



Malaysian Association for the Study of Obesity

MASO 2015

Scientific Conference on Obesity

in conjunction with World Obesity Day on 11 October 2015



“Combating Obesity: Societal and Environmental issues and challenges”



Souvenir Programme & Abstracts

28 - 29 October 2015
Seri Pacific Hotel, Kuala Lumpur

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MINISTER OF HEALTH MALAYSIA

Message

I would like to extend a warm welcome to all the delegates of MASO 2015. The conference held this year is somewhat outstanding and special in comparison to the previous MASO conferences as it is held in conjunction with the inaugural “World Obesity Day” which is celebrated worldwide on 11 October 2015.

On behalf of the Ministry of Health Malaysia, I would like to congratulate the Malaysian Association for the study of Obesity (MASO) for their commendable effort to host this biennial Scientific Conference. My special thanks to the plenary speakers, Prof. JP Poulain (University of Toulouse, France), Prof. Mike Lean (University of Glasgow, UK) and to the Symposium speakers (national and international) for their invaluable contribution towards the scientific programme.

The theme for the conference “**Combating Obesity: Societal and Environmental issues and challenges**” is not only timely, but also serves as a crucial reminder of the trans-disciplinary role in combating obesity. Despite considerable effort by the Ministry and advances in our knowledge, obesity continues to pose a threat to Malaysians, and this subsequently leads to great challenges to our researchers, health experts and policy makers.

It is my fervent hope and belief that this conference will bridge the knowledge gaps, highlight findings that could be useful in future strategies to help our government to cope with the ever escalating epidemic of obesity.

May I wish all the delegates of MASO 2015 a fruitful meeting and to our foreign friends, do have an enjoyable and pleasant stay in Malaysia.

YB Datuk Seri Dr. S. Subramaniam



Message from President

It gives me great pleasure to welcome you to Kuala Lumpur for MASO's biennial conference (MASO 2015) held in conjunction with the World Obesity Day celebrated on 11 October 2015. We are indeed privileged and honoured to have with us today YB Datuk Seri Dr S Subramaniam, Honorable Minister of Health Malaysia to officiate MASO 2015.

The theme of this year conference is "Combating Obesity: Societal and Environmental issues and challenges". We hope this Conference will integrate and mobilize all relevant scientific disciplines to showcase the trans-disciplinary nature in Obesity research.

We have a busy 2-day scientific programme which include 2 Plenary lectures by Prof JP Poulain from Toulouse University, France and Prof Mike Lean from University of Glasgow, UK, 7 Symposia with 27 oral and some 30 posters presentations.

On behalf of MASO, I would like to express our sincere gratitude and thanks to YB Datuk Seri Dr. S Subramaniam, Honorable Minister of Health Malaysia for taking time off his hectic schedule to support MASO 2015 and to launch the World Obesity Day 2015. A special thanks to all the speakers for accepting our invitation and to all the participants of MASO 2015. I would like to acknowledge the support of the sponsors, other contributors and last but not least, members of the Organising Committee for their undivided attention and support.

I wish all of you a very successful and fruitful deliberation and to our foreign colleagues have a pleasant stay in Kuala Lumpur.

Emeritus Professor Dr Mohd Ismail Noor FASc, FIUNS
Chairman, Organizing Committee

**Members of the 15th Council &
Organising Committee of
MASO 2015
Scientific Conference on Obesity**

President

Emeritus Prof. Dr. Mohd Ismail Noor

Vice-President

Prof. Dr. Norimah A Karim

Honorary Secretary

Prof. Dr. Poh Bee Koon

Honorary Treasurer

Assoc. Prof. Dr. Hazizi Abu Saad

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Council Members

Dr. Zawiah Hashim

Dr. Mahenderan Appukutty

Ms Zaiton Daud

Assoc. Prof. Dr. Nik Shanita Safii

Dr. Mohd Razif Shahril

Conference Information

Registration Desk

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

Wednesday, 28 October 2015	0800-0900, 1030-1100
Thursday, 29 October 2015	0800-0900

All delegates may collect their conference materials at the registration desk during the hours stated above. Participants are required to wear their badges throughout the conference for identification purposes and admission to the 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 Atrium, Level 4, Seri Pacific Hotel, Kuala Lumpur.

Secretariat Room

The Secretariat Room is located at Pacific Ballroom Secretariat Room, Level 2, 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 two conference days at the back foyer of the Pacific Ballroom, Level 2, Seri Pacific Hotel, Kuala Lumpur. Posters should be put up by 0830 hours on Wednesday, 28 October 2015, and should be taken down by 1730 hours on Thursday, 29 October 2015. Poster presenters should be

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

Opening Ceremony

The Opening Ceremony of MASO 2015 will be held at 0945 hours on Wednesday, 28 October 2015, at Pacific Ballroom, Level 2, Seri Pacific Hotel, Kuala Lumpur. Participants are requested to be seated in the Ballroom by 0930 hours.

Trade exhibitions

iNova Pharmaceuticals (S'pore) Pte Ltd

Soon Soon Oilmills Sdn Bhd

Tanita Health Equipment HK Ltd

Totalife (M) Sdn Bhd

United Lifestyle 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.

Official Opening

DAY 1 WEDNESDAY 28 OCTOBER, 2015

0800 hrs Registration

0900 hrs

PLENARY LECTURE I:

From nutritional transition to a socio-anthropological understanding of the obesogenic environment

Prof Dr. J. P. Poulain
*Taylor's University / University Toulouse 2 Jean
Jaures, Toulouse, France*

Chairperson: Ms Rokiah Don
*Director, Nutrition Division,
Ministry of Health Malaysia*

0945 hrs

OFFICIAL OPENING

0950 hrs

Welcome Address by
Emeritus Prof. Dr. Mohd Ismail Noor
President
*Malaysian Association for the Study of Obesity
(MASO)*

1000 hrs

Speech and Official Opening by
Y.B. Datuk Seri Dr. S. Subramaniam
Minister of Health
Ministry of Health Malaysia

1030 hrs

**Tour of Trade Exhibition/Scientific Posters by
Invited Guests**

Refreshments

Poster session: *Presenters in attendance for
discussion*

Scientific Programme

DAY 1 WEDNESDAY 28 OCTOBER, 2015

SYMPOSIUM 1: Socio-cultural and Environment Aspects of Obesity

Chairperson : Prof. Dr. Norimah Abdul Karim
Universiti Kebangsaan Malaysia

- 1100 hrs **S1.1 Key socio-cultural drivers of obesity**
Assoc. Prof. Dr. Jane Dixon
The Australian National University, Canberra, Australia
- 1130 hrs **S1.2 Socioeconomic inequalities in overweight/obesity and abdominal obesity among Malaysian adults: The National Health Morbidity Survey (NHMS) II, III and IV**
Ms. Jeevitha Mariapun
Julius Centre University of Malaya, Kuala Lumpur
- 1150 hrs **S1.3 Association between whole-school environment mapping and body mass index of school children in Terengganu**
Dr. Sharifah Wajihah Wafa binti Syed Saadun Tarek Wafa
Universiti Sultan Zainal Abidin, Kuala Terengganu
- 1210 hrs **S1.4 Drinking habits and issue of obesity: A socio-anthropological perspective**
Dr. Elise Mognard
Taylor's University / University Toulouse 2 Jean Jaures, Toulouse, France

1230 hrs **Lunch Break**

Lunch is sponsored by Nestle Products Sdn. Bhd.

1330 hrs **Poster Viewing / Trade Exhibition**

Poster presenters in attendance for discussion

SYMPOSIUM 2 : Obesity Intervention I

Chairperson : Dr. Tahir bin Aris
*Director, Institute of Public Health,
Ministry of Health Malaysia*

Theme: My Body Fit and Fabulous (MyBFF)

MyBFF is an intervention programme on obesity in different settings.

- 1400 hrs **S2.1 MyBFF @Home: Obesity intervention among housewives living in low cost flats in Klang Valley**
Ms. Rashidah Ambak
Institute of Public Health, Kuala Lumpur
- 1430 hrs **S2.2 MyBFF@School: Preliminary findings of a school-based obesity intervention program**
Assoc. Prof. Dr. Abdul Halim Mokhtar
University of Malaya, Kuala Lumpur
- 1500 hrs **S2.3 MyBFF @Work: Workplace intervention study to combat obesity among civil servants in Kota Bharu, Kelantan**
Prof. Dr. Wan Abdul Manan Wan Muda
Universiti Sains Malaysia, Kota Bharu, Kelantan

SYMPOSIUM 3 : Obesity Intervention II

Chairperson : Dr. Zawiah Hashim
Council Member, MASO

- 1530 hrs **S3.1 Calorie-labelling as an anti-obesity measure**
Dr. Charoula Konstantia Nikolaou
Nanyang University and Imperial College, Singapore
- 1600 hrs **S3.2 Healthy Lifestyle Programme for primary prevention of obesity among Malaysian adolescents living in day-school hostel**
Dr. Chin Yit Siew
Universiti Putra Malaysia, Serdang, Selangor
- 1620 hrs **S3.3 Workplace, weight and wellness: Effectiveness of MASO Camp obesity intervention in Kuching, Sarawak**
Mr. Mohd Shah Kamarudin
Department of Health Sarawak, Kuching, Sarawak
- 1640 hrs **S3.4 Process evaluation of the H.E.B.A.T! Program: a randomized control trial intervention to combat childhood obesity in Negeri Sembilan**
Ms. Siti Sabariah Buhari
Universiti Teknologi MARA, Puncak Alam, Selangor
- 1700 hrs **Refreshments / Trade exhibition**

DAY 2 THURSDAY 29 OCTOBER, 2015

0845 hrs

**PLENARY LECTURE II:
Tackling severe and medically complicated
obesity**

Prof. Dr. Mike Lean
*University of Glasgow / Glasgow Royal Infirmary,
United Kingdom*

Chairperson: Emeritus Prof. Dr. Mohd Ismail Noor
Taylor's University, Malaysia

0930hrs

Refreshments / Poster Viewing / Trade exhibition

Poster presenters in attendance for discussion

**SYMPOSIUM 4 : Prevention and Management of
Obesity**

Chairperson : Assoc. Prof. Dr. Nik Shanita Safii
Universiti Kebangsaan Malaysia

1000 hrs

**S4.1 Early pregnancy status and the risk of
developing overweight and obesity among young
males and females**

Assoc. Prof. Dr. Abdullah Al Mamun
University of Queensland, Brisbane, Australia

1030 hrs

**S4.2 Sexually dimorphic responses of infant
growth to maternal antioxidant levels during
pregnancy**

Dr. Loy See Ling
KK Women's and Children's Hospital, Singapore

1050 hrs **S4.3 Management of daily activities with the support to modern communication tool, a new way of preventive medication practice**
Mr. Masashi Okura
Tanita Corporation, Tokyo, Japan

1110hrs **S4.4 Emerging therapies in obesity**
Assoc. Prof. Dr. Rohana Abdul Ghani
Universiti Teknologi MARA, Selangor

SYMPOSIUM 5 : Genes, Obesity and Metabolic Syndrome

Chairperson : Prof. Dr. Poh Bee Koon
Universiti Kebangsaan Malaysia

1130hrs **S5.1 Metabolic syndrome in Orang Asli population – a rising health concern**
Prof. Dr. Zalilah Mohd Shariff
Universiti Putra Malaysia, Serdang, Selangor

1150 hrs **S5.2 Gene polymorphisms and gene-lifestyle interaction on childhood obesity among Malay children in Klang Valley**
Dr. Chong Pei Nee
UCSI University, Cheras, Kuala Lumpur

1210 hrs **S5.3 Serum HMW adiponectin in lean and overweight/ obese adults and its association with metabolic syndrome components**
Ms. Norliyana Aris
Universiti Sains Malaysia, Kota Bharu, Kelantan

1230 hrs **S5.4 Gene polymorphisms, environmental factors
and hormones levels related to obesity in Malay
children**

Dr. Christinal Teh Pey Wen

SEGI University, Kota Damansara, Selangor

1250 hrs **Lunch Break**

1330 hrs **Poster Viewing / Trade Exhibition**

Poster presenters in attendance for discussion

SYMPOSIUM 6: Food, Behaviour and Obesity

Chairperson : Dr. Wan Azdie Mohd Abu Bakar
*International Islamic University
Malaysia*

- 1410 hrs **S6.1 The use of healthier food ingredients for healthier processed foods to combat obesity**
Dr. Neoh Soon Bin
Soon Soon Group, Prai, Pulau Pinang
- 1430 hrs **S6.2 Effect of common vegetables extracts on lipid and glucose in 3T3-L1 adipocytes**
Assoc. Prof. Dr. Muhammad Muzaffar Ali Khan
Khattak
International Islamic University Malaysia, Kuantan, Pahang
- 1450 hrs **S6.3 Fast food intake among adults in Malaysia: Finding from Malaysian Adult Nutrition Survey (MANS 2014)**
Mr. Mohamad Hasnan Ahmad
Institute of Public Health, Kuala Lumpur
- 1510 hrs **S6.4 'I was previously obese; and I think I am still obese' The influence of overweight and obesity history on the current body image among adolescents**
Dr. Wong Jyh Eiin
Universiti Kebangsaan Malaysia, Kuala Lumpur

SYMPOSIUM 7: Free Communications

Chairperson : Ms. Zaiton Daud
Nutrition Division, Ministry of Health

1530 hrs **S7.1 Correlation between brain size and obesity among 6-16 years age school children in Kuala Terengganu, Malaysia**

Prof. Dr. Swamy KB
MAHSA University, Kuala Lumpur

1550 hrs **S7.2 Overweight and obesity among military personnel and its implication on sickness absenteeism**

Mr. Azizan Omar
University Malaya, Kuala Lumpur

1610 hrs **S7.3 Sex-stratified analysis of the association between obesity and cognitive function in adolescents**

Mr. Chong Kar Hau
Universiti Kebangsaan Malaysia, Kuala Lumpur

1630 hrs **S7.4 Obese mothers in Malaysia: difficulties in breastfeeding**

Ms. Syahrul Bariah Abdul Hamid
Universiti Teknologi MARA, Puncak Alam, Selangor

Prize Giving and Closing

1650 hrs **Best Poster Prize**

1700 hrs **Refreshments**

Conference Ends

Biography of Plenary Speaker 1

Prof Dr. J. P. Poulain

*Taylor's University / University Toulouse 2 Jean Jaures, Toulouse,
France*

Prof. Jean Pierre Poulain holds a PhD in Sociology from the University of Paris VII and an accreditation to leads research (HDR) from University of Paris IV-La Sorbonne, France. After studies in Hospitality Management at the Toulouse Hotel School of Toulouse, he follows with a Master in psychology in the University of Toulouse Le Mirail, and a master of sociology in University of Paris VII. Jean Pierre is specialized in sociology and anthropology of food and has a long and established career in both academics and in international cooperation in different part of the world, in the field of food studies. Throughout his career, he has worked in a range of functions as Full Professor, Dean of Department, Research Team leader, and now as Chair Professor of food studies in the Taylor's Toulouse University Center hosted in Taylor's University Lakeside Campus. For the French Ministry of Agriculture or the Ministry of Health, he has participate as member, co-president or president at different experts committee on the subjects of obesity, eating disorder, image of the body. Jean Pierre Poulain has published over 150 articles, books and book chapters, and lead book series on food heritage. He had lead a Dictionary of food cultures, involving more than 160 authors from different countries and wrote a book entitled "Sociologie de l'obésité". He presented numerous keynotes and conference presentations in the fields of food studies, sociology of obesity and Food heritage. He receives the « Grand prize of the National Culinary Academy », for Histoire de la cuisine et des cuisiniers, Lanore 1988 and the "Jean Trémolières Award", for Manger aujourd'hui, Privat, and Sociologies de l'alimentation, PUF (2002) and for his global contribution of research in the field of nutrition the "Grand prix de la Recherche" from the French institute for nutrition, 2002 (First time such an prize has been awarded to a researcher in social and human sciences)

Plenary Lecture 1

From nutritional transition to a socio-anthropological understanding of the obesogenic environment

Prof Dr. J. P. Poulain

*Taylor's University / University Toulouse 2 Jean Jaures, Toulouse,
France*

Obesity is a social problem because it affects people in ways that are socially differentiated. Its prevalence, that is the proportion of individuals in a given population suffering from it, is not the same in different strata of society. It thus becomes another factor for health-related social inequality. Another reason for calling obesity a social problem is that many people affected by it suffer from the way they are regarded and socially condemned. They endure not only the possible physical consequences of their state but also the social consequences: they are unfavourably judged and sometimes victims of discrimination. They feel unloved, and, worse, do not consider themselves worthy of love. One can detect, beneath all this, the influence of current models of bodily aesthetics. Finally, obesity is a social problem because human diet is culturally determined in terms of what is considered edible, how it is prepared and consumed, and the way these prescriptions are implemented in precise social contexts. Since diet is seen to be both a determinant of obesity and a prime factor through which one can act to prevent its onset or limit its development once it is present, knowledge of dietary models and the conditions in which they can be modified is an evident priority; all the more so in that certain dietary practices could be at the origin of certain life-histories of obesity. However, it is widely acknowledged in the scientific community that obesity is a complex problem depending on multiple factors: genetic, physiological, psychological, social, etc. (WHO, 2000). Even in the field of social sciences, it appears likely to involve many channels of determination, which should all be explored before proceeding with the elaboration of public health policies. Sociology can look at obesity in three ways. The first point of view, that could be called the sociology of obesity, is at the service of medical research to identify the social factors involved in the development of this pathology. It thus looks at the social and demographic characteristics of the individuals concerned, their life-styles, their eating habits and their social careers. By so doing it helps to identify groups at risk and reveals the phenomena of stigmatization that

obese individuals are victims of in modern society. The second, sociology about, studies the way social and scientific conceptions of obesity have evolved. Today obesity is viewed as a disease, but this was not always the case. There are cultures in which obesity is desirable, and in which individuals inflict strict discipline upon themselves in order to reach this state. Even in western society, slimness was for a long time associated with illness, melancholia and sterility, while well-fleshed bodies signified health, life and, for women, the promise of fecundity. Why has what was formerly valued to a greater or lesser degree now come to be seen as a problem - a problem both in social and medical terms? This second point of view therefore studies these transformations. How has respect for corpulence been replaced by moral discredit? What are the scientific grounds for the definition of obesity as a disease? How have these new concepts won acceptance at political level? How do the media treat this question? What are the economic, social and scientific issues that lie behind the question of obesity and influence the way it is handled by public policy? The third point of view, that could be called sociology *for*, looks at public policy as it applies to obesity. Faced with the development of obesity in the developed countries, the health authorities have launched programmes of prevention and treatment designed to halt the extension of what the WHO has defined as a pandemic. Levers of action exist both at individual level (promotion of "better" dietary habits and more generally a healthier life-style) and in the economic and social environment (encouraging the food and restaurant industries to improve their offering, mobilization of sectors using the image of the body to reduce pressure caused by the model of corporeal aesthetics, combating stigmatization). Sociology highlights the risks of possible counterproductive consequences of the medicalization of everyday diet and the dramatization of obesity. Finally, after having helped to identify certain levers, it can participate alongside other players in the health sector to plan and evaluate public policy.

Biography of Plenary Speaker 2

Prof. Dr. Mike Lean

University of Glasgow /Glasgow Royal Infirmary, United Kingdom

Mike Lean holds the Glasgow University chair of Human Nutrition, based at Glasgow Royal Infirmary, where he is also a consultant physician with NHS responsibilities for an acute medical ward and emergency receiving duties. His primary training was in Medicine, completing a Cambridge MA degree in History and Philosophy of Science. Medical undergraduate training was at St Bartholomew's Hospital, and postgraduate training mainly in Aberdeen and Cambridge, with specialist training in diabetes, obesity and metabolic diseases. He received research training as Medical Research Council Clinical Scientist for 4 years at the University of Cambridge Dunn Nutrition Laboratories, and on a Leverhulme Scholarship to the University of Colorado in Denver CO, in 2003. He has held Visiting Professorships at the Robert Gordon University, Aberdeen and currently at the University of Otago, New Zealand. Current research includes the largest clinical project ever funded by Diabetes UK, aimed at achieving complete remission from type 2 diabetes, by early intensive weight management intervention. He was for 8 years a non-executive director of the Health Education Board of Scotland, chaired the Food Standards Agency Advisory Committee (London) on Research, and has served on a variety of advisory boards to provide expertise on scientific method for research into nutrition, obesity, and diabetes/metabolic health. In 2014 he was one of only 19 Scottish researchers from all academic fields in the Thomson-Reuters listing of the top 1% of most highly-cited researchers. His research publications currently have H-Index 81.

Outside work, Mike Lean has very active interests in Scottish traditional music, violins and violin-making and in mountaineering.

Plenary Lecture 2

Tackling Severe and Medically Complicated Obesity

Prof. Dr. Mike Lean

University of Glasgow /Glasgow Royal Infirmary, United Kingdom

The obesity epidemic over the last 30-40 years has resulted in large numbers of younger people with *severe and complicated obesity* (BMI >35, or BMI>30 with major secondary medical consequences, of which type 2 diabetes is the most worrying, and most costly). The only sustainable solution lies in primary prevention of excess weight gain in young people, and we now have some evidence for effective low-cost interventions, employing mobile technology and prominent calorie labelling for young people who would like help to avoid excess weight gain. When obesity is severe or complicated by diabetes etc, the conventional treatment target of 5-10kg weight loss is still beneficial but insufficient to restore physical and mental functionality, to correct complications or normalise life expectancy. Based mainly on evidence from type 2 diabetes, the 2010 Scottish SIGN guideline broke new ground, setting a clinical target of *>15kg maintained weight loss*. That can be achieved for about 80% of patients undergoing bariatric surgery, or by about 25-30% of those managed in routine primary care using the much less expensive Counterweight-Plus programme. This involves behavioural change methods, applied in three phases: (1) 'Total Diet Replacement' using 820kcal/day nutrient-replete formula diet (no normal food and drink, while planning for a new eating pattern) for the main weight loss phase, over 12 weeks; (2) stepped Food Reintroduction, meal by meal; (3) a structured behavioural-change support programme for Weight Loss Maintenance over at least 12 months. This non-surgical approach has few risks, and for the same funding it achieves about 4 times as many successful patients maintaining >15kg loss for >12 months. This programme has been adopted by Diabetes UK for the current DiRECT trial, aiming to achieve remissions of type 2 diabetes (return to a non-diabetic state). Not all patients are successful, but optimal modern non-surgical methods should always be offered before resorting to bariatric surgery, and should be employed before and with any anti-obesity or anti-diabetes drug treatment.

Abstracts of Papers

Symposium Day 1

Symposium 1: Socio-cultural and Environment Aspects of Obesity

S1.1 Key socio-cultural drivers of obesity

Jane Dixon

National Centre for Epidemiology and Population Health, Research School of Population Health, ANU College of Medicine, Biology and Environment, The Australian National University, Australia

Obesity, in many countries, has become manifest in a relatively short time period in upper and middle income countries. The contributing determinants of obesity have however taken root more slowly and insidiously over a longer time frame. This presentation focuses on the intersection between the economic and socio-cultural determinants of obesity, and in particular on labour market engagement and the rise in a 'culture of convenience', with a focus on processed food diets and reliance on automobility. A culture of convenience has arisen to meet the needs of urban citizens whose labour force participation has shifted from long hours to very long hours, predictable schedules to flexible and on-demand schedules, from single earner to double earner households, from home to office or factory worksites involving a temporally arduous commute. Put another way: labour force participation in modern market economies has become the dominant life-force, requiring the outsourcing of diets and transportation. However there is a conundrum: although common forms of labour market engagement generate household incomes which can improve health, they also rob those same households of a valuable health protective resource, namely time. Using insights from Australian research, with some application to middle income country cities, the presentation explores how healthy 'ways of living' have become subservient to a particular form of household income generation. It suggests that 'transition science' is useful to explain the economic and socio-cultural interrelationships leading to the rise in obesity and is equally useful for illuminating the challenge in reorienting social systems to prevent further rises in obesity.

S1.2 Socioeconomic inequalities in overweight/obesity and abdominal obesity among Malaysian adults: The National Health Morbidity Survey (NHMS) II, III and IV

Jeevitha Mariapun, Noran Naqiah Mohd Hairi & Ng Chiu Wan

Julius Centre University of Malaya, Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya, Malaysia

This population-based study aimed to explore the trends of the socioeconomic inequalities in overweight/obesity and abdominal obesity (AO) in Malaysian adults aged 30 years and above from Peninsular Malaysia. The socioeconomic trends in overweight/obesity and AO were analysed using the NHMS II, III and IV data sets for the years 1996 (n=15968), 2006 (n=19118) and 2011 (n=10178). The WHO Asian BMI cut-off point of ≥ 23.0 kg/m² was used to define overweight/obesity. AO was defined as having a waist circumference of ≥ 90 cm for males and ≥ 80 cm for females. Household per-capita income was used as a measure of socioeconomic position and for descriptive purposes was categorised into population-weighted quintiles. As a measure of inequality, the concentration index which quantifies the degree of socioeconomic inequality in a health outcome was computed. The findings show that at all three time-points, the distributions of overweight/obesity and AO for men were concentrated among the rich, however showed trends of becoming less pro-rich distributions. For women, overweight/obesity and AO were concentrated among the poor in 2006 and 2011 and showed trends of becoming more pro-poor distributions. With regard to the three major ethnic groups, prevalences of overweight/obesity and AO were consistently the lowest among the Chinese particularly Chinese women from the richest quintile. Both overweight/obesity and AO were always highest among Indians especially Indian women. The distributions of overweight/obesity over the three years for both Indian men and women were equally distributed across the socioeconomic spectrum and showed trends of moving towards pro-poor distributions. Overweight/obesity and AO among Malay men were consistently concentrated among the rich; although more so in 1996 than in 2011. In conclusion, the trends of the distributions in overweight/obesity and AO seem to be gradually shifting towards burdening the poor.

S1.3 Association between Whole-school Environmental Mapping and Body Mass Index of School Children in Terengganu

Wafa SW^{1,2}, Rasyidah G¹ & Aryati A^{1,2}

¹*School of Nutrition and Dietetics, Faculty of Health Sciences, Universiti Sultan Zainal Abidin;*

²*Institute for Community Development and Quality of Life, Universiti Sultan Zainal Abidin*

There is evidence to suggest that the school environment do have prominent contributions to the rising of childhood obesity. The objective of this study was to examine the association between whole-school environmental mapping (physical, economic, political and sociocultural) and body mass index (BMI) of school children in Terengganu using the cross-sectional study design. Sixteen schools were randomly selected (8 urban and 8 rural) in Terengganu and 32 teachers were interviewed face-to-face using a set of validated Malay version “Whole-school Environmental Mapping” questionnaire. A total of 400 school children aged 10 and 11 years old were randomly selected from the selected schools. Children’s weight and height were assessed to calculate BMI (defined using WHO 2007 reference chart). Simple linear regression analysis was use to examine the association between the school environment practice and children’s BMI. The prevalence of underweight, normal, overweight and obese was 4.0%, 46.3%, 23.3% and 26.5%, respectively. The highest median score was for political environmental mapping (63.9%; IQR=43.1) whilst the lowest score was for socio-cultural environment mapping (33.8%; IQR=27.2). There were significant differences between rural and urban schools for physical, economic and political environmental mapping ($p<0.01$). For overall score, rural schools scored significantly higher compared to urban schools (54.9% vs. 45.0%; $p<0.01$). There were negative correlations between physical ($r= -0.19$; $p<0.01$) sociocultural ($r= -0.25$; $p<0.01$) and whole-school environmental mapping ($r= -0.16$; $p= <0.01$) with BMI of school children. The lower score of school environment practice was associated with higher BMI. As a conclusion, this study confirms the evidence that the school environmental factors may contribute to the higher prevalence of childhood obesity. Therefore, an appropriate intervention would be beneficial to improve the school environment to reduce the rate of obesity.

S1.4 Drinking Habits and Issue of Childhood Obesity: A Socio-Anthropological Perspective

Mognard E¹, Tibère L², Laporte C², Naidoo K¹, Wei TT¹, Yu A¹, Chiang D² & Poulain JP^{1,2}

¹School of Hospitality Tourism and Culinary Arts, Taylor's University, Subang Jaya, MALAYSIA;

²ISTHIA, University Toulouse 2 Jean Jaurès, Toulouse, FRANCE

Childhood obesity is a major public health issue. Being overweight or obese in childhood implicates metabolic and physical consequences in a child becoming adult. Due to stigmatisation process and employment-related discrimination, the consequences could also be psychosocial and economic. The rising prevalence of overweight and obesity as well as diabete amongst children has been linked to consumption of sugar-sweetened drinks. In Malaysia, due to the raise of overweight and obesity over the past decade among Malaysian teenagers and children, eating and drinking habits have been explored from the nutrition perspective. As a consequence, in order to prevent overweight and obesity, nutrition education is advocating that sweetened soft drinks intake should be minimize. In doing so, nutritional recommendations are joining the worldwide consensus and battle against sweet drinks. What are the actual drinking practices of Malaysian children and teenagers in Malaysia? Which social representations are associated with drinking practices? How are they involved in the building and the negotiating the identities? Answering these questions raise some methodological issues: as in many cases beverage drinking does not occur during meals and as it could be highly routinized, accurate methods have to be set-up in order to build reliable data. Nutritional surveys have been capturing the food and beverage consumption amongst children. However, these surveys present some limitations in collecting the actual drinking practices. In another side, sociological and anthropological perspectives on drinking have demonstrated the crucial role of drinks in social relationships and building of collective identities but are mainly qualitative, focusing on specific ethnic or social groups. Based on a pilot survey on Malaysian Children Drinking Habits, this communication focuses on these methodological considerations and on common research avenues for nutrition and socio-anthropology of food.

Symposium 2: Obesity Intervention I

Theme: My Body Fit and Fabulous (MyBFF)

MyBFF is an intervention programme on obesity in different settings.

S2.1 MyBFF @Home: Obesity intervention among housewives living in low cost flats in Klang Valley

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Introduction: The National Health and Morbidity Survey (NHMS 2011) findings have shown that female adults (including housewives) are one of the high risk groups that require specific obesity intervention. This presentation describes the development of the My Body is Fit and Fabulous at home (MyBFF@home) study and the intervention among overweight and obese housewives. Methodology: The MyBFF@home involved a mixed quantitative and qualitative methods. Phase I (development of the intervention package) included scoping review, construction and development of initial package, in-depth interviews and review of the intervention package. Phase II (intervention) was a quasi-experimental study which involved pre and post intervention (6 months of weight loss intervention and 6 months of weight sustainability). Housewives aged 18-59 years old were recruited from 14 low cost flats around Klang Valley Results: A total of 332 housewives (intervention group=168, control group=164) were recruited. Control group was involved in six series of women's health seminar, while the intervention group received a weight loss intervention package consisted of individual counselling on diet, physical activity, self-monitoring activities at home and group exercises (brisk walking and pillow dumb bell). Measurements were done on anthropometric, physical activity, biochemical parameters, body fat, dietary intake, body pain, quality of life, symptoms related to weight loss and health literacy at baseline, 6 months and 12 months. Discussion / Conclusion: The weight loss intervention package specific for the housewives was developed. Findings from the Phase I were then used in the intervention (Phase II) which was started in January 2014. It is envisage that the findings of the

MyBFF@home will empower the housewives to reduce their weight and support the future planning of the weight loss programmes in Malaysia.

S2.2 MyBFF@School: Preliminary findings of a school-based obesity intervention program

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The alarming state of the nation's obesity prevalence (leading in Asia), drove the team of researchers from Ministry of Health and the Public Universities and National Sports Institute, with the support of Ministry of Education, GSIAC, MIGHT, and NYAS to combine effort to reduce obesity in Malaysia. Thus, MyBFF@school program is inceptioned. MyBFF stands for My Body is Fit and Fabulous. MyBFF@school is a program that is introduced in school to combat overweight and obesity at school, in both primary and secondary students. MyBFF@school is an intervention program which combines physical activity, nutrition and psychology strategy. In MyBFF@school 2014, we recruited a total of 237 primary school students, aged 9-11 years old. We obtained written consent from the parents/guardians of the subjects. The aim of the study was to study the effects of 16 weeks of MyBFF@school program on the overweight and obese children. The main outcomes looked at were: the changes in BMI, waist circumference, percentage body fat and the muscle mass. We also looked at the prevalence of metabolic syndrome in this population. The selected primary schools were randomly assigned to intervention and control groups. The intervention group underwent a 16 weeks of MyBFF@school program in addition to the standard school curriculum (the physical and health education, and the co-curriculum classes) whereas the control group followed the standard curriculum. The MyBFF@school program was arranged as such that the subjects participated in 3 hours of physical activity (also called the small sided games (SSG) football) and one hour of either nutrition or psychology education (alternate with each other) for every week. Assessments were done at baseline and post 16-weeks. For the metabolic syndrome (based on 89 subjects with blood samples), we found 21% of the subjects age less than 10 years old (N=43) were at risk of metabolic syndrome; whilst 13% of the subjects age 10-11 years old (N=46) had metabolic syndrome. We further compared between the intervention and the control groups (final number was 86 vs 96 subjects- all obese). We found that there was no significant changes in BMI in both groups after 16 weeks. No significant change in the waist circumference of the

intervention group was seen, but there was a significant increment in the control group (by 2.41 cm, $p < 0.05$). There were significant reduction in percentage body fat (1.23%, $p < 0.05$) and increment in the muscle mass (0.79 kg, $p < 0.05$) for the intervention group after 16 weeks, but not in the control group. We concluded that the prevalence of metabolic syndrome and at-risk of metabolic syndrome is quite high in the overweight and obese children. The BMI doesn't change significantly with 16 weeks of MyBFF@school program, although there were significant reduction in percentage body fat and increment in muscle mass. This is likely due to BMI not an accurate measurement for body composition. The changes in percentage body fat and muscle mass carry more weights to prove the benefit of the program. Finally, waist circumference were noted to be maintained MyBFF@school program.

S2.3 Work Place Intervention Study to Combat Obesity among Civil Servants in Kota Bharu, Kelantan

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Obesity is increasing in Malaysia at an alarming rate. In Kelantan and Terengganu the prevalence of obesity were 16.2% and 14.0%, respectively; while the prevalence of overweight were 31.5% and 32.8%, respectively. The objective of this study is to carry out an intervention to combat obesity among government employees in Kota Bharu, Kelantan. Phase 1: A cross sectional study was conducted among government employees age between 18 to 59 years old, in eight federal ministries and 13 state department offices around Kota Bharu. Data for preliminary study was collected for 6 months starting from June 2014. Respondents were then systematically selected after an informed consent is obtained. Phase 2: Respondents who met the inclusion criteria were assigned to three experimental groups (meal replacement, portion size control and

control group) in the intervention phase. The Malay validated The Binge Eating Scale, International Physical Activity Questionnaire (IPAQ), OWQOL/WRSM Questionnaire and Pain Questionnaire were used in this study. The data was analysed by using SPSS version 22. There were 1028 respondents involved in this study. Their mean age was 41 years old. The prevalence of overweight and obesity were 41.1% and 20.9% respectively. Out of 1028 respondents, only 6.9% were binge eaters. This is mainly contributed by female respondents (4.2%). The intervention phase is still ongoing for the 8th week. It is evident that overweight and obesity rate among government employees were high, and, binge eating are more prevalent among female respondents.

Symposium 3: Obesity Intervention II

S3.1 Calorie-Labeling as an anti-obesity measure

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Calorie-labelling has been suggested as an anti-obesity measure, but evidence for its impact is scarce. Two studies were conducted examining the effect of calorie-labelling. *Study 1*: Calorie information for the evening meal components was provided at the point of choice for young adults. The study was conducted over two years; participants were observed without and with calorie-labelling, respectively. Weights were recorded at the start and end of the year for both years. By the end of the year one, mean weight change of participants (n=64) was 3.4 (SD2.6)kg, $p<0.001$ while in the second year that calorie-labelling was present for most of the year, there was no weight change among the residents (n=87), -0.15 (SD0.8)kg, $p=0.535$. Young-adults in year-one were ten times more likely to have gained weight than those in year-two (odds ratio=10.5, 95% CI=3.8-28.7, $P<0.0001$). *Study 2*: Calorie labels were posted beside sandwiches for a two-week period in two retail catering outlets of a university. A third outlet one was used as a control site. Sales data for the month before and during the calorie labelling period were collected for all three sites. Consumers' views on their use of the calorie labels along with their demographic data were sought using a questionnaire. Total sales of all the sandwiches reduced significantly ($p>0.001$) during the labelling period in the intervention sites compared to the control site (-17% vs -2%). Sales of the high-calorie items reduced more compared to the low-calorie items (-30% vs -18%). 1166 students and 646 staff members evaluated the calorie-labelling (97% on-line). More female students of normal Body Mass Index (BMI) (n=384, 61%) used the labels when choosing their meals compared to male students (n=121, 41%). Calorie-labelling is a low-cost, effective intervention, which could be easily implemented if also supplemented by legislation.

S3.2 Program Cara Hidup Sihat for Primary Prevention of Obesity among Malaysian Adolescents Living In Day-School Hostels

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A healthy lifestyle is able to reduce risks of adverse health consequences among adolescents. The “*Program Cara Hidup Sihat*” (Healthy Lifestyle Program) is a three-year intervention program that aims to educate Malaysian adolescents living in day-school hostels on healthy eating and active living for the prevention of obesity. The program involved adolescents from 50 intervention day-schools (n=1885) and 50 control day-schools (n=2392) from six regions of Malaysia. In the intervention schools, the program was implemented by teachers who had attended Training of Trainers (TOT) workshops prior to conducting intervention sessions among the adolescents. The control schools did not receive any intervention sessions during the study period. Data were collected from adolescents at three time points, which were at baseline, post-intervention I, and post-intervention II. After the intervention program, knowledge and practice improved but attitude on healthy lifestyle remained the same in the intervention group and were all higher than in the control group. The intervention group had higher frequency in main meals consumption, and was physically more active compared to the control group. Although body weight status was not significantly different between intervention and control groups, the prevalence rate of obesity in the intervention group decreased, while the prevalence rate of obesity in the control group remained the same after the program. The “*Program Cara Hidup Sihat*” (Healthy Lifestyle Program) was effective in promoting healthy lifestyle among the target group. Therefore, the Ministry of Education Malaysia has approved further plans for implementing this program to all Malaysian schools.

S3.3 Workplace , bodyweight and wellness: MASO camp obesity intervention programme in Kuching Sarawak

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The trends in the prevalence of overweight and obesity among adults in Malaysia has been reported to increase since the first National Health Morbidity Survey (1996). The objective of this study is to evaluate the effectiveness of a workplace obesity intervention programme jointly organized by MASO and the Sarawak State Health Department (SSHD). The SSHD staffs with a BMI of more than 25 were invited to participate. Anthropometric measurements such as weight, height, BMI and percent body fat (%BF) were measured at baseline and consequently every month for 3 months. During the two day camp, participants were taught education modules on healthy eating and dietary modification, physical activity with demonstration as well as behavior modification. After the camp, participants continued with once a week aerobics exercise session, once a month body weight training and encouraged to continue with their customized plan on reducing weight which incorporated dietary and behavior modifications as well as physical activity. At the end of 3 months intervention, out of the 37 participants recruited at baseline, only 20 participants remained. Mean changes of weight, BMI and %BF were - 2.4 kg \pm 0.3 kg, -1.0 \pm 0.4 and -0.2% \pm 0.3% respectively; and were significant ($p < 0.01$). These changes translated to a 3% weight loss, 3% reduction in BMI and 5% BF loss after 3 months. There were significant time effect changes in body weight, BMI and %BF. Post hoc tests using Bonferroni corrections showed that there were significant improvements in body weight, BMI and %BF after one month intervention. However, BMI was the only outcome which remained significant after 3 months. Workplace intervention on combating obesity is effective in managing weight loss. Continuous support from employers/stakeholders are crucial however, sheer determination from participants are just as essential in achieving weight loss in any given intervention programme.

S3.4 Process evaluation of the H.E.B.A.T! Program: A randomized control trial intervention to combat childhood obesity in Negeri Sembilan

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Health promotion programs benefit from an accompanying process evaluation since it can provide insights to the strengths and weaknesses of a program. This paper reports on the process evaluation of a childhood obesity intervention program known as 'The H.E.B.A.T! Program', which aims to improve weight status, eating habits and physical activity of overweight children aged 10-11 years old in Negeri Sembilan. Process evaluation was assessed based on the reach, dose delivered, fidelity, dose received and context of the intervention. A total of 43 children (69.7% boys; 30.3% girls) participated in the H.E.B.A.T! Program. The intervention group underwent a series of two 3-day camps, and had regular school-based fun activities to engage in healthy eating and active lifestyle, and participated in a healthy weight competition. Parents of children in intervention group attended a half-day workshop to enable them to create supportive environments for their children at home. Process evaluation measures were obtained from researcher's observation, participant interviews and records. Results indicated that the reach was high among the children and their parents (>70%). Furthermore, the programme was delivered successfully as planned. Satisfaction score on 'rate of excitement when participating in the program' was 4.52 ± 0.60 (1=most disliked; 5=most liked). The trainers reported that the intervention module was 'user-friendly'. Facilitators and barriers faced by parents in adopting the recommendations were assessed through focus group discussions. A total of 18 parents were involved and they identified numerous barriers to adopting the recommendations, most notably child and family preferences and resistance to change, but also economic barriers. In conclusion, the program successfully reached the targeted population of overweight/obese children. The process evaluation performed during intervention provides information on the quality of program implementation and can guide the revision of intervention material and provide insights for future health promotion programmes and public health policy.

Abstracts of Papers

Symposium Day 2

Symposium 4: Prevention and Management of Obesity

S4.1 Early pregnancy status and the risk of developing overweight and obesity among young males and females

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Background: Many young people terminate their pregnancies and some give live births. Although it is well known that pregnancy recycles weight in the life course, it is unknown whether same age males, who cause pregnancy, and females who experience pregnancy, have differential risk of overweight and obesity. Methods: The study used a sub-sample of 2500 offspring from the original cohort of the Mater University of Queensland Study of Pregnancy (MUSP) and its outcomes. The MUSP is a prospective birth cohort study which commenced in early 1980s in Brisbane, Australia and followed their offspring till young adulthood. Anthropometric data were measured at 5, 14 and 21 years and experience of pregnancy including termination, miscarriage and live births were self-reported at 21 years follow-up. Multivariate analyses were conducted to determine whether pregnancy status of young people independently associated with overweight and obesity status. Results: Twenty percent females experienced at least one pregnancy (10% at least one termination/miscarriage and 10% live births) and 11.3% males caused pregnancy (7.5% termination/miscarriage and only 3.5% live births) by age 21 years. One-third of males or females were overweight or obese by age 21 years. The odds ratio of being overweight and obese were 1.65 (95% CI: 1.04, 2.62) and 2.59 (95% CI: 1.46, 4.59) times, respectively for those females who experienced at least live births compared to females who did not experienced any pregnancy. These associations remained consistent adjusting for a range of potential confounders. Pregnancy termination or miscarriage was not associated with overweight and obesity status for females. There was no association between any pregnancy status of males and their overweight and obesity status. Conclusions: Findings of this study suggest that

pregnancy termination or miscarriage was not associated with the risk of being overweight and obesity for females and males but experience of live births among females but not males independently increased the risk of being overweight and obesity by young adulthood. Experience of pregnancy among young females and males have differential impact on the development of their overweight and obesity status. Findings have implications for prevention of overweight and obesity among females and males.

S4.2 Sexually dimorphic responses of infant growth to maternal antioxidant levels during pregnancy

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Oxidative stress has been suggested as the biological plausible mechanism of obesity development. However, the gender-specific effects of prenatal antioxidant levels on infant growth are unclear. This study aimed to examine the longitudinal growth of infants during the first 24 months of life in relation to antenatal antioxidant levels according to gender. A total of 108 pairs mother-offspring were drawn from Unievrstiti Sains Malaysia Pregnancy Cohort Study. Maternal glutathione peroxidase and catalase levels were assessed at 18 and 34 weeks' gestation. Infant weight and length were measured and converted to the WHO standards for weight-for-age Z-scores (WAZ), length-for-age Z-scores (LAZ) and weight-for-length Z-scores (WLZ). Differences in WAZ, LAZ and WLZ at 0-6, 6-12 and 12-24 months were calculated. Multiple linear regression analysis was used to examine the association between antioxidant levels and infant growth. Overall, boys and girls showed similar growth magnitude from 0-6, 6-12 and 12-24 months of life. Higher maternal catalase levels at 18 weeks' gestation were associated with slower WAZ ($\beta = -0.81$, CI= -1.41, -0.22) and WLZ gains ($\beta = -0.73$, CI= -1.45, -0.02) from 12-24 months in girls, but not in boys. In contrast, higher maternal catalase levels at 34 weeks' gestation were associated with slower LAZ ($\beta = -1.16$, CI= -2.15, -0.18) and WLZ gains ($\beta = -1.68$, CI= -3.10, -0.26) from 6-12 months in boys, but not in girls. Maternal glutathione peroxidase levels during pregnancy did not show any significant association with infant growth during the first 24 months of life. Longitudinal infant growth responses to maternal antioxidant levels

during pregnancy differ among boys and girls. Catalase is suggested as a potential biomarker in influencing growth and obesity development in infants at different age intervals. These findings are important to provide evidence on planning and implementing effective preventive strategy which is gender specific in combating childhood obesity epidemic.

S4.3 Management of daily activities with the support to modern communication tool, a new way of Preventive Medication Practice

Masashi Okura

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The concept of implementing health monitoring cloud system (with body composition analyzer, activity monitor and blood pressure monitor), namely some vivid installations of kiosk corner has been introduced in community in Japan and Korea. The aim of this is to promote social awareness of general health and to create awareness of the health issues related to obesity within local communities, by illustrating the concept and how equipment and connectivity product could help us to monitor our health condition on a daily basis. It is a strong preventive tool that will alert and allow individual and the community to be aware and to monitor their health situation namely high threshold of body fat (%) and high blood pressure. The intervention from the medical clinic or health center will provide assistance (via cloud data) and consultation.

S4.4 Emerging therapies in obesity

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Obesity and overweight are health issues, which are affecting almost every region in the world. In recent years, Malaysia has emerged as the nation with highest waistline within the South East Asia region, attributed to changes in lifestyle, consumption of food with high energy content and an increasingly sedentary lifestyle. The main goal in obesity treatment is to achieve a clinically significant weight loss of between 5-10% of body weight and sustaining it. Effective weight losing therapy is complex, involving multidisciplinary and multifaceted stages. All successful weight-loss programs require significant changes in eating habits and increased physical activity. Pharmacotherapies in obesity management are limited

and inconsistent. Older agents like orlistat and duromine, accompanied by comprehensive dietary and lifestyle interventions could induce between 5–10% weight loss but limited by side effects. Newer agents like Lorcaserin (Belviq) has demonstrated modest efficacy but more favorable side-effect profile than previous 5HT receptor-agonist targets. Anti-diabetic agent Glucagon-like peptide-1 (GLP-1) analogue has been recently approved as a weight reducing agent, which works as an appetite suppression and delays gastric emptying. A 12-week study performed at a local institution showed a statistically significant reduction in body weight following treatment with liraglutide, $z = 3.529$, $p < 0.001$, with a large effect size ($r = 0.54$). The median weight decreased from 91.1kg to 87.7kg. This was associated with added benefits of significant reductions in blood pressure. Other potential mono- [Cetilistat, Tesofensine, Velneperit] and combination [(phentermine-topiramate (Qsymia) and Contrave (bupropion and naltrexone)] are options which are yet to be explored within our region. Bariatric surgery including gastric bypass, sleeve gastrectomy and laparoscopic adjustable gastric banding (LAGB) has shown good clinical outcome both in treatment and prevention of Type 2 diabetes mellitus.

Symposium 5: Genes, Obesity and Metabolic Syndrome

S5.1 Metabolic Syndrome in Orang Asli Population – A Rising Health Concern

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Introduction: While child undernutrition is still prevalent, adult obesity is on the rise in Orang Asli population. This study assessed the prevalence of metabolic syndrome (Mets) and its components among the Orang Asli adults. Methods: This was a cross-sectional study of Orang Asli adults (≥ 18 years) from 9 villages in Krau Wildlife Reserve, Pahang. All eligible subjects were measured for weight, height, waist and hip circumferences and blood pressure. Fasting venous blood samples were collected for glucose, lipids and vitamin D analyses. Mets was defined based on the Harmonized criteria. Demographic and socioeconomic factors, acculturation and food environment were examined as possible correlates. Results: A total of 555 Orang Asli adults (29.5% men, 70.5% women) participated in this study. Overweight and obesity were more prevalent in women than men based on body mass index, waist-to-hip ratio and waist-to-height ratio. Prevalence of Mets was 22.2% and higher in women (23%) than men (20.1%). About 52.4% of the adults had high blood pressure (BP) and those with elevated glucose, triglycerides (TG), abdominal obesity and reduced high density lipoprotein cholesterol (HDL-C) were 9.9%, 36.9%, 30.1% and 29.4%, respectively. While a significant higher proportion of women than men had abdominal obesity and reduced HDL-C ($p < 0.001$), the proportion of men with elevated TG and BP was significantly higher than women ($p < 0.01$). Almost all adults (98.6%) have sufficient vitamin D level (≥ 50 nmol/L). The presentation will discuss aspects of nutrition transition that could explain metabolic risks in the Orang Asli population, drawing upon the experiences of other indigenous communities worldwide. Conclusion: Metabolic risks are evident in this Orang Asli population undergoing nutrition transition. Understanding related factors is important for formulating effective preventive strategies.

S5.2 Gene Polymorphisms and Gene-Lifestyle Interaction on Childhood Obesity among Malay Children in Klang Valley

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This study aimed to investigate the association between gene polymorphisms with obesity and gene-lifestyle interactions among Malay children. A total of 557 overweight and obese (OW/OB) and 538 non-OW/OB children aged 7-12 years were recruited. Body mass index (BMI) categories were based on the World Health Organization 2007 growth reference. Body composition was measured using bioelectrical impedance technique. Physical activity was objectively measured by pedometer for seven days. Sleep duration was self-reported through questionnaire. Blood samples were collected and DNA was genotyped using a semi-automated Sequenom iPLEX® Gold assay and further verified by Sanger Sequencing. Mean BMI of non-OW/OB and OW/OB subjects were 16.0 ± 2.3 kg/m² and 24.6 ± 4.3 kg/m², respectively. OW/OB had lower mean pedometer step counts (OW/OB 6703 ± 3512 steps/day; non-OW/OB 7959 ± 4164 steps/day, $p < 0.001$) and sleep duration (OW/OB 7.00 ± 2.30 hours; non-OW/OB 7.19 ± 2.21 hours, $p < 0.05$). Genotyping revealed that Single Nucleotide Polymorphism (SNPs) of fas apoptotic inhibitory molecule 2 gene (FAIM2) rs7138803 and melanocortin-4 receptor genes (MC4R) rs17782313, fat mass- and obesity-associated gene (FTO) rs9939609 were significantly associated with increased susceptibility to obesity with odds ratio (OR) ranging from 1.49 to 2.82 ($p < 0.05$) after adjusting for age and sex. Brain-derived neurotrophic factor (BDNF) rs4074134, however, was associated with decreased obesity risk (OR: 0.776; 95%CI: 0.601, 1.002). Significant interactions between genotype with lifestyle for FTO and FAIM2 SNPs were found, but not for MC4R. Children who achieved recommended pedometer step counts and those who slept more than eight hours had diminished association between genotype and BMI for FTO and FAIM2. In conclusion, SNPs at FAIM2, FTO and MC4R were associated with increased obesity risk in Malay children; however, BDNF may have protective effect against obesity. The effect of the FTO and FAIM2, but

not MC4R, polymorphisms on obesity in the Malay childhood population can be modified by lifestyle factors.

S5.3 Serum HMW Adiponectin in Lean and Overweight/Obese Adults and its Association with Metabolic Syndrome Components

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The metabolic consequences of obesity are associated with an imbalance of adipocytokines such as adiponectin. There are limited numbers of study regarding the association between adiposity and serum levels of high molecular weight adiponectin (HMW Adiponectin) in relation to the metabolic syndrome components among Malay adults. The study aimed to compare the levels of HMW adiponectin in lean and overweight/obese subjects and to determine the relationship between serum HMW adiponectin levels and metabolic syndrome risk factors. A total of 192 participants (94 men and 98 women) whose working in Kelantan, aged 20 – 60 years were underwent cross-sectional metabolic characterization as well as measurement of serum level of HMW adiponectin which was analysed using an enzyme-linked immunosorbent assay (ELISA). The results showed that 43.8% of study participant were lean (BMI 18.50 – 24.99 kg/m²) while 56.3% were overweight/obese (BMI ≥ 25.00 kg/m²). Lean participants showed significantly ($p=0.001$) higher median serum HMW adiponectin [2.23 (1.35-3.46) ug/mL] than overweight/obese [1.66 (1.04-2.29) ug/mL]. In addition, men had significantly lower HMW adiponectin compared to women ($z=-5.73$, $p<0.001$). In simple linear regression, serum HMW adiponectin was positively associated with high-density lipoprotein (HDL) cholesterol ($\beta=1.97$, $p<0.001$) but inversely associated with other metabolic syndrome components including waist circumference ($\beta=-0.05$, $p<0.001$), triglycerides ($\beta=-0.57$, $p<0.001$), glucose ($\beta=-0.13$, $p<0.001$), systolic ($\beta=-0.01$, $p=0.011$) and diastolic ($\beta=-0.02$, $p=0.009$) blood pressure. In addition, those who were overweight/obese had significantly lower HMW adiponectin by 0.73 ug/mL than those who were lean ($p<0.001$). Using multivariate linear regression, waist circumference ($\beta=-0.03$, $p<0.001$), triglycerides ($\beta=-0.25$, $p=0.025$) and HDL cholesterol ($\beta=0.90$, $p=0.007$) were significantly related to the HMW adiponectin levels after adjustment for other variables. In conclusion, HMW adiponectin was significantly lower in overweight/obese Malay adults

and 34.5% of the variation in HMW adiponectin is explained by age, sex, waist circumference, triglycerides and HDL cholesterol.

S5.4 Gene Polymorphisms, Environmental Factors and Hormone Levels Related to Obesity in Malay Children

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Prevalence of obesity is rapidly increasing in Malaysia and its development may be due to genetics, environment factors, and hormones. Studies on their influences on development of childhood obesity are lacking. Hence, investigation on the associations of gene polymorphisms, environmental factors, hormone levels and their interactions on obesity risk in children is warranted. A total of 1095 Malay children were recruited from primary schools in Klang Valley, and were categorized into overweight or obese (OW/OB) and non-OW/OB groups based on WHO 2007 growth reference. Analysis showed OW/OB have higher levels of phenotypes related to obesity and metabolic syndrome, lower physical activity (PA), shorter self-reported sleep duration (SD), and higher food intake than their non-OW/OB counterparts. Eating habits but not sleeping habits of OW/OB were significantly different from non-OW/OB. Sequenom Mass ARRAY iPLEX® Gold assay was used for DNA genotyping. Minor homozygotes of *MC4R* rs12970134, *MC4R* rs17782313 and *INS* rs689 were associated with increased (OR=1.578-2.873, $p<0.05$), while *ADIPOQ* rs12495941 was associated with decreased (OR=0.647, 95%CI=0.451-0.927) obesity risk. Interactions that influence obesity risk were found between *MC4R* rs12970134 and *INS* rs689 with PA, *MC4R* rs17782313 with SD, and *ADIPOQ* rs12495941 with both PA and SD. Hormone levels of randomly selected 116 serum samples were analysed by enzyme-linked immunosorbent assay. OW/OB have higher levels of leptin, lower levels of adiponectin, ghrelin and neuropeptide Y (NPY) ($p<0.05$) but no difference in agouti-related protein (AgRP) and alpha-melanocyte stimulating hormone (α -MSH) compared to non-OW/OB. In conclusion, polymorphisms of *MC4R*, *ADIPOQ* and *INS* gene and their

interactions with PA and SD were associated with obesity risk in Malay children. Regulations in hormone levels also contributed to obesity development.

Symposium 6: Food, Behaviour and Obesity

S6.1 The use of healthier food ingredients for healthier processed foods to combat obesity

Neoh Soon Bin

Soon Soon Group, Prai, Pulau Pinang

Non-communicable diseases (NCDs) are the biggest cause of deaths worldwide, accounting for 63% of annual global deaths with more than 36 million people dying annually from it. More than 50% of these deaths are related to diet and obesity. Malaysia has the highest rate of obesity in Asia. It is crucial for us to revisit the fundamentals of food composition to reformulate our traditional foods which can be very unhealthy. Drastic measures to change our eating habits besides adopting a healthier lifestyle are crucial to combat obesity. This transformation needs to be a holistic approach incorporating food ingredients which are high in dietary fibre and protein content with less fat and with a balanced fatty acid profile to produce food that is low in caloric value and glycaemic index. This process involves the whole food value chain from ingredient suppliers to food manufacturers and finally food service and restaurants. Examples of healthier ingredients include high fibre wheat flour, legume proteins and fibre, low fat margarines with a balanced fatty acid profile, high fibre grains such as oats and barley.

S6.2 Effect of common vegetables extracts on lipid and glucose in 3T3-L1 adipocytes

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Obesity is the major health problem both in developing and developed countries and Malaysia is no exception. Due to obesity, various adverse health conditions such as diabetes mellitus (DM), metabolic syndrome (MS) and cardiovascular diseases (CVDs) are frequently inborn. The prevalence's of the listed diseases are increasing at alarmingly higher

rates in the world including Malaysia. The treatment cost is increasing exponentially therefore; prevention would be the better option to fight against these diseases. Three common vegetables namely *Momordica Charantia* (also known as Bitter gourd, Karela or Peria Katak), *Lagenaria Siceraria* (known as Bottle Gourd, Calabash) and *Trichosanthes Cucumerina* (known as Snake gourd or Labu Ular) of the Cucurbitaceae family were investigated for their water and ethanolic extracts (*extracted from whole vegetable, peels and seeds*) effect on 3T3-L1 adipocytes were assessed on cell differentiation, adipogenesis, adipolysis (using appropriate kits) and on glucose uptakes (assessed by radioisotopes). The cells tolerated a concentration up to 0.063 mg/ml of extracts. The cell upon treatment demonstrated reduced lipid accumulation in the cells. The water and ethanol extracts showed reduction in lipid accumulation which is evident from reduced adipogenesis in the treated cells. *Bitter gourd* and Snake gourd seeds and Bottle Gourd peels & seeds of the ethanolic extract showed highest inhibition/reduction of adipogenesis. Lipolysis was enhanced when the adipocytes were treated with ethanolic extracts of the whole and peel from the three sources of vegetables. Furthermore, there was improved glucose uptake in the extract treated cells. The results of this study suggest that these vegetable can be useful for the prevention of obesity and also may provide better regulation over glucose metabolism.

S6.3 Consumption of Fast Food of Malaysian Adults: Findings from Malaysian Adults Nutrition Survey (MANS, 2014)

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Fast food restaurants seem to be ubiquitous in Malaysia, in which numerous studies have documented adverse effects of high frequent of fast food intakes on health outcomes, including excess weight gain. The objective of the study was to determine the prevalence of fast food intakes among Malaysian adults. A total of 3,000 adults aged 18 and 59 year old were included from the nationwide population-based study of Malaysian Adult Nutrition Survey (MANS) 2014. Consumption patterns of fast food was assessed using semi-quantitative food frequency questionnaire (FFQ), comprising 16 types of common fast foods available in Malaysia. About 99.7% Malaysian adult consumed fast food at least once in a month. Among them, 16.6% and 81.3% of adults,

respectively, were reported to consume fast food on weekly and monthly basis, whereas only 1.8% of them reported to take fast food daily. The 5 common types of fast foods were fried chicken (50.7%), followed by french-fries (36.6%), burger (36.0%), coleslaw (32.7%) and mashed potato (31.2%). In terms of associations in relation to fast food consumption, it showed that adults from urban areas (69.5%) had higher intakes of fast food compared to those from rural areas (30.5%) and younger adults aged 18-39 years (58.0%) had higher than that of older counterparts. Almost similar proportion was found between genders. The prevalence of fast food intakes among Malaysian adults is becoming one of the major health and nutritional concerns, with the proportion of adults reported to take fast food at least weekly basis is high. This extensive consumption of fast food is distressing due to its high content of fat and calorie, which may lead to obesity and subsequently obesity-related chronic diseases. Promotion of healthier food choices must be strengthened as well as tightening government regulations on the marketing of fast food in this country.

S6.4 'I was previously obese; and I think I am still obese' The influence of overweight and obesity history on the current body image among adolescents

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This retrospective cohort study aims to examine the effect of overweight and obesity history on the current body image of 16-year-old adolescents. A total of 193 Form Four students (86 boys, 107 girls) aged 15.6 ± 0.26 years was included in this study. Each participant underwent body weight and height measurements, and completed a questionnaire to rate their self-perceptions of body weight and body image. Annual weight and height records from Standard One (age 7) to Form Three (age 15) were retrieved to determine the prevalence of overweight and obesity history. Based on the current BMI-for-age, most of the participants (68%) were of normal weight, including those who were previously overweight or obese ($n=33$, 17%). Overweight participants scored highest in their perceptions of body weight (4.0 ± 0.5 , $p < 0.05$) and body image (6.8 ± 0.9 , $p < 0.05$) compared to the normal weight and underweight participants. Formerly overweight participants had a larger body image perception (5.2 ± 1.1 , $p < 0.05$) than their normal-weight counterparts. A multiple regression model was used to estimate the

association of body weight and body image perceptions with years of being overweight or obese, with adjustment for sex and current weight status. For every one year increase in being overweight or obese, there was an increase in the perceptions of body weight by 0.04 (95%CI 0.01, 0.07) and body image by 0.20 (95%CI 0.14, 0.26). Among the normal weight participants, body weight perceptions were most accurate among those who were consistently normal weight (64%), followed by those with a history of underweight (58%), and overweight or obesity (46%). It is concluded that overweight and obesity history affects the current body image among adolescents. Normal weight adolescents who were previously overweight or obese had inflated body image, and were least accurate in their body weight perception.

Symposium 7: Free Communications

S7.1 Correlation between Brain size and Obesity Among 6-16 years age school children in Kuala Terengganu, Malaysia

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Introduction: Obesity is defined as having a body mass index (BMI) of 30 or higher. Childhood obesity is acknowledged as one of the most serious public health challenges of the 21st century. Malaysia has earned the inglorious title of the region's fattest nation, and the sixth most obese country in Asia. In recent years obesity has been attributed to significant brain atrophy and cognitive impairment. Objectives: To identify the effect of obesity on brain size among school children in Kuala Terengganu, Malaysia. Methodology: Weights and heights of the subjects were measured using the SECA Digital Weighing Scale and SECA 217 Stadiometer to the nearest 0.1 kg. and 0.1 cm. respectively. Cephalometry was performed for each subject in sitting and head in the anatomical position to evaluate the brain size. Analysis was performed using the statistical package for social sciences (SPSS) version 20.00 (IBM Inc, Chicago, IL, USA). Continuous variables were assessed for normality using the Kolmogorov-Smirnov test. Mean and standard deviation (SD) were used for the data since the data were normally distributed in this study. Results and Discussion: A total of 419 subjects (203 males and 216 females) participated in this study. The mean and SD for age was 12.51 ± 2.82 years. Body weight, height, BMI (Body mass index), waist and hip circumferences and percentage of body fat were measured. According to BMI for age percentiles, 65.6% (n=274) were having normal (healthy) weight where as 9.8% had overweight (n=41), 6.9% subjects fell into obese group (n=29), 14.6% were underweight (n=61) and 3.1% were found severely obese (n=13). For percentage of body fat, 29.6% are at average level (n=124), compared with 16.9% were in fitness, 17.9% were obese, 12.6% athletes and 2.6% had essential fat. Conclusion: BMI and age are correlated with decreased total brain volume. A 2.4% decrease in brain parenchymal volume is observed in obese individuals when compared to normal individuals (Ward et al.2014).

S7.2 Overweight and obesity among military personnel and its implication on sickness absenteeism

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Tight health screening and physically demanding training at entry point has produced recruits best fit for military requirements. Unfortunately, some has put on weight to the point where they can no longer perform their duties. This study aimed to determine factors associated with overweight and obese among military personnel its implication on sickness absenteeism. This is a retrospective cohort study from year 1990 to 2015. A total of 4580 service and medical records of 2290 army personnel from 3rd Division (Melaka and Negeri Sembilan) were reviewed. Variables extracted including demographic data (age, gender, race, marital status, and educational status), occupational data (rank and duration of service) and data from their medical records (BMI, sick report, sick leaves and sick excuses). A total of 44.3% of personnel had ever been overweight ($\text{BMI} \geq 25 \text{ kg/m}^2$) in their career, and from those 16.3% proceeded to become obese ($\text{BMI} \geq 30 \text{ kg/m}^2$). Mean (sd) duration of service to become overweight and obese were 6.80 (4.77) and 9.77 (5.05) years respectively. Age was significantly associated with both overweight and obesity while Malays and married personnel were significantly associated with overweight. About half of the overweight and obese personnel are from the age group of 30-40 years old. Personnel who never been overweight in their career had a lower number of sick reports, sick leaves and sick excuses. Obese personnel had higher number of sick reports and sick excuses compare to normal and overweight personnel. There was no significant difference in sick leaves between overweight and obese personnel. A number of army personnel become overweight and obese early in their career and subsequently lead to higher rate of sickness absenteeism. More targeted approach is required to prevent these personnel in their productive years from becoming liability to the organization.

S7.3 Sex-stratified analysis of the association between obesity and cognitive function in adolescents

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The present study was undertaken to ascertain whether obesity are associated with lower cognitive function in adolescents. A total of 295 Malay adolescents aged 10 to 14 years were recruited from primary and secondary schools in Kuala Lumpur using multistage sampling method. Anthropometric measurements included weight, height and waist circumference; body mass index (BMI) and waist-height ratio (WHtR) were calculated and used as surrogate indices of adiposity. Four subtests of the Wechsler Intelligence Scale for Children-IV^{UK} were selected to evaluate visuospatial ability, memory, processing speed and reasoning ability. For the current analysis, only 242 subjects (126 boys; 116 girls) with BMI-for-age Z-score ≥ -2 SD (based on WHO Growth Reference 2007) and who had complete data for all variables of interest were included. In the present sample, 31.8% of subjects were overweight or obese (boys: 34.9%; girls: 28.4%); and 22.3% (boys: 24.6%; girls: 19.8%) were found to be abdominally obese based on WHtR (≥ 0.50). For cognitive function, sex differences were observed in memory ($p < 0.05$) and processing speed ($p < 0.001$), but not for visuospatial ability ($p = 0.07$) and matrix reasoning ($p = 0.50$) domains. Among boys, there were no significant differences in cognitive profiles between normal-weight and overweight/obese groups ($p = 0.51-0.99$); and between abdominal obesity groups ($p = 0.24-0.65$). However, girls who were overweight/obese and abdominally obese were found to perform significantly poorer than their counterparts by 0.56 unit (S.E.=0.21) ($p < 0.01$) and 0.54 unit (S.E.=0.24) ($p < 0.05$), respectively, on the test of processing speed domain, after adjusting for potential confounders. These findings suggest that the association between obesity and cognitive function in adolescents may vary by sex, with females appearing to be more susceptible than males to the adverse

effects of obesity on cognition. Further research is warranted to better understand the mechanisms underlying these results.

S7.4 Obese mothers in Malaysia: difficulties in breastfeeding

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The number of obese mothers is increasing throughout Asia. Breastfeeding provides the ideal nutrition for infants, by promoting a higher IQ and protecting against childhood and adult diseases. A prospective cohort study was undertaken of mothers attending eight antenatal clinics run by the Ministry of Health in Selangor, Malaysia to document the prevalence of obesity and its association with breastfeeding outcomes. Mothers were recruited during the antenatal period and followed up until 6 months postpartum to document breastfeeding outcomes. A total of 652 Malay mothers were recruited for the study a response rate of 93.1 %. The pre-pregnancy BMI of the mothers indicated that 36.5% of the mothers were overweight or obese. There were a total of 78 obese mothers in the sample and 41 (52.6%) of these mothers were able to initiate breastfeeding within one hour of birth compared to 238/337 (70.6 %, χ^2 9.35, $p < 0.001$) of those with a normal BMI. At 6 months, 23.1 % of obese mothers were exclusively breastfeeding their infants, compared to 56.0 % of the normal BMI mothers. Conversely, the rate of infant formula feeding was higher in the obese mothers by 53.8 % compared to 19.0 % among normal weight mothers, χ^2 37.6, $p < 0.001$). After logistic regression analysis, the following factors were found to be positively associated with discontinued exclusive breastfeeding at 6 months among obese mothers were who perceived their biological mothers had preference towards formula feeding or were ambivalent about the feeding method, whose their biological mothers did not have experience in breastfeeding for more than 1 month, delayed breastfeeding initiation, had health problems during pregnancy, caesarean delivery, insufficient colostrum/milk

and babies had sucking problems at or before 4 weeks. Obesity rates are higher in children who are given infant formula or are breastfed for shorter periods. These results may help to explain the higher rates of obesity in the children of obese mothers. Furthermore, overweight and obese women were less likely to initiate breastfeeding, they also tend to breastfeed in shorter period and have less adequate milk supply. Hence, the promotion of breastfeeding is an important public health strategy to reduce the increasing rates of obesity.

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Abstracts for Poster Session

P01 Lifestyle, obesity and wellbeing

Adriana Ortega¹, Haslinda Abdullah² & Steven Krauss¹ (Abd. Lateef)

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Malaysia has been described as the fattest nation in South East Asia! However, there is limited research data on current BMI cut points, obesity risk related health problems and factors associated to the increased obesity risks for young Malaysians 16 to 35 years old. Nonetheless, high prevalence of obesity among young people can have detrimental effects on individual health and wellbeing and serious repercussions in terms of economic and social costs for society. This paper presents preliminary findings from a project on lifestyle, obesity and wellbeing among young people in Malaysia. Data were collected during January-July 2015. The sample consisted of Malaysian secondary and university students and young workers (16 to 35 years old). The overall results indicate that 20.6% of the participants were pre-obese, 27.6% were obese class I and 29.8% obese class III. The results also showed that male respondents exhibited higher BMI; spent more hours in physical activities and exercising, and engaged more in mood related eating behaviour than their female counter parts. Female participants were more weight conscious, relied more on their friends to avoid gaining weight and were more influenced by their friends eating attitudes and behaviour than the male participants. Furthermore, young people working exhibited higher BMI, reported less hours spent in physical activities and exercise during the week and weekends when compared with secondary and university school. Young worker also reported to be more weight conscious and influenced by their friends eating attitudes and behaviour more often than secondary school and university student. Secondary school student reported less frequently to eat their meals and/or snack while watching TV than did university student and young workers. These results suggest that the programs and policies designed to address increased risk of obesity among young people should be tailored to the appropriate gender and the current status of young Malaysians (i.e. secondary school, university students or young workers).

P02 Relationship of PROP (6-N-Propylthiouracil) Taster Status with Sweet and Fatty Taste Acceptance Among Young Adult Subjects

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Abundance of palatable food these days have driven to overconsumption around the globe. The genetic ability to taste the bitter compound 6-N-propylthiouracil (PROP) has been accepted as universal marker for food acceptance and preference among individuals. Individuals who are sensitive to the bitter compounds 6-n-propylthiouracil (PROP) are more sensitive and dislike to some bitter, sweet and fatty substances. This study aimed to compare the sweet and fatty acceptance among PROP taster groups in food model, namely corn soup. A total of 50 subjects aged 20-25 were classified as PROP nontasters, medium tasters, or supertasters by comparing their psychophysical function for PROP to that of NaCl. The subjects were composed of 50% supertasters, 28% medium tasters and 22% nontasters. Fattiness rating were significantly different among the 3 taster groups but not for sweetness and overall liking rating. However, intensity rating (fattiness and sweetness) was highest among the supertaster groups. Non taster and medium taster preferred higher fat content compared to supertaster in this food model. On the other hand, women have lower liking rating on higher fat content samples. These results suggest that PROP taster status could play a vital role in food intake and preference among individuals. Future studies examining the relationship among taste sensitivity, food consumption and weight gain seem warranted in order to combat the increasing obesity epidemic.

P03 Preliminary characterisation of cardiac metabolic phenotype in a new rat model of type 2 diabetes using high fat, hydrogenated coconut oil diet in combination with low dose streptozotocin.

Amira Hajirah Abd Jamil, Ahmad Zubair Samsul Bahari, Siti Wan Safiga Wan A'laudeen Muhammad Fauzul Kabir Kasim & Abdul Razak Kasmuri

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Background: Obesity increases the risk of cardiovascular complications in patients with type 2 diabetes (T2DM), with growing evidence linking abnormal myocardial fatty acid metabolism to the ensuing diabetic cardiomyopathy. Consequently, in the recent years, physiologically relevant animal models of T2DM induced by high fat feeding/low dose streptozotocin (STZ) are gaining popularity for investigating disease mechanism and pharmacological therapies. To establish a model with cardiac metabolic dysfunction associated with obesity relevant to the Malaysian population, this study is aimed to preliminarily characterise cardiac metabolism in a new rodent model of type 2 diabetes using a high saturated fat diet sourced from hydrogenated coconut oil, in combination with low dose STZ. Methods and Results: Male Sprague-Dawley rats were fed a high saturated fat (HF) diet (comprised of 60% hydrogenated coconut oil) for four weeks, with single IP injection of low dose STZ after 21 days at 0, 25 and 35mg/kg body weight (n= 6 each group). After four weeks of their designated diet and STZ doses, rats were terminally anaesthetised, hearts were rapidly excised and freeze clamped for subsequent analysis for cardiac metabolic proteins via western blotting. Compared with chow-fed or HF diet-fed control rats, a HF diet in combination with 25 and 35mg/kg STZ caused a significant increase in body weight, and was associated with increased adiposity. There was a dose-dependent increase in both fasting and random blood glucose and plasma lipids (triglyceride and cholesterol levels) with increasing concentrations of STZ. Cardiac glucose transporter 4 protein levels (GLUT 4) were decreased, whereas fatty acid metabolism regulated proteins including medium-chain acyl dehydrogenase (MCAD) and uncoupling protein 3 (UCP3) were increased with increasing doses of STZ. Conclusion: High saturated fat diet sourced from hydrogenated coconut oil (staple Malaysian diet) in combination with low doses of STZ induced cardiac metabolic changes that mirror the increase in fat metabolism and a decrease glucose metabolism typically observed in type 2 diabetic patients. The observed changes appear to dependent on STZ dose, demonstrating that the severity of diabetes can be modified according to the requirements of the study. It is hoped that this method

of inducing T2DM would be used to model cardiac abnormalities associated with obesity and T2DM in larger scale studies, with possible pharmaceutical interventions targeting the metabolic pathway to combat the debilitating effect of cardiovascular complications among diabetic Malaysians.

P04 Association of physical activity and sedentary behaviours with obesity: A prospective observational study among school children in Kuala Lumpur

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The present study aimed to investigate changes in physical activity (PA), sedentary behaviour and nutritional status during growth of Malay children in Kuala Lumpur. A total of 267 participants (118 boys, 149 girls) aged between 9-14 years participated in the study. Anthropometric measurements included weight, height and waist circumference (WC). Participants were categorized based on WHO 2007 BMI-for-age growth reference. PA was assessed by self-reported physical activity questionnaire (PAQ) and using pedometers for seven days. Sedentary behaviour was assessed with a self-administered questionnaire adapted from the Child and Adolescent Physical Activity and Nutrition Survey. All measurements were repeated after an interval of nine months. Mean age, weight, height, body mass index (BMI) and WC at baseline were 12.2±1.7 years, 43.8±15.3 kg, 147.1±11.3 cm, 19.8±5.2 kg/m², and 64.4±12.3 cm, respectively. All anthropometric variables increased at follow-up ($p<0.05$). At baseline, mean PAQ score was 2.42±0.56 and mean pedometer step count 9361±3352 per day; with 73% not meeting Tudor-Locke et al. (2009) pedometer step-count recommendation. PA variables did not change at follow-up. Screen time was higher at follow-up (1.5±0.9 hours) compared to baseline (1.3±0.8 hours, $p<0.05$); and was positively associated with BMI ($\beta=1.04$, $p<0.05$) and BMI-for-age Z-score ($\beta=1.04$, $p<0.05$) after adjusting for covariates at follow-up, but not at baseline. PAQ scores, steps counts and other sedentary activities were not associated with anthropometric indicators at both phases. Prevalence of overweight/obese increased from 28.8% at baseline to

30.3% at follow-up. A two-fold increase in the number of overweight/obese children whose screen time was at least two hours daily was found at follow-up (n=25) compared to baseline (n=12). In conclusion, it appears that among growing children, obesity increases with age along with increase in sedentary behaviour, particularly screen time. This suggests that reduction of sedentary behaviour may need to be emphasised in order to prevent obesity in late adolescence.

P05 Anthropometric outcomes from *Juara Sihat* Programme: A school-based childhood obesity nutrition promotion programme in Kuala Lumpur, Malaysia

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Childhood obesity prevalence is increasing worldwide and is associated with significant short- and long-term health consequences. Thus, urgent development of effective interventions to prevent rapidly rising childhood obesity in Malaysia is needed and should target modifiable health-related behaviours. *Juara Sihat* is a quasi-experimental, four-phase multi-component, school-based nutrition education program to treat childhood obesity. It aims to improve weight status, eating habits and physical activity of overweight and obese children aged 9 to 11 years old. This study involved two primary schools in Kuala Lumpur with similar demographic characteristics. A total of 106 children (55 intervention, 51 control) participated in this study. Prior to intervention, anthropometric status were measured; and repeated during post-intervention at the third and sixth months after intervention. Intervention group (IG) underwent a 12-week programme consisting of six components addressing eating habits, physical activity and behaviour modification, namely: nutritional status assessment; Malaysian Food Pyramid; healthy food choices; body image; fruits and vegetables; and physical activity. Control school (CG) did not receive any intervention. Process evaluation was conducted to assess the implementation of intervention activities. The primary outcome was BMI z-score, while

other anthropometric outcomes included weight change, waist circumference, and fat percentage which were measured at baseline and post-intervention (at 3 months and 6 months). There were no significant differences in outcome variables between IG and CG at baseline. At six months, IG showed significant improvement in BMI z-score compared to the CG (-0.01 vs +0.06, $p<0.05$). Weight gain in IG was significantly lower relative to CG (+4.5kg vs 5.0kg, $p<0.05$). Changes in waist circumference and systolic BP significantly lower in the IG. In conclusion, *Juara Sihat* program made a positive impact in improving anthropometric status among overweight and obese primary school children. We expect *Juara Sihat* programme could be implemented by the government and private sectors as well as policy makers in formulating childhood obesity intervention.

P06 Weight change and cardiometabolic risk factors over a 6-month period of lifestyle interventions in overweight and obese women: the MyBFF@Home study

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Although lifestyle interventions could offer effective weight loss strategies, there is a paucity of such evidence in non-clinical settings in Malaysia. This study aimed to examine associations between weight loss and cardiometabolic risk factors over a 6-month period in overweight and obese women in the My Body is Fit and Fabulous (myBFF) at Home study. A total of 323 housewives (158 control group and 165 intervention group) from 16 low cost community flats around Klang Valley, Malaysia were recruited in this study. Respondents in the control group were given six series of health seminar, while those in the intervention group received a weight loss intervention package consists of individual counselling on diet, physical activity, self-monitoring activities and group exercise. Anthropometry and blood pressure assessments were performed at baseline and at 1st, 2nd, 3rd, and 6th month follow-ups while biochemical parameters were assessed only at baseline and 6th month follow-up. Mixed effects models were used to compare changes in cardiometabolic risk factors within weight change categories (gained, $>2\%$; maintain, $\pm 2\%$; lost, $>2\%$ - $\leq 5\%$; lost, $>5\%$ - $<20\%$) over a 6-month period. A higher weight loss was observed in the

intervention group compared to that control group (-1.4kg vs. -0.9kg; 95%CI: -0.24, 1.20). Small but comparable changes were observed for all cardiometabolic risk factors i.e. glucose, HDL-C, LDL-C, triglycerides and blood pressure between the study groups. However, weight changes were not significantly correlated with changes of any cardiometabolic risk factors in both groups ($p>0.05$). Furthermore, each higher category of weight loss was not significantly associated with greater improvements in any of the cardiometabolic risk factors ($p>0.05$). These results provide no empirical support for the assertion that a greater weight loss would produce improvements in cardiometabolic risk factors in overweight and obese women in the first six months of lifestyle interventions.

P07 Age and ethnicity differences in eating self-efficacy among overweight or obese Type 2 diabetes mellitus patients attending primary healthcare clinic in Malaysia

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Background: Self-efficacy for eating is an important predictor of successful weight loss and maintenance. Improvement in self-efficacy among individuals with diabetes demonstrated better dietary compliance and glycemic control. Self-efficacy for eating has been measured using the Weight Efficacy Lifestyle (WEL) questionnaire. This study aimed to determine the level of eating self-efficacy and factors associated with self-efficacy for eating in overweight/obese Type 2 diabetes mellitus subjects. Methods: A total of 334 subjects from a primary healthcare clinic in Seremban completed the study. The WEL questionnaire was administered via interview. Subjects rated their self-efficacy on a 0–9 scale; 0 indicating “not confident” and 9 indicating “very confident” to resist eating. An increase in the WEL scores indicated a higher self-efficacy to resist eating. The scores of five subscales of the WEL questionnaire (food availability, negative emotions, social pressure,

physical discomfort and positive activities) were computed for total population. Multinomial logistic regression determined factors contributing significantly to eating self-efficacy. Results: Subjects had the least ability to resist eating when engaging in positive activities such as when watching television, while reading, before going to bed, or in a happy mood (Mean=17.7, SD=4.4). However, subjects had highest confidence to resist eating when feeling negative such as angry, depressed, anxious, and feelings of failure (Mean=29.4, SD=3.6). Malay subjects were more likely to have lower self-efficacy to resist eating compared to Indian subjects (OR=16.571, $p=0.016$). Likewise, Chinese subjects were more likely to have lower self-efficacy to resist eating compared to Indian subjects but the results were insignificant (OR=7.392, $p=0.081$). Furthermore, younger subjects aged 55 years and below were more likely to have lower self-efficacy to resist eating compared to subjects above 55 years of age (OR=9.045, $p=0.043$). Conclusion: There are age and ethnic differences in eating self-efficacy and this need to be further examined to better target interventions for diet and lifestyle changes in managing diabetes.

P08 Protein Intake among Malaysian Adults: Findings From Malaysian Adult Nutritional Survey (MANS) 2014

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Introduction: Evidence based knowledge on protein intake among the Malaysia adults is essential to improve health of the population. Protein is an essential nutrient required by human body for growth and maintenance. Adequate protein intake is crucial for regulation of body composition and bone health, digestive system function and bacterial flora, glucose regulation, cell signaling and satiety. Objective: This study was carried out to determine the protein intake among Malaysian adults. Methods: Data was taken from Malaysian Adult Nutritional Survey (MANS) 2014, which is a cross-sectional population survey conducted nationwide. A multi-stage stratified cluster sampling was used and a total of 2842 Malaysian adults aged between 20 to 59 years participated in this survey. The information on dietary intake was collected based on 24 hours diet recall. Dietary analysis software, Nutritionist Pro, was used for nutrient analysis. Results: The recommended daily protein intake based on Recommended Nutrient Intake for Malaysia (RNI) for adult males and females are 62g/day and 55g/day respectively. The average protein intake for males was 67g/day, which was higher than the recommended

intake. Protein intake is significantly below the recommended intake among females aged 50-59 years. By ethnicity, protein intake was lowest among the Indian females. It was noted that the protein intake was lowest in males with earning less than RM 2300 compared to other income groups. Conclusion: Healthcare practitioners and nutritionists have to be more alert to promote health and nutritional education to older females and of Indian ethnicity. Awareness also has to be increased to the lower income groups to educate them on the various sources of proteins and its significance in a healthy diet and wellbeing. Therefore, initiatives should be undertaken to ensure Malaysian adults consume the ideal amount of protein.

P09 Anthropometric and Somatotype Characteristics among Males and Females Adults in Kuala Terengganu, Malaysia

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Introduction: The aim of this cross-sectional study was to describe sex related variations of the anthropometric and somatotype characteristic, employing Heath Carter's method among adults from Kuala Terengganu, Malaysia. Method: A total of 308 adults aged 25-57 years were recruited into this study. Body weight, height and others anthropometric dimension were measured to determine their body mass index (BMI) and body somatotypes. Results: Mean BMI of respondents was (26.09 ± 5.69) kg/m². 41.6% of respondents were in normal BMI category, 1.9% respondents were underweight while 41.2% and 15.3% were in overweight and obese categories, respectively. BMI of female respondents was significantly higher than males ($p < 0.05$). Female have significantly higher measurement of triceps, subscapular, supraspinale and medial calf skinfold compared to males ($p < 0.05$), while males show higher score for bone breadth and girth. Mean somatotype for all respondents were (7.2, 4.9, 0.9). Mean somatotype for male were (5.7, 4.7, 1.2), while mean somatotype for female were (8.8, 5.1, 0.5). 84.4% of respondents were classified to endomorph body somatotype while 12.7% and 2.9% belong to mesomorph and endomorph group, respectively. In terms of somatotype vs. BMI, 75% of normal BMI category respondents were endomorphic while 21% and 3% of them

belongs to mesomorph and ectomorph group, respectively. This study also showed that 28% of respondents in mesomorphic body somatotype category were classified into overweight and obese according to BMI classification. Conclusion: Overall, half of the respondents were overweight and obese. Most of them belong to endomorph body somatotype. Males were more towards endomorph-mesomorph body somatotype while females were more towards endomorph body somatotype. There are respondents with mesomorph body somatotype were categorized under overweight and obese according to BMI classification, although their body weight may due to higher muscle mass. Hence, BMI measurements cannot distinguish body build of a person; somatotype can be used as additional tools to assess adiposity and muscularity.

P10 The GReat-Child™ Trial: A quasi-experimental intervention to manage childhood obesity in Kuala Lumpur, Malaysia

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The rapid rise of childhood obesity is a serious public health problem that has led to the development of many interventions. However, no intervention originating in Southeast Asia has emphasized whole grain as a strategy to manage childhood obesity. The GReat-Child trial was a quasi-experimental intervention that aimed to improve anthropometric measurements of overweight/obese children. Two schools in Kuala Lumpur with similar demographic characteristics were assigned as intervention (IG) and control (CG). Eligibility criteria were overweight/obese children aged 9 to 11 years who had no serious co-morbidity problems. Children who reported consuming wholegrain foods in their 3-day diet-recall during screening were excluded. A total of 63 children (31 IG; 32 CG) completed the entire intervention programme. IG underwent six 30-minute nutrition education lessons, which employed Food Guide Pyramid and visual plate model in emphasizing the whole grain recommendation and balanced diet, and had school delivery of wholegrain food on a daily basis to provide opportunity for the children to experience and accept eating wholegrain food. Parents of IG children attended 1-hour individual diet counselling to encourage them to

increase the availability of wholegrain food and to practice balanced diet at home. Anthropometric outcomes including BMI z-score, body fat percentage and waist circumference were measured at baseline and twice (at 3rd [T1] and 9th month [T2]) post intervention. The intervention attained significant improvement ($p=0.007$) in body fat percentage at T1 (weighted difference: 1.45%; 95% CI: 0.53%, 2.37%) and T2 (weighted difference: 1.77%; 95% CI: 0.48%, 3.06%). The findings of the GReat-Child Trial indicate that intervention emphasizing whole grain made an impact on improving boy fat percentage among the children. We anticipate the GReat-Child Trial to be a pioneer that could be implemented by the government and policy makers to increase whole grain consumption among Malaysian children, and to be incorporated into childhood obesity intervention programs.

P11 C.E.R.G.A.S programme improved health-related physical fitness in overweight and obese adolescents: A pilot study

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Physical fitness (PF) has been shown to be associated with physical activity (PA) and inversely related with childhood and adolescent obesity. This pilot study aimed to examine the effectiveness of the C.E.R.G.A.S. (*Ceria, Respek, Gigih, Aktif, Sihat*) programme on PF among overweight/obese (O/O) adolescents in secondary schools. Two secondary schools in Selangor were assigned to either intervention (IG) or control group (CG). The IG students ($n=46$, 13.2 ± 2.3 year-old) received additional PA education in a two-day camp at a training centre,

apart from the standard Physical and Health Education school curriculum. IG students also underwent supervised aerobic, resistance and flexibility exercise training sessions with qualified exercise trainers once a week for eight weeks. In order to encourage participation, exercises were designed to suit the capabilities of O/O subjects. CG students (n=50, 13.4±2.1 year-old) received only standard Physical and Health Education school curriculum. A series of tests were conducted before (week-0) and after the programme (week-8) to evaluate PF: cardiovascular fitness (15-m PACER), upper body strength (handgrip – both hands), flexibility (modified back saver sit and reach-MBSSR) and muscle endurance (1-minute sit-up test). The main outcome measure was changes in PF tests mean scores. There were significant improvements ($p<0.05$) in IG during post-intervention [body fat percentage ($\Delta = -1.5\pm1.9$ %), 15-m PACER ($\Delta = 3.3\pm2.2$ laps), handgrip (both hands) ($\Delta = 2.0\pm2.3$ kg), MBSSR ($\Delta = 3.2\pm2.8$ cm) and 1-minute sit-up ($\Delta = 3.3\pm4.2$)], while no significant changes were observed in body fat percentage and any of the PF tests in CG ($\Delta = -0.9\pm4.5$ laps; $\Delta = 0.9\pm3.1$ kg; $\Delta = -1.3\pm3.7$ cm; $\Delta = 1.5\pm3.6$, respectively). This pilot study shows that the C.E.R.G.A.S programme was effective in improving PF among O/O adolescents. We anticipate that the programme may be feasible for adoption on a large-scale by relevant stakeholders pending confirmation in a full-scale intervention study.

P12 Metabolic Syndrome in Non-Obese Adults: A Growing Concern in Malaysia

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This study aimed to describe the prevalence of metabolically obese non-obese (MONO) individuals and its gradient in normal to pre-obese categories among adult population in Malaysia. A cross-sectional study involving public secondary school teachers recruited via multi-stage sampling from the state of Malacca, Malaysia was carried out. Anthropometric and biochemical measurements were performed. Metabolically obese, non-obese (MONO) was defined as body mass index (BMI) of 18.5 to 29.9 kg/m² with metabolic syndrome. Metabolic syndrome was diagnosed based on the Harmonization criteria. Participants completed self-reported questionnaires that included alcohol intake, sleep duration, smoking, physical activity, fruit and vegetable consumption. A total of 1511 teachers were recruited with response rate

of 36%. The prevalence of MONO was 17.8% (95% CI: 15.4, 20.5) where males 26.6% (95% CI: 20.6, 33.6) were significantly higher than females 15.1% (95% CI: 12.3, 18.4). The proportion of metabolic syndrome among adults with BMI 18.5 to 23.0 kg/m² was 11.7%. There was an increasing trend in the proportion of metabolic syndrome and its components with increasing BMI categories ($p < 0.001$) except for fasting blood glucose. After adjusting for age, gender, education, ethnicity, alcohol intake and sleep duration, the odds of metabolic syndrome increased as BMI categories increased. The odds of metabolic syndrome was higher by more than three times in adults with BMI categories of 23.0 to 24.9 kg/m² onwards compared to BMI ≤ 20.9 kg/m². In conclusion, the prevalence of MONO was high among our study population with males preponderant. Individuals of BMI ≥ 23.0 kg/m² had significantly higher odds of metabolic syndrome. Identification of MONO adults is useful for targeted intervention to prevent early onset of diabetes and cardiovascular disease.

P13 Association of fruits and vegetables intake with body weight status of Malaysian primary school children: findings from SEANUTS survey

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Adequate fruits and vegetables intake have been suggested to be beneficial in maintaining body weight. Research on the relationship between fruits and vegetables intake with childhood obesity is unclear. This cross-sectional study aimed to examine the association of fruits and vegetables intake with body weight status of Malaysian primary school-aged children using data from SEANUTS Malaysia. This survey is part of a larger multi-center study carried out among 16,744 children aged 0.5 to 12 years in four countries in South East Asia. Data from a total of 1,773 children aged 7 to 12 years, from six regions in Malaysia was included in this analysis. Fruits and vegetables intake was determined using food frequency questionnaire (FFQ), and intake was calculated as daily servings. Weight and height was measured; body mass index (BMI) and BMI-for-age z-score (BAZ) calculated. Mean weight and

height was 34.5 ± 0.5 kg and 135.7 ± 0.4 cm, respectively; with 14.3% overweight and 18.7% obese. Mean fruits and vegetables intake were 1.20 ± 0.03 servings/day and 1.38 ± 0.06 servings/day, respectively. General linear model showed that vegetables intake was negatively (β :-0.10; $p < 0.05$) associated with BAZ after adjusting for covariates. Logistic regression analysis showed that obese children were less likely (OR:0.51; 95% CI:0.30-0.85) to consume three or more daily servings of vegetables as compared to normal weight children. No association was found between fruits intake with body weight status. In conclusion, vegetables intake was inversely associated with the body weight status of Malaysian primary school children. Further studies using objectively measured dietary intake maybe needed to confirm this finding.

P14 Physical Activity, Body Mass Index, and Perceived Neighbourhood Environment Walkability among Adults in Kota Bharu and Penang, Malaysia: Preliminary Results

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Physical activity has been consistently implicated in the etiology of obesity. Built environment have been proved to be important predictors of physical activity. 'Walkability' means high density, high street connectivity and greater mixed land use, where it is proposed that individuals who live in more walkable communities will engage in more total and moderate intensity physical activity than those living in less walkable communities. The aim of this paper is to determine the correlation between perceived neighbourhood walkability and environment characteristics with body mass index (BMI) and moderate-to-vigorous physical activity (MVPA). A validated and reliable Neighbourhood Environment Walkability Scale (NEWS) in Malay language was used to obtain residents' perceptions of the environment characteristics in their neighbourhood. A total of 365 participants worn the accelerometers (Actigraph model w-GT3X+) on their waists for seven consecutive days. The mean values of MVPA per day (minutes) and steps achieved per day were 13.8 (19.1) minutes/day and 5095 (2304) steps/day, respectively. BMI was negative correlated with mean MVPA/day ($r = -0.15$, $p < 0.01$) but not with mean steps/day. BMI was also found to be negative correlated with residential density ($r = -0.20$,

$p < 0.001$), mixed land use–diversity ($r = -0.11$, $p < 0.05$), but positively correlated with pedestrian traffic safety and crime safety ($r = 0.14$, $p < 0.05$). Mean steps achieved/day was positively correlated with residential density ($r = 0.31$, $p < 0.001$), mixed land use–diversity ($r = 0.18$, $p < 0.001$) but negatively correlated with pedestrian traffic safety and crime safety ($r = -0.11$, $p < 0.05$). Meanwhile, mean MVPA/day was found to be correlated with residential density ($r = 0.31$, $p < 0.001$), mixed land use–diversity ($r = 0.22$, $p < 0.001$), but negatively correlated with aesthetics conditions of the neighbourhood ($r = -0.14$, $p < 0.05$) and pedestrian traffic safety and crime safety ($r = -0.12$, $p < 0.05$). Most of the participants had low levels of physical activity observed over a 7-day period of monitoring. Participants from neighbourhoods perceived to have more diverse and nearby non-residential destinations to head to had achieved more steps and MVPA per day, despite the neighbourhoods perceived as not being pedestrian-friendly and safe from crime.

P15 Modification of Unhealthy Sleeping Behavior in Managing Obesity in Malaysia: A Review

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Promoting behavioral interventions programs in managing obesity in Malaysia need to be looked in a broader perspective and being angled as multi-component strategies. Sleep is known as an under-recognized area where focus towards modification may contribute to weight-loss result. Most intervention strategies incorporate lifestyle modification by focusing only on food intake and physical activity. Identifying alternative areas beyond the routine food intake and physical activity for intervention is necessary as small lifestyle modifications can be effective for achieving and maintaining weight. This review aims to provide background information on why modification of sleeping behavior should be incorporated with other lifestyle intervention in managing obesity in Malaysia. A literature search was conducted on all articles published between 2005 and 2015 using the keywords in the MENDELEY database to achieve the aim. Previous findings highlighted that the global upsurge on prevalence of obesity in Western nations over the

past half-century has been correlated by a serious reduction in sleep duration. Reduced sleep was also suggested by physiological studies that it may effect hormonal regulation of appetite. Prospective studies suggest lacked of routine sleep duration as assessed by self-report is an independent risk factor for an increased rate of weight gain and obesity. The movement in the West and these findings can be taken as a caution to combat obesity by promoting healthy sleeping behavior in Malaysia. However the studies exploring sleep and obesity that may assist in designing effective interventions in Malaysia are still limited. Promoting modification of unhealthy sleeping behavior as multicomponent strategies together with food intake and physical activity in combating obesity in Malaysia may contribute to improve the overall health risk in the country.

P16 Effects of 4 Weeks Probiotic Supplementation on Fasting Blood Sugar Levels, Anthropometry and Fecal Short Chain Fatty Acid Among Overweight Malaysian

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To our interest, recent research has revealed that the alterations on gut microbiota contributes to the pathophysiology of metabolic disorders including obesity and type 2 Diabetes Mellitus (DM). Numerous studies in the Western countries revealed benefits of probiotics supplementation on metabolic disorders such as improved glucose homeostasis, lipid metabolism and reduced endotaxemia. However, this study is the first to investigate the probiotic supplementation effects among Malaysian populations. Previous studies have established a degree of population heterogeneity towards probiotics and prebiotics supplementation thus rekindles the need of a Malaysian study. Twenty-four subjects whom met the inclusion criteria were recruited in this randomized controlled trial. The subjects were randomized to receive either probiotics powder containing a cocktail mix of six strains namely, *Lactobacillus acidophilus*, *Lactobacillus lactis*, *Lactobacillus casei*, *Bifidobacterium longum*, *Bifidobacterium bifidum* and *Bifidobacterium infantis* (3.0×10^{10} colony

forming units) or placebo powder twice daily for 4 weeks under double-blind condition. Fasting blood glucose (FBG) levels, body weight (BW), waist circumference (WC), waist-to-hip ratio (WTHR) and fecal short chain fatty acids (SCFA) is measured during the baseline (Day 0) and end-of-trial (Day 28). Besides, subjects were asked to come for interim measurement (Day 14) for follow-up. Subjects were required to maintain their usual diet and lifestyle, which was monitored bi-weekly using a three-day 24-hour diet recall and the International Physical Activity Questionnaire (IPAQ) respectively. All twenty-four subjects successfully completed the four weeks study period. There is no significant difference seen in FBG levels, BW, WC, WTHR and fecal SCFA concentrations between probiotics and placebo groups. This pilot study concludes a null instead of beneficial effect of probiotics on Malaysian overweight adults. However, this study reemphasized the heterogeneity of a study population that influenced probiotics efficacy. Besides that, the study duration was found to be insufficient to elucidate the probiotic effects among overweight Malaysian. As a conclusion, four weeks probiotics supplementation did not change FBG levels, BW, WC, WTHR and fecal SCFA concentrations compared to placebo, thus, null hypothesis could not be rejected. To obtain conclusive results, a study with longer intervention (6 to 8 weeks) and larger sample size is warranted in future.

P17 Body image disturbance and disordered eating in overweight and obese male and female Malaysian adolescents

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While adolescents are experiencing rapid growth and development, they are at risk of body image disturbance and disordered eating behaviours. These health risk behaviours may have the implications on their body weight status. This cross-sectional study was conducted to compare differences in perception of body image and eating behaviours between overweight/obese male and female Malaysian adolescents aged 12-19 years old. Stratified multi-stage sampling was applied in the study sample selection. A total of 8651 adolescents from 67 secondary schools in all states of Malaysia were participated in the study. All respondents were requested to complete a set of self-administered

questionnaire that assess body image perception and eating behaviours of the respondents, and anthropometric measurements were conducted by trained researchers. In this study, the prevalence of overweight was 14.2% (95%CI: 13.4, 15.1) and obesity was 10.1% (95%CI: 9.4, 10.8), respectively. Half of the respondents have incorrect perception on their body weight status (overweight and obese respondents: 54.2%, 95%CI: 51.8, 56.6; non-overweight and obese respondents: 53.7%, 95%CI: 52.3, 55.1). In term of body size satisfaction, 83.8% (95%CI: 81.9, 85.6) overweight and obese respondents were dissatisfied with their current body size and desired to be thinner compared to non-overweight and obese respondents (33.4%, 95%CI: 32.0-34.7). On the other hand, 11.3% (95%CI: 9.8, 13.0) overweight and obese respondents were satisfied with their current body size and 4.9% (95% CI: 3.9, 6.0) of them were dissatisfied with their current body size but desired to be bigger. About two in five (39.9%, 95%CI: 37.6, 42.3) of the overweight and obese respondents were reported to have disordered eating compared to the non-overweight and obese respondents (27.2%, 95%CI: 26.0, 28.5). Findings from this study suggested to promote positive body image and healthy eating behaviours in future weight management program for overweight and obese Malaysian adolescents.

P18 Prevalence of Vitamin C intake among Malaysian Adults: Malaysian Adult Nutritional Survey (MANS) 2014

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Introduction: Vitamin C is required in human diet¹ and acquired primarily through the consumption of fruits and vegetables. Increased intake of vitamin C is associated with a reduced risk of chronic diseases such as cancer, cardiovascular disease, and cataract, probably through antioxidant mechanisms². Objective: This study was carried out to determine the vitamin C intake among Malaysian adults. Methods: Data was taken from Malaysian Adult Nutritional Survey (MANS) 2014, which was a cross-sectional population survey conducted nationwide. A multi-stage stratified cluster sampling was used and a total of 2842 Malaysian adults aged between 20 to 59 years participated in this survey. The information on dietary intake was collected based on 24 hours diet recall. Dietary analysis software, Nutritionist Pro, was used for nutrient analysis. Results: The recommended daily intake of Vitamin C is 70mg among adults aged 20 and above. The average Vitamin C intake was lower than

the recommended intake for both males (59.0g) and females (61.8g), with no significant difference noted between the genders. Vitamin C intake was significantly lower among those aged 20 to 29 compared to other age groups ($p<0.05$). The urban population was noted to have a lower intake of Vitamin C compared to the rural population (58.3g and 65.5g), however this difference was not statistically significant. Vitamin C intake was lowest among the Malays, with a significant difference compared to the Chinese in Malaysia ($p<0.05$). Conclusion: Consumption of Vitamin C is generally lower than the recommended dietary intake in the Malaysian adult population. This study emphasizes the need to educate the Malaysian community to increase Vitamin C intake and consumption of fruits and vegetables to reduce risk of chronic disease, particularly to the younger age groups and the Malay and Indian population.

P19 Psychological and physical activity differences between overweight/obese and non-overweight/obese welfare home children

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Welfare home children, who were under the disadvantaged group in society, were reported to have poorer health outcomes compared to children in general population. While childhood obesity is a global health problem, there is a need to determine the prevalence of overweight and obesity among welfare home children and its associated factors. This study is aimed to compare psychological factors (self-esteem, depression, disordered eating, and body image perception) and physical activity between overweight/obese and non-overweight/obese welfare home children in Selangor. A total of 307 respondents (males: 51.7%; females: 48.3%) were selected from 12 welfare homes through sampling with proportionate to size of the home. While height and weight were measured, information on psychological factors and 24-hour physical activity recall were interviewed by the researchers. The respondents comprised orphans (54.4%), abandoned children (23.8%), and children from problematic family (21.8%). A majority of the respondents were Malay (52.4%), followed by Indian (31.3%), Chinese (12.7%), and other

ethnic groups (3.6%), with a mean age of 13±3 years old. The prevalence of overweight and obesity was 23.1% (males: 18.4%; females: 28.2%). Overweight/obese respondents were found to be dissatisfied with their body shape (80.3%) and misperceived of their body weight status (69.0%) as compared to non-overweight/obese respondents (body shape dissatisfaction: 70.8%, $X^2=9.570$, $p<0.05$; misperception of body weight status: 39.4%, $X^2=19.246$, $p<0.05$). Overweight/obese respondents were found to have lower energy expenditure per body weight (38 kcal/kg) compared to their non-overweight/obese counterparts (51 kcal/kg) ($t=6.332$; $p<0.05$). There were no statistical differences in self-esteem, depression, and disordered eating between overweight/obese and non-overweight/obese respondents ($p>0.05$). After adjusting for the socio-demographic factors, binary logistic regression showed that body shape dissatisfaction (OR=2.167; 95% CI=1.700-10.640) and misperception of body weight status (OR=5.742; 95% CI=2.610-12.632) were risk factors of overweight/obesity, but high energy expenditure per body weight (OR=0.837; 95% CI=0.786-0.892) was the protective factor for overweight/obesity. In conclusion, one in five welfare home children were overweight/obese. Promoting healthy body image and physical activity are important components in preventing overweight and obesity problem among welfare home children.

P20 Objectively measured physical activity during Ramadan among female office employees in UniSZA

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Physical activity reduces the risk of numerous diseases like type 2 diabetes, cardiovascular disease, and all-cause mortality. However, daily physical activity is usually reduced during Ramadan fasting due to the properties of this month which may also leads to physiological changes. This study aimed to evaluate objectively measured physical activity during Ramadan among female office employees in UniSZA. Physical activity levels and patterns during weekdays and weekends were also examined to emphasize possible differences. Thirty female staffs, age 22 to 60 years were recruited. Participants wore an activPAL™ monitor for seven consecutive days on the midpoint of the anterior aspect of the

right thigh. The activPAL™ directly reports total time spent sitting or lying, standing and stepping every 15 seconds. Participants were required to provide at least four days of valid data (including one weekend day) for their data to be included in the analysis. A valid day was considered to be 600 minutes or more of recording during waking hours (i.e. from 5 am to 11 pm). From the initial 30 participants, a total of 24 participants provided valid data for analysis. The results showed that female office employees (age; 29.4 ± 7.4 years old and BMI; 23.2 ± 4.5 kg/m²) spent most of their waking hours in sitting/lying (76.2%) compared to standing (17.8%) and stepping (6%). There were no significant differences between weekdays and weekends for sitting or lying (18.11 hours/day vs. 18.36 hours/day; $p=0.594$), standing (4.26 hours/day vs. 4.17 hours/day; $p=0.397$) and stepping (1.42 hours/day vs. 1.47 hours/day; $p=0.392$). There was also no significant difference in total steps per day between weekdays and weekends (6196 steps vs. 6410 steps; $p=0.304$). In conclusion, most of waking hours in Ramadan were spent on sitting or lying. There were also no significant differences on physical activity level during weekdays and weekends among female office employees possibly due to lack of variation on daily routine throughout Ramadan fasting. Interventions during Ramadan to displace sitting or lying may reduce levels of sedentary behaviour and increase physical activity levels in female office employees.

P21 Supplementation of red pitaya juice reduces triglyceride and non-esterified fatty acids (NEFA) in diet-induced obesity in rats

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Red pitaya may improve lipid profiles and glucose concentrations in obese rats, probably due to phytochemicals such as betalains. This study aimed to assess whether red pitaya juice produces therapeutic effects in high-carbohydrate, high-fat (HCHF) diet-induced obese rats. Thirty two Male Wistar rats were divided into four groups and fed either HCHF diet or corn starch (CS) for a total of 16 weeks. Red pitaya juice (5 % in food, RP) was supplemented starting from week 9 until week 16 (CS + RP and HCHF + RP). Body weight and food intake were

measured every day. Total fat mass was determined using DXA scan. Abdominal adiposity index was determined from the excised adipose tissue. Glucose uptake was measured with OGTT. Heart function was determined in vivo with echocardiography and ex vivo with Langendorff hearts. Lipid profiles and non-esterified fatty acids levels were determined using commercial kits according to the manufacturer-provided standards and protocol using a Roche/Hitachi cobas c system. After 16 weeks, rats fed with HCHF diet developed hypertension, dyslipidaemia, impaired glucose tolerance, excess fat deposition and increased pro-inflammatory markers. Red pitaya juice supplementation increases total fat mass, abdominal obesity index and abdominal adipose tissue masses ($P<0.05$). No improvement was observed in glucose tolerance test. Red pitaya did not reversed cardiovascular remodeling in left ventricular eccentric hypertrophy and left ventricular mass ($P<0.05$). However, a reduction in triglyceride and NEFA level were observed. These findings show that incorporation of red pitaya juice together with high-carbohydrate, high-fat diet showed minimal repotes on obesity but may offer cardio-protective effect by means of reduction of NEFA and triglyceride. It is suggested to conduct molecular study so that the data will give significant contribution to the concept of red pitaya as viable and therapeutic agent to reverse the metabolic and cardiovascular complications associated with obesity.

P22 Behavioural factors associated with BMI status among young Malaysian women with inclination towards cosmetic surgery

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Introduction: The younger generation are now becoming more aware of their body image, and with the availability of cosmetic surgery to enhance appearance, many are beginning to seek this service as means to alter their body images to more “ideal” figures. The aim of this study was to identify behavioural factors that are associated with inclination towards cosmetic surgery among overweight and obese young Malaysian women between 18 and 25 years old in Johor Bahru, Malaysia. Method: A cross-sectional study with snowball sampling method was conducted among students from two tertiary institutions in Johor Bahru. Data on socio-demography, eating attitude, self-esteem, body shape perception, attitude towards body image, media influence and inclination towards cosmetic surgery were collected via self-

administered standardised questionnaire. A sub-group comparisons within young women participants (n=133; 36 overweight or obese vs 97 normal BMI) were performed with IBM SPSS 20.0. Results: The average age of the respondents were 21 years old and majority were Malay students with at least secondary school level education, from urban or sub-urban, have a medium family size and moderate to high financial security background. Overweight or obese females with interest towards cosmetic surgery were found to be more likely to have overall eating disorder (OR=5.272,p<0.001), underestimate her body shape (OR=5.573,p=0.001), overestimate body shape (OR=5.971,p=0.005), highly influenced by magazines (OR=0.246,p=0.001), but less likely to exhibit oral control (OR=0.536,p=0.001), have body shape confidence (OR=0.164,p=0.006) as compared to young women with normal BMI. Conclusion: The findings suggest strong relationships between several factors associated with body image and BMI status of young women with interest towards cosmetic surgery. The findings will also assist development of behavioural interventions will improve these young women's body image at an earlier stage and reduce the likelihood of them to resort into extreme measures.

P23 Weight changes among Iranian type 2 diabetic patients pre to post educational intervention

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Overweight and obesity are common among type 2 diabetes patients. The aim of this study was to determine the weight changes of diabetics after 12 weeks educational intervention and 6 months follow-up. An intervention study was carried out among 200 Iranian type 2 diabetics, aged 34 to 65 years, attending the Diabetes Clinic at Golestan Hospital, Ahvaz, Iran. Body weight, height, waist circumference were measured pre and post intervention. The diabetics were given educational intervention which included dietary and physical activity modules to improve their quality of life. Fifty percent of the patients were female and 50 % were male. Nearly 77 % of patients had diabetes for less than four years from the time of diagnosis, while 33% had diabetes between 5 to 7 years. The majority of type 2 diabetes (80 %) had moderate economic

status, 5 % with low economic status. Meanwhile only 15 % of them reported high economic status. Before intervention, 9.5 % had normal weight (BMI 18.5-24.9 kg/m²), 83.5 % over weight (BMI 25-29.9 kg/m²) and 7 % were obese (BMI \geq 30 kg/m²), while 99 % were abdominally obese. After 6 months follow-up, 35.5 % had normal weight while 64.5 % were still over-weight. The mean weight before intervention was 72.09 \pm 7.82 kg and decreased to 69.11 \pm 7.26 kg after educational intervention. Almost three quarters of diabetics (86%) achieved some weight loss, for 3% had no weight loss while almost 11% gained weight. Accordingly, both BMI and waist circumference also decreased significantly ($p < 0.001$) after educational intervention. The waist circumference decreased from 102.04 \pm 6.10 cm to 99.92 \pm 6.13.cm. These findings emphasize the importance of improving knowledge and awareness related to diabetes. Health care providers should develop educational programs to prevent weight gain among diabetic patients and encourage them to have healthy lifestyle.

P24 Integrated Intervention Improves Perception of Body Image and Reduces Obesity among Peer Educators: Preliminary Outcomes of EPaL Program

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The 'Eat Right, Be Positive About Your Body and Live Actively' (EPaL) Program is a school-based health education intervention program which aimed to promote healthy lifestyle in preventing overweight and disordered eating among secondary school adolescents. Peer education was applied as a strategy to convey the knowledge and skills to the adolescents. This study is aimed to determine the changes in perception of body image and body weight status among PE before and after the training-of-trainers (TOTs). A total of 58 peer educators (PE) in Form 2 (37.9% males, 62.1% females) were selected and trained in two phases of 2-day TOTs to empower them with the knowledge and skills on healthy lifestyle. Data on anthropometric measurement, perception on body size and shape and body satisfaction of the PE were obtained before the TOTs (pre-intervention) and after completing 2 phases of

TOTs (post-intervention). There was a significant difference between the perception of body size and shape in pre- and post-intervention ($p < 0.05$). The percentage of correct estimators (perceived body size=actual body size) was increased from 43.1% to 63.8% ($p = 0.023$). The discrepancy score of body size was decreased significantly from 0.66 ± 1.24 to 0.33 ± 1.05 ($p = 0.009$). This shown that body size satisfaction among the PE improved in the post-intervention. For body weight status, the prevalence of thinness was decreased from 3.4% to 1.7%. The prevalence of obesity was decreased from 8.6% to 0%, whereby all obese PE have improved their body weight status from being obese to overweight. The preliminary outcomes of the EPaL program add support for the effectiveness of integrated intervention in improving adolescent's health status.

P25 Insulin resistance and its cut-off values for young Malaysian adolescents: Identification of metabolic risk and associated factors

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Objectives: Insulin resistance (IR) has been known as one of the factors contributing to metabolic syndrome (MS). However there is no recognized international cut-off to determine IR among adolescents. Thus, this study aimed to identify the cut-off values for IR for Malay adolescents. The prevalence of MS and IR were determined; and the relationship between IR and body composition, adiposity and physical activity was examined. **Materials & Methods:** A cross-sectional study was conducted among 408 participants (207 boys, 201 girls) aged 9-14 years. Weight, height, waist circumference (WC), skinfolds at five sites

and blood pressure (BP) were measured. Fat mass was assessed through bioelectrical impedance analysis. Physical activity level was assessed through pedometer step counts. Fasting blood glucose (FBG), triglycerides (TG), high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, total cholesterol and insulin were determined from an overnight fasting blood sample. IDF (2007) criteria for children were used to diagnose MS while homeostasis model assessment (HOMA-IR) method was used to calculate insulin sensitivity. Receiver operating characteristic (ROC) analysis was used to identify optimal cut-off values to predict metabolic risk. Results & Findings: Girls have significantly higher total cholesterol ($p<0.05$) and body fat percentage ($p<0.001$) compared to boys. MS was found in 2.4% of the adolescents and IR in 17.1%. HOMA-IR value of 2.8 had 90% sensitivity and 85% specificity with area under the curve of 0.914 (95%CI: 0.826, 1.002). Stepwise multiple regression analysis revealed that biceps skinfold ($\beta=0.309$, $p<0.001$), FBG ($\beta=0.319$, $p<0.001$) and TG ($\beta=0.203$, $p<0.001$) were independently associated with HOMA-IR among boys; while FBG ($\beta=0.755$, $p<0.001$), WC ($\beta=0.145$, $p<0.05$), TG ($\beta=0.130$, $p<0.001$), subscapular skinfold ($\beta=0.196$, $p<0.01$) and diastolic BP ($\beta=0.083$, $p<0.05$) were associated with HOMA-IR in girls. Conclusion: A HOMA-IR cut-off of 2.8 provides a high sensitivity and specificity in diagnosing MS among young Malay adolescents.

P26 Obesogenic Environment and Social Influences on Sustainability of Childhood Obesity Intervention in Malaysia: A Study Protocol

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Childhood obesity is an epidemic in developing countries and the prevalence of childhood obesity is increasing in Asia-Pacific area, including Malaysia. Obesogenic environments that would relate to both energy intake and expenditure in schools such as vending machines, snacks with high energy density, soft drinks and school policy that discourage physical education and physical activity have the broad potential to impact on students' food choices and dietary quality. Obesity intervention approaches should emphasize environmental factors to promote a healthy behaviour and supporting environment. Hence, this study aims to identify the influence of obesogenic environment and multilevel social organization on sustainability of childhood obesity

intervention. Subjects will be selected from childhood obesity interventions in two primary schools in Kuala Lumpur with similar demographic characteristics that had been conducted earlier, namely GReat-Child Trial study and Juara Sihat. Eligibility criteria will be all students, project managers, parents, teachers, Parents and Teachers Association (PTA), as well as school principals that have been involved in the previous obesity intervention studies. Knowledge, attitudes and practice (KAP) scores among students from Great-Child Trial study and Juara Sihat study between pre-intervention, post-intervention and the current study will be compared to evaluate the sustainability of KAP. In-depth interviews and focus group discussions will be carried out by interviewing students, project managers, parents, teachers, committee members of Parents and Teachers Association to explore their perceptions, encouraging and discouraging factors towards sustainability of childhood obesity interventions. School principals will be interviewed to explore their perceptions on the implementation of school policy and regulations to prevent childhood obesity. It is hoped that this study will identify factors that influence the sustainability of childhood obesity intervention in Malaysia, which is important for long-term effectiveness in childhood obesity management programmes.

P27 Long Sleep Duration and Breakfast Skipping are Associated with Overweight/Obesity among Children

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This study aimed to determine the association between sleep duration, breakfast skipping and overweight/obesity among primary school children in Selangor, Malaysia. A total of 822 children (34.4% males; 65.6% females) aged 10.6±0.6 years from thirteen selected primary schools in Selangor participated in this study. A majority of the respondents were Malay (67.5%), 21.8% were Chinese and 10.7% Indian. The time spent sleeping for two days (one weekend and one weekday) was self-reported by the children and was classified into short (<9hours/day), regular (9-11hours/day), and long (>11hours/day) duration. Breakfast skipping was assessed using the Eating Behaviour

Questionnaire. Body weight and height were measured and BMI-for-age (z-score) was calculated and categorized. Logistic regression analysis was used to determine the contribution of sleep duration and breakfast skipping towards overweight/obesity. Overall, 30.4% of the children were overweight/obese. More than half (67.5%) of the children had short sleep duration, while 5.8% had long sleep duration. There were significantly more overweight/obese children (9.6%) who had long sleep duration compared to the non-overweight children (4.2%), while more non-overweight children (68.5%) had short sleep duration compared to the overweight/obese children (65.2%) ($\chi^2=9.267$, $p<0.05$). About half (46.2%) of the children skipped breakfast daily. Overweight/obese children (52.4%) were more likely to skip breakfast compared to the non-overweight children (43.5%) ($\chi^2=5.504$, $p<0.05$). After adjusting for confounders (age, ethnicity, and sex), the logistic regression analysis showed that long sleep duration (Exp β = 2.472; 95% CI=1.329-4.598) and breakfast skipping (Exp β = 1.410; 95% CI=1.032-1.926) were significantly associated with increased risk of overweight/obesity. Since long sleep duration and breakfast skipping may contribute to overweight/obesity among children, future intervention programmes should focus on promoting breakfast consumption and age-appropriate sleep duration in the prevention and management of childhood overweight/obesity.

P28 Does eating while watching television affect nutritional status of young Malay adolescents?

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Television viewing has been proposed to influence diet quality and obesity risk among children; however, few studies have reported the effect of eating while watching television in relation to nutritional status. The aim of this study is to investigate the association between the habit of eating while watching television on nutritional status of Malay adolescents. A total of 314 participants (136 boys and 178 girls) aged 10 to 14 years were recruited from national schools in Kuala Lumpur using multistage sampling. Body weight and height were measured and body mass index (BMI) was calculated. Participants were categorised as non-overweight/obese (non-O/O) or overweight/obese (O/O) based on WHO 2007 BMI-for-age growth reference. Information on habits and frequency of eating while watching television were obtained from self-administered

questionnaire. Mean age, weight, height and BMI were 12.1 ± 1.4 years, 42.8 ± 15.0 kg, 146.1 ± 10.8 cm and 19.7 ± 5.2 kg/m², respectively. Proportion of O/O was 31.5%. About a third of the participants (32.5%) ate while watching television everyday. Results indicated O/O was significantly associated with the frequency of eating while watching television ($\chi^2 = 8.038$, $p < 0.05$). However, there was no significant association between habit of eating with family without watching television with overweight and obesity. In conclusion, eating while watching television is shown to be associated with weight status of adolescents. Hence, future obesity intervention may need to consider emphasising not eating while watching television so that programmes may be more comprehensive and consequently help improve lifestyle and well-being of young adolescents.

P29 Nutritional status of schoolchildren in Kuantan, Pahang

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This study aimed to determine the nutritional status among primary schoolchildren in Kuantan, Pahang and to map the distribution using Geographical Information System (GIS). This community based cross sectional study was conducted in Kuantan, Pahang. Stratified random sampling method was used to select schoolchildren from seven subdivision of Kuantan district. A total of 391 schoolchildren age 7 years old were recruited. Data was collected using a questionnaire consisted of questions on socio demographic and anthropometry measurement. Schools' coordinate were recorded and Geographical Information System (GIS) software was used to map and visualize the distribution of schoolchildren according to nutritional status. Findings showed that 13.8% (n=54) of the children were having overweight and obesity, 10.5% (n=41) stunting and 9.5% cases of underweight (n=37). The mean for BMI-for-age z score (BMIAZ), height-for-age score (HAZ) and weight-for-age z score (WAZ) were 0.07(1.68), -0.64(1.105), and -0.32(1.68) respectively. There were significant difference of BMIAZ and WAZ between urban and rural area ($p=0.016$) and ($p=0.033$). There were no significant difference between the three anthropometric measurements with gender, ($p=0.947$), ($p=0.551$) and ($p=0.613$) respectively. There was a significant association between WAZ with income per capita ($p=0.014$) but there is no association between BMIAZ, HAZ and WAZ with other socio demographic factors including education, occupation and

household size. This study shows that the nutritional status among schoolchildren in this area is a major concern. The results warrant the need for further investigation to identify the root causes of childhood obesity in order to develop informed policy, intervention programs and guidelines.

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