5) respectively, while abdominal obesity was 65.3% (95% CI: 62.4, 67.6). The overall prevalence of MetS was 42.0% (95% CI: 39.3, 44.7). There were more males (49.2%) with MetS compared to females (36.2%). In the multivariate logistic model: sex, race, age, BMI and uric acid were found to be significant predictors of MetS (p<0.05). Males had the odds of 1.69 (95% CI: 1.35, 2.11) times more of having MetS than females. Malay and Indian participants had two to three times higher risks for MetS than Chinese. As age, level of uric acid and BMI increased, the odds of getting MetS increased significantly too. The area under the curve of the Receiver Operating Characteristic (ROC) was 0.768. The prevalence of obesity and MetS among this study population was high. They were at high risk for Type 2 Diabetes Mellitus and Cardiovascular Disease. A worksite wellness program targeting the above predictors is urgently required.

S2.5 Physical Activity and Sedentary Behaviours among Malaysian Schoolchildren

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Lack of physical activity is becoming a global concern as it is a major factor influencing health and weight status. This paper reports the physical activity pattern of primary school-aged children in Malaysia from a recent survey carried out in year 2008. Anthropometric measurements included body weight and height, and body mass index (BMI) was calculated. Body fat levels were estimated using the Tanita Body Composition Analyser (TBF-300). Physical activity and inactivity pattern was assessed using a set of questionnaire. Subjects comprised 5678 boys and 5671 girls aged between 6 and 12 years studying at primary schools in all regions of Malaysia. Mean BMI were 17.5 ± 4.3 and 16.9 ± 3.9 , respectively, for boys and girls. The most commonly reported physical activity during Physical Education classes were running or jogging. Less than one-fifth of children walked or cycled to school. During leisure time, most of the children preferred sedentary activities, such as watching television, reading, and doing homework or revision. However, boys were more likely to be active than girls after school hours. Boys also preferred sports and outdoor games while girls preferred indoor games and more sedentary activities. Mean time spent on sedentary and active activities were not significantly different between normal weight and overweight/obese groups, except for overweight girls who spent significantly ($p < 0.01$) more time in sedentary activities. Significant but low positive correlation was found between BMI of boys ($r = 0.102$, $p < 0.01$) and girls ($r = 0.131$, $p < 0.001$) with the amount of time spent on sedentary activities. Percentage body fat of girls was also positively correlated ($r = 0.150$, $p < 0.001$) with amount of time spent on sedentary activities. We conclude that the children were generally sedentary, with the girls being more so than boys. It is suggested that intervention to increase physical activity in schools and the community should be implemented to prevent the trend towards increasing prevalence of overweight and obesity over the long term.

Symposium 3: Childhood Obesity

S3.1 Why We Must Prevent Childhood Obesity in Malaysia

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(Abstract not received at the time of publication)

S3.2 Association of Sugar Intake and Sweetened Beverage Consumption with Body Mass Index among Primary School Children in Klang Valley

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The increasing prevalence of obesity among children is one of the nutritional problems occurring in many countries including Malaysia. This cross sectional study was carried out to determine the association between sugar and sweetened beverage intake with body mass index among primary school children. 198 children of Malay, Chinese and Indian ethnic groups (100 boys, 98 girls) were randomly selected from five schools in Subang Jaya in Klang Valley. Body mass index was determined using WHO classification. Sweetened beverage consumption and sugar intake was determined using two-days 24 hour recall (a weekday and a weekend) by interview while sweetened beverage drinking habits was evaluated using a guided self administered food frequency questionnaire. Mean BMI for girls was 19.3 ± 3.8 kg/m² while for boys 18.8 ± 4.1 kg/m². The top three favourite sweetened beverage were chocolate malted drink (21.3%), carbonated drinks (13.7%) and fruit juice (12.7%). The consumption of flavoured drinks and energy drinks were higher especially during lunch time, afternoon tea and dinner among overweight/obese children than their normal counterparts. Sweetened beverages were mainly consumed at home. Malay children had significantly higher mean sugar intake from beverages (59.0 ± 30.0 /day) followed by Indian (51.8 ± 18.4 /day) and Chinese (30.9 ± 20.8 /day) children. Overweight /obese children also showed higher mean sugar intake than their normal counterparts although this was not significant. There was a weak association between sugar intake and BMI status ($r=0.26$, $p<0.05$). This study

showed that there was a need to monitor sweetened beverage consumption at meal times among children. The consumption of plain water should be encouraged during meal times as consumption of sweetened beverage could be a contributing factor in the increasing prevalence of obesity among children.

S3.3 Diet and Physical Activity Profile of the Obese Children Attending the Obesity Clinic of Yangon Children Hospital

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The aim of the study was to investigate the diet and physical activity profile of the obese children attending the obesity clinic of the Yangon Children's hospital. Seventy five obese children who attended the clinic during the period from September 2004 to October 2005 were included. Anthropometric measurements of the children were taken from which body mass index (BMI) was calculated. Those with BMI against the growth chart of more than 85th centile were taken as obese. Structured questionnaire was used as a data collection tool. Among the children, 89.4% of boys and 86% of girls were severely obese with BMI centile of more than 97%. For both sexes, 74.9% of the children were having calories more than RDA. Eighty four percent of obese children ate main meals 3 times a day while 15.3% ate 4 times a day. Majority of them took snacks once or twice a day. More than half of the children viewed television 2-4 hours a day. Playing computer games was practiced in 18.8% of boys and 16.7% of girls. Although most of them played at schools the duration was very short and at homes only 26% of boys and 17.2% of girls played. Most of the children (84.6% of boys and 72.3% of girls) came to the schools by cars/other vehicles while the rest came on foot. Mean television viewing, studying, and sleeping times of the respondents were 9±1.5 hours, 6±1.7 hours, and 9±09 hours respectively. The results of the present study would provide effective input for the further management of obese children in the obesity clinic.

S3.4 A Case Study on Snacking Frequency amongst Obese Male Teenagers at Regular National School in Shah Alam, Selangor

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Obesity has become a major public health issue and an epidemic worldwide. This epidemic affects developed and developing countries society including adult, and children. In numbers, the alarming increase of obese people in recent decades, worldwide, including teenagers indicates that there is no sign of this trend to end. In fact, the World Health Organization (WHO) considered teenagers' obesity as an epidemic of global proportion and if no intervention is made, there is a thought that they possibility will stay obese as adults. Undoubtedly, the prevalence of obesity also appears among Malaysian people, based on research by Ministry of Health, the prevalence of overweight is 21 percent and 6.2 percent is obese in Malaysia (Ismail, 2000). On the other hand, an estimation was made by World Health Organization towards the prevalence of obesity in Malaysia, indicated that in 2005, 8.2 percent of females and 1.6 percent of males were found obese from age between 15 to 100 years old. In addition, this percentage mounting as the WHO estimates for 2015 as females increase higher up to 14.3 percent while males just increase slightly to 1.7 percent will find obese. In line with the statistical evidences, many studies related to teenagers snacking behavior and obesity have been conducted. Unfortunately, from all studies undertaken, little evidence on the provision of snacking frequency towards young obese particularly male teenagers is identified particularly in the context of Malaysia. Realizing such limitation, a case study at a small setting in Shah Alam has been conducted by the researchers to investigate the snacking frequency amongst obese male teenagers at school. Result revealed that most respondents eat snacks more than three meals per day (162, 68%), compared to 57 respondents or 24% mentioned "less than twice a day" and about 19 respondents or 8% were said, "I never ate snack". Therefore, local health and education authorities need to work in close collaboration in order to address the problems. Besides, a provision should be made for parental education, a healthy school canteen policy, and a supportive school environment.

S3.5 A Randomised Controlled Trial of Childhood Obesity Treatment in Malaysia: The Preliminary Findings of MASCOT

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A study was carried out to determine whether a MASCOT (Malaysian Childhood Obesity Treatment) weight management program reduced BMI z-score relative to no treatment among obese children. The study design consisted of an assessor-blinded, randomised, controlled trial involving 107 obese children (54 boys, 53 girls; BMI $\geq 95^{\text{th}}$ percentile relative to CDC reference) aged between 7 and 11 years who were randomly assigned to a MASCOT program (intervention) or no treatment (control) organised between November 2008 and April 2009. The intervention used family-based group and behavioural strategies to modify diet, physical activity and sedentary behaviour. BMI z-score, weight, objectively measured physical activity and sedentary behaviour, and quality of life (QoL) were recorded at baseline and at 6 months. There were significant differences between groups for indicators of height, weight and BMI ($p=0.01$, $p=0.02$, $p=0.04$, respectively) at baseline. The mean BMI z score at baseline were $3.1 \pm 0.5 \text{ kg/m}^2$ and $2.8 \pm 0.8 \text{ kg/m}^2$ for intervention and control groups, respectively. The intervention had no significant effect on BMI z score from baseline to 6 months ($p=0.93$). However, the BMI z-score significantly increased in control group from baseline to 6 months ($p<0.05$). Weight significantly increased in both groups from baseline to 6 months ($p<0.00$, respectively). At baseline, the proportion of monitored time spent in sedentary behavior was high and participation in moderate-vigorous physical activity (MVPA) was extremely low in both groups (intervention: $0.7 \pm 0.6\%$; control: $0.7 \pm 0.7\%$, respectively). There were significant between-group differences for the total activity (mean count per minutes) and percentage of time spent in light-intensity physical activity at baseline in favour of the intervention ($p<0.00$, $p<0.05$, respectively). Percentage of time spent in MVPA significantly increased from baseline to 6 months in intervention group ($p=0.01$). There is no significant

between-group differences were found for changes in QoL scores for the child self-report from baseline to 6 months. However, there were significant between-group differences in parent-proxy report for psychosocial sub-score ($p<0.05$) and total score ($p<0.05$) at 6 months. Children-reported QoL scores for psychosocial sub-score and total score significantly improved from baseline to 6 months in intervention group ($p<0.05$, respectively). In conclusion, the MASCOT weight management programme that was tested in this study had modest benefits for BMI z-score, for objectively measured physical activity and for QoL.

MASO Dinner Lecture

The Importance of Weight Management in Preventing and Managing Diabetes

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Type 2 diabetes is a remarkable problem in Malaysia but the implications of having such high levels of glucose intolerance have also not been fully recognised. The continuing escalation of diabetes predicts a huge medical burden affecting not only general clinical and cardiovascular services but also the demands on the relatively scarce ophthalmic and renal dialysis facilities. Weight gain with its associated dietary contributors and physical inactivity is the principal determinant of why individuals develop type 2 diabetes; those with a family history of diabetes are particularly vulnerable. However, the markedly increased sensitivities of the whole population to developing type 2 diabetes has not yet been taken on board in terms of major changes in clinical practice. Three approaches are going to be required: first in those with newly diagnosed diabetes the role of immediate and appreciable weight loss has not yet been fully understood partly because of the poor experience of the UK PDS studies where dietetic advice was incoherent and often misleading. The dramatic impact of bariatric surgery is a vivid proof of the extreme value of weight loss. Secondly there needs to be a new approach to identifying those with glucose intolerance with immediate measures to combat the problem and prevent the development of diabetes. Thirdly a new approach to prenatal, pregnancy and post natal care could potentially limit the susceptibility of children to developing diabetes. The benefits of weight management in patients with diabetes will be illustrated by the use of sibutramine and/or orlistat in promoting improvements in fasting glucose, insulin resistance and HbA1c values. The critical role of reducing fat and increasing physical fitness will also be considered and how best to do this. The preliminary results from the SCOUT cardiovascular trial will also be used to show the potential impact of weight management on cardiovascular morbidity and mortality.

Abstracts of Papers

Symposium Day 2

Symposium 4: Behavioural Aspects of Obesity

S4.1 Self-esteem, Life Satisfaction and Weight Measures in the Malaysian Urban Community

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Studies in obesity and mental health have shown a relationship between increased body mass index and the risk of psychological disorder. Apart from an increased risk of suffering from physical problems related to obesity, people who are overweight and obese are also often viewed in a negative light, leading to prejudice and discrimination. As such the quality of life in the overweight and obese is at risk of being negatively affected due to physical and psychological problems. This study investigates the relationship between weight measures and psychological health measures, namely body mass index (BMI), and waist circumference against self-esteem and general life satisfaction scales. A total of 332 participants were surveyed at random from shopping centres around the Klang Valley in Malaysia. They were surveyed for sociodemographic information, anthropometric details with regards to height, weight and waist circumference, as well as on the Rosenberg Self-esteem Scale and the Satisfaction with Life Scale. This survey only included participants with normal BMI and above, leaving out underweight individuals for the purpose of controlling for related confounds. Results revealed that the average person studied in this survey is overweight based on the Asian classification of BMI. There was also a significant negative correlation between waist circumference and life satisfaction. Life satisfaction was highly correlated with self-esteem although self-esteem was not significantly correlated with waist circumference, or BMI. As such, this study concludes that while there is a trend of smaller waistlines leading to better life satisfaction, self-esteem seems to be independent of either measures of weight among people in urban Malaysia.

S4.2 The Differences in Attitudes toward and Beliefs about Obese Persons among Malaysian Chinese and Malaysian Indian

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Obesity refers to an excess of body fat, which normally accounts for about 25% of weight in women and 18% in men (Wadden, Brownell, & Foster, 2002). Obesity can be formally defined as abnormal or excessive fat accumulation that presents risk to health (WHO 2009). Researchers have shown that the stigma of obesity is widespread. Obese people are less liked and viewed less favorably when compared with people of normal weight. In this present research study, the interest of the investigation was whether Malaysian Indians, as compared with Malaysian Chinese, have a more positive attitude toward obese persons and stronger beliefs that obesity is not within the control of the obese individual themselves. To investigate this, a survey was conducted on 60 Malaysians (30 Chinese and 30 Indians, mean age = 21.35 years) who were required to answer a set of questionnaire that consists of the demographic sheet, the Attitudes Toward Obese Persons (ATOP), and Beliefs About the Obese Persons (BAOP). The results found that, only the Chinese males have significantly positive attitudes towards obese persons. The implications of this study affect policies which relate to the effect of globalization and acculturation, which are reflected in the attitudes and beliefs of races in a multi-cultural society.

S4.3 Dietary, Exercise and Mental Attitude Patterns in Subjects' 6-months into a Weight Management Program

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The purpose of this study is to observe dietary, exercise and mental attitude patterns in subjects' 6-months into a weight management program. Among study subjects [n=155] who had participated in a 6-week weight loss competition at a tertiary obesity care centre, 55 were lost to follow-up; the remaining 100 were recruited for the present study and were followed-up for 6 months. A general questionnaire captured the demographic details, physical activity, personal habits, and exercise

and health profile. Nutritional profiling included dietary habits, a food frequency questionnaire and a 24-hour diet recall. Mental attitude was captured via the body shape questionnaire [BSQ], life effectiveness questionnaire [LEQ] and resilience questionnaire. The mean age was 38.5 ± 11.7 years. 79 individuals maintained/lost weight [Geometric mean 1.806 kg, Maximum=18 kg]; the remaining 18 individuals gained weight [1.367 kg, Maximum=8.9 kg]. Females exercised more frequently than males [p-value<0.001]. Among study subjects 52% were non-vegetarian and the protein: carbohydrate: fat ratio was 19:73:16 [n=100]; comparable to a “very low fat and a very high carbohydrate diet”. Except when coping with stress, >85% of the subjects were effective in most areas of their lives and resilient irrespective of gender. Females have a significantly lower body image than males [p-value<0.001] with a higher mean BSQ scores at age intervals ≤ 20 years (43.8 ± 16.5) [Males= 16 ± 0 , p-value=0.05], 21-40 years (41.8 ± 13.9) [Males= 28 ± 13.5 , p-value<0.005] and 41-60 years (34.0 ± 10.3) [Males= 20.4 ± 8.6 , p-value<0.001]. However at age ≥ 61 years an inversion in pattern was observed with males being less accepting of their body image [Males= 42.5 ± 23.3 , Females= 20.5 ± 2.1], although the difference did not reach significance. We observed that individuals, who showed a steady decline in their anthropometric indices and had higher life effectiveness scores, managed their weight more effectively over the 6-months period.

S4.4 Relationship between Weight and Mental Health

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A total of 431 youths consisting of 216 males and 215 females were studied to ascertain the relationship between weight and mental health issues amongst youth. Measures of mental health were assessed based on Depression-Anxiety-Stress Scale (Lovibond & Lovibond, 1995) and Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet & Farley, 1988) and the weight was measured based on calculated Body Mass Index (BMI). In addition to standardised questionnaires, the participants were also required to answer questions about perception of weight and daily eating habits. The results indicated a positive relationship between BMI towards depression, anxiety and stress while a negative relationship was observed between BMI and perceived family social support. With regards to overall weight perception, more than half of the female participants reported to

perceive themselves as overweight. The implication of this study can be useful in the development of youth health/wellness programme which takes into account of the mental health needs of youth.

S4.5 Transtheoretical Model of Change and Weight Control among Sarawak Natives

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This study was conducted to determine the applicability of Transtheoretical Model of Change to examine the Stages of Change, the Decisional Balance and the self efficacy in weight control among Bidayuh, Malay and Iban in Sarawak. A total of 271 respondents participated in this cross-sectional study. Interview using structured questionnaires was used to collect data. Findings showed that 60.5% of these respondents were in the Precontemplation, while around 20.7% were in the Contemplation Stages of Change for weight control. Education level, household income and age had significant influence on stage distribution in which higher percentage of respondents with higher education, higher income and younger age took action to lose weight. Confirmatory factor analyses failed to replicate the original subscales of Weight Efficacy Lifestyle Questionnaire and Decisional Balance Scale of this model of change. Exploratory factor analyses were performed to determine the factorial structure of these measurements. Two con and one pro subscales were determined for Decisional Balance Scale. Three subscales were determined for self-efficacy questionnaire. The relationship between self efficacy, decisional balance and Stages of Change were tested using non-parametric tests which showed statistical significant difference between groups. Findings showed that Transtheoretical of Change could be applicable to study natives' weight control intention, self efficacy and their decisional balance pattern in weight control. The findings also indicated that stage determination was crucial to ensure stage-match weight control intervention. In addition, findings suggested the use of self efficacy questionnaire and decisional balance scale to evaluate the intermediate outcomes of weight loss interventions implemented in Malaysia especially among the rural natives of Sarawak.

Symposium 5: Management and Treatment of Obesity

S5.1 Can Food Solutions Win the War Against Obesity?

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Obesity is a complex issue. Although the pathophysiology which underlines the initiation and chronic nature of this disorder remains largely unknown, the basic reason is clear: energy intake is more than energy expended over an extended period of time. Food manufacturers invest in the innovation and renovation of its portfolio of products to provide practical food solutions for weight management. Scientific approach is multidisciplinary, focusing on understanding the interactions between genetics, food selection, and psychological factors. A few examples of key finding include: the ingestion of fast-absorbable proteins, like whey proteins, results in a greater postprandial aminoacidemia and a higher beta-cell secretion than the ingestion of a “slow” protein; modulation of gut microflora ameliorates glucose tolerance of mice by altering the expression of hepatic and intestinal genes in inflammation and metabolism; consumption of a beverage containing green tea catechins and caffeine increase energy expenditure by 106 ± 31 kcal/24 hours; certain naturally occurring flavonoids act as inhibitors of human α -amylase, which could help to control blood glucose; exposure to a greater food variety at weaning facilitated greater acceptance of new food. The effects of repeated exposure appear to be long lasting as 63% of the infants were still eating and liking the initially-disliked vegetable after nine months post-study. The research findings will be used to develop food and beverage applications that satisfy specific consumer preferences that meet individual nutritional needs. Food manufacturers’ goal is to promote a healthy and active life and make it easier for people to maintain a healthy weight while still getting essential pleasure from their food.

S5.2 A Successful Dieting through Avoiding High-fat Diets and Performing light-Resistance Exercise to Prevent Metabolic Syndromes and Sarcopenia

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Habitual exercise and food restriction are the most popular therapies for obese individuals. Although food restriction using low calorie diets has the most immediate weight reduction effect, it will result in the loss of muscle mass due to decline resting metabolic rate (RMR), leading to sarcopenia in old age. Decline in RMR may inhibit subsequent weight loss and its maintenance; in addition they enhance the development of metabolic syndromes. Apart from positive energy balance as the main contributing factor to obesity, the difference in dietary energy composition can alter body fat deposition, even if energy intake remains the same. The diet-induced thermogenesis (DIT) is much lower in a high-fat diet than in a low-fat/high-carbohydrate diet. In addition to the percentage of fat in total energy consumption, the simultaneous intake of fat and sugars from sweet foods and drinks is another important reason for the enhanced efficiency of body fat deposition from dietary fat. This has been clearly demonstrated by rat study that a more efficient body fat accumulation occurs when fat is ingested together with insulinogenic sugar as compared with the separate ingestion of fat and sugar. This is due to activation of lipoprotein lipase in adipose tissue by insulinogenic sugar concurrently with the increased supply of TG into the blood. Feeding on high-fat diet feeding over generations can have an effect on the efficiency of body-fat accumulation in the offspring. We have investigated the effect of a parental high-fat diet on body-fat accumulation in the offspring. The results suggest that a parental high-fat diet before intrauterine developmental stage may increase body-fat accumulation in the offspring, suggesting parental diet may influence the lifelong health of offspring and epigenetic inheritance may be occurred. In terms of increase in energy expenditure, aerobic exercise is generally recommended because they result in a greater utilization of fat stores and greater energy consumption than does anaerobic or resistance exercise. However, aerobic exercise such as jogging, swimming or aerobic dancing sometimes causes fat free mass (FFM) loss and is difficult for many obese people to develop the habit of aerobic exercise because of mental stress or orthopaedic lesions. Dumbbell exercise (aerobic-resistance exercise with light dumbbells) is much easier to instil as a habit as compared to general aerobic exercise. This exercise could

successfully reduce body weight and body fat without reducing FFM, contrary could increase RMR and DIT. About three hours after a meal both plasma glucose and TG significantly decreased. When the dumbbell exercise was applied after a high-protein snack, the muscle mass and strength were significantly increased with a marked reduction of body fat. Thus enhancement of energy expenditure in RMR (BMR) and DIT by the light-resistance exercise with low-fat diets may produce a successful dieting favoring of the prevention of metabolic syndromes and sarcopenia.

S5.3 Paediatric Obesity: Outpatient Management in a District General Hospital

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Obesity is a hot topic which has a major impact on physical, social, emotional well being of an individual including huge financial impact on a country's economy. It increases morbidity and mortality particularly when linked with disease, notably diabetes, dyslipidaemia and hypertension. Because of the rising prevalence among the paediatric population, we carried out a prospective audit to identify the percentage of children attending clinics who were overweight or obese and how medical staff managed these children. We conducted a prospective audit over a period of three months on children attending outpatient clinics in a district general hospital. 136 cases were selected randomly but only 105 children were studied. Children under the age of 1.5 years were excluded from the study. Subjects had anthropometric measurements taken during clinic attendance. We looked at the management plan with special interest on assessments or investigations done to determine cause of weight gain by attending healthy professionals and follow-up plans. 10% of children studied were overweight with a male to female ratio of 9:2. Overweight children were aged between 1.9 to 12.2 years. None of these children were assessed. However, 50% of the 21% obese children were assessed and had follow-up plans. Obese children were aged between 1.6 to 16.7 years with a male to female ratio of 12:10. Childhood obesity is becoming a huge problem worldwide with a rising prevalence in developed countries. The number of overweight and obese children in the UK has risen over the past 20 years with estimated 14 percent of boys and 17 percent of girls aged two to 15 obese in 2004. It is the duty of health professionals

to identify these children and initiate prompt measures bearing in mind the health problems associated with obesity in adult life.

S5.4 Promoting Weight Loss among Obese Participants through a Community-based Behavioural Intervention Program in Kelantan

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The purpose of this study was to evaluate the effectiveness of weight loss and change in body composition among obese adult volunteers who participated in the healthy lifestyle community-based intervention program in three districts of Kelantan. Data were derived from 63 participants (at baseline and at the end of the program) from each district whereby Kota Bharu represented for control groups (n=25) (Group I), Pasir Mas as an Intervention Group II and participants from Intervention Group III was carried out in Bachok District. The intervention was carried out weekly and simultaneously at three different locations to avoid contamination among participants. The intervention package consisted of behavioral modification, physical activity, and nutrition education. No intervention was introduced for the control group, Group II implemented weight resistance exercise and Group III was instructed for walking exercise. At the end of the program, the change in body weight and body composition variables which include percentage of fat, percentage of body mass and weight of fat showed significant differences ($p < 0.05$). In term of group comparison, there was a significant difference ($p < 0.05$) between groups with different intervention based on ANOVA test. ANOVA Repeated Measures showed there was a main effect of time (baseline and post intervention) [$F(1, 62) = 46.75, p < 0.05$] and also significant interaction (effect of different intervention toward weight loss) [$F(1, 62) = 33.842, p < 0.05$] in this study. However, post-hoc study Bonferonni test showed there was a significant difference of mean weight loss between Control and both intervention groups, but the difference was not indicated between intervention groups. In conclusion, this study showed there was a significant improvement in body weight and body composition in both the aerobic exercise (walking regiment) and anaerobic exercise (dumb bell regiment).

Symposium 6: Emerging Issues and Technologies Related to Obesity

S6.1 Feeding Regulation and Energy Metabolism in Brain -Novel GPCR Ligands-

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Novel neuropeptides of G-protein coupled receptor (GPCR) ligands are shown to be localized in brain and play a range of physiological functions including feeding regulation and energy metabolism. Here, I will describe the distribution and localization of these GPCR ligands identified recently and to review their involvement in neuronal networks, particularly feeding regulation and energy metabolism. This presentation concerns some novel GPCR ligands of feeding and energy metabolism-regulating neuropeptides such as orexin, ghrelin, galanin-like peptide (GALP) and neuropeptide W (NPW), such as those studied by our research group and others, and neuronal interactions among these and other well known neuropeptides such as neuropeptide Y (NPY) and alpha-melanocyte stimulating hormone (alpha-MSH) in the hypothalamus. Cross-talk among several these neuropeptides-containing neurons in the hypothalamus plays a key role in determining feeding states as well as feeding behavior. I will show some structural and functional characteristics of these very recently discovered neuropeptides and summarize the known interactions between these different kind of feeding regulating neurons and leptin-targeting neurons in the hypothalamus. Moreover, I will present a new strategy for analyzing the neural circuit of these feeding- and energy metabolism-regulating GPCR ligands-containing neurons in brain by use of transgenic model mice. Finally, I will present our very recent results of GALP which are involved in regulation of feeding as well as energy homeostasis and body temperature. I will show our hot data of intranasal infusion of GALP to decrease body weight and locomotor activity in animal models. Research in this field will serve a very important role of clarifying neurologically-based causes for appetite dysfunctions and diseases and it may help to establish and to lead new therapies for people who are suffering such conditions.

S6.2 BMI, a Better Predictor of Hypertension among a Tribe of Sikkim, India: Evidence of Gene-lifestyle Interaction

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The association of obesity on cardiovascular disease (CVD) risk factors is well established phenomenon. On the other hand, the angiotensin converting enzyme (ACE) insertion/deletion (In/Del) polymorphism has been identified as one of the genetic risk factors for hypertension. Studies, worldwide, have reported the possible effect of obesity, lifestyle variables and gene-environment interaction on hypertension. Present study has examined the possible association of ACE In/Del polymorphism and a set of lifestyle related variables on hypertension among the Bhutias, a tribe of Himalayan State of Sikkim, India. Moreover, it evaluated body mass index as an independent predictor of hypertension among the population. Such study has never been attempted among any Himalayan tribe. A total of 739 Bhutias of both sexes from urban and rural habitat were chosen initially for the study. After receiving informed consent, data on blood pressures and anthropometrics were collected from all of them. Further, data on lifestyle related variables viz. dietary habit, physical activity pattern, socioeconomic status, perceived psychosocial stress, substance use and genotype for ACE In/Del polymorphism, were obtained from systematically selected sub-samples. The data were pooled for sex, as sex effect was absent in any of the age-adjusted dependent variables. One way ANOVA shows significant difference for both the blood pressures when the mean values were compared with BMI sub-categories. Logistic regression analysis shows ACE In/Del polymorphism and few lifestyle related variables as significant predictors of hypertension. Further, after adjustment of significant predictors, adjusted odds ratio depicted BMI and waist circumference as significant predictors of hypertension. ROC curve analysis shows BMI as the independent predictor of hypertension among the study population. Although association of genetic polymorphism and lifestyle related variables play an imperative role behind the adverse profile of hypertension among the study population, BMI is found to be the most important variable, predicting hypertension significantly.

S6.3 Obesity Screening for Young Japanese Males and Females Using Skin Fold Measurements: The Classification Revisited

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Anthropometric assessment is a simple, safe, and cost-efficient method to examine the health status of individuals. In Japan, the classification of obesity based on the sum of two skin fold thickness ($\Sigma 2SF$) is available. However, the classification was proposed nearly 40 years ago and its applicability to Japanese living today is unknown. The current study aimed to determine $\Sigma 2SF$ cut-off values that correspond to percent body fat (%BF) and BMI values using two datasets of young Japanese adults (233 males and 139 females). Using regression analysis, $\Sigma 2SF$ and height-corrected $\Sigma 2SF$ (Ht $\Sigma 2SF$) values that correspond to %BF of 20, 25, and 30% for males and 30, 35, and 40% for females were determined. In addition, cut-off values of both $\Sigma 2SF$ and Ht $\Sigma 2SF$ that correspond to BMI values of 23 kg/m², 25 kg/m² and 30 kg/m² were determined. In comparison with the original $\Sigma 2SF$ values, the proposed values are smaller by about 10 mm at maximum. In comparison with the original values, the proposed values showed an improvement in sensitivity from about 25% to above 90% to identify individuals with $\geq 20\%$ in males and $\geq 30\%$ in females with high specificity of about 95% in both genders. The results indicate that the original $\Sigma 2SF$ cut-off values to screen obese individuals cannot be applied to young Japanese adults living today and modification is required. Application of the proposed values may assist screening in the clinical setting. It is recommended that the present findings be confirmed using more advanced body composition assessment techniques and with a larger sample size across a wider age range.

S6.4 A Framework of Web-mobile Intelligence Monitoring System in the Management of Obesity for Malaysian Community

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The growing number of our population with obesity and chronic diseases encourage us to propose the Web-Mobile Intelligence Monitoring System. Current technologies such as internet and mobile phone can be used to replace the intensive face to face consultation. One way to improve current healthcare practice is by introducing new services that will support the community with obesity problems in self management and monitoring health disorders. The objectives of the system are to provide intelligent health-care management that will contribute to better decision making; to improve the current process of healthcare delivery by supporting communication and sharing of information; and to serve the needs of the current life style, improve health outcomes, and strengthen public health. The system will focus on three critical issues in management and monitoring health status which are promoting weight control; encouraging physical activity; and improving knowledge of healthy life style. In order to handle these issues, the system will be designed to provide daily/weekly healthcare data management, intelligent monitoring of diet and physical activities, intelligent alert and reminding message and intelligent diet planning and menu construction. The system will combine internet with mobile-phone technologies in order to develop the intelligent management and monitoring personalized healthcare application. The system will integrate personal, food and nutrients databases and general healthcare knowledge-based, including decision support system to assist in both technical and clinical decision making. The system can also become an effective tool to communicate and educate the users in order to improve their understanding of the related diseases. The system will only focus on the management of obesity problems in our society. In future the system can also be applicable to other chronic diseases related to obesity such as diabetes, high blood pressure and heart disease.

S6.5 Body Mass Index, Waist Hip Ratios and Novel Phenotypic Markers: A Triad for Detecting Diabetes in a Population of Tamilnadu, South India

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Asian Indians have a higher propensity towards diabetes and metabolic syndrome mainly attributed to the Asian phenotype and lifestyle pattern. Early detection of obesity and diabetes occupies prime position in health care systems of today. The clinical diagnosis of obesity and its management lies in accurate and validated anthropometric standards. A total of 108 overweight and obese subjects, (mean age: 36 years) from urban regions of Coimbatore, South India were recruited in the study with mutual consent. A questionnaire based interview was conducted to analyze socio-demographic factors and dietary pattern. Routine anthropometric measurements, (body mass index, waist circumference and hip circumference) were recorded as per the guidelines for Asian Indians. Further, novel phenotypic markers namely 'double chin', 'buffalo hump' and '*Acanthosis nigricans*' were used for the detection of metabolic syndrome and diabetes. Subjects with any two of the novel phenotypic markers were screened for dyslipidemia and Type 2 Diabetes. Subjects with hypertriglyceridemia (Mean TGL = 165 mg/DL), elevated BMI ≥ 28.04 kg/m² (Mean age = 36 years), *Acanthosis nigricans* and buffalo hump were at risk for diabetes (Mean FBG = 136 mg/DL). Buffalo hump and double chin had positive correlations with metabolic syndrome among men in the study cohort. In addition to Body mass index, and Waist hip ratios, the novel phenotypic markers serve as quick clinical indicators for detecting diabetes in Asian Indians.

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GROUP A: CAUSES AND CONSEQUENCES OF
OBESITY

A02 The Relationship of Diet Quality and Body Mass Index (BMI) of Husbands and Wives in a Selected Urban Area in Selangor

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The objective of this study was to assess the diet quality of husbands and wives and to determine the relationship between diet quality and the Body Mass Index (BMI) of husbands and wives in a selected urban area in Selangor. This cross-sectional was carried out in Bandar Baru Bangi among 150 married couples aged 20 and above, who voluntarily agreed to participate and were not practicing any special diet. Data were collected using 2 days of 24 hour dietary recall and a food frequency questionnaire (FFQ) to evaluate the quality of diet among husbands and wives using the Diet Quality Index Revised (DQI-R). Demographic characteristics including age, occupation, educational level, household income and household size were also collected. Data were analyzed using SPSS version 16 while analysis of nutrient composition was conducted using the Nutritionist Pro software program (Axxya, USA) which contains nutrient composition data of Malaysian foods. Results showed that the mean DQI-R score which ranged from 0 to 100 for husbands (mean age= 43.33 + 11.16 years) and wives (mean age= 41.28 + 10.93 years) were 67.8 ± 9.1 and 64.4 ± 9.3 respectively and there was a significant difference found between scores of husbands and wives, $t(298) = 3.23$, $p = 0.001$. In general, the diet quality of this study population is not satisfactory and that the diet quality of husbands is slightly better compared to that of their wives. Those who achieved DQI-R scores exceeding 80, regardless of gender, had the lowest percent of energy derived from fat, compared to other scores group; whereas those who had scores below 50 for husbands and below 40 for wives had the highest percent of energy derived from fat. As the DQI-R scores increased, the percent energy derived from fat decreased. Similarly, those with scores of more than 80 also had low saturated fat and dietary cholesterol intakes compared to those with scores below 50 for husbands and scores below 40 for wives. Both husbands and wives that achieved DQI-R scores of more than 80 also had the most adequate levels of intake of fruits and vegetables as recommended in the Malaysian Dietary Guidelines. Diet diversity scores were still low among husbands and wives compared to diet moderation scores. However, there was a weak correlation between DQI-R and BMI, $r =$

0.116, $n = 300$, $p < 0.05$ of husbands and wives in this study. Mean BMI of the husbands was 25.68 ± 3.28 compared to wives, which was 25.0 ± 4.14 and no significant differences were found between husbands and wives. DQI-R may be used as one of the indices to examine the food intake, gauge macronutrient intake, mineral intake, Food Guide Pyramid adherence, variety and moderation in the diet but not as the BMI's predictor in this study. It is proposed that for future research, a standard index for assessing diet quality in Malaysia will be developed. Another suggestion is to determine whether the DQI-R is a reliable tool in predicting nutritional status as well as disease outcomes of populations.

A03 Leg Vascular Conductance Kinetics in Lean versus Overweight and Obese Young Men

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Obesity is related to exercise impairment. However, the causes for the exercise impairment are not well understood. Reduced delivery of oxygen has been suggested to be a potential factor that can affect exercise performance, but to date, the dynamics of the lower limb blood flow have not been investigated. The purpose of the study is to investigate leg vascular conductance (VC) (blood flow/mean arterial pressure) kinetic responses during a high intensity constant-load calf plantar-flexion exercise in overweight/obese (BMI: $27-35 \text{ kg.m}^{-2}$) young University male students. Eight lean ($23 \pm 3 \text{ kg.m}^{-2}$) and eight overweight/obese ($31 \pm 3 \text{ kg.m}^{-2}$) inactive men were tested. Ethical approval was obtained from the Trinity College Dublin Faculty Research Ethics Committee. Initially, subjects performed a graded cycling incremental test where expired gas and cardiac output measurements were recorded. Subsequently, subjects performed three constant load exercise bouts (6 min long) of intermittent calf plantar flexion exercise at an intensity of 70% maximum voluntary contraction (MVC) on a upright custom-built calf ergometer. Calf BF was measured contraction by contraction using venous occlusion plethysmography. Kinetic analysis was performed by fitting a biexponential function to the mean (3 bouts) of the vascular conductance (BF/MAP) data. Results are shown as mean \pm SD. Peak VO_2 ($\text{ml.kg}^{-1}.\text{min}^{-1}$) was significantly lower for the obese (29.8 ± 2.4) compared to lean (37.5 ± 4.3). Peak cardiac output (L.min^{-1}) was not different between groups (19.2 ± 3.4 leans vs 18.6 ± 1.2 obese). In addition, all the calf VC kinetic parameters, the mean response time of the complete response and the end-exercise amplitude were not

different between both groups. This study showed that the rate at which vascular conductance responses increase during high intensity static calf exercise is similar in lean and overweight/obese young men, suggesting similar vasodilatory function in the two groups. Cardiac responses were also similar between groups. Factors related to oxygen extraction might be linked to the exercise impairment observed in obese subjects.

A04 Metabolic Risk Factors among Adults with Abdominal Obesity at Universiti Putra Malaysia, Serdang, Selangor Darul Ehsan

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A cross-sectional study was carried out to assess the prevalence of metabolic risk factors among staff of Universiti Putra Malaysia, Serdang, Selangor Darul Ehsan. Recruitment of subjects was conducted between April to December 2008. Data of metabolic risk factors including waist circumference (WC), blood pressure (BP), triglycerides (TG), high density lipoprotein cholesterol (HDL-C) and fasting plasma glucose (FPG) were collected from physical examinations and biochemical measurements. Subjects consisted of 201 adults (130 women, 71 men) of 25 to 55 years of age with no reported chronic diseases but having abdominal obesity, which was defined by WC \geq 90cm for men and \geq 80cm for women. The difference of mean WC between men (99.3 \pm 8.5 cm) and women (91.7 \pm 8.6 cm) was significant ($p=0.00$, $t=5.986$). Mean body mass index (BMI) for all subjects was 28.9 \pm 4.3kg/m². A total of 23.4% of the subjects had triglycerides level more than 1.7 mmol/l, 45.3% had HDL-C less than 0.9 mmol/l in males and less than 1.1 mmol/l in females, 21.4% had FPG more than 5.6 mmol/l and 40.3% had elevated BP (systolic BP \geq 130mmHg and/or diastolic BP \geq 85mmHg). By using the criteria of International Diabetes Association (2005), the prevalence of metabolic syndrome among this sample was 35.8%, with a higher prevalence among men (59.2%) as compared to women (23.1%). Those with metabolic syndrome had higher mean WC (97.2 \pm 8.5cm) than those without metabolic syndrome (92.9 \pm 9.3cm). A positive significant correlation was found between WC and the number of metabolic risk factors ($p=0.000$, $r=0.268$). There were significant positive correlations between WC and TG ($p=0.011$, $r=0.180$), WC and

systolic BP ($p=0.001$, $r=0.228$) and WC and diastolic BP ($p=0.000$, $r=0.249$) while no significant relationship was found between WC and HDL-C or FPG. It was observed that among adults with abdominal obesity, men were more prone to metabolic syndrome. For both gender, there was an increased risk of metabolic syndrome by WC while those with higher WC were more likely to have a rise in their TG and BP. These findings reveal that metabolic syndrome was high in males than females. Changes in lifestyle should be encouraged to avoid future cardiovascular morbidity and type 2 diabetes mellitus.

A05 Clinical and Biochemical Profiles in Obese Children with Fatty Liver

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Objective of this study is to assess correlation between degree of obesity and biochemical profiles suggestive of steatohepatitis. This is a retrospective review of records of obese children referred for evaluation of obesity to endocrine clinic in University Malaya Medical Centre (UMMC) from 2005 to 2009. The clinical profile and biochemical characteristic (liver enzymes and fasting lipid profiles) were studied to find correlation between the degree of obesity as shown by body mass index (BMI). Obesity related to genetic, syndromes, secondary forms were excluded from the study. Steatohepatitis is a condition that causes inflammation and accumulation of fat and fibrous tissue in the liver. It is commonly seen in patients with obesity, type 2 diabetes and insulin resistance. It is most often discovered during routine laboratory investigations and most common findings are raised liver transaminases. Excessive accumulation of lipids within hepatocytes is thought to be the cause for steatohepatitis but the exact cause for this condition is unknown. Non-alcoholic steatohepatitis can progress to liver cirrhosis from adult studies. A total of 60 patients (40% girls, 60% boys), mean age 10.3 +/- 3.63, median age 10 years were available for review. The mean BMI was 29.5 +/- 6.74. Eighty five % had BMI > 24, 11 % with BMI 20-23 and 3.3% had BMI < 19. At presentation, 80% had raised ALT above the upper limit, 35% had raised AST, 32 % had raised cholesterol, and 40% with raised LDL and 80% had low HDL. The degree of obesity based on BMI was positively correlated with ALT ($r=0.347$), cholesterol($r=0.256$) and triglyceride level ($r=0.307$). Majority of patients with obesity had biochemical evidences for hepatic steatosis. The more severe the degree of obesity, the more likely the patients to

have abnormal biochemical markers for fatty liver. Long term follow up are needed to determine the significance of metabolic derangements related to hepatic steatosis in children.

A07 Physical Activity and Breast Cancer: A Case-Control Study

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A physical activity questionnaire was developed with modification of The Breast Cancer Comprehensive Questionnaire, prepared for the National Action Plan on Breast Cancer of the Office on Women's Health by Institute for Survey Research Temple University. The questions about exercise and physical activity were asked since the subjects were in high school. The exercise and activities mean at least two hours a week for four month or more in one year and will be categorized by strenuous and moderate exercise. Strenuous activity mean the activities increase the heart rate and breathing, and cause you to break out in a sweat while the moderate activity mean activities involve prolonged, rhythmic movements but do not increase your heart rate or breathing as much as strenuous exercise. A prospective case-control study was done among 70 newly diagnosed breast cancer patients and 138 controls aged 29-65 years old in Klang Valley to examine the lifestyle related risk factors for breast cancer in women. The study was started from January 2005 until Jun 2006. The inclusion criteria for cases (i) pathologically newly diagnosed breast cancer (stage I to III) (ii) that had not undergone any therapy for cancer (iii) no other chronic diseases such as hypertension and diabetic (iv) not pregnant and lactating (vi) for those who are not menopause yet, they are not in period time when participating this study. The control group comprised women who were healthy, not diagnosed with cancer and other chronic disease, not pregnant, lactating and not in menstruation time as well as cases. Demographic data were obtained through standardized pre-tested questionnaire by trained interviewers. Results showed that the mean body mass index (BMI) among cases were $26.1 \pm 4.8 \text{ kg/m}^2$ and $25.3 \pm 4.5 \text{ kg/m}^2$ for control group ($p > 0.05$). Result of this study showed that women who did not have history of exercises and sports regularly have four times higher risk [adjusted OR=4.1 (95% CI=2.1-8.1)] compared to those had lifetime physical activity. Pre menopausal women who did not have history of exercise and sports had five time higher risk for getting breast cancer [adjusted OR=5.0 (95% CI=2.1-11.5)] compared to those active women. Physical activity may an important promising primary prevention strategy to

reduce breast cancer risk among women. Changes in patterns of physical activity in younger women will require some efforts both in individual and community level. Effort should be taken to increase awareness and understanding of the important of healthy lifestyle in reducing risk of cancer. The implementation of regular physical activity exercise is important in promoting healthy lifestyle especially for adolescent and adult women.

A08 Lower Extremity Biomechanics in Obesity - Rehabilitative Perspective

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Obesity is a major public health problem that has become a worldwide epidemic. Overweight and obesity are now dramatically increasing in developed countries impairing health-related quality of life and is a major cause for musculoskeletal disorders. Obesity is associated with static & dynamic biomechanical changes in trunk & lower extremities. This study aims to overview lower extremities Biomechanical changes in obesity & to provide clinical implications towards rehabilitative perspective. An extensive literature review using Ovid, Science direct, Pubmed, and Proquest. The results of the overview showed marked biomechanical alterations in lower extremity like reduced anteversion in the hip joint, varus and valgus malalignment in the knee-joint, reduced dorsiflexion in the ankle, pronated foot, metatarsus abductus, out toeing, and flat foot. Obese persons are characterized with physical inactivity, general deconditioning of the musculatures, and impaired neuromuscular function & co-activation. Comparatively the lower extremity strength is reduced than upper extremity and also impaired dynamic postural balance. The locomotion changes were evident both in kinematic and kinetic analysis. The kinematic changes include reduced cadence, velocity, step length, step frequency, reduced swing phase, increased step width and prolonged stance phase. Kinetic changes include increased hip flexor activity, increased knee flexion angle (early stance) and increased knee extension angle (stance phase). All available evidence states excessive & prolonged loading as a key factor for skeletal and neuromuscular abnormalities, which increases the prevalence of degenerative musculoskeletal disorders in obese persons. Consideration of this biomechanical adaptability might play a vital role in clinical decision making towards accurate estimation of contributing

factors of musculoskeletal disorder. Since neuromuscular adaptation primarily results from osseous abnormalities, rehabilitation that promotes neuromuscular performance (endurance and neuromuscular co-activation) will be most valuable in management of obese.

A10 The Effect of Obesity on Microvascular Endothelial Function in Humans

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Obesity is a major public health problem; the 2007 Malaysian NCD Surveillance showed that 13.9% and 18.8% of adult males and females are obese. Obesity is associated with cardiovascular risk including microvascular complications such as retinopathy, nephropathy, and heart failure. This study aims to determine microvascular endothelial function in obese subjects compared to non-obese controls. A cross-sectional prospective study was conducted involving 36 healthy non-obese subjects (mean body mass index {BMI} 21.01 ± 0.35 kg/m²; mean age 26.47 ± 0.8 years) and 36 healthy obese subjects (BMI 35.10 ± 0.91 kg/m²; mean age 26.58 ± 0.9 years). Microvascular endothelial function was measured using Laser Doppler fluximetry and the process of iontophoresis. Iontophoresis is a non-invasive technique of introducing drugs across the skin by means of a small electrical current. Acetylcholine was used to assess endothelial dependent vasodilatation, while sodium nitroprusside assessed endothelial independent vasodilatation. Obese subjects had higher systolic (118.83 ± 1.51 vs 105.72 ± 2.01 mmHg, $p < 0.001$) and DBP (71.61 ± 1.35 vs 64.53 ± 1.40 mmHg, $p < 0.001$), higher serum triglyceride (1.35 ± 0.13 vs 0.79 ± 0.05 mmol/L, $p < 0.001$) and lower high density lipoprotein cholesterol (1.43 ± 0.04 vs 1.62 ± 0.05 mmol/L, $p = 0.003$) compared to non-obese individuals. Difference in LDL-C levels did not reach statistical significance (3.29 ± 0.14 vs 3.10 ± 0.10 mmol/l, $p = 0.356$). C-reactive protein levels were significantly higher in obese compared to controls (0.02 ± 0.001 vs 0.16 ± 0.04 mg/L, $p < 0.001$). Acetylcholine mediated vasodilatation was significantly lower in obese individuals compared to non-obese individuals (40.534 ± 6.59 vs 71.03 ± 7.13 AU, $p = 0.001$), while sodium nitroprusside mediated vasodilatation was not significantly different between the 2 groups ($p = 0.053$). Microvascular endothelial function was impaired with obesity; this is associated with higher blood pressure, inflammatory and triglyceride levels in the obese group.

GROUP B: EPIDEMIOLOGY OF OBESITY

B01 Physical Activity & Sedentary Behaviors among the Adolescents in Petaling District, Selangor

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Physical inactivity is strongly associated with obesity in childhood and adolescence, and an increased risk of cardiovascular disease at a later age. Sedentary behaviors have been associated with low levels of physical activity. A cross sectional study was carried out to determine the association between demographic characteristics, sedentary behaviors and physical activity levels among adolescents. Data were collected from 792 adolescents (417 boys; 375 girls) aged 16 years attending 15 schools in Petaling District, Selangor using a self-administrated questionnaire adapted from the Physical Activity Modules of the School Health Action, Planning and Evaluation System (SHAPE). Results showed that more females (49.6%) were physically inactive compared to males (39.6%) [OR: 1.47, 95% confident interval (CI: 1.05, 2.04)]. Physically inactive adolescents were less likely to participate in intramural/house league sports (OR: 1.72, 95% CI: 1.20, 2.47), school team sports (OR: 1.48, 95% CI: 1.05, 2.08) and individual physical activities outside of school (OR: 1.59, 95% CI: 1.15, 2.21) compared to their physically active counterparts. However, physically inactive adolescents were also less likely to engage in sedentary activities [television watching (OR: 0.68, 95% CI: 0.50, 0.93), playing computer/video game (OR: 0.46, 95% CI: 0.29, 0.73), talking on the telephone/text messaging (OR: 0.47, 95% CI: 0.32, 0.70) and reading (OR: 0.43, 95% CI: 0.23, 0.83)] compared to those who were physically active. These findings suggest that adolescents may be physically active and yet still engaged in sedentary behaviours.

B02 BMI & Smoking Habits among Army Personnel in Kelantan

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BMI provides a reliable indicator of body fatness for most people, including army and is used to screen for weight categories that may lead to health problems. However, the BMI calculator does have limitations. It may overestimate body fat in those people with a muscular build such as army profession. Overweight and obesity contribute to the hypertension, cardiovascular disease (CVD) are known to influence the impact of this disease on the population. The army profession is known as high demanding job associated with lots of physical activities (ideal weight), stress and high risk behavior such as smoking habits. A cross-sectional study was carried out in Kelantan to determine body mass index (BMI), prevalence of smoking, prevalence of hypertension and physical activities among army aged 19 to 57 years. A total of 319 were selected using random sampling from four army camps in Kelantan. Current weight and height were measured and body mass index (BMI) were calculated. Blood pressure was measured in triplicate at one minute interval using Digital Sphygmomanometer. The mean age of the subjects was 31.52 ± 7.40 years while the mean BMI of the subjects was 24.73 ± 3.85 kg/m². Based on the classification of weight status according to BMI in Asian Adults, the prevalence of armies: 8(2.5%) were underweight (< 18.5 kg/m²), 112 (35.1%) were normal or ideal weight ($18.5 - 22.9$ kg/m²), 58(18.2%) were overweight (>23.0 kg/m²), 116(36.4%) were over weight at risk ($23.0 -24.9$ kg/m²) and 25(7.8%) were obese class 1 ($25.0 - 29.9$ kg/m²). From the measurement of waist; 289(90.6%) ≤ 94 cm and only 30(9.4%) ≥ 94 cm which denotes increased risk of metabolic complication and from the waist hip ratio category; more than 98.4% subjects measured ≤ 94 cm. About 67.7% (n=216) of the subjects were smokers. Mean Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) were 114.88 ± 12.83 mmHg and 70.93 ± 10.22 mmHg respectively. SBP was significantly higher in non-smokers (117.15 ± 11.30 mmHg) than smokers (113.81 ± 13.39 mmHg). However, DBP was higher in non-smokers (71.02 ± 10.06 mmHg) than smokers (70.89 ± 10.32 mmHg), although not significant. Prevalence of HPT among army personnel was 4.1% (n=13). The mean physical activities in minutes/day, (vigorous exercise = 98.31 ± 10.70), (walking and cycling = 98.57 ± 18.43), (exercise during leisure time = 96.66 ± 10.00). Findings showed more than 50%, armies were

overweight and obese although armies have enough physical activities in line with Healthy Lifestyle Campaign which recommended at least 30 minutes/day. However, many in the military have high rates of muscle mass, which weighs more than fat, putting their BMI in the overweight category. From the study also showed high prevalence of smokers among army personnel in Kelantan. These results indicated significant rise in cardiovascular risk factors among army personnel and urgent intervention is needed to overcome this problem.

B03 Eating Attitude, Lifestyle Practices & Body Image Perception among Middle Eastern & Malaysian Students of UCSI University

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The purpose of this study was to compare the eating attitude, lifestyle habits, nutritional status and body image perception between Malaysian and Middle Eastern female students in UCSI University. A sample of 130 female university students aged 18-25 completed anthropometric measurements and a self administered questionnaire, which incorporated questions on demographic data, lifestyle practices which included smoking habit, alcohol consumption, fast food intake, and physical activity level using IPAQ, 24-hour food record, eating attitude using Eating Attitude Test-26 and body image perception using Figure Rating Scale. Eating disorder risk was more prevalent among Middle Eastern students (29.2%) compare to Malaysian (6.2%) with significant difference found ($p < 0.001$). Significantly ($p < 0.05$) Middle Eastern students (1616kcal) consumed higher calories than Malaysian (1275kcal). Based on result, 7.7% of Middle Eastern students and no Malaysian student were smoking. Middle Eastern students were found to be more physically active as 50.8% of them involved in moderate physical activity level while 58.5% of Malaysian involved in low physical activity level. Generally, Middle Eastern students had higher BMI (20.9) and larger waist circumference (68cm) compare with Malaysian students (19.0, 63cm) and were at risk for eating disorder. Majority of Middle Eastern students (81.54%) perceived their body image correctly (55.28% for Malaysian). Malaysian students who were at risk of eating disorder tend to have lower energy intake (1087kcal). Smaller waist circumference was associated with lower BMI in both origins. As conclusion, Middle Eastern students have higher prevalence in eating disorder, have bigger body size and tend to perceive their body image correctly than Malaysian students. Educating young people about

healthy nutrition will be helpful to prevent eating disorders, which are significant in terms of public health.

B05 Gender Differences in Body Weight Perception and Weight-loss Strategies among Undergraduates

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The knowledge of the association between Body Mass Index (BMI), body weight perception, eating attitudes and weight loss strategies can help direct future intervention efforts. We carried out a study among undergraduate students with the objective of comparing BMI with body weight perception and to determine the relationship between gender with BMI, body weight perception, eating attitudes and weight-loss strategies. Subjects consisted of 600 undergraduates (300 males and 300 females) from the various faculties in Universiti Malaysia Sarawak recruited from early September 2008 until mid November 2008. The Original Figure Rating Scale: Body Weight Perception, Body Shape Questionnaire (BSQ) and Eating Attitudes Test-26 (EAT-26) were used as assessment tools. Overall, 52.8% of students have normal BMI, with approximately equal number of both genders. More males than females are overweight (33.7%), while more females than males are underweight (25.3%). Males are more likely to perceive themselves as overweight than females and fail to see themselves as underweight. More than half of the females want their ideal figure to be underweight whereas about 30% males choose overweight as their ideal figure. Females are generally more concerned about body weight, body shape and eating than males. They more frequently diet, have self-induced vomiting, use laxatives, and exercise as their weight-loss strategies. In conclusion, issues pertaining to body weight perception, eating attitudes and weight-loss strategies exists with differences among males and females. Thus, more in-depth studies into the various factors involved are required as these have far-reaching implications on health policies.

B06 The Association between Weight Status and Iron Deficiency among Male Adolescents

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The prevalence of obesity had increased at an epidemic rate, and obesity has become one of the most common health concerns in Malaysia. Some studies have found a possible association between iron deficiency and obesity. This is a cross-sectional study that aims to investigate the association between weight status and iron deficiency of male adolescents. Subjects comprised 25 obese and 25 normal weight boys, aged 12 to 17 years, from secondary schools in Kuala Lumpur. Data on socio-demography, anthropometry, iron status and dietary intake were collected. Multiple iron status indicators namely, serum ferritin, transferrin saturation, mean corpuscular volume (MCV), total iron binding capacity (TIBC) and hemoglobin were determined. Logistic regression was used to estimate the association between weight status and iron deficiency. Mean age of subjects was 13.2 ± 1.1 years, while mean BMI for obese and normal groups were $31.1 \pm 5.1 \text{ kg/m}^2$ and $18.6 \pm 3.9 \text{ kg/m}^2$, respectively. The percentages of iron deficiency in the obese and normal group male adolescent were 12% and 8% respectively. Obese subjects demonstrated the highest percentage of iron deficiency. Obese subjects were found to have significantly higher TIBC than normal weight subjects ($p < 0.05$). Results from logistic regression analysis showed that, adolescent who were obese were approximately 1.3 times more prone to be iron-deficient. In conclusion, obese adolescents demonstrated higher percentage of iron deficiency compared to their normal weight counterparts. Given the increasing numbers of overweight and obese adolescent and the known morbidities of iron deficiency, these findings suggest that guidelines for screening for iron deficiency may need to be modified to include adolescents with elevated BMI.

B07 Knowledge, Attitude & Practice in Relation to Obesity among Malay Married Women in Hulu Langat, Selangor

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A study involving 160 subjects, age between 19 and 50 years was conducted among the Malay married women in Selangor. The objective of the study is to identify the relationships between knowledge, attitude and practice in relation to obesity among Malay married women. A survey among Malay married women in Hulu Langat was conducted using semi-conducted questionnaires. Knowledge was assessed through multiple answer questions on definition of obesity, BMI calculation and factors contributing to obesity. 20 items of each attitudes and practice towards obesity were asked using Likert Scale items. Questions on attitudes assessed the women's perception towards obesity, their concern on the treatment of obesity and preventive measures towards the problem. Questions on practice assessed their actions in maintaining their ideal weight, and how they treat their obesity. 42.5% of the subjects were obese (using BMI 30 as cut off points), 98.8% with waist circumference above 80 cm and 10% with WHR above 1. 40.6% of the subjects were having a hypertension problem and 53.1% hypercholesterolemia. There was a significant correlation between BMI and practice ($p < 0.05$), and a small correlation between attitude and practice. There was no significant relationship between knowledge, attitude and practice in relation to obesity among the subjects involved. Obesity epidemic is at an alarming rate. Knowledge on obesity should be imparted to the community and effective interventions program are needed to improve the dietary habits in this community.

GROUP C: CHILDHOOD OBESITY

C01 Physical Activity, Body Composition and Resting Metabolic Rate in Relation to Obesity and Metabolic Syndrome among Schoolchildren Aged 8 to 10 Years Old

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Metabolic syndrome is a complication of obesity that is related to physical inactivity and low metabolic rate. This study aimed to determine the physical activity, body composition, resting metabolic rate and incidence of metabolic syndrome among overweight/obese and normal weight children. Subjects comprised 97 schoolchildren aged between 8 and 10 years; divided into overweight/obese (O/O) (BMI-for-age \geq 1SD) and normal weight group ($-1SD < \text{BMI-for-age} \leq$ median) based on WHO (2007) growth reference. Physical activity was measured objectively using Actical accelerometer. Body composition was assessed using Bioelectrical Impedance Analysis method and body mass index was calculated from weight and height measurements. Blood biochemical profiles included triglyceride, HDL cholesterol, fasting blood glucose, and blood pressure. Metabolic syndrome (MS) was defined according to International Diabetes Federation (2007) criteria. Deltatrac Metabolic Monitor MBM-2, an indirect calorimetry method, was used to measure the resting metabolic rate (RMR) of a sub-sample of 23 subjects. O/O subjects (9.2 ± 0.9 years) were of similar age with their normal weight counterparts (9.2 ± 0.8 years) but their BMI were significantly higher ($24.6 \pm 4.0 \text{ kg/m}^2$ versus $15.1 \pm 0.8 \text{ kg/m}^2$). Only one obese subject (1.3%) had metabolic syndrome; 92.9% overweight/obese was at risk for at least one component. In comparison, only 9.1% normal weight was at risk for at least one component. Among the components of metabolic syndrome, HDL cholesterol showed a negative correlation with % body fat ($r=-0.523$) whereas systolic blood pressure ($r=0.636$), diastolic blood pressure ($r=0.486$) and waist circumference ($r=0.901$) showed moderate relationship with % body fat ($p<0.001$). Normal weight subjects spent twice as much time (0.6 ± 0.6 minutes) on vigorous activity (4923 ± 4890 counts) per day as compared to the O/O group ($p<0.01$). Similarly, normal weight subjects and subjects free of any risk of metabolic syndrome had a significantly higher RMR ($38 \pm 4 \text{ kcal/kg body weight/day}$, $38 \pm 5 \text{ kcal/kg body weight/day}$) as compared to $29 \pm 3 \text{ kcal/kg body weight/day}$ reported for O/O subjects and $29 \pm 4 \text{ kcal/kg body weight/day}$ reported for subjects at-risk of metabolic syndrome.

Low vigorous-intensity activity and resting metabolic rate were found to be lower among O/O subjects and subjects at-risk of metabolic syndrome. Hence, it is important intervention be undertaken to increase participation of O/O children in vigorous intensity activity.

C02 Dietary Intake of Obese and Normal Weight School Children Aged 9 to 12 Years Old

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Rising awareness of the vital role of diet for health promotion and obesity prevention has resulted in a greater concern about the diet and eating patterns of school children and adolescents. The aim of this study is to compare the dietary intake of obese and normal weight children. A cross sectional study was conducted using quota sampling according to ethnic ratio. A total of 168 children aged 9 to 12 years comprise of 84 normal weight and 84 obese subjects follow ethnic of Malay (59.5%), Chinese (31.0%) and Indian (9.5%) ethnicity participated in the study. Anthropometric screening was carried out to determine weight status based on BMI-for-age reference (WHO 2007). Food intake was assessed through face-to-face interviews using diet history technique. Results show that energy, macronutrient and micronutrient intakes were significantly ($p<0.05$) higher among obese children compared to normal weight children. Significant differences ($p<0.05$) were found in percentage of fat and carbohydrate contribution to energy intake of normal weight (25% fat, 61% carbohydrate) and obese (28% fat, 58% carbohydrate) girls. Daily breakfast consumption was higher among normal weight children (66.7%) compared with obese (46.4%). Frequency of daily fast foods processed foods and vegetable consumption were higher among obese children; whereas daily snacks, fruits and milk consumption were lower among obese children. We found that 32.1% obese children tended to underreport their intake while 10.7% normal weight children over-reported their intake. Energy intake ($r=0.427$), protein ($r=0.320$), carbohydrate ($r= 0.402$), fat ($r=0.379$), calcium ($r=0.196$), iron ($r=0.258$), vitamin B2 ($r=0.190$), vitamin B3 ($r=0.198$) and vitamin A ($r=0.276$) were found to have significant positive correlation ($p<0.05$) with BMI. Based on percentage of macronutrient energy contribution, a significant negative relationship ($r= -0.179$, $p<0.05$) was found between carbohydrate and BMI whereas fat was positively significant correlated ($r=0.159$, $p<0.05$) with BMI. In

conclusion, there were an apparent differences in the energy, macronutrient and micronutrient intakes among obese and normal weight school children.

GROUP D: BEHAVIOURAL ASPECTS OF OBESITY

D02 Eating Attitude, Lifestyle Practices and Body Image among Malaysian and African female Students in UCSI University

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This study aimed to compare eating attitude, lifestyle practices and body image between Malaysian and African female students in UCSI University. Subjects consisted of 120 students who completed anthropometric measurements and a self-administered questionnaire assessing on socio-demographics, lifestyle practices which included physical activity using IPAQ, cigarette smoking and alcohol, eating pattern, eating attitude using EAT and body image using FRS. Results showed that 31.7% Malaysian and 41.7% African subjects were at risk of developing eating disorder with no significant difference found between the groups. African subjects had significantly higher median BMI (22.1, 4.2) and mean waist circumference (71.2±6.2) than Malaysian subjects (18.7, 3.4; 68.3±7.1). Significantly more Malaysian subjects consumed alcohol, practised consistent meal time and consumed vegetables daily whereas more African subjects skipped lunch, snacking daily and had higher fast food consumption. Physical activity level did not differ significantly between subject groups with 8.3% Malaysian and 11.7% African subjects achieved high physical activity level. No correlation found between IPAQ and EAT-26 score with BMI of all subjects. Body dissatisfaction and body image perception did not differ significantly between subject groups. However, significantly more African subjects desired bigger body size (15.0% African; 6.7% Malaysian) and they were more likely to underestimate their body size (6.7% African; 1.7% Malaysian) as compared to Malaysian subjects. Higher BMI was associated with increased body dissatisfaction in both subject groups and those who were more dissatisfied with their body image exercised more. Majority of subjects with distorted body image overestimated their body weight (96.0% Malaysian; 84.6% African). African subjects without body image distortion exercised more than those who had distorted body image. In conclusion, no significant differences found in eating attitude, lifestyle practices and body image between subject groups. However, African subjects had more negative eating patterns and tend to idealize bigger body size and underestimate their body weight as compared to Malaysian subjects.

D03 Readiness to Change among Overweight and Obese Patients Attending Dietary Counseling: Does It Really Matter?

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The objective of this study was to assess readiness to change among overweight and obese patients. This study was carried out by interviewing new patients and follow-up patients aged 19 to 59 years old who were overweight and obese and enrolled in dietary counseling sessions at Poliklinik Warga, Universiti Kebangsaan Malaysia Medical Centre (UKMMC) of which 76 respondents participated (38 new cases, 38 follow ups). Readiness to change is assessed by three dietary behavior algorithms for reducing fat intake, increasing fruits and vegetables consumption and portion size control. These algorithms categorized patients according to their readiness to change status which may influence their food intake. Food intake is determined through food frequency questionnaires which consisted of 126 food items. Back to back translation is done on three readiness to change algorithms. Readiness to change is classified into these stages: pre-contemplation, contemplation, preparation, action and maintenance. The hypothesis is that respondents in the action and maintenance stages tend to consume less fat, higher in fruits and vegetables intake and able to control portion size. Results shown there is no respondent in pre-contemplation stage while contemplation, preparation, action and maintenance stage are 7.9%, 71.1%, 5.2% and 15.8% respectively in the reducing fat intake stages of change algorithm. In the increasing of fruits and vegetables intake algorithms, percentage of respondents in pre-contemplation, contemplation, preparation, action and maintenance stages are 14.5%, 7.9%, 61.8%, 6.6% and 9.2% respectively. The highest percentage of respondents reported to control their portion are in action stage, followed by those in the maintenance stage (30.3%), contemplation stage (10.5%), preparation stage (9.2%) and pre-contemplation stage (2.6%). Fruits and vegetables intakes were significantly higher among those in action and maintenance stages (465.40 ± 248.23 g/day; 329.23 ± 209.95 g/day, $p < 0.05$) compared to other stages. The association between portion control behavior and portion control stages of change is significantly higher in new cases patients compared to follow-up patients ($p < 0.001$). In conclusion, readiness to change can assist health providers (nutritionists and dietitians especially) in tailoring dietary

counseling according to their patients' readiness. This will increase their patients' compliance in meeting the dietary recommendations, ultimately the weight reduction goal.

D04 Relationships between Elevated BMI and Negative Body Image and Disordered Eating Behaviors in Adolescent Girls

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As preoccupation with the thin beauty ideal is very common among adolescent girls, it is not surprising that elevated BMI is one of the risk factors contributing to negative body image and disordered eating behaviors. This study aimed to determine the relationships between elevated BMI and negative body image and disordered eating behaviors among adolescent girls. A total of 407 adolescent girls aged between 13 to 19 years from secondary schools in Kuantan district, state of Pahang, were randomly selected to complete the Multidimensional Body Image Scale (MBIS), Eating Attitudes Test-26 (EAT-26), and their weight and height were measured. The study found that overweight and obese respondents (23.9%) were five times more than underweight respondents (4.7%), and about one in ten of the respondents (12.8%) were at-risk of eating disorders. BMI was moderately correlated with MBIS score ($r=0.591$) but weakly correlated with EAT score ($r=0.271$), and MBIS score was strongly correlated with EAT score ($r=0.603$). Additionally, BMI was found to predict MBIS score after controlling for EAT score ($R^2=0.561$; $F=258.218$; $P<0.05$) and EAT score after controlling for MBIS score ($R^2=0.375$; $F=121.138$; $P<0.05$). Further, the relationship between BMI and EAT score was found to partially mediated by MBIS score (Sobel test=10.053, $P<0.05$), and hence, elevated BMI predicted disordered eating behaviors of the adolescent girls both directly and indirectly through negative body image. In short, adolescent girls who have an elevated BMI were at-risk for both negative body image and disordered eating behaviors. Promoting health body weight should be integrated in both negative body image and disordered eating behaviors prevention programs.

GROUP E: MANAGEMENT AND TREATMENT OF OBESITY

E01 The Effect of a 3- Month Modified Lifestyle Program on Arterial Stiffness and Anthropometric Measurements in Overweight Patients

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Obesity is associated with increased stiffness of the large arteries which can lead to increased cardiovascular risk. Lifestyle modification through exercise and dietary intervention had been proven to reduce the body weight and cardiovascular risk. The aim of this study is to assess the effect of lifestyle modification on arterial stiffness and anthropometric measurement in overweight patients. 22 overweight subjects (body mass index [BMI]>25.0 kg/m², age: 32.6 ± 2.2 years) participated in lifestyle modification intervention program encompassing three principal components: diet, exercise and behavior therapy. This intervention program aims to produce energy deficit of 500 kcal/day by modifying diet, increasing physical activity and exercise. Assessment of arterial stiffness was assessed using parameters carotid-femoral pulse wave velocity (PWV) and augmentation index (AIx) using the SphygmoCor device. Anthropometric indices, blood pressure and body fat percentage were accessed 3 monthly and the Queen Step test was used as indicator for fitness level. Body weight and BMI before and after intervention were 79.1 ± 3.5 vs 77.7 ± 3.5 kg (p=0.104), 31.6 ± 1.0 vs 31.0 ± 1.0 kg/m² (p= 0.101) respectively. There was no significance difference in augmentation index, pulse wave velocity, blood pressure and pulse before and after 3 months intervention. Significant decrease in waist and hip circumference was observed, from 89.8 ± 1.9 to 87.9 ± 1.8 cm (p=0.036) and 109.7 ± 2.4 to 107.5 ± 2.5 cm (p= 0.003) respectively. Fitness level increased significantly from 46.1 ± 2.5 to 49.9

± 2.3 ml/min/kg ($p=0.04$). Body fat percentage at baseline and after 3 months were 35.6 ± 1.2 and 35.1 ± 1.3 % ($p=0.322$). This study showed improvement in waist and hip circumference and fitness level of overweight subjects after 3 months intervention. However, 3 months may be too short a period to show significant improvement in arterial stiffness.

E02 'Live Healthy, Work Healthy' Wellness Program Improved Medical Leave and Health Status for Employees

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Worksite wellness program was implemented for employees in Support Services Division from the month of May to December 2009. The objective of the program is to create health awareness and improve medical leave among the employees. Forty-six employees (20 men and 26 women) were selected from Support Services Division based on their previous year medical certificate (MC) records. Data was collected via questionnaire to assess employee's lifestyle habits, stress levels and health conditions. Anthropometry data on BMI, body weight, body fat percentage and visceral fat were measured using the Omron Fat Analyzer. Data indicated that that 81% (37) employees were overweight and obese and $\geq 75\%$ (35) have poor lifestyle habits i.e. poor diet, inadequate sleep hours, smoking and no exercise. The program was planned according to the results from questionnaire and employee's health status, which comprise of nutrition activities, motivation, stress management and fitness. Attendance rate, anthropometry measurements, MC record were charted on the 3rd and 6th month from the program initiated. Two follow-up sessions were conducted after six month program. The results indicated that 57% (26) employees lost weight, 41% (19) employees reduced body fat and 20% (9) employees reduced visceral fat over the 12 months period. Sixty three percents (29) of employees reduced MC rate by 46%, from average of 447 days to 240 days. In conclusion, wellness program has created an awareness of health and reduced medical leave for employee effectively.

GROUP F: EMERGING ISSUES AND TECHNOLOGIES RELATED TO OBESITY

F01 Pharmacological & Non-pharmacological Interventions Beneficial in Improving Vascular Function & Cardiovascular Risk in Obesity – Study Methodology

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Obesity is associated with significant cardiovascular related morbidity and mortality. We have shown that microvascular endothelial function is impaired in obese subjects compared to controls, this was associated with increased blood pressure, the inflammatory marker C reactive protein and serum triglycerides. This project aims to assess the effects of 2 pharmacological interventions or monitored lifestyle modifications in improving vascular function and reducing cardiovascular risk in overweight and obese subjects. This presentation will describe the details of the methodology in this project. This clinical study involved approximately 108 patients divided into three intervention groups for 9 months. Patients will be randomised to receive pharmacological intervention with Orlistat 120 mg three times daily, or sibutramine 10 mg daily. The third group does not receive any drugs but will undergo monitored lifestyle modification consisting of dietary intervention and increasing physical activity under the supervision of qualified sports science instructors and dieticians. Arterial stiffness, an index of vascular health will be assessed using the principles of pulse wave analysis and pulse wave velocity. Microvascular endothelial function will be determined using the laser Doppler fluximetry and the process of iontophoresis (transdermal drug delivery). Other parameters that will be monitored include changes in anthropometric measurements with body fat percentages, central (aortic) blood pressure, metabolic risk markers and cardiovascular inflammatory markers at baseline before intervention and 3 monthly thereafter up till 9 months. Adverse effects throughout study duration will be monitored and recorded. Physical activity level will be assessed using a validated questionnaire while subject's calorie

intake is estimated by study dieticians. Fitness testing is performed in the monitored lifestyle modification group. Approximately 100 patients have been recruited; 90 have been randomised. Results from this project will possibly be available early 2010.

F03 Prevalence of the Leptin Gene A19G and Leptin Receptor Gene K109R, Q223R, K656N Variants and Obesity Risk Factors among the UTAR Population

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Obesity is due to the combined effects of genes, environment, lifestyle, and the interactions of these factors. Leptin is secreted by white adipose tissues and binds to leptin receptor to signal and regulate food intake and energy expenditure. The leptin gene (*LEP*) A19G and leptin receptor gene (*LEPR*) K109R, Q223R and K656N variants have been associated with obesity in different populations, mostly in the West. The study was to investigate the association of these gene polymorphisms with obesity in Malaysia, preliminarily among the population of UTAR campuses around Klang Valley. Random convenience sampling was performed with informed consents, obesity risk factors were assessed by questionnaire and anthropometric measurements were taken. Mouthwash samples were obtained, genomic DNA was extracted and genotyping was performed using Polymerase Chain Reaction - Restriction Fragment Length Polymorphism (PCR-RFLP). A lower BMI cut-off point of 27kg/m² for obesity was adapted; categorizing the 200 subjects (85 males, 115 females) into 143 non-obese and 57 obese. There was no significant difference in the genotype and allele frequencies of *LEP* A19G and *LEPR* K109R, Q223R variants between obese and non-obese subjects. Only the K656N genotype, but not the 656N allele was associated with obesity. There was no significant difference in the genotype frequencies between Malays, Chinese and Indians - either in obese and non-obese groups. Physical activity frequency, blood pressure, Waist Hip Ratio (WHR) and Total Body Fat (TBF) were significantly different between the non-obese and obese groups. Age, WHR and TBF were significantly correlated with BMI, but not alcohol consumption and family history of obesity. In conclusion, only the K656N genotype was significantly associated with obesity among this preliminary small-sampled UTAR subjects. In the future, we hope to conduct a larger scale study involving more subjects and covering other gene polymorphisms of the leptin-melanocortin pathway associated with obesity.

F04 Waist Circumference or Waist-hip Ratio: Which Is Better?

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Body weight status is an important indicator for health risk and previously Body Mass Index (BMI) has been extensively used as an indicator for the risk cardiovascular diseases. However, recent investigations emphasized the importance of body fat distribution as a predictor of health risk. Waist circumference (WC) and waist-to-hip ratio (WHR) are common measurements used to assess central distribution of fat. A survey was conducted among 151 Malays at a workplace in Kuala Lumpur. The objective was to investigate whether WC or WHR was a better measuring tool to estimate body weight status. Pearson's correlation was used to determine the correlation of WC and WHR. Receiver operating characteristic (ROC) curves were plotted to compare the above by using BMI as the gold standard. The correlation between BMI and WC were good among males ($r = 0.759$, $p < 0.001$) and females ($r = 0.771$, $p < 0.001$). WHR showed a lower correlation with BMI among males ($r = 0.577$, $p < 0.001$) and females ($r = 0.499$, $p < 0.001$) compared to WC. The area under the curve (AUC) generated by waist circumference was 0.877 (95% CI: 0.767 – 0.987) among males and 0.873 (95% CI: 0.809 – 0.937) among females. While AUC generated by WHR was 0.836 (95% CI: 0.687 – 0.984) among males and 0.692 (95% CI: 0.588 – 0.796) among females. The AUC of waist circumference for both males and females was good while WHR did not perform well among females. In conclusion, waist circumference is a better and more efficient measurement compared to WHR.

F05 Waist Circumference versus Waist: Height Ratio in Relation to Cardiovascular Risk Factors in Children

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This study was undertaken to determine the relationship between waist circumference and cardiovascular disease risk factors with waist height ratio in children. A total of 403 subjects (195 boys and 208 girls) aged 9 – 12 years in Selangor and Kuala Lumpur participated in this study, with mean age of 11.06 ± 0.84 years and 10.94 ± 0.86 years, respectively. Subjects were 61% Malay, 30.5% Chinese and 8.2% Indian. Anthropometric measurements comprised weight, height, waist circumference and hip circumference. Blood pressure was measured, and 5ml of overnight fasting blood was drawn by venous puncture. Fasting blood glucose (FBG), full lipid profile including triglycerides (TG), high lipoprotein cholesterol (HDL-C), low lipoprotein cholesterol (LDL-C) and total cholesterol (TC) were determined. The cut-offs of 0.5 for waist height ratio (WHtR) and 90th percentile for sex and age specific for waist circumference (WC) were used, relatively. More girls (46.2%) had larger WC than boys (43.6%); while more boys (41.5%) had WHtR >0.5 compared to girls (37.0%). WC was better correlated with weight and systolic blood pressure ($r=0.932$, $p<0.001$; $r=0.436$, $p<0.001$) as compared to WHtR ($r=0.738$, $p<0.001$; $r=0.400$, $p<0.001$), respectively. However, WHtR was better correlated with TG and TC/HDL ($r=0.334$, $p=0.001$; $r=0.410$, $p<0.001$) compared with WC ($r=0.330$, $p<0.05$; $r=0.401$, $p<0.000$), relatively. In conclusion, waist circumference and waist height ratio showed significant relationship with the cardiovascular risk clustering in children. Waist height ratio may be used as an alternative option in estimating cardiovascular risk because of its simplicity, easy and non age dependent index compared to waist circumference.

F07 Validation of Bioelectrical Impedance Analysis (BIA) against Dual Energy X-ray Absorptiometry (DEXA) for the Estimation of Body Composition among Adolescents

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Bioelectrical impedance analysis (BIA) is an alternative method for the estimation of body composition that requires population specific predictive equations. This study aimed to evaluate the predictive validity of four previously published bioelectrical impedance equations against dual energy X-ray absorptiometry (DEXA) in determining the body composition of the adolescents. A total of 150 Malay adolescents (76 boys; 74 girls, mean age = 14.9 ± 1.2 y/o) participated and underwent measurement of FM% by DEXA (Hologic QDR-4500) and BIA (ImpediMed DF50). Impedance, reactance, and resistance values from the BIA were entered into four predictive equations and body fat percentage was calculated. Paired *t*-tests and Pearson correlation were used to assess differences and correlation between methods. Methods agreement was assessed by Bland and Altman technique. Lukaski et al. (1986) and Schaefer et al. (1994) equations tend to overestimate the body fat percentage, whereas Segal et al. (1988) and Houtkooper et al. (1992) equations tend to underestimate body fat percentage of adolescents compared to DEXA. For all categories of boys, overweight and obese girls, the Bland-Altman method showed poor agreement between the four BIA equations and DEXA. For normal weight girls, the Lukaski et al. (1986) equation provided the best estimation of body fat percentage with no significant difference ($+0.8 \pm 2.3$ %, $p > 0.05$) and good agreement (percentage points with 95% confidence interval -3.78 and 5.33) with DEXA. In conclusion, The Lukaski et al. (1986) equation is a valid BIA equation to estimate body fat percentage among normal weight girls. However, all the equations selected appear to be inappropriate for use among boys, overweight girls and obese girls in the targeted population. This proves that specific predictive equation is needed for each population to ensure accuracy of prediction.

F08 Predicting Total Body Water using Bioelectrical Impedance Analysis among Malay Children

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Bioimpedance analysis (BIA) is a widely used, quick and simple technique for determination of body composition. However, BIA equations tend to be population specific, therefore most equations which had been generated in Caucasian populations, may not be suitable for the Malaysian population. The aim of this study was to develop a single BIA equation to predict the total body water (TBW) of Malay children. A total of 90 Malay children (45 boys; 45 girls) aged 8 – 10 years participated in this study. Subjects were randomly divided into developmental (30 boys, 30 girls) and cross-validation (15 boys, 15 girls) groups. Body weight and height were measured, and BMI was calculated. Deuterium dilution method was used as the gold standard technique to determine TBW for developing predictive equations based on single-frequency bioelectrical impedance analyzer (Omron pre-commercial unit). Predictive equations were developed using stepwise regression analysis in the developmental group. Independent variables such as impedance index, decimal age, body weight, height and gender were tested. Impedance index was identified as the strongest predictor; and by adding weight, the accuracy of the equation improved ($R^2 = 0.665$, SEE = 1.24 kg). The predictive equation was then applied to the cross validation group. Predicted TBW (15.88 ± 1.87 kg) in the cross validation group was not significantly different from measured TBW (15.79 ± 2.36 kg), with a pure error of 0.97 kg which was similar to the SEE in developmental group. This cross validation results was satisfactory, hence, a single predictive equation was developed with the total sample ($n=90$): $TBW \text{ (kg)} = (0.183 \times \text{impedance index}) + (0.246 \times \text{weight (kg)}) + 2.399$, with impedance index as the strongest predictor. ($R^2 = 0.731$, SEE = 1.15 kg) In conclusion, the new BIA equation was valid for predicting the TBW of Malay children aged 8-10 years.

F09 Validation of Skinfold Thickness Method against Air Displacement Plethysmography for Estimation of Body Fat in Normal Weight and Obese Children

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Skinfold thickness (SKF) is widely used to estimate body composition in children, but with little information on its validity. The aim of this study is to validate six existing SKF equations against air displacement plethysmography (ADP) for estimation of body fat in normal weight and obese children aged 9-12 years. The SKF equations tested were Brook (1971), Johnston et al. (1988), Slaughter et al. (1988) (triceps and subscapular), Slaughter et al. (1988) (triceps and calf), Deurenberg et al. (1990) and Lohman et al. (2000) equations. Subjects comprised 63 normal weight and 63 obese children who were categorized according to WHO (2007) BMI-for-age reference. Mean percentage of body fat (%BF) measured by ADP for normal weight and obese children were $19.9 \pm 5.4\%$ and $40.4 \pm 4.9\%$, respectively. Among normal weight children, all the SKF equations were significantly correlated with ADP ($p < 0.05$) with r values ranging from 0.420 to 0.707. However, Bland-Altman analyses revealed that all six SKF equations significantly underestimated %BF ($p < 0.01$) for normal weight children with the exception of Lohman et al. (2000) equation (+1.0%, $p = 0.11$). Among obese children, all SKF equations were significantly correlated with ADP with r values ranging from 0.390 to 0.468 ($p < 0.01$). %BF was significantly underestimated ($p < 0.01$) by all the equations in obese children with the smallest bias shown by Lohman et al. (2000) equation (-7.7%, $p < 0.0001$). Bland-Altman 95% limits of agreement between all six equations and ADP were wide in either normal weight or obese children, indicating poor agreement for individual predictions. In conclusion, it was found that validity of SKF method was poorer in obese children with weaker correlation, larger mean bias and wider limits of agreement compared with normal weight children. The present study shows that SKF technique is a valid method for estimating %BF for groups but may not be suitable for individual assessment.

F10 Development of Waist Circumference Percentiles for Malaysian Children Aged 6 to 16 Years

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Obesity is a global concern irrespective of socioeconomic status, ethnicity or age groups, and is a known health risk for various diseases. Waist circumference (WC) is a surrogate measurement to determine abdominal obesity. This paper reports the development of age- and gender-specific WC percentile curves for Malaysian children and adolescents aged 6 –to 16 years. A total of 16,239 (8123 boys; 8116 girls) were participated in this study. Weight and height were measured and body mass index (BMI) was determined. WC measurements were taken at the middle line between the tenth rib and the iliac crest. Smoothed percentile charts for the 3rd, 5th, 10th, 25th, 50th, 75th, 90th, 95th and 97th were constructed using LMS Method. Mean weight, height, WC and BMI were 38.3 ± 16.7 kg, 141.0 ± 16.7 cm, 63.9 ± 12.9 cm, 18.4 ± 4.8 kg/m² respectively for boys and lower among girls at 36.3 ± 14.4 kg, 139.2 ± 14.1 cm, 60.7 ± 10.6 cm, 18.1 ± 4.5 kg/m², respectively. WC was found to increase with age for both sexes but boys tend to have higher values than the girls at every age and percentile points. Comparisons with other studies indicate that at 50th percentile, Malaysia was not different with British, Hong Kong and Turkey but at 90th percentile, Malaysia had higher values compared to other countries starting at 10 years old. The 90th percentile was adopted as cut off point to assess abdominal obesity in Malaysian children and adolescents. These curves represent the first WC percentiles reported for Malaysian children and adolescents and they can be employed as a reference for future studies.

F11 Specificity and Sensitivity of Modified International Physical Activity Questionnaire (IPAQ) among Middle-aged Population of the Malaysian Cohort

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Physical inactivity is a global health concern. Tools to measure physical activity are very challenging to use and validate. The aim of this project was to determine the specificity and sensitivity of modified IPAQ against Actical accelerometer. Subjects comprised of 129 Malaysian adults (74 women, 55 men) aged 40-65 years participating in The Malaysian Cohort project. The IPAQ was interview-administered on two different occasions (Day 1 and Day 8). Subjects wore the Actical accelerometer for seven consecutive days between the two interview sessions. Specificity and sensitivity were calculated based on classification of subjects into two groups, whether meeting physical activity guidelines or not. The modified IPAQ identified 89% (specificity) of those who met the current PA guidelines of accumulating more than 30min day⁻¹ spent in vigorous and moderate activities as determined by accelerometer, whereas only 13% (sensitivity) of those not meeting the guidelines were classified correctly. Median of total time spent in vigorous and moderate activity (MVPA) for modified IPAQ was 87 (137) (min day⁻¹) whereas MVPA for accelerometer was 60 (47) (min day⁻¹). These results indicate that the specificity was acceptable, however the sensitivity was low. In addition, Malaysian adults tend to over-report their physical activities.

GROUP G: EXPERIMENTAL STUDY

G01 Weight Changes After Supplemented of Mixture of *Strobilanthes Crispus* and Roselle Tea in Rats

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The objective of this study was to determine the body weight after administration of *Strobilanthes crispus* tea (SCT), roselle tea ® and the mixture of *S.crispus* and roselle tea (M). The treatments were given through forced fed for 7 days to a total number of 120 rats which were divided into 12 groups whereby 4 groups received low dose at 2.5% (L) for each treatment (LNC, LSCT, LR and LM), 4 groups received medium dose at 25% (M) for each treatment (MNC, MSCT, MR and MM) and the other 4 groups received high dose at 50% (H) for each treatment denotes HNC, HSCT, HR and HM. Each group contains 10 rats with 5 males and 5 females. They were housed in standard cages at the animal house of Faculty Medicine and Health Sciences and fed with standard rat chow with water *ad libitum*. The result showed that there were significant differences in the mean body weight for all groups in each dose given at different treatment. There was an increased in body weights in all groups of rats with low dose except for the LSCT and LM that had slightly decreased in mean body weight after 7 days. There were significant different in mean body weight before and after the treatment with medium dose or 25%. Normal control group and MR was found to have the highest percentage of difference and less increased in MM was noted. HSCT showed small differences in mean body weight compared to normal control. All the groups receiving high concentration of treatments were significantly different in their body or weight from day 1 to day 7 ($p < 0.05$). In conclusion, the *Strobilanthes crispus* or a mixture with roselle tea showed less increased of mean body weight in rats.

G02 Induction of Cell Cycle Arrest (G1) and Apoptosis in 3T3-L1 Adipocytes by a Standardized Extract of *Caralluma fimbriata* and a Pregnane Glycoside in It

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Obesity is a disease of multi-factorial origin and forms the root cause for several major diseases creating a serious problem that has social as well as economic implications. The pharmacological approaches, for obesity management include interventions to decrease appetite, increase energy expenditure, inhibit differentiation and proliferation of pre-adipocytes, decrease lipogenesis and increase lipolysis. Here, induction of adipocyte apoptosis is a recent concept. Apoptosis is critical tissue homeostasis, and its disruption has been linked to a wide variety of disorders including obesity. *Caralluma fimbriata* (Asclepiadaceae), an edible succulent, listed in *Indian Materia Medica*, is believed to possess several phytotherapeutic properties including anti-obesogenic, anti-diabetic, anti-atherosclerotic and appetite reducing activities. Our earlier investigations on standardized extract of *C. fimbriata* (CFE) [SlimalumaTM] in rodent and cell line models have provided evidence in support of these activities. The objective of the study is to determine the pathways involved in induction of cell cycle arrest (G1) and apoptosis by CFE and the major principle in it, a pregnane glycoside. The study was conducted in two phases using 3T3-L1 pre-adipocyte cells. The pre-adipocyte cells were differentiated into mature adipocytes adopting the established protocol. In the first phase, the cells were treated with CFE at 100 ug/ml concentration, and subjected to flow assisted cell sorter (FACS) analysis, confocal microscopy and immuno-fluorescent localization of cyclin D1, followed by immuno-blotting of CDK4/6. In the second phase of the study, the cells were treated with CFE and the purified major pregnane glycoside in this extract and screened for induction of apoptosis. Analysis of apoptosis was carried out adopting AO&EB, Hoechst 33258, JC-1 and Annexin V -Cy3 staining and immuno-blotting of caspases 3/9, followed by comet assay to find DNA damage. Flow cytometry, immuno-fluorescent analysis and confocal microscopy revealed that CFE inhibits adipocyte proliferation, induces G1 cell cycle arrest and reduces the expression of CDK 4/6. Further, apoptosis specific staining of treated cells indicated that the cell death

could be mediated via mitochondria-mediated pathway. Immuno-blotting analysis indicated activation of caspases 3 and 9. The purified pregnane glycoside also produced similar results but was less efficient. The results reveal that CFE can significantly inhibit adipocyte proliferation, induce cell cycle arrest and bring about apoptotic cell death. The less significant results produced by the pregnane glycosides may be due to solubility, stability, etc consequent upon isolation and purification, thus, signifying the importance of synergism in therapeutic applications of herbal extracts.

G03 Anti-obesity Effect of Emu (*Dromaius novachollandiae*) Oil in Diet Induced Obesity (DIO) in Male *Wistar* Rat

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Obesity is a “nutritional disorder”, has become huge burden both in developed and developing countries. It forms the root cause for most of the diseases which are fatal leading to death. Several strategies were adopted to treat or curb the rising level of obesity, which include social, cultural, behavioral, nutritional modification, surgery and pharmacological approaches. Researchers in the past as well as in the present depend mostly on plant resources to find the lead molecule and ignored animal sources to treat any diseases. Resources obtained from animals like oil do have medicinal properties. The objective of the study is to investigate the anti-obesity efficacy of Emu oil in diet induced obesity condition and to screen the principles present in Emu oil. Emu oil was subjected for GC-MS analysis for chemo-profiling. Briefly, male *Wistar* rats (150-180 g) were classified into five groups (N=5), group one served as untreated control and fed with pellet chow, whereas rats in groups two-five were fed with cafeteria diet for 12 weeks to induce obesity. After induction, rats in group 3-5 were administered with three doses of Emu oil orally through gavages for five weeks. After the treatment period, body weight, fat pad and liver weight were recorded. Serum lipid profiles, blood sugar and hormonal (insulin, LH and testosterone) levels were estimated. Liver and kidney function test along

with histopathological analysis (liver, testis, spleen, kidney) were carried out for toxicological evaluation. The GC-MS analysis revealed the presence of various fatty acids like octadecanoic acid, hexadecanoic acid and linoleic acids. Administration of Emu oil to obese rats produced significant reduction in feed and water intake leading to reduced body weight, fat pads and liver mass. The impact of reduced fat mass was reflected in serum lipid and hormonal profiles compared untreated obese rats (group 2). Liver and kidney function test reveals that treatment with Emu oil has ameliorated the changes induced by feeding cafeteria diet. Histo-pathological analysis of vital organs does show a similar pattern with less signs of toxicity. Hormone analysis of obese rats indicated an alteration in insulin and testosterone level whereas no significant changes were observed in LH levels. These alterations were restored back to normalcy upon Emu oil administration. We believe that the fatty acids present in the Emu oil could have played a major role in conferring the anti-obesity effect. The present study provides the first scientific evidence for anti-obesity property of Emu oil, which can be taken to the next level of research and applications to control obesity.

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