MASO 2019
SCIENTIFIC CONFERENCE ON OBESITY
in conjunction with MASO 25th Anniversary
15 – 16 OCTOBER 2019
ISTANA HOTEL, KUALA LUMPUR

“Obesity: Addressing Multiple Drivers and Solutions”

SOUVENIR PROGRAMME AND ABSTRACTS
Let’s move with better FLEXIBILITY and STRENGTH today!

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Visit www.anlene.com/my/movecheck to do a simple move check.

Higher Protein
No Added Sugars
Collagen

It is important to exercise regularly and eat a balanced diet.

*32% higher compared with previous formulation
*NIH, 2009
*Daly et al., 2013
*BMC Geriatrics 13: 71
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I would like to extend a warm welcome to all the participants of MASO 2019. On behalf of the Ministry of Health Malaysia, I would like to congratulate the Malaysian Association for the Study of Obesity (MASO) for their fine effort in convening this biennial Scientific Conference since 1995 in conjunction with 25th Anniversary MASO Silver Jubilee Celebration. I must also thank the National Centre for Scientific Research (CNRS) France who is represented by Dr. Angeline Blanc-Serre, Attaché for Cooperation in Higher Education and Science, French Embassy in Malaysia for their continued support towards MASO.

My special thanks to the Plenary speakers, Assoc. Prof. Dr. Michael Vallis, Dalhousie University, Canada and Prof. Dr. Maithé Tauber, Toulouse University Hospital - Children's Hospital, France and the Symposium speakers for their invaluable contribution showcasing the emergence of research talents in obesity, locally. Given the magnitude and the complexity of the problem of obesity and its prevention, there is an urgent need to enhance professional understanding of preventive and management principles. The theme of MASO 2019 “Obesity: Addressing Multiple Drivers and Solutions” provides a platform for participants to discuss the challenges and opportunities in preventing and managing the rising Obesity epidemic in Malaysia.

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

I wish all participants a rewarding and fruitful experience at the Conference as you take time to renew old friendship and forge new ones over this 2-day event. For our foreign friends, do take time to savour the cultural diversity Malaysia has to offer.

Dr. Lee Boon Chye
Deputy Minister of Health Malaysia
Message from the President

On behalf of the Organising Committee it gives me great pleasure to welcome you to Kuala Lumpur for MASO 2019 in conjunction with MASO 25th Anniversary. We are indeed honoured to have the presence of YB Dr. Lee Boon Chye, Deputy Minister of Health Malaysia to grace the official opening of MASO 2019.

I am pleased to inform that MASO have collaborated with Associated International Laboratories (LIA) an International Organisation under the auspices of the National Centre for Scientific Research (CNRS) France since MASO 2017 and I would like to thank Prof. JP Poulain from Toulouse University for the initiative. We are pleased to have the support Dr. Angeline Blanc-Serre, Attaché for Cooperation in Higher Education and Science, French Embassy in Malaysia representing the interest of CNRS, France.

In the context of escalating obesity prevalence and the obesogenic environment in which we live, work and play, the theme for this year conference "Obesity: Addressing Multiple Drivers and Solutions" is not only relevant but timely in view of the escalating prevalence of obesity in Malaysia. We have a busy 2-day programme that includes two Plenary Lectures by Assoc. Prof. Dr. Michael Vallis, Dalhousie University, Canada and Prof. Dr. Maithé Tauber, Toulouse University Hospital - Children's Hospital, France, 47 oral presentations and some 32 poster presentations provides a platform for our researchers to showcase their current endeavours in the field obesity research. It is most gratifying to note that we have managed to attract many “new” researchers from several local Universities that were not with us previously. This augurs well with the national agenda to create the “critical mass” in the area for obesity research.

A special thank goes to our Plenary and Symposium speakers, poster presenters for accepting our invitation. To all the participants of MASO 2019, I hope you take full advantage of this opportunity to communicate your research and also take time to look into other research fields which may provide new ideas and potential for future collaborations.

We would also like to acknowledge the support of the sponsors and last but not least, to members of the Organising committee for their hard work and undivided support.

May I wish all participants a fruitful and enjoyable MASO 2019.

Emeritus Professor Dr Mohd Ismail Noor, PhD
FASc, FLUNS, FNSM, FMSA, FMOSTA, FCFAM
Chairman, Organizing Committee MASO 2019
25 Years Journey

Brief Highlights (1994-2019)

Persatuan Kajian Obesiti Malaysia or Malaysian Society for the Study of Obesity (MASSO) was registered (Bil:PPM 1102/93) with the Registrar of Society on 15 February 1994 and was officially launched by YB Datuk Napsiah Omar Minister of National Unity and Social Development on 17 July 1994 at Padang Merbok, Kuala Lumpur. The Founding President for MASSO (1994-1995) was Dato’ Dr. Ismail Merican, Deputy Director General of Health Malaysia. At the 3rd AGM in 1996, Prof. Dr. Mohd Ismail Noor, was elected President MASSO and its Secretariat moved from Servier Ltd (Malaysia), to the Department of Nutrition and Dietetics, Universiti Kebangsaan Malaysia. In 1998, MASSO changed its name to “Malaysian Association for the Study of Obesity (MASO)” in line with its international affiliate the International Association for the Study of Obesity (IASO) now known as World Obesity Federation.

The objectives of MASO are:

- To stimulate and facilitate obesity research on its impact, causes, prevention and management.
- To promote improved understanding on obesity among professionals and public.
- To collaborate with the government agencies, other professional organisations, private sectors and international bodies to improve local environment to support healthy lifestyle.
- To lead and drive national effort to reduce, prevent and manage obesity through involvement in policy development.

MASO membership is open to all health-related professionals namely Nutritionists, Dietitians, Exercise Physiologists, Clinical Psychologists, Endocrinologists, Medical Doctors and Social Scientists whose interest is in line with the objectives of the Association.

As a professional body, MASO is affiliated with the World Obesity Federation, formerly known as International Association for the Study of Obesity (IASO) since 1998, a Founding Member of the Asia-Oceania Association for the Study of Obesity (AOASO) since 1998 and Confederation of Scientific and Technological Associations Malaysia (COSTAM) in 2000. More recently (2017), MASO has collaborated with the Associated International Laboratories (LIA) under the auspices of the National Centre for Scientific Research (CNRS) France. These affiliations have emplaced us within a professional network and given us access to information and events that keep us updated on Obesity related matters around the globe.
At the national level, MASO is actively involved as members in several MOH Committees including the National Coordinating Committee on Food and Nutrition (NCCFN) since 1996 and the Obesity Task Force since 2015 and also represented in several Ministry of Health (MOH) health promotion activities. MASO also collaborates with other professional bodies namely Nutrition Society of Malaysia (NSM) and Malaysian Dietitians’ Association (MDA) in organising the Nutrition Month Malaysia since 2002. Whether at home or abroad, MASO has gained due recognition and is increasingly being consulted by public and private organisations for advice on matters pertaining to Obesity.

For the scientific community, MASO Scientific Conferences are held once every two years since 1995 and MASO Scientific updates at our Annual General meetings. MASO organised its first International Conferences the 2nd Asia-Oceania Conference on Obesity (AOCO) in 2003 followed by the Asia Pacific Obesity Conclave (APOC) in collaboration with the Bariatrics Surgery Society in 2007.

MASO greatest achievement thus far must be the success in jointly organising with World Obesity Federation, the International Congress on Obesity (ICO), a world congress on obesity held once in four years, in KLCC Kuala Lumpur from 16-20 March 2014. It attracted some 1000 participants mainly from abroad and featuring some of the globally renowned obesity researchers to KL. Malaysia is the first South East Asian country and second Asian country behind Japan (1990) to organise this World Obesity Congress.

For the general public at-large, MASO has conducted numerous weight management camps (MASO Camps) since 1998. Usually held over the weekends in selected beach or hill resorts, participants with BMI above 27.5 were invited to attend the MASO camp and given a series of lectures and hands-on practical tips by nutritionists/dieticians, exercise physiologists and clinical psychologists on how to modify their behaviour towards healthy weight reductions. MASO also co-organize and co-sponsor Community Nutrition activities by several local universities in carrying out obesity management and healthy lifestyle programmes.

In 2017, MASO in collaboration with NSM, MDA was awarded a grant by the Ministry of Health Malaysia, through MySIHAT, to pilot an intervention programme for overweight and obese individuals using the “Suku-Suku Sepuruh dan Cergas” (3SC) concept involving the Enhance Primary Health Care (EnPHC) clinics in 10 districts (Selangor and Johor). Initial findings of the project will be presented in MASO 2019.

Between the years 2000-2010, MASO has collaborated with Pharmaceutical companies namely Roche (Xenical) and Abbott (Sibutramine) to organise numerous Scientific Workshops for clinicians involved in weight management activities. However, these activities ended when both the weight reducing drugs were withdrawn from the market.

MASO latest achievement was winning the bid in a recently concluded AOCO 2019 in Seoul, Korea on 31 August 2019, to organise for the second time (first in 2003) the Asia-Oceania Conference on Obesity (AOCO) 2021 in Kuala Lumpur. We hope all the participants of MASO 2019 and many more will support us in hosting the No. 1 Obesity conference in the Asian region. Make a date with us in AOCO 2021.
Highlights of MASO 25 Years Journey…

Launched of MASO
Padang Merbok, Kuala Lumpur
24 July 1994

MASO Scientific Conferences
MASO Scientific Conferences

Obesity: Addressing Multiple Drivers and Solutions
MASO Scientific Updates

MASO Scientific Update

Are carbohydrates making us fat? Evidence from ASiA

PROF DR. JAYAKUMAR HENRY
Director, Clinical Nutrition Sciences, A*STAR, Singapore

1 June 2016 (Wed) | 5pm to 9pm
Hotel Istana Kuala Lumpur

Dinner - Members need only RM80.00, members RM150.00 before 20th May 2016.

Malaysian Association for the Study of Obesity
25th Annual General Meeting & Scientific Update

DIET, OBESITY & HEALTH:
from SCIENCE to POLICY

Speaker:
Professor Susan Jebb, OBE
Professor of Diet & Population Health
Nuffield Department of Primary Care Health Science
University of Oxford

Program
5.00 - 5.15 pm: Registration
5.15 - 7.00 pm: MASO AGM
7.00 - 8.00 pm: Scientific Update
8.00 - 9.00 pm: Dinner

10th Aug 2018 (Fri) | 5 pm to 9 pm
Hotel Istana Kuala Lumpur

Dinner - Members need only RM80.00, members RM150.00 before 20th Aug 2018.

MASO Scientific Conference on Obesity, 15-16 Oct 2019
Obesity: Addressing Multiple Drivers and Solutions
MASO Camps and Educational Activities

Abbott (Malaysia)

For further information on weight management kindly contact:

WEIGHT MANAGEMENT INFORMATION CENTRE (WMIC)
W17-A1, 17th Floor, West Block
Wisma Selangor Dredging
142 Jalan Ampang, 50450 Kuala Lumpur
Tel: 03-21661100
Fax: 03-21666310
Website: www.weightmanagement.org.my

Note: Collaboration with Roche (Malaysia) ended in 2010
Nutrition Month Malaysia
MASO Initiatives (Publication) & Other Contribution

- Clinical Practice Guidelines on Management of Obesity, 2004
- Strategy for the Prevention of Obesity - Malaysia
- Recommended Nutrient Intakes for Malaysia (RNI)
- Malaysian Dietary Guidelines
- Prioritizing Food Policy Options to Reduce Obesity in Malaysia
- RNI: Recommended Nutrient Intakes for Malaysia
Suku Suku Sepurah Dan Cergas (3SC) Program
MASO Bid to Host AOCO 2021

Prof. Brian Oldfield, President AO/ASO with Prof Ismail and the Malaysian delegates after winning the bid to host AOCO 2021 in Kuala Lumpur, Malaysia
31 August 2019, Seoul, Korea

Prof. Ismail with some of Malaysian participants at ICIMES/AOCO 2019 celebrating our Merdeka day and winning the bid to host AOCO 2021 in Kuala Lumpur.
31 August 2019, Seoul, Korea
Organising Committee

MASO 2019
Scientific Conference on Obesity

Chairman
Emeritus Prof. Dr. Mohd Ismail Noor

Secretariat
Dr. Geeta Appannah

Scientific Committee
Prof. Dr. Poh Bee Koon
Emeritus Prof. Dr. Mohd Ismail Noor
Assoc. Prof. Dr. Chin Yit Siew

Publicity and Publication
Dr. Mohd Razif Shahril
Dr. Denise Koh
Assoc. Prof. Dr. Hazizi Abu Saad

Financial and Sponsorship
Assoc. Prof. Dr. Hazizi Abu Saad
Assoc. Prof. Dr. Nik Shanita Shafii
Assoc. Prof. Dr. Gan Wan Ying

Protocol
Prof. Dr. Norimah A. Karim
Ms Zaiton Daud
Ms Sameeha Mohd Jalil

Logistic and Technical
Assoc. Prof. Dr. Mahenderan Appukutty
Registration Desk

The registration desk will be located at the entrance of Baiduri Room, Hotel Istana, Kuala Lumpur. Registration will be open during the following hours:

- Tuesday, 15 October 2019  
  0800-0900, 1030-1100
- Wednesday, 16 October 2019  
  0800-0900

All delegates may collect their conference materials at the registration desk during the hours stated above. Conference delegates are required to wear their nametags throughout the conference for identification purposes and admission to the conference hall and exhibition area.

Lunch and Tea / Coffee Breaks

Tea/coffee breaks will be served at Foyer of Mahkota III Ballroom, while packed lunch will be served during Lunch Symposium. For vegetarian, please contact hotel staff or secretariat for assistance.

Oral and Poster Sessions

For oral presenters, facility for viewing your slides is available at Baiduri Room (Secretariat). Please contact the Secretariat for assistance.

As for poster presenters, posters will be displayed throughout the two conference days in the Safir 1, Hotel Istana, Kuala Lumpur. Posters should be displayed by 0800 hours on Tuesday, 15 October 2019, and should be taken down by 1730 hours on Wednesday, 16 October 2019. Velcro will be provided by the Secretariat. Please don’t use any pin or sharp materials on the poster board to mount your poster. There will be a poster competition for all participants. Therefore, poster presenters should be in attendance next to their posters during the indicated Poster sessions for discussion with Judges and interaction with other conference delegates.
Opening Ceremony

The Opening Ceremony of MASO 2019 will be held at 1500 hours on Tuesday, 15 October 2019, at Mahkota III Ballroom, Hotel Istana, Kuala Lumpur. To allow the Opening Ceremony to run smoothly, participants are kindly requested to be seated by 1450 hours in the Mahkota III Ballroom.

Trade Exhibitions

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Yakult (M) Sdn. Bhd.
InBody Asia Sdn. Bhd.
Nestlé Malaysia
Malaysian Palm Oil Board
UNO Nutrition Malaysia Sdn. Bhd.

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Herbalife Products Malaysia 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 (MASO).
DAY 1  TUESDAY, 15 OCTOBER 2019

0800 hrs  Registration

0900 hrs  PLENARY LECTURE 1

**Simplifying Obesity Management: Speak, Support and Sustain**
Assoc. Prof. Dr. Michael Vallis
Dalhousie University, Halifax, Canada

Chairperson: Emeritus Prof. Dr. Mohd Ismail Noor
*Taylor’s University*

0940 hrs  Refreshments / Poster Viewing / Trade Exhibition
*Poster presenters in attendance for discussion*

0950 hrs  SYMPOSIUM 1

**OBESOGENIC ENVIRONMENT**
Chairperson: Prof. Dr. Norimah A Karim
*Universiti Kebangsaan Malaysia*

1010 hrs  S1.1 Workplace Health and the Impact to Absenteeism and Presenteeism Among Malaysian Employees: The AIA Vitality Healthiest Workplace Survey
Assoc. Prof. Dr. Wee Lei Hum
*Universiti Kebangsaan Malaysia*

1030 hrs  S1.2 Creating Support Environment for Healthy Eating in Higher Learning Institution
Assoc. Prof. Rokiah Don
*International Medical University*

1050 hrs  S1.3 Physical Activity and Obesity
Assoc. Prof. Dr. Ahmad. Taufiq Jamil
*Universiti Teknologi MARA*
1110 hrs S1.4 Does Food Environment Influence Body Weight and Eating Behaviours Among Adolescents in Malaysia?  
Suhaila Abdul Ghaffar  
Universiti Kebangsaan Malaysia

SYMPOSIUM 2  
YOUNG INVESTIGATOR’S SYMPOSIUM

Chairperson: Assoc. Prof. Dr. Chin Yit Siew  
Universiti Putra Malaysia

1130 hrs S2.1 Obese Mother, Obese Child: The Intergenerational Transmission of Obesity in Malaysia  
Nur Nadia Mohamed  
Universiti Sains Malaysia

1145 hrs S2.2 Relationship Between Muscle Strength, Energy Intake and Abdominal Obesity: An Outcome from the Adolescent Cohort Study  
Ng Ai Kah  
University Malaya

1200 hrs S2.3 Process Evaluation of a Nutrition and Lifestyle Behaviour Peer Support Program for Abdominally Obese Malaysian Adults with Metabolic Syndrome  
Muhammad Daniel Azlan Mahadzir  
Monash University Malaysia

1215 hrs S2.4 Are They Getting Fatter and Rounder? – A Cross-Sectional Study Among Adult Orang Asli in Jelebu, Negeri Sembilan  
Muslimah Ithnin  
Universiti Sains Islam Malaysia

1230 hrs S2.5 Impact of Weight Change on Cardiometabolic Risk Markers in Overweight and Obese Women from Low Socioeconomic Community in A Lifestyle Intervention Study  
Liyana Ahmad Zamri  
Universiti Putra Malaysia
1245 hrs  **S2.6 A Quasi-Experimental Study: Fundamental Motor Skills Approach Towards Childhood Obesity**  
Dr. Melvin Chung Hsien Liang  
*Universiti Malaysia Sarawak*

1300 hrs  **LUNCH SYMPOSIUM 1**

Bile Acid is a Responsible Host Factor for High-fat Diet-induced Gut Microbiota Alterations in Rats: Proof of “Bile Acid Hypothesis”  
Prof. Dr. Atsushi Yokota  
*Hokkaido University, Sapporo, Japan*

Chairperson: Assoc. Prof. Dr. Mahenderan Appukutty  
*Universiti Teknologi MARA*

**Poster Viewing / Trade Exhibition**  
*Poster presenters in attendance for discussion*

1400 hrs  **SYMPOSIUM 3**  
**TOYBOX STUDY MALAYSIA**

Chairperson: Dr. Denise Koh  
*Universiti Kebangsaan Malaysia*

1420 hrs  **S3.2 ToyBox Study Malaysia: Preliminary Outcomes from Kuala Lumpur and Selangor**  
Prof. Dr. Ruzita Abd Talib  
*Universiti Kebangsaan Malaysia*

1430 hrs  **S3.3 Evaluation of an Intervention (ToyBox Malaysia) to Promote Healthy Weight in Preschool Children: Preliminary Findings from Sarawak**  
Assoc. Prof. Dr. Cheah Whye Lian  
*Universiti Malaysia Sarawak*
1440 hrs  **S3.4 ToyBox Malaysia: A Qualitative Perspective from Multiple Sites**  
Dr. Julia Lee Ai Cheng  
*Universiti Malaysia Sarawak*

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**OFFICIAL OPENING OF MASO 2017**

1500 hrs  **Welcome Address by**  
Emeritus Prof. Dr. Mohd Ismail Noor  
President  
*Malaysian Association for the Study of Obesity (MASO)*  
and *Taylor’s University*

1510 hrs  **Speech by**  
Dr. Angeline Blanc-Serre  
*Attaché for Cooperation in Higher Education and Science, French Embassy in Malaysia*

1520 hrs  **Speech and Official Opening by**  
YB Dr. Lee Boon Chye  
*Deputy Minister of Health, Malaysia*

1540 hrs  **MASO 25th Anniversary Celebration**  
Visit Trade Exhibition and Posters  
Refreshment and Press Conference

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**SYMPOSIUM 4**  
**GOVERNMENT INITIATIVES IN OBESITY REDUCTION**

Chairperson: Assoc. Prof. Dr. Hazizi Abu Saad  
*Universiti Putra Malaysia*

1600 hrs  **S4.1 Overweight and Obesity Prevalence and its Risk Factors Among Elderly: Findings from National Health and Morbidity Survey 2018 Elderly Health**  
Dr. Tahir Aris  
*Institute of Public Health, National Institutes of Health*

1630 hrs  **S4.2 Government Policies and Strategies in Combating Obesity in Malaysia**  
Khairul Zarina Mohd Yusop  
*Nutrition Division, Ministry of Health*
1650 hrs  **S4.3 Combating Obesity at School with Parents-Teachers Collaboration: A Socio-Legal Outlook**  
Dr. Noorfajri Ismail  
*Your Best Healthy Lifestyle (C-HAT), Ministry of Health and Universiti Teknologi Malaysia*

1710 hrs  **S4.4 A Community Setting Weight Management Intervention Among Overweight and Obese Adults: Suku Suku Separuh & Cergas (3SC) Programme**  
Prof. Dr. Norimah A Karim  
*Malaysian Association for the Study of Obesity (MASO) and Universiti Kebangsaan Malaysia*

1730 hrs  **Refreshments / Trade exhibition**
DAY 2  WEDNESDAY, 16 OCTOBER 2019

0800 hrs  Registration

0900 hrs  PLENARY LECTURE 2
The Model of Prader-Willi Syndrome: How to Translate This Knowledge to Understand and Manage Non-Syndromic Obesity

Prof. Dr. Maithé Tauber, 
Université Paul Sabatier, Toulouse, France

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

0940 hrs  Refreshments / Poster Viewing / Trade exhibition
Poster presenters in attendance for discussion

SYMPOSIUM 5
OBESITY TREATMENT AND MANAGEMENT

Chairperson: Assoc. Prof. Dr. Gan Wan Ying
Universiti Putra Malaysia

1010 hrs  S5.1 Real-World Clinical Effectiveness of Liraglutide 3.0mg for Weight Management in Canada
Dr. Sean Wharton
Wharton Medical Clinic in Burlington, Canada

1040 hrs  S5.2 Surgery for Diabetes Mellitus: A New Paradigm Shift
Prof. Dato’ Dr. Nik Ritza Kosai
Universiti Kebangsaan Malaysia

1100 hrs  S5.3 Leptin in Obesity Related Disorders
Prof. Dr. Harbindar Jeet Singh
Universiti Teknologi MARA

1120 hrs  S5.4 Obesity and Cardiometabolic Markers Among Adolescents Born to Parents with Premature Coronary Heart Disease: A Case Control Study
Dr. Nur Aida Astaman
Universiti Malaya

MASO Scientific Conference on Obesity, 15-16 Oct 2019
Obesity: Addressing Multiple Drivers and Solutions
1140 hrs  **S5.5 Jom Cergas: An Intervention Approach Among Selected Obese Student in Sekolah Kebangsaan Jelutong Barat, Pulau Pinang**  
Mohd Yusri Noordin  
*Penang State Health Department, Ministry of Health*

**SYMPOSIUM 6**  
**EXPERIMENTAL STUDIES**

Chairperson: Dr. Mohd Razif Shahril  
*Universiti Sultan Zainal Abidin*

1200 hrs  **S6.1 In Vitro Evaluation of Cytotoxic and Anti Adipogenic Activity of Gac Fruit Extract (Momordica cochininchensis (Lour.) Spreng)**  
Mohd Nazri Abdul Rahman  
*Universiti Malaysia Sabah*

1215 hrs  **S6.2 The Role of Annatto Tocotrienol on Toll-like Receptor Signalling in a Rat Model of Metabolic Syndrome Induced by High-carbohydrate High-fat Diet**  
Dr. Wong Sok Kuan  
*Universiti Kebangsaan Malaysia*

1230 hrs  **S6.3 Gut Microbiota Dysbiosis in Diet-Induced Metabolic Syndrome and the Prebiotic Potential of Geraniin and Geraniin-Enriched Extract**  
Mohanambal Moorthy  
*Monash University Malaysia*

1245 hrs  **S6.4 High-Fat Emulsion Modification Through High Shear Homogenization: An Approach in Appetite Control**  
Lau Chei Wei  
*Taylor’s University*
1300 hrs  LUNCH SYMPOSIUM 2

Advanced Body Composition Management for Obesity Management
Ms. Lisa Seungju Cha,
Clinical Team, InBody CO., Ltd, Korea

Promoting Healthy Nutrition Among Malaysian Primary School Children
Assoc. Prof. Dr. Chin Yit Siew
Univrsiti Putra Malaysia

Chairperson: Dr. Zawiah Hashim
Malaysian Association for the Study of Obesity (MASO)

Poster Viewing / Trade Exhibition
Poster presenters in attendance for discussion

1400 hrs  SYMPOSIUM 7

BATTLE OF THE BULGE (OBESITY) – ENVIRONMENTAL AND INDIVIDUAL PERSPECTIVE STUDIES

Chairperson: Prof. Dr. Jean Pierre Poulain
Toulouse University, France and Taylor’s University

1400 hrs  S7.1 Food Behaviours in Eating Out Contexts
Dr. Elise Mognard
Taylor’s University

1410 hrs  S7.2 Investigation on Over-energy Consumption Association with Food Culture in Asia: A Potential of Satiety and Satiation Enhancing Effects Through Food Matrix Modification
Dr. Chong Li Choo
Taylor’s University

1420 hrs  S7.3 Taste, Emotion and Food Choice: A Facial Expression Analysis
Assoc. Prof. Dr. Rahmat Hashim
Taylor’s University
1430 hrs  S7.4 Smart, Connected and Immersive Ecosystem to Shape a Healthy Diet and Lifestyle  
Dr. Tan Chun Hong  
*Taylor’s University*

1440 hrs  S7.5 Polymethoxy Flavones: Investigation of Their Anti-Obesogenic Role  
Assoc. Prof. Dr. Wong Eng Hwa  
*Taylor’s University*

**SYMPOSIUM 8**  
**FREE COMMUNICATION I: PHYSICAL ACTIVITY AND NUTRITIONAL STATUS**

Chairperson: Dr. Geeta Appannah  
*Universiti Putra Malaysia*

1500 hrs  S8.1 Effect of Using Different Basal Metabolic Rate Predictive Equations on the Estimation of Physical Activity Ratios of Walking  
Dr. Brinnell Annette Caszo  
*International Medical University*

1510 hrs  S8.2 Integrating Traditional Games in Physical Education Lesson to Increase Physical Activity: A Comparison of Normal, Overweight and Obese Children  
‘Arif Azlan  
*Universiti Kebangsaan Malaysia*

1520 hrs  S8.3 Meeting Physical Activity, Sedentary Behaviour and Sleep Guidelines is Associated with Healthier Body Weight Status Among Malaysian Preschoolers  
Lee Shoo Thien  
*Universiti Kebangsaan Malaysia*

1530 hrs  S8.4 Comparison of Nutritional Factors in Children with Autism Spectrum Disorder of Different Body Weight Status at an Autism Intervention Center in Kuala Lumpur  
Eow Shiang Yen  
*Universiti Putra Malaysia*
1540 hrs  S8.5 Age Modifies the Association Between Gender and Body Adiposity Among Adolescents in Malaysia: (MyHeART) Study  
Dr. Ruben Ramakrishnan  
Universiti Malaya

1550 hrs  S8.6 High Dietary Glycemic Index Is Associated with Gestational Diabetes Mellitus in Overweight and Obese Pregnant Women  
Farah-Yasmin Hasbullah  
Universiti Putra Malaysia

SYMPOSIUM 9  
FREE COMMUNICATION II: NUTRITION INTERVENTION AND OTHERS

Chairperson: Zaiton Daud  
Nutrition Division, Ministry of Health

1600 hrs  S9.1 The Impact of Combination of Behavioural Intervention and Nutrition Education with Brown Rice (COMBINE-BROWN) Weight Loss Program on Body Composition and Body Anthropometry in Overweight and Obese Adults  
Ong Mei Gee  
Universiti Sains Malaysia

1610 hrs  S9.2 Sustainability of a Culinary Nutrition Education Programme ‘Kids in Kitchen’ (KidChen): Children as Change Agent of Home Food Environment  
Ng Choon Ming  
UCSI University

1620 hrs  S9.3 Improvement of HbA1c in Type 2 Diabetes Mellitus Patients by Supplementation of Mixed Herbs  
Assoc. Prof. Dr. Muhammad Muzaffar Ali Khan Khattak  
International Islamic University Malaysia

1630 hrs  S9.4 Legal Tools to Reduce Obesity in Malaysia  
Chin Chin Sia  
Taylor’s University
1640 hrs  **S9.5 A School-Based Interventional Study to Improve Healthy Eating Practices Among Malaysian Adolescents: A Feasibility of Quasi-Experimental Pilot Study**  
Assoc. Prof. Dr. Hazreen Abdul Majid  
*University Malaya*

1650 hrs  **S9.6 The Influence of Social Facilitation on Energy Intake Among Public University Students in Selangor**  
Cheah Khang Jin  
*Universiti Putra Malaysia*

1700 hrs  **PRIZE GIVING AND CLOSING**

1730 hrs  **Conference Ends & Refreshments**
Patients taking Saxenda® lost weight and kept it off in a 1-year trial¹

9.2%* mean weight loss with Saxenda®²

1 out of 3 patients lost >10% (P<0.001 vs placebo)²,³

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¹P<0.001 vs placebo.¹,² ²Estimated calculation: Figure derived as follows: 106.2 x 0.092 = 9.77.
³References:

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PLENARY SPEAKER 1

Assoc. Prof. Dr. Michael Vallis
Psychologist & Associate Professor, Family Medicine, Dalhousie University, Halifax Canada

Dr. Vallis is a registered health psychologist practicing in Halifax, Canada. He is a Health Behaviour Change Consultant and Associate Professor in Family Medicine at Dalhousie University. His main areas of expertise are diabetes, obesity, cardiovascular risk and gastroenterology. He has worked in the public health system for 35 years and is now working as a consultant and doing private practice. He regularly supervises clinical and academic students at Dalhousie and is active in research on motivation, behavioural change and psychosocial adaptation to chronic disease. He consults nationally as well as internationally and is heavily involved in journal editing, clinical practice guidelines and academic publications. He was recently awarded a Queen’s Diamond Jubilee Medal by the Government of Canada on the recommendation of Diabetes Canada.
The complexity of obesity, from the perspectives of development, management and outcomes, cannot be ignored. Yet typical approaches to simplifying obesity management have been to focus on one dimension to the exclusion of others (i.e., forced simplicity). The challenge of obesity management is to develop an approach that balances simplicity with complexity. In this plenary, a behavioural perspective that is anchored in the patient experience, the patient-provider relationship, and evidence-based approaches to achieve healthier weights will be reviewed. This approach can be summarized as: speak, support and sustain. Lifestyle, medical and surgical management approaches can be viewed as all involving patient behaviour and therefore requiring collaboration with individuals living with obesity in an empowering manner. The behavioural goals associated with obesity management include adherence, self-efficacy and intrinsic motivation. Further, individuals living with obesity will most often need to address issues of bias (self-bias and bias from others), expectations of weight loss, as well as their emotional and social relationship with food. In this plenary a scalable approach that embraces these principles will be presented. The goal is to facilitate providers achieving improved outcomes from their approaches by actualizing the speak, support sustain approach.
Biography

PLENARY SPEAKER 2

Prof. Dr. Maithé Tauber,
Centre de Référence du Syndrome de Prader-Willi, Service d’endocrinologie Hôpital des enfants CHU Toulouse,
INSERM U1043, Centre de Physiopathologie de Toulouse Purpan, Université Paul Sabatier,
Toulouse, France

Professor Dr. Maïthé Tauber is a Paediatrician and Professor of Paediatrics in Hôpital des Enfants and Paul Sabatier Université, Toulouse, France. She is currently a coordinator of the French Reference Centre for Prader-Willi Syndrome (PWS) and other rare disorders with obesity and/or feeding disorders. She is also the head of the endocrinology, obesity, bone diseases, genetics and medical gynaecology team in Hôpital des Enfants and Paul Sabatier Université. Apart from that, she is also the President of the regional network for paediatric obesity and national association for the networks on paediatric obesity in France. She has been an active researcher particularly in the area of PWS and has 25 years of experience in the care of PWS children with particular emphasis on early diagnosis, endocrine issues, treatment of comorbidities, multidisciplinary care and new treatments for PWS. Besides that, Professor Tauber also conducts various research on obesity prevention at the regional level.
The Model of Prader-Willi Syndrome: How to Translate This Knowledge to Understand and Manage Non-Syndromic Obesity

Prof. Dr. Maithé Tauber,
Université Paul Sabatier, Toulouse, France

PWS is today considered a complex genetic disorder primarily characterized by impaired hypothalamus development. Indeed, a defect in the hypothalamus explains most of the phenotype and the very specific natural history of the disease. PWS is the first known example of a human disorder involving genomic imprinting demonstrated in 1989. The phenotype includes neonatal hypotonia with poor oral skills and social abilities, a decreased appetite that mimics anorexia, facial dysmorphia with acromia, and subsequently, in the absence of proper care and management, early excessive weight gain with hyperphagia and impaired satiety that induce early and severe obesity, multiple endocrine dysfunction learning disabilities, and behavioural problems with psychiatric phenotypes and various symptoms of dysautonomia. This complex disease has severe consequences and raises difficult management issues for patients, families and caregivers. High rates and varied causes of morbidity and mortality have been reported, mainly due to respiratory problems in infancy and childhood and obesity complications later on. Given the severity of the hypotonia displayed by neonates and the increased knowledge of this disease, diagnosis is now made during the first months of life before the start of obesity. PWS is therefore a model of neurodevelopmental trouble starting with neonatal anorexia with poor weight gain that subsequently switch to severe obesity with hyperphagia and a true obsession with food. Peculiar endocrine defects such as multiple pituitary hormone deficits and abnormal ghrelin and oxytocin pathways have been described offering new perspectives for pathophysiological treatments that are currently studied using ghrelin analogues and oxytocin and oxytocin receptor agonist. We believe that improved knowledge on the pathophysiology and care of PWS will be of great interest for understanding and treating severe forms of obesity characterized by food addiction and behaviour troubles.
Abstracts of Papers

Symposium Day 1
SYMPOSIUM 1
OBESOGENIC ENVIRONMENT

S1.1 Workplace Health and the Impact to Absenteeism and Presenteeism Among Malaysian Employees: The AIA Vitality Healthiest Workplace Survey

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There is a growing body of literature on the benefits of employers investing in their employees’ health. The objective of this study was to determine the interaction between employees’ lifestyle choices, general health and critical outcomes for organisations. This was a cross sectional online survey among working adults in Malaysia by AIA Vitality in year 2018. A total of 117 companies in Malaysia participated in the study with 11,551 employees answering the questionnaire. Among the respondents, 42.1% were males with mean age of 35.8 years and monthly income of RM5,629. Nearly half (45.0%) were either overweight or obese. Of the respondents who had a BMI classified as ‘overweight’, 91.0% reported their waist circumferences were within the healthy range. Of the 13.0% of employees who had four or more risk factors, 62.0% believed they were in ‘good’ or ‘very good’ health. Nearly half of respondents reported less than 150 minutes per week of physical activity (46.0%) and consumed only 1-2 servings of fruits daily (44.0%). More than half (54.0%) reported getting less than 7 hours of sleep in a 24-hour period and 13.0% indicated they had poor or very poor-quality sleep. Half were subjected to at least one dimension of work-related stress. A total of 85.0% reported experiencing one or more musculoskeletal conditions. The respondents lost 28.0% of working hours due to ill-health related absence and presenteeism in the week, expressed as a percentage of available working hours. This equated to 73.1 days lost per employee per year. The estimated average yearly cost of health-related absence and presenteeism per organisation is estimated at RM 2,271,539. Unhealthy lifestyles of employees are shown to reduce short term-productivity and it is crucial for employers to support them to make healthier choices.
S1.2 Creating Support Environment for Healthy Eating in Higher Learning Institution

Rokiah D  
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The paper is aimed to share how the International Medical University (IMU) paves its way to be the first private university in Malaysia to have its cafeteria recognised as a ‘Healthy Cafeteria’, awarded by the Ministry of Health Malaysia (MOH) on 11 May 2017. This initiative by the Ministry of Health Malaysia is to encourage cafeterias, nationwide, to provide more nutritious and healthier food options as well as cleaner foods for a healthier community towards disease prevention. This recognition marks the beginning of the Wellness Initiative to promote overall wellness amongst the staff and students of IMU. The integration of Healthy Eating into the Wellness Initiative was important to map the subsequent actions. The very existence of the Nutrition and Dietetics Division at IMU is a great trigger in this development, in addition to IMU being a healthcare education institution in the field of medicine, dentistry, pharmacy and health sciences. Further collaborative efforts by the various departments within and outside the University had lent great assistance in creating a supportive environment for healthy eating at IMU. Commitment at all levels, from the higher management to the food handlers, were attained. All levels of community were aligned towards achieving the Wellness goals. The purpose of the Wellness Initiative was widely disseminated and well demonstrated through various activities such as the HEALs (Healthy Eating and Active Living) Program specially designed for selected staff for weight management. The adoption of the MOH KOSPEN (Komuniti Sihat, Perkasa Negara) Plus, in April 2019, to build healthy and productive employees through a healthy workplace environment was a key strengthening factor. The three out of six identified major scopes of the KOSPEN PLUS are healthy eating practices, weight management and health screening (including for Body Mass Index (BMI), blood glucose and blood pressure). The teaching and learning activities in nutrition and dietetics are long-term support in developing students to have the knowledge and skill in adopting healthier food choices throughout lifespan. Students are assessed through implementation of various projects such as the Health Promotion Week which is conducted annually to create awareness on healthy eating and active living towards healthy lifestyle. The development of an integrated plan to be aligned with the University’s vision and mission in collaboration with MOH and other stakeholders was a key feature in the creation of the supportive environment for healthy eating at IMU.
S1.3 Physical Activity and Obesity

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Physical activity is an important factor to prevent and treat overweight and obesity. In Malaysia, obesity showed an increasing trend in the past 20 years. Even though physical activity may contribute 20-30% of energy expenditure, its role in preventing and treating obesity is crucial. Trend of physical inactivity may show declining pattern, but it may not reflect the true exercise level of the community. WHO, in 2010 has published global recommendation on physical activity to combat obesity and non-communicable disease. And recently, in 2018, WHO published Global Action Plan 2018-2030, to further strengthen the important of physical activity in reducing obesity and non-communicable disease around the world. In Malaysia, Kementerian Kesihatan Malaysia, responded by publishing Garis Panduan Aktiviti Fizikal in 2017 and launching NASPAL (National Strategic Plan for Active Living) in 2018. More work has to be done to increase physical activity level in the community. Other option that we should think of is to put physical activity as vital sign among patient and encourage physician to prescribe and counsel their patient to be physically active.
S1.4 Does Food Environment Influence Body Weight and Eating Behaviours Among Adolescents in Malaysia?

**Suhaila AG**, **Ruzita AT**, **WMN WMohd**, **Tahir Aris** and **Norimah AK**

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Weight gain and poor dietary habits among adolescents through neighbourhood food environment are being investigated. Greater access to food outlets has been associated with less favourable diet and is potentially associated to obesity-related health disparities. This study aimed to assess the spatial relationship between food environment features with weight status and eating behaviours among adolescents. Nine-hundred and ninety-five adolescents from secondary schools in Selangor were recruited for a cross-sectional study. They completed questionnaires on socio-demography, fast food consumption, fruit and vegetable intakes while height and weight measurements were taken. Geographic Information System was used to geocode for spatial cluster and buffer analysis with a 400m and 800m radius buffer around respondents’ schools. The relationship between the presence of fast food outlets with fast food consumption and BMI of respondents using multivariate models was assessed. There was a high degree of clustering of food outlets around schools in the urban areas. The findings revealed that the median distance from any school in urban area to the nearest fast food outlet was 0.52 km and 67% of schools had at least one fast food outlet within 0.8 km. Weight status was positively associated with the presence of fast food outlets within a 1.6 km buffer. Spatial analysis showed no significant difference in food environment features and eating behaviours among adolescents. The further away the fast food outlets are located from schools, the higher the consumption of fruits and vegetables of the respondents. In adjusted analysis, fast food availability was not associated with weekly frequency of fast food consumption. The results strengthen the argument for local authorities to increase the number of healthy food options within the adolescents’ food environment.
S2.1 Obese Mother, Obese Child: The Intergenerational Transmission of Obesity in Malaysia

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Overweight and obesity can affect both adults and children living in the same household. There is a strong association between maternal and child obesity and theories such as the Developmental Origins of Health and Disease and Maternal Resources hypothesis posit that maternal physiology and environment influence the disease development of children throughout life. The purpose of this study was to determine factors associated with overweight and obesity among overweight mother/overweight (OWM/OWC) in Malaysia. This study utilised data from the Malaysian National Health and Morbidity Survey 2015, a population-based cross-sectional study. Mother and the youngest child aged between 5 to 17 years old were identified from each household, matched and grouped according to their BMI categories (WHO definition). The overweight and obese groups were then regrouped into a single outcome category, ‘overweight’ mother/child. Multiple logistic regression was used to assess for factors associated with OWM/OWC pairs with normal weight mother/normal weight child (NWM/NWC) pairs as reference category. The total number of mother-child pairs extracted were 2,871. When the mothers were paired with their children according to their BMI categories, the prevalence of OWM/OWC pair was 21.7%. The factors associated with increased risk of OWM/OWC pair in Malaysia were mother’s age (AOR=1.98; p=0.027), a household size of 3 persons and less (AOR=2.25, p<0.001) and mother’s education status, primary education level (AOR=2.03; p<0.001). However, the child’s age between 15 to 17 years old (AOR=0.58; p=0.007), Chinese ethnicity (AOR=0.42; p<0.001) and low household income (AOR=0.55; p=0.004) were protective factors of OWM/OWC pairs. In conclusion, one in five Malaysian households has an OWM/OWC pairs. These are influenced by maternal age, maternal education level, children’s age, household size, ethnicity and household income which were associated with overweight mother-child pairs in Malaysia.
S2.2 Relationship Between Muscle Strength, Energy Intake and Abdominal Obesity: An Outcome from the Adolescent Cohort Study

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The aim of the study is to investigate the longitudinal relationship between muscle strength, energy intake and abdominal obesity. A closed cohort study was conducted on 436 on going secondary school adolescents (134 males; 302 females) at the age of 13-year-old and was followed up at 15- and 17-year-old. All subjects underwent muscle strength assessment using a calibrated hand dynamometer. Waist circumference measured by non-elastic SECA measuring tape. They completed a seven-day diet history via interviewed face-to-face by trained dietitians. A longitudinal analysis using a generalised linear model was constructed to investigate the longitudinal relationship between the effects of energy intake and waist circumference changes on muscle strength over five years. The analysis showed that changes in energy intake over the five-year period did not affect changes in muscle strength for males and females. However, it was found that changes in waist circumference consistently and inversely affect changes in muscle strength from early until late adolescence for females only (between early and middle adolescence: β = -0.002 [p = 0.013]; between middle and late adolescence: β = -0.003 [p = 0.014]). This means that an increase in waist circumference caused a reduction in muscle strength between early and late adolescence among females. Although the magnitude of the estimated waist circumference effects (on a two-year muscle strength change) was small, the effects may accumulate over time and become clinically significant if the waist circumference consistently expands for multiple years. These findings emphasise the need to develop lifestyle intervention that may require sex-specific programmes targeted to improve muscle strength for these adolescents.
Abdominal obesity is a manifestation of underlying metabolic chaos that is represented in a clustering of metabolic risk factors termed as Metabolic Syndrome (MetS). MetS is an important health issue in developing countries including Malaysia, calling for an urgent need to improve the prevention and management of this condition. Although lifestyle intervention is commonly prescribed, only a few successful interventional studies have been reported effective for long-term. Here, we describe the development, implementation, and process evaluation of a community-based nutrition and lifestyle behaviour peer support program (PERSUADE) for abdominally obese Malaysian adults with MetS. PERSUADE incorporates relevant behavioural improvement goals identified through a comprehensive review of literature and guidelines. The peer group lesson plans and arrangement of information were designed based on findings from focus group discussions and the overall construct of Health Belief Model. Finally, the effectiveness of PERSUADE was tested through a 3-month pre-post trial to promote nutrition and lifestyle behaviour change in adults with MetS. Process evaluation in form of intervention adherence, content satisfaction and peer leadership were conducted at post intervention. 48 adults (mean age: 44.17 ± 7.45 years old) formed 4 peer groups for 3 months. The participants’ program adherence (81.3%) and content satisfaction (90.3%) were high while peer leadership (75.5%) score was satisfactory. Furthermore, content satisfaction is significantly correlated with the changes of waist circumference ($r=0.295$, $p=0.044$). Additionally, changes in body fat percentage is significantly correlated with both content satisfaction ($r=0.521$, $p=0.000$) and peer leadership ($r=0.354$, $p=0.015$). The process evaluation of PERSUADE demonstrates its feasibility to inform and benefit abdominally adults with MetS. Future studies should identify the possibility of extending the use of peer-based intervention programs with interactivity of peer support via social media, and other means to increase participants’ engagement.
S2.4 Are They Getting Fatter and Rounder? – A Cross Sectional Study Among Adult Orang Asli in Jelebu, Negeri Sembilan

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The Orang Asli are the indigenous minority people of Peninsular Malaysia. Among them, obesity has become a significant problem. According to previous study, the risk of obesity is higher for the Orang Asli living in the periphery and town settlements category. Due to the association between obesity and its risk of developing NCDs, this study was aimed to determine the obesity indicators among adult Orang Asli living in the periphery of Jelebu, Negeri Sembilan. Eleven Orang Asli settlements in Jelebu were selected using stratified random method for this cross-sectional study. A total of 325 respondents from Proto-Malay Orang Asli ethnic groups aged 18 years and above were recruited. Body percentage of fat was assessed using bioelectrical impedance analysis (Maltron BF-906 Body Fat Analyser). Waist circumference (WC) and Body Mass Index (BMI) were also measured using the standard method. The mean age of the respondents was 39.94 (SD=13.196) year olds and majority (71.1%) of them were females. Slightly more than half of the respondents had BMI of more than 25.00 kg/m2 and in the obese category (59.1%), had abnormal waist circumference (59.7%) and majority have high body fat percentages (82.2%). Female respondents had significantly higher prevalence of obesity (66.7% vs 40.4%, aOR=4.259, p=0.039), with increased waist circumference (70.1% vs 34.0%, aOR=3.267, p=0.029) and of high fat body percentages (93.9% vs 53.2%, aOR=3.430, p<0.001) when compared to the male counterparts. The findings imply a high prevalence of obesity among Orang Asli, with more females are getting fatter and “rounder” as compared to males Orang Asli. Since obesity is modifiable and preventable, a comprehensive intervention with the aim to change their lifestyle, and future study to address the problem of obesity among these vulnerable communities is essential to ensure a sustainable health and balanced lifestyle.
S2.5 Impact of Weight Change on Cardiometabolic Risk Markers in Overweight and Obese Women from Low Socioeconomic Community in A Lifestyle Intervention Study

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Weight loss intervention and its health benefits in low socioeconomic women has been sparsely studied particularly in the local setting. This study aimed to examine the impact of weight change on cardiometabolic risk markers in overweight and obese women from low-cost flats in Klang Valley in a lifestyle intervention namely My Body is Fit and Fabulous at Home. A total of 243 women aged 18 to 59 years (body mass index: 25 to 39.99 kg/m²) were assigned to either lifestyle intervention (individual diet counselling, moderate physical activity (PA) and self-monitoring skills using food diary, PA diary and pedometer) for 6 months or control group (general health seminars) and were followed up at 12 months. Cardiometabolic risk markers were assessed at baseline, 6 and 12 months. Weight change was categorized as loss 5 to 20%, loss >2 to <5%, maintained ±2% and gained >2%. Repeated measures ANCOVA revealed a significant intervention effect on total cholesterol (TC) (F(2,236)=3.13, p=0.046) and hs-CRP (F2,288)=4.129, p=0.017) after 12 months controlling for age and baseline weight. The weight change in the intervention group after 12 months significantly correlated to changes in waist circumference (WC), glucose, insulin and HOMA-IR. When compared across the weight change categories, participants in the intervention group who lost between 5 to 20% of their body weight at 6 months showed highest reduction in WC (-5.67cm [95%CI: -7.98,-3.36]), insulin (-4.27µU/mL [95%CI:-7.35,-1.19]) and TC (-0.59mmol/L [95%CI:-0.99,-0.19]). Those who lost >2 to <5% of body weight also showed improvement in WC and insulin but not in TC. The associations diminished during the 6-month weight maintenance period. In conclusion, this study supports that weight loss related lifestyle modifications over 6 months could improve selected cardiometabolic risk markers including TC, hs-CRP and markers of glycaemic control in low socioeconomic overweight and obese women even with minimal weight loss (>2% from initial body weight).
S2.6 A Quasi-Experimental Study: Fundamental Motor Skills Approach Towards Childhood Obesity

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Physical activity (PA) and fundamental motor skills (FMS) are an important factor in explaining the rising prevalence of obesity. The recent increase trend in childhood obesity among preschool children have refocused the importance of PA and FMS in this age group. Structured FMS oriented school-based intervention allows children to be more competent and interested to participate in a wider range of PA hence prevent childhood obesity. This study aims to determine the PA and FMS outcome from a school-based intervention programme among rural pre-schoolers in Kuching. It used a quasi-experimental non-randomised design with a total of 153 children from 9 government kindergartens. Data collected included PA measured by pedometer and FMS performance by Test of Gross Motor Development (TGMD)-2. Repeated measure ANCOVA were carried out to measure the effect of intervention between the groups. The boys were more active than the girls (10390 ±1379.89 vs 9779.6 ±1448.37) and higher fundamental motor skill score than the girls (105.9 ±16.56 vs 102.6 ±16.93). Children who were non-obese (60.4%) have higher PA level compared with those who were obese. The higher the FMS score, the higher the PA level (p<0.05). Children in intervention group were more active [F(1, 151) = 55.70, p<0.001, ƞ2=0.27] and higher FMS [F(2, 150) = 80.9, p<0.001, ƞ2=0.52] as compared with the control group post intervention. Teaching an FMS oriented structured intervention programme during the physical exercise (PE) classes allow the children to be more competent and interested to participate in a wider range of physical activities, which help to prevent the risk of physical inactivity and childhood obesity. Further long-term follow-up to improve the ideal content of PE lesson, setting and duration of the intervention are warranted to support these initial positive findings.
It has been reported that gut microbiota is involved in the metabolic disease development especially on a high-fat diet (HFD). Much work has been done on the elucidation of the causal relationship between HFD-induced gut microbiota alterations and host pathophysiology. However, mechanisms underlying HFD-induced gut microbiota alterations remain unclear. Previously, we showed that bile acid is a host factor that regulates the composition of gut microbiota in rat cecum. Based on this finding, we hypothesized that bile acid is responsible for HFD-induced gut microbiota alterations as bile acid excretion increases in response to HFD intake (=bile acid hypothesis). Here, we proved “bile acid hypothesis” by comparing gut microbiota alterations between those in response to a HFD (230 g lard per kg diet) intake and cholic acid (CA) administration (0.5 g CA per kg diet) in a rat model. In both cases preferential increases in highly bactericidal deoxycholic acid (DCA) concentrations in cecum accompanied by increases in total bile acid concentrations were observed after 8 weeks. Gut microbiota composition in cecum of both diet groups showed increased Firmicutes/Bacteroidetes ratios. The bacterial isolates from HFD group showed significantly higher resistance to DCA in Firmicutes than in Bacteroidetes. Analyses of the top 20 abundant operational taxonomic units (OTUs) each in Firmicutes and Bacteroidetes in HFD feeding experiment identified those significantly increased or decreased in their relative abundance commonly in both HFD and CA diet groups. Also identified were those showed significant positive or negative correlations to the cecal bile acid concentrations commonly in both HFD and CA diet groups. From these criteria, it was concluded that 11 OTUs amounting to ~30% of the gut microbiota population in rat cecum changed their relative abundance by bile acid during HFD intake for 8 weeks, thus proving the “bile acid hypothesis”.
S3.1 Development of ToyBox Study Malaysia: A Pilot Intervention to Improve Energy-Balance Behaviours in Pre-schoolers Based on the European ToyBox Study

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3Universiti Malaysia Sarawak, Kota Samarahan, Sarawak, Malaysia
4University of Durham, Durham, UK

Childhood obesity is a public health concern in Malaysia: evidence supports targeting of multiple behaviours, and role modelling, for successful child obesity interventions. We describe the development, design and implementation of ToyBox Study Malaysia, a kindergarten-based intervention to improve energy balance related behaviours in preschool children. In 2016, we successfully applied to a UK MRC-Akademi Sains Malaysia Newton-Ungku Omar Fund call for collaborative research in Malaysia on non-communicable diseases, such as obesity. A team from Roehampton and Durham Universities, including two who had worked on the European kindergarten-based intervention, the ToyBox-Study, invited Malaysian collaborators via existing contacts in Kuala Lumpur and Sarawak. This ToyBox intervention was a feasibility study, targeting four obesity-related behaviours: drinking more water, healthy snacking, reducing sedentary behaviour and increasing physical activity. The project was implemented in 3 stages: (1) use of Theory of Change framework for developing the intervention, including focus groups with key stakeholders (parents, kindergarten teachers); (2) translate and adapt ToyBox material to a Malaysian sociocultural milieu; and (3) conduct a pilot RCT testing its effectiveness relative to usual practice, on the four target behaviours. Forty-eight kindergartens were recruited around Kuala Lumpur and in Sarawak, of which 22 were intervention sites. The key behaviours were targeted in four separate modules, with each module conducted initially over 4 weeks, then repeated again over 2 weeks. Kindergarten teachers attended three sessions of training – once prior to, and twice during the implementation period. Parents received newsletters and tip cards on a regular basis in line with the respective modules. Baseline and post-intervention assessments included anthropometry, physical activity, dietary intake and behaviour. Various challenges were encountered, which varied across urban and rural settings; however, use of existing networks with multidisciplinary expertise, together with knowledge of a pre-existing intervention, facilitated the rapid and successful submission of a funding application for this feasibility study in Malaysia.
S3.2 ToyBox Study Malaysia: Preliminary Outcomes from Kuala Lumpur and Selangor

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With a growth in childhood overweight and obesity in Malaysia, it is important to ensure children have good eating habits and physical activity behaviour. Toybox Study Malaysia targets four key energy balance-related behaviours which are drinking water, eating healthy snacks, reducing sedentary behaviour and increasing physical activity, to prevent obesity in young children. The aim of the present study evaluated outcomes of parent-reported drinking and snacking behaviour, and measurements of sedentary behaviour and physical activity in preschool children aged 4-6 years old from Kuala Lumpur and Selangor. The Community Development Department (KEMAS) kindergartens were selected as the study setting. Thirty-three KEMAS kindergarten were recruited to the study; 15 assigned into intervention group and 18 into control group. Parents filled out a questionnaire, assessing children’s drinking and snacking behaviours at baseline and follow-up. Sedentary and physical activities were measured using accelerometers. The findings showed positive behaviour change for soft drinks and sugar-sweetened beverages from baseline to follow up in the intervention group. Sweet and salty snacks habits were improved at follow-up compared to baseline. The intervention group showed a decrease in total time spent in sedentary activities at follow-up (8.8 hours/day to 6.5 hours/day) (\(p<0.001\)) compared to baseline. Moderate- to vigorous-intensity physical activity in the intervention group was significantly higher at post-intervention compared with the control group (\(p<0.001\)). Therefore, the Toybox Study Malaysia is feasible in promoting healthy drinking and snacking behaviours, reducing sedentary behaviours and increasing physical activity among preschool children in Kuala Lumpur and Selangor.
S3.3 Evaluation of an Intervention (ToyBox Malaysia) to Promote Healthy Weight in Preschool Children: Preliminary Findings from Sarawak

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The ToyBox Malaysia intervention was tested in a pilot randomized control trial intervention in Selangor, Kuala Lumpur, and Sarawak; this paper reports on the findings from Sarawak. The intervention focuses on four energy-balance related behaviours: drinking water, healthy snacking, increasing physical activity and reducing sedentary behaviour through a change of environment and behaviour of children. Participants were KEMAS pre-school children aged 4-6 years old from 7 intervention and 8 control kindergartens, and teachers and parents were involved with the intervention. Assessment of nutritional status, physical activity and sedentary behaviour, drinking of water and snacking, with addition of cognitive functioning skills and gross motor development was conducted. A total of 337 children were invited and participated, with a retention rate of 91%. Baseline assessment indicated 14.3% were overweight and obese, and 9.2% were underweight; 23.1% were intellectually superior and 17.5% were intellectually below average; 45.1% had superior and above gross motor abilities, and 22.3% had poor and very poor gross motor abilities. Compared with baseline, the intervention group (n=41) reported an increase in the number of children who met the current movement guidelines of at least 60 minutes of MVPA per day from 41.5% to 63.4% (p<0.05). There was a reduction of 14.7% time allocated for sedentary behaviour from 10.2 hours to 8.7 hours per day (p<0.01) (n=41). Preliminary descriptive findings showed consumption of water (4 times per day) improved from 29.9% to 31.8%, consumption of carbonated drinks (1-3 times per month) has decreased from 38.9% to 32.5%. For snacking (1-3 times/month), there was a reduction in intake of sweet snack (45.2 to 41.4%), sweets (31.8 to 31.2%), sweet “kueh” (snack) (42 to 28.7%) and cream biscuits (29.9 to 27.3%). This intervention programme was found to promote healthy energy balance-related behaviours among pre-school children in Sarawak. The results of this study will improve the implementation, impact and sustainability of the programme in the future.
S3.4 ToyBox Malaysia: A Qualitative Perspective from Multiple Sites

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ToyBox Study Malaysia is aimed at improving healthy energy balance-related behaviours. The aim of the present study was to elicit teachers’ and parents’ perspectives regarding the implementation of ToyBox. The research design for this study was a descriptive-interpretive qualitative study. The setting involved rural and urban kindergartens in Sarawak and Peninsular Malaysia, respectively. In Sarawak, six intervention kindergartens participated in this study. All nine teachers from the kindergartens and three parents from each of these kindergartens participated in the study. From the Peninsular Malaysia site, all 15 intervention kindergartens participated in this study. The Peninsular Malaysian team focused on exploring the perspectives of teachers and their assistants regarding implementation of ToyBox. Fourteen kindergarten teachers and 10 teacher assistants participated in the study. At both sites, semi-structured focused group interviews were conducted. The interviews were voice-recorded and transcribed verbatim. Data analysis was guided using a framework and themes from the interview. Altogether, several themes emerged: (i) knowledge and awareness about ToyBox; (ii) changes in healthy energy balance-related behaviours; (iii) roles of kindergarten teachers and family in ensuring the success of ToyBox; (iv) ToyBox materials as mediational tools; (v) adoption of ToyBox activities at the kindergartens and advantages of ToyBox; (vi) expectations of ToyBox as a holistic means to a balanced diet; and (vii) weaknesses and suggestions for improvement. This multi-site qualitative study has enabled us to understand the impact of the ToyBox Study Malaysia intervention programme. ToyBox Study Malaysia hold great promise for fostering healthy energy balance-related behaviours among the pre-schoolers.
Nutritional status has an essential role among elderly. Optimum nutritional status helps to maintain better health status and slow down the progression of the diseases. The objective of this study is to determine the prevalence of overweight and obesity and its risk factors among elderly in Malaysia. Data was derived from National Health and Morbidity Survey 2018. A stratified cluster sampling design involving a total of 3977 elderly aged 60 years and above was used for statistical analysis. Face-to-face interviews were conducted to obtain socio-demographic characteristics using mobile device. Body weight and body height of selected respondents were measured using TANITA electronic weighing and SECA stadiometer. Elderly body mass index 25kg/m² and above were categorized as overweight or obese. Complex sample descriptive and multiple logistic regression analysis were performed for statistical analysis. The prevalence of overweight or obesity among elderly in Malaysia was 54.6% (95%CI: 51.9, 57.1). Multivariate logistic regression showed that elderly who were diagnosed with hypertension 1.74(95%CI: 1.44,2.10) and diabetes 1.51(5%CI: 1.23,1.86) have significant higher odds of being overweight or obese. Elderly with secondary and higher education level have significant higher odds of being overweight and obese. In addition, elderly with income RM 2,000 and above were having 1.5 times higher odds of being overweight or obese and elderly with income of RM 1,000-RM 1,999 had 1.42 higher odds of being overweight or obese. Elderly who were current smoker were 0.67 (95%CI: 0.51,0.86) less likely be overweight or obese. In conclusion, there was a high prevalence of overweight and obesity among elderly in the country that warrant urgent intervention by policymakers. Other factors associated with overweight and obesity should also be taken into consideration such as associated diseases, monthly individual income and smoking status.
Malaysia is currently facing the emerging issues of obesity and other diet-related non-communicable diseases (NCDs). The burden of mortality, morbidity and disability attributable to NCDs are currently greatest and continuing to grow in the country. Meanwhile, undernutrition still remains a concern especially the rising trend of stunting and wasting among children under 5 of age that may predispose to overweight and NCDs later in life. This double burden of malnutrition poses a real challenge to the country. More holistic and comprehensive national policies and strategies are being formulated to ensure the nutritional well-being of Malaysians through the third National Plan of Action for Nutrition of Malaysia (NPANM III), 2016-2025. In order to combat obesity issue in Malaysia, there are 48 policy options on food, physical activity and environment at various settings being identified. Most of the policy options have been incorporated into the NPANM III, 2016-2025. The development and implementation progress of these policy options are monitored under the purview of Cabinet Committee on Healthy Living Environment chaired by the Deputy Prime Minister. The government play a central role, in cooperation with other stakeholders, to create an environment that empowers and promote behaviour change of Malaysian towards practising healthy diets and active lifestyle. This including the community empowerment programme namely C-HAT (Cara Hidup Anda Terbaik) as one of the main strategies to address obesity at the grass-root level. To ensure sustainable impact a concerted effort by multi-stakeholder including government sectors, public, private and civil society is warranted. In conclusion, policy coherent and commitments by various sectors are crucial in combating obesity in Malaysia and apart from all these strategies and programmes, Malaysians themselves should also be more responsible for their own health.
S4.3 Combating Obesity at School with Parents-Teachers Collaboration: A Socio-Legal Outlook

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The rising rates of childhood obesity in Malaysia are the main concern. National Plan of Action for Nutrition of Malaysia III (NPANM III 2016-2025) found that Malaysian children today are growing up in an obesogenic environment that lead to sedentary lifestyle and unhealthy eating habit. Therefore, children aged 7 to 17 which comprises 4.939 million school children are at risk of obesity that will lead to non-communicable disease (NCD) in their later life. Strategic coordination is needed between teachers and parents in combating obesity at school. However, teachers and school administrators are already stretched and should not be held responsible for an issue that requires concerted action across the board. Hence, families, government, industry, and other parts of the public or private sector have a role to play in making food and drink at school healthier and supporting children to make better choices. NPANM II 2006-2015 has identified lack of intersectoral and multi-stakeholder coordination. Initial study showed lack of strategic coordination between Ministry of Education and Ministry of Health due to insufficient regulatory framework. This study aimed to analyse the effectiveness of parents-teachers collaboration as important tools for intervention in combating obesity among school children. It is found that the National Education Blueprint 2013-2025 can complement the initiatives under NPANM III 2016-2025 as the parents and community involvement are critical tools towards the success of these initiatives.
S4.4 A Community Setting Weight Management Intervention Among Overweight and Obese Adults: Suku Suku Separuh & Cergas (3SC) Programme

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Dietary and behaviour modification as well as physical activity play important roles in weight management. This presentation discusses the Suku Suku Separuh & Cergas (3SC) which was carried out among 199 adults (184 women and 15 men) aged 43±9.4 in five community setting in Johore. The objectives of the 3SC programme were to educate the overweight and obese adults on the appropriate portion size using the healthy plate quarter-quarter-half concept, to increase their physical activity level and to instil behaviour modification in the management of weight and non-communicable diseases. The 3SC programme modules include dietary modification (dietary modification and consultation once/month), behaviour modification (motivation consultation once/month), physical activity (aerobics/ zumba once/week) and implications of obesity on health. The intervention was carried out for 6 months however, the results reported is based on 3 months intervention. Anthropometric measurements such as body weight, percent body fat, waist circumference and blood pressure were measured at baseline (P0) and 3 months after intervention (P1). At baseline, the results showed that 33.2% were overweight and 66.8% were obese, while 91.3% female had very high percent body fat. After 3 months of intervention, there were significant reduction in the mean weight (P0: 80.2±14.1 vs P1: 79.1±14.0, p<0.05), waist circumference (P0: 94.4±11.9 vs P1: 93.6±11.1, p<0.05), systolic blood pressure (P0: 131.8±20.4 mmHg vs P1: 129.7±20.0 mmHg, p<0.05) and diastolic blood pressure (P0: 82.8±12.2 vs P1: 80.8±11.1 mmHg, p<0.05) as compared to the baseline. However, there were no significant changes in BMI and percent body fat. After 3 months of the intervention, 9.0% of the adults lost more than 4kg of weight while another 17.6% lost between 2kg to 4kg. Body weight reductions have resulted in improvement in the BMI category to 1.5% having normal weight, 34.7% were overweight and 63.8% obese at 3 months follow-up with mean percentage of body weight change -1.4±2.4. This 3SC intervention programme demonstrated that successful weight loss can be achieved in the community setting, if behaviour modification for both food intake and physical activity are achieved and maintained.
Abstracts of Papers

Symposium Day 2
S5.1 Real-World Clinical Effectiveness of Liraglutide 3.0mg for Weight Management in Canada

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Most of our evidence for anti-obesity medications (AOMs) come from randomized clinical trials (RCT). Real world evidence regarding the use of medications for weight management is rare but is becoming important to inform all stakeholders of the effectiveness of a medication in real situations. A Canadian clinic has recently published some evidence regarding the use of liraglutide 3.0mg in the real world. The data is from 2015 - 2016 (the first year Liraglutide 3.0mg was available for weight management in Canada). The study is a retrospective analysis of patients attending the Wharton Medical Clinic, a government funded community-based weight management clinic in Canada. The study assessed 311 patients initially started on the medication. At 4 months 67.5% of patients were still taking the medications and at 6 months 53.7% of patients were still on medications. Medications were either covered by private insurance or patients paid out of pocket. The demographics of patients were mainly white, females, average age of 50. They 75% normoglycemic, 20% prediabetes and 5% diabetes. The average BMI was 40, and average weight was 114kg, a bit heavier that the SCALE trial. The average weight loss was 7% at 6 months. Categorical weight loss was 64.1% losing 5% weight and 34.5% of patients losing 10% at 6 months. The major side effects were nausea at 44% and constipation at 15%. The authors conclude that this trial may give some insight into how patients will respond to AOMs in the real world.
S5.2 Surgery for Diabetes Mellitus: A New Paradigm Shift

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The current global obesity and diabetes phenomena is an alarming concern. Obesity and Diabetes goes hand in hand, hence the aptly termed Diabesity. Malaysia is currently the fattest nation in South East Asia and second in Asia. The prevalence of Diabetes in Malaysia stands at an alarming 17.5% and more worryingly despite numerous efforts to enhance these patients’ Diabetic control, only less than a quarter are under the satisfactory and good control category. The current management for obesity follows a stepwise treatment from lifestyle alteration, pharmacotherapy, endoscopic treatment and a more definitive bariatric surgery. Metabolic surgery is a term used primarily for surgery that aims to alter, improve and treat metabolic diseases, in particular diabetes. The history of metabolic surgery started back in the early 1960s, and since then, it has evolutionised and revolutionised into a more safe, efficient and durable form of surgery. Currently the most performed metabolic surgery is the Roux en Y gastric bypass. The mechanism behind, the resolution of diabetes is based on the foregut (duodenal proximal jejunal bypass) and the hindgut (excretions of incretins in particular, GLP-1 and PYY) theory. At present, there are numerous and compelling evidence notably the Swedish SOS trial, STAMPEDE trial, Asian and our local Malaysian data, which showed very promising and durable metabolic outcomes. More scientific evidence has proved the benefits of metabolic surgery in improving and resolving microscopic and macroscopic complication of diabetes. Several studies have also showed the prophylactic benefits of metabolic and bariatric surgery in risk reduction of development of diabetes. The predictors for resolution of diabetes is based on the A (age), B (BMI), C (c peptide) and D (durations), and the individualised metabolic score allows us to choose the most appropriate type of metabolic surgery relying on factors includes duration of diabetes, diabetic control, the numbers of diabetic medications and the use of insulin. These compelling evidences that support the superiority of metabolic surgery or diabetes surgery has result in the inclusion of metabolic surgery in the management of diabetes and has been endorsed by the International Diabetes Federation since 2012 with the support of numerous medical, endocrine and surgical societies. The first bariatric metabolic surgery in Malaysia was performed in 1996 and to date over 3000 cases has been performed. The detailed progress and current local and international data on metabolic surgery and outcome will be discussed. So, who would have thought that diabetes is a surgical problem? Well it is now.
S5.3 Leptin in Obesity Related Disorders

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Obesity has long been recognized as a risk factor contributing to diseases like hypertension, atherosclerosis, pre-eclampsia, diabetes mellitus, renal disease, cancer, and infertility. The precise link between obesity and these diseases however remains uncertain. Leptin is a 16 kDa protein produced primarily by the white adipose tissue and secreted constitutively into the circulation where its levels correlate positively with percentage body fat. Whilst leptin is important for normal physiological functions, it appears that persistently elevated levels of leptin, as often seen in obese individuals, could be responsible for the various obesity-associated disorders. Its reported actions on the sympathetic nervous system, vascular endothelium and smooth muscle, ACE2 activity, renal salt and water handling together with its pro-oxidant activities make it the prime potential contributor to the pathogenesis of hypertension, atherosclerosis and coronary heart disease in the obese. The raised leptin levels in obese expectant mothers could make them more susceptible to pre-eclampsia, which is often seen in these women. Leptin administration to pregnant rats e.g. has been shown to raise blood pressure, cause endothelial activation and increase urinary protein excretion. Leptin administration to normal weight rats causes changes in sperm parameters that are very similar to those reported in obese males and could therefore account for the higher prevalence of infertility evident in these males. Its tumorigenic and cell proliferative properties, together with its ability to enhance the activity of some carcinogens, points to its role in the higher prevalence of cancer reported in the obese. In brief, it appears that leptin might be the missing link between obesity and the various obesity-related disorders. Clearly, the role of leptin in these disorders needs to be investigated further. Attempts have to be made to find ways to ameliorate its impact that could help reduce the prevalence of these disorders in obese individuals.
S5.4 Obesity and Cardiometabolic Markers Among Adolescents Born to Parents with Premature Coronary Heart Disease: A Case Control Study

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Adolescents with parental history of premature coronary heart disease (CHD) are at increased risks of developing cardiovascular and metabolic diseases in adult life likely due to genetic, behavioural and environmental influences. The objective of this study is to determine the cardiometabolic risk factors among adolescents with parental history of premature CHD compared to controls. Adolescents (10-18 years-old) with parental history of premature CHD and age- and gender-matched controls were included. Body mass index (BMI), blood pressure (BP) and waist circumference were measured. They were assessed for obesity (IOTF criteria), metabolic syndrome (IDF 2010) and hypertension (2017 AAP Guidelines). A total of 50 adolescents (25 in each group) were recruited. There were 13 (52%) males in each group with participants being largely Malays (66%). Adolescents with parental history of CHD (study group) had higher mean BMI (23.0 ± 5.5kgm⁻² vs 19.3 ± 3.4 kgm⁻², p=0.006), higher proportion of obesity (10/25 (40%) vs 1/25 (4%), p=0.002), higher median diastolic BP (65.0mmHg (60.0, 77.5) vs 60.0mmHg (57.0, 64.5), p=0.007) and higher proportion of hypertension (28% vs 4%, p=0.024) compared to controls. They also had significantly higher median fasting glucose (4.8mmol/l (3.8, 18.1) vs 4.6mmol/l (4.2, 5.0), p=0.011), fasting insulin (12.1 mU/L (1.9, 45.9) vs 7.8mU/L (5.7, 10.7), p=0.021) and HOMA-IR (2.54 (0.3, 12) vs 1.56 (1.2, 2.2), p=0.010). Although there were 48% of them who had dyslipidaemia compared to 28% in the control group, this was not statistically significant (p=0.120). Three adolescents (12%) in the study group had metabolic syndrome with one diagnosed with Type 2 Diabetes Mellitus. There were significantly larger percentage of adolescents with 2 or more metabolic syndrome risk factors in the study group compared to controls (32% vs 4%, p=0.012). As a conclusion, this study revealed a significantly elevated burden of cardiometabolic risk factors in adolescents with parental history of premature CHD and emphasises the urgent need to screen and treat these adolescents early in their life course.
S5.5 Jom Cergas: An Intervention Approach Among Selected Obese Student in Sekolah Kebangsaan Jelutong Barat, Pulau Pinang

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Overweight and obesity among children has become one of the major threats in public health. Managing this issue became more challenging year by year. This intervention targeting obese student in Sekolah Kebangsaan Jelutong Barat, age 10-12 years old, that was already been screen under SEGAK programme, performed by the school teacher. 36 obese students with the permission from their parents or guardians, were selected to join the intervention that was held for 14 weeks. This intervention involves not only involvement from the teachers and health staff, but also the parents or guardians of the students. Seven simple modules been used throughout this intervention and the parents or guardians help to monitor the student activity and diet at home with some reports delivered everyday via Social Media Groups. Regular BMI monitoring also been done by the teachers throughout the intervention period. Among the 36 selected students, 94.4% (34 students) shows the reduction of BMI status with the range of reduction percentage are 0.2% to 15.2%. Two students showed more than 10% reduction of their BMI compare to previous BMI before the intervention. 72 % of the students shows improvement in their academic achievement (2.4%- 24.3% of GPM level) base on GPM rating by the school teachers. The KPI for the attendance to school (target 90% days attendance in a year or more) also shows the improvement with 31 out of 36 students (86.1%) achieved 90% attendance throughout the program. As the conclusion, the intervention helps to reduce BMI among targeted students and also helps to improve their academic achievement level and also reduce the rate of absence to school.
S6.1 In Vitro Evaluation of Cytotoxic and Anti Adipogenic Activity of Gac Fruit Extract (*Momordica cochinchinensis* (Lour.) Spreng)

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*Momordica cochinchinensis* (Gac), contain extraordinarily high bioactive compounds especially carotenoids (β-carotene, lycopene and lutein). In this study, the effects of Gac fruit extracts (peel, pulp and aril) on antioxidant, cytotoxic and anti-adipogenic activity of 3T3-L1 adipocytes were evaluated. The DPPH radical scavenging activity of Gac extracts at concentration 1000µg/ml serial dilution was measured. The viability of 3T3-L1 preadipocytes were evaluated by MTT assay. Differentiated adipocytes were treated with 75, 150 and 300µg/ml of Gac extracts for 7 days. The lipid accumulation and inhibitory effects of Gac extracts on 3T3-L1 adipogenesis were evaluated by Oil Red O staining. The triglyceride content in adipocytes was measured by a colorimetric method, comparing to the control. The IC₅₀ values for peel, pulp and aril against 2,2-diphenyl-1-picrylhydrazyl radicals were 660, 560, and 820µg/ml, respectively. There is no toxic effect on the viability of 3T3-L1 cells up to concentration of 200µg/ml. Gac extracts significantly reduced the viability of 3T3-L1 cells at 200µg/ml and exerted the cell growth and proliferation when compared to non-treated cell-lines. The Gac extracts treatment markedly diminished the lipid accumulation and inhibited the differentiation of 3T3-L1 cells in a dose-dependent manner. Among the three part of Gac extracts, pulp dramatically diminished the intracellular triglyceride content by 0.42% in adipocytes; higher than aril and peel respectively. Gac extract efficiently inhibited adipogenesis in 3T3-L1 adipocytes in a dose response manner as indicated by a significant reduction in lipid accumulation, triglyceride content, and cell viability. These findings suggest a potential therapeutic approach for the prevention and treatment of obesity.
S6.2 The Role of Annatto Tocotrienol on Toll-like Receptor Signalling in a Rat Model of Metabolic Syndrome Induced by High-carbohydrate High-fat Diet

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The toll-like receptor (TLR) signalling is the most implicated mechanism during inflammation. All components of metabolic syndrome (MetS) share an underlying chronic inflammatory aetiology, manifested by increased levels of pro-inflammatory cytokines. This study aimed to investigate the role of annatto tocotrienol (AnTT) in modulating TLR signalling during MetS. Male Wistar rats (n=30) were divided into five groups. The baseline group was sacrificed upon arrival. The normal group was given standard rat pellet and tap water. The remaining three groups were fed with high-carbohydrate high-fat (HCHF) diet and 25% fructose drinking water to induce MetS. At week 8, these animals were assigned with three different treatments [tocopherol-stripped corn oil (vehicle), 60 and 100 mg/kg AnTT] respectively. The rats were sacrificed at week 20. Blood was drawn and immediately processed into serum. Liver was harvested, homogenised in protein extraction buffer and supernatant was collected. The measurement of TLR2, TLR4, downstream targets [myeloid differentiation primary response protein (MyD88), nuclear factor-kappa B (NF-κB) and phosphorylated NF-κB] as well as inflammatory cytokines [C-reactive protein (CRP) and interleukin-10 (IL-10)] was performed. Our data revealed that HCHF diet increased the levels of TLR2, TLR4, MyD88 and caused NF-κB phosphorylation in liver (p<0.05). In serum, HCHF diet increased TLR2, TLR4 and CRP levels in animals (p<0.05). Treatment with 60 and 100 mg/kg AnTT lowered TLR2, MyD88, caused NF-κB dephosphorylation and raised IL-10 in liver of the HCHF rats (p<0.05). The elevations of TLR2 and CRP in serum were prevented following AnTT supplementation (60 and 100 mg/kg) (p<0.05). Only 60 mg/kg AnTT reduced the level of TLR4 in liver and serum of the HCHF animals (p<0.05). In summary, AnTT potentially reduced inflammatory response during MetS. The postulated mechanism of action may be in part mediated through the inhibition of toll-like receptor signalling, thus favouring the balanced profile between pro- and anti-inflammatory cytokines.
S6.3 Gut Microbiota Dysbiosis in Diet-Induced Metabolic Syndrome and the Prebiotic Potential of Geraniin and Geraniin-Enriched Extract

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Metabolic syndrome (MetS) refers to a cluster of risk factors associated mainly with cardiovascular diseases and type II diabetes. Management of MetS involve lifestyle modifications and pharmacotherapy which were shown to be ineffective. More recent methods involve modification of gut microbiota (GM) through the intake of prebiotics, probiotics, synbiotics or via faecal transplantation. Polyphenols are emerging prebiotics shown to positively modulate GM composition in both human and animal studies and subsequently metabolic derangements. Since inflammation and oxidative stress are the hallmarks of Mets, geraniin (ellagitannin), a polyphenol, appears to be a suitable candidate in addressing MetS due to its established antioxidant and anti-inflammatory properties. Thus, the objective of this study was to determine the effect of oral administration of geraniin and its enriched-extract from the *N. lappaceum* L. rind in modulating the gut microbiota and, its influence in ameliorating metabolic derangements among rats fed a high-fat diet (HFD). Three weeks old male Sprague Dawley rats were divided into five groups and fed either a normal diet or a high-fat diet (HFD) supplemented with either geraniin (5mg/kg or 50mg/kg) /the geraniin-enriched extract (115mg/kg). Metabolic parameters measuring body weight, OGTT, fasting glucose, fasting insulin, lipid profile and lipopolysaccharide-binding protein (LBP) concentration were evaluated. The metagenomics evaluation (16s rRNA sequencing) of the faecal samples was also determined. Administration of 5mg/kg GE and 115mg/kg of GEE significantly improved TC, triacylglyceride, LDL, glucose intolerance, HOMA-IR and LBP concentrations. The 16s rRNA sequencing of the faeces indicated alpha diversity to be improved in 5 mg and 50mg geraniin administered rats. While, PcoA analysis (beta diversity) showed normal diet fed rats and HFD rats formed a distinct bacterial cluster based on the diet. Further analysis to determine the relative abundance is on-going to identify changes in specific bacterial genus in response the treatment.
S6.4 High-Fat Emulsion Modification Through High Shear Homogenization: An Approach in Appetite Control

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This study aimed to assess the potential of high shear homogenization in emulsion structuring to enhance diet satiety and satiation. Using curry gravy as the food model, the oil-in-water emulsion made up of 25 wt.% oil phase and 75 wt.% aqueous phase was subjected to homogenization process at speed of 5000 rpm, 10000 rpm, 15000 rpm, 20000 rpm and 25000 rpm, respectively. The effects of modification were done by investigating the colour, refractive index, rheological and microstructure properties versus the control sample. The micrograph result showed that with increase homogenization speed, formation of more uniform and smaller oil droplet sizes, range from 10 μm to 50 μm as compared to the control sample which was polydispersity. The increase in homogenization speed significantly changes the colour of emulsions to brighter (high value of L*) and more yellowish (increased value of b*). This resulted by the significant decrease of oil droplet size which allow higher degree of light reflection. With respect to the rheological behaviour, the curry emulsions were found to exhibit shear-thinning behaviour. The value of consistent flow index (k) of the emulsions homogenized at speed above 20000 rpm was significantly higher (p < 0.05) than other samples. All curry emulsions demonstrated similar fluid-like behaviour with greater loss modulus (G") than storage modulus (G’) and loss tangent (tan δ) more than 1. Recent researches evidenced that smaller oil droplet size increases total surface area of food emulsion and thereby induce satiety and satiation by increasing fatty acid sensing for greater fat hydrolysis rate. On the other hand, high viscosity and creaminess foods were expected to have an effect on appetite suppression. The present study provides useful information in developing food emulsion system with enhanced satiating power predominantly in appetite control for long-term weight management.
If you don’t measure accurately, you can’t improve it accurately

- The key to effective weight loss is losing excess body fat, not overall body weight.

- Instead of tracking how heavy you are, use body composition to analysis to track how healthy you are.

---

**InBody**

**ID:** Jane Doe  
**Height:** 156.9cm  
**Age:** 51  
**Gender:** Female  
**Test Date / Time:** 2015.05.04 09:46

### Body Composition Analysis

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### Body Composition History

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---

**Visceral Fat Area:** 127.8

**Whole Body Phase Angle:** 4.3°

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Advanced Body Composition Management for Obesity Management

Lisa Seungju Cha
Clinical Team, InBody CO., Ltd, Korea

The present session is to introduce how body composition management helps obesity management and share its various applications and technologies. Along with the recent trend to define obesity not only using BMI but body composition, this session will focus on the knowledge of scientific outcomes regarding how body composition helps in obesity management from various groups as well as share new concepts and parameters which will relate with future direction of obesity management by professionals. Many different obesity treatments are used to treat obesity, however, in order to maximize the outcomes, it is important to diagnose which type of obesity each patient is having. Using body composition, we can diagnose patients into four different types of obesity. Subcutaneous obesity, Visceral fat obesity, Muscular obese and also oedematous obese types. According to these different types of obesity, we can choose the most effective treatment and personalize the treatment procedure for each patient. There are many different body composition analysis methods such as skin-fold measurement, DEXA (Dual Energy X-ray Absorptiometry), UWW (Under Water Weighing), CT, MRI, etc. Among many body composition analysis methods, BIA (Bioelectrical Impedance Analysis) is fast, easy, non-invasive measurement which allows us to constantly monitor the patient’s changes before and after treatment. Recent discussions have risen questions whether BIA devices are accurate and valid for clinical practice. This session will also focus on different types of BIA technologies (Single frequency measurement vs. Multiple frequency measurement, Whole body measurement vs. Direct segmental measurement, Use of empirical data vs. Exclusion of empirical data etc.) and what practitioners need to consider when choosing an appropriate device for clinical practice.
Recognizing the importance of promoting healthy nutrition from a young age, Nutrition Society of Malaysia (NSM) collaborated with Nestle Malaysia in developing and implementing a nutrition education module for primary school children. Term as the Nestlé for Healthy Kids Programme, its main objective is to improve nutrition knowledge and promote active lifestyle among primary school children aged 7 to 12 years. Launched in August 2010, the programme was planned and conducted by a nutrition expert panel from NSM and entailed the implementation in three phases. In Phase 1 (2011 – 2013) of the programme, NSM developed a 3-year educational module and tools comprising of 18 topics on nutrition, hygiene and physical activity. The ‘fun while learning’ concept was used by the nutritionists from NSM to engage the students with various games, quizzes and songs. The nutritionists also used easy to understand words and visually appealing pictures, while worksheets and goal cards were used to reinforce the children’s learning and to monitor their eating and lifestyle habits. Parents were given pamphlets to inform them of what their children were learning. Further, a three-year longitudinal intervention study was conducted in Phase 1. The study aimed to assess the effectiveness of this educational programme on changes in the children’s nutrition knowledge, attitude and practice (KAP), and nutritional status. A total of 12 primary schools (n=386 children) in Klang Valley were randomly assigned as intervention and control schools. The results showed that there was a significant increase in the nutrition knowledge score compared to the control group. However, there was no significant change in attitude and practice scores. There was a lower percentage of overweight and obesity in the intervention group (32.5%) than the control group (44.0%). With the aim of expanding the reach of the programme to more school children, Phase 2 (2014 – 2016) was implemented in 77 day-boarding primary schools in East Malaysia using the developed module. A 3-year Training of Trainers (TOTs) was given to 170 teachers and wardens who in turn educated 5000 students. Teachers were very positive about the trainings and modules and topics were well received by the students. Based on the learnings from the previous phases of the programme, the educational contents in the Phase 3 (2017 – to date) were summarized into 2-hour interactive nutritional educational sessions with nutritionists that aimed to give nutritional awareness in order to reach out to more students and schools, and reduce burden on teachers for nutrition education. To date, Phase 3 of the programme has reached out to 53,000 students. Since 2010, the Nestle for Healthier Kids programme managed to educate close to 59,000 students at more than 200 schools. It is hoped that many more schools and students will be reached out, and refresher learnings could be implemented in the previous participating schools in the future to reinforce the initial learnings.
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based on 17 OPTIFAST users in Malaysia

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- 20g
- Only 201 kcal per serve
- Excellent source of protein

- 3.6g soluble fibre per serving
- Nutritionally complete meal replacements

- Excellent source of 24 vitamins & minerals

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Gluten Free

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SYMPOSIUM 7
BATTLE OF THE BULGE (OBESITY) – ENVIRONMENTAL AND INDIVIDUAL PERSPECTIVE STUDIES

S7.1 Food Behaviours in Eating Out Contexts

Mognard E1, Laporte C2, Tibère L2, Dupuy A2, Fournier T2, Dasgupta A4, Baloch GM4, Pillai SKV4, Neethiahnanthan AR1, Ismail MN1, Poulain JP5
1 Taylor’s University, LIA-CNRS “Food Cultures & Health”
2 University of Toulouse Jean Jaurès, LIA-CNRS “Food Cultures & Health”, Taylor’s-Toulouse University Centre
3 IRIS-CNRS
4 Taylor’s University
5 University of Toulouse Jean Jaurès, Taylor’s University, LIA-CNRS “Food Cultures & Health”, Taylor’s-Toulouse University Centre

The National Plan of Action for Nutrition of Malaysia (2016 – 2025) has incorporated numerous initiatives towards school canteens, cafeteria and catering. As such, the “environmental health model” or “ecological model of health” is one of dominant paradigms to curb the increasing trends of obesity and non-communicable diseases. Assessment of this environmental and preventive policy requires an in depth-analysis of Malaysian food supply and consumption practices. High rate of eating out is one of the specificities of the Malaysian food system that has been increasing with the urbanization of the population that may be associated with obesity. It is assumed to be associated with public health concern regarding the development of obesity. There are also evidences demonstrating that food choices when eating out are usually higher in energy content. However, most of the available data on this perspective were reported in Europe and North America while Asia is characterized by high food cultures diversity, a very pronounced outside of home food consumption and a rapid urbanization. Hence, there is a gap in the knowledge in the assessment of actual contribution of eating out on the explanation of the Body Mass Index. This research intents to classify eating contexts (inclusive of eating outside and at home); To evaluate quantitatively the proportion of those eating contexts; To analyse dynamic and modernization of food practices and social representations in multi-ethnic societies; To analyse social interactions influences on individual food choice in different contexts. From a methodological standpoint, the project benefits from several existing or on-going data collections; namely the Food Barometers (two data collections completed in 2013 and 2018); the “Eating Out Survey”; the “Experimental Restaurant” and some ad-Hoc methods such as ethnography; food autobiographies (focusing on the discourse related to eating out) and food trajectories.
S7.2 Investigation on Over-energy Consumption Association with Food Culture in Asia: A Potential of Satiety and Satiation Enhancing Effects Through Food Matrix Modification

Chong LC¹, Goh WDY², Lau CW², Pau CH² & Ismail MN¹
¹School of Food Studies & Gastronomy, Taylor’s University, Subang Jaya, Malaysia
²School of Biosciences, Taylor’s University, Subang Jaya, Malaysia

A rapid economic growth has made greater contribution to the food availability and this brought obesity to an alarming stage in Asia. Recent reviews have addressed the relationships between obesity and the food culture in Asia. Aside from the high carbohydrate content of staple food such as rice, noodles and the flour-based products, most of the Asia-style cuisines come with gravy as a good accompaniment to the staple food. This eating habit or cooking culture present since decades not only increase the pleasantness and familiarity of food consumed, however, it also accounts 10-20% of the total weight of meals and was proven as one of the calorie contributors. Westernized and processed food and beverage consumption have also heightened the average sugar and fats consumption among Asian. One of the major sources of excessive sugar and fats intake is reported from sweetened beverages, particularly the resurgence in popularity of the high calories milk tea in Asian regions recently. This phenomenon has led to an underlying risk factor for obesity and other Non-Communicable Diseases (NCD). Somatosensory properties of food play an essential role in diminishing the feelings of satiation and satiety. This project aims to investigate the extent of anticipated appearance and texture characteristics modification of three categories of products: rice grains, gravy emulsion & milk tea beverage. The recent disclosure of food and beverage matrix, such as emulsion and foam restructuring by a real interaction of major nutrient components in the matrix has been identified as a noteworthy technique to create palatable healthier diet that closely linked to lower energy intake. Research in appetite control, including sensory specific satiety (SSS) and sensory specific desire to eat (SSD) using high speed homogenization, sonication & stabilizer technology hold the potential for redesigning high fat, high sugar and carbohydrate-dense food will be focused.
S7.3 Taste, Emotion and Food Choice: A Facial Expression Analysis

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¹ School of Hospitality, Tourism & Events, Faculty of Social Sciences and Leisure Management, Taylor’s University, 47500 Subang Jaya, Selangor, Malaysia
² School of Food Studies and Gastronomy, Faculty of Social Sciences and Leisure Management, Taylor’s University, 47500 Subang Jaya, Selangor, Malaysia
³ Faculty of Social Sciences and Leisure Management, Taylor’s University, 47500 Subang Jaya, Selangor, Malaysia

Traditional consumer studies (sensory evaluation, focus group, survey, etc.), to a certain extent, were unable to elucidate the complexities of food choice since they are based on customers’ declarative data (conscious and rational) which sometimes may not reflect consumer’s true opinion (non-conscious and emotion). Despite extensive sensory analysis of a new product (particularly, ‘clean label’ product) before market introduction, the failure rate is still high. Consumers today are more health-conscious than before and food intake and eating behaviours directly affects one’s health. It has been argued that taste evokes emotions which will influence our food choice and purchase decision. The complexity and non-propositional structure (may be meaningful without being true or false) of emotion make it very difficult to objectively quantify the antecedents that influence food choice through a survey. Hence, the main objective of this study is to explore how tastes characterize emotions and affect our food choice (dietary choice) in a social context environment through facial expression analyses. A quasi-experiment research design is planned for this study to assess the facial expression through a facial emotion tracking method. Real-time facial expression data will be captured through ceiling-mount video camera for consumer emotional response to food stimuli that have been presented. With the inherent algorithms embedded into the system, facial muscular movement will be recorded to better explain the food choice phenomenon. Beyond the convention, addressing human eating behaviour from the consumer neuro-marketing perspective can benefit greatly in the research of consumer eating behaviour, especially in an attempt to better understand the complexity of consumers’ food choice and their decision-making process. The findings from this study will record the intrinsic non-verbalized emotion status that consumers were unable to articulate. It is hoped that the behavioural/cognitive datasets will be able to enhance the predictive power of food preference and choice.
S7.4 Smart, Connected and Immersive Ecosystem to Shape a Healthy Diet and Lifestyle

Tan CH¹, Wong BTZ¹, Chekima K², Ismail MN¹
¹School of Food Studies and Gastronomy, Taylor's University, Lakeside Campus, 1 Jalan Taylor’s. Subang Jaya, 47500 Selangor.
²School of Biosciences, Taylor’s University, Lakeside Campus, 1 Jalan Taylor’s. Subang Jaya, 47500 Selangor.

The lifestyles of Malaysians are increasingly defined by unhealthy dietary habits and an increased risk of diet-related non-communicable diseases. While population health programs are embraced at the national level policies, an individual’s lifestyle is determined by their daily commitments and environment. Hence, personalised programs present new opportunities for targeted interventions to improve the individual’s health. Younger people expect healthcare to be mobile, digital and available on-demand. In the era of digital lifestyles, smart personal devices can allow people to become more active participants in their own health. Hence, an ecosystem of connected health devices, health informatics and mobile connectivity, can provide a model for the delivery of on-demand and personalised health interventions. For this ecosystem, we envision a smartphone-based platform paired with a host of connected health devices that collect data on key vitals in real-time. Smart predictive analytics utilise this data to generate feedback, insights and timely guidance to the individual user. The user experience must also consistently motivate users to achieve health goals. In our study, we demonstrated a model ecosystem that utilised a device that monitors post-prandial glycaemic response data in real-time. We formulated an expert system to proffer carbohydrate intake recommendations in response to the user data and behaviour. Interaction with individual users are facilitated via a smartphone app interface. Importantly, the study examined the determinants of process design and user experience that underpins adoption and sustenance of the ecosystem. Outcome is measured as changes to food habits and eating decisions. In Malaysia, there is a paucity of studies on the implementation of mobile and health technologies on nutrition and lifestyle. The study describes the implementation of an integrated model for the delivery of personalised health intervention, with the aim of informing the design and implementation of the next generation of connected health and wellness innovations.
Obesity is defined as a body mass index (BMI) greater than 30 kg/m². An imbalance between the intake and expenditure of energy results in obesity. It is considered as one of the biggest and fastest-growing health problems around the globe. According to the reports of world health organization (WHO), in 2016, 1.9 billion adults were overweight, of whom 650 million were obese. It is also considered as the fifth leading cause of death worldwide. Polymethoxy flavones are a group of methoxylated phenolic compounds and are usually found in large amount in citrus fruits. Polymethoxy flavones have been proven in the previous studies to exhibit anti-carcinogenic, anti-inflammatory and anti-diabetic properties. Their anti-obesogenic role has been shown in a very few previous studies which need further research. In our study, various methoxy flavones, distinct from each other in their substitution of various methoxy groups have been synthesized in collaboration with the University of Kent, England. These polymethoxy flavones will be investigated for their anti-obesogenic effects, which include the anti-pancreatic lipase activity, activation of the negative regulatory pathway of adipogenesis such as Wnt/β catenin-dependent, and AMPK pathway. First, the potential anti-obesogenic effects of polymethoxy flavones will be investigated using an in vitro model (3T3-L1 cell line). The results obtained will be analysed further comparatively with an in vivo model using BALB/c mice. This would give a better understanding of the relevant efficacies of polymethoxy flavones against obesity epidemics. Moreover, it will also provide an opportunity to assess the most significant group of polymethoxy flavones in combating obesity through diversified anti-adipogenic molecular mechanisms.
S8.1 Effect of Using Different Basal Metabolic Rate Predictive Equations on the Estimation of Physical Activity Ratios of Walking

Caszo BA¹, Johari HM², Knight VF², Gnanou JV¹
¹School of Medicine, International Medical University, Kuala Lumpur
²Faculty of Medicine and Defence Health, National Defence University of Malaysia, Kuala Lumpur

This investigation aimed at analysing the effect of using six different basal metabolic rate (BMR) predictive equations on the calculation of physical activity ratio (PAR) of walking by officer-cadets studying in a university. PARs are a ratio of the energy cost of the activity expressed as a multiple of the BMR and can be used to estimate energy requirements. Predictive equations for BMR may be used to estimate these values. Since predictive equations must be derived from data of representative populations, the choice of a predictive equation influences this estimation. Male participants aged 20-25 years who gave written informed consent were enrolled. Two hours after consuming their breakfast (between 10 and 11 am), energy expenditure was measured while walking at a speed of 3.5km/hour for 15 min on a treadmill, using a mobile indirect calorimeter (K4b2, COSMED, Italy). Data was downloaded onto a computer and energy expenditure was thus obtained. PAR values were then calculated using the six BMR predictive equations. The following PAR values of 3.6, 3.4, 3.7, 3.5, 3.9, 3.7 were obtained. For 24 hours (one day), energy expended was calculated by multiplying the PAR and BMR. An overestimation of up to 454 Kcal/day to an underestimation of 504 Kcal/day of energy expending during this time were observed with this group of individuals. This is a significant number of calories either not provided for or provided in excess of an individuals’ calorie requirement. Thus, use of appropriate BMR equations should be taken into consideration while deriving and documenting PAR values for a population at large.
S8.2 Integrating Traditional Games in Physical Education Lesson to Increase Physical Activity: A Comparison of Normal, Overweight and Obese Children

‘Arif A¹, Nadzirah I¹, Nor Farah MF² & Ruzita AT¹
¹Nutritional Sciences Program & Centre of Community Health, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, 53000 Kuala Lumpur
²Occupational Therapy Program & Centre of Community Health, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, 53000 Kuala Lumpur

Physical education (PE) lesson is an important avenue to promote physical activity (PA) in school. Non-sport activities like traditional games can be practical way to promote PA during PE lesson, especially among those who are less inclined in sports. This study aims to compare PA variables between playing traditional games in PE lesson and conventional PE lesson among normal, overweight and obese secondary school students. A total of 56 subjects (Mean age: 13.4 ± 0.5 years; mean BMI: 21.8 ± 4.9 kg/m²) from a school in Kuala Lumpur were consented by their parents to participate in this study. The sociodemographic and anthropometric measurements were collected prior to data collection. BMI categories were determined by WHO z-score for BMI-for-age. PA was measured by using the Actigraph accelerometer (Actigraph GT3X+), on two separate PE lesson period which were: PE lesson incorporated with traditional games (TG-PE) and conventional PE lesson. All subjects wore accelerometer for a total of 40 minutes during each PE lesson to determine total activity counts and moderate-to-vigorous physical activity (MVPA). The chosen traditional games for this study were Galah Panjang and Baling Selipar. About half (51%, n = 29) of the subjects were normal weight and the rest fall into overweight (n = 12) and obese (n = 15) categories. There were more overweight and obese boys (57%) compared to girls (38%). Overall, mean total activity counts (p=0.007) and time spent in MVPA (p=0.006) were 20% and 19% greater respectively, during TG-PE lesson compared to conventional PE lesson. PA levels were slightly greater across normal, overweight and obese subjects during TG-PE lesson compared to conventional PE lesson, however these differences were not significant. In conclusion, PA participation during PE was similar across BMI categories, while incorporating fun and meaningful activities like traditional games in PE lessons can serve as an alternative strategy to promote PA participation among overweight and obese children, who may not be inclined in sports.
S8.3 Meeting Physical Activity, Sedentary Behaviour and Sleep Guidelines is Associated with Healthier Body Weight Status Among Malaysian Pre-schoolers

Lee ST, Wong JE & Poh BK
Nutritional Sciences Programme & Centre for Community Health, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia

Children with a combination of high physical activity, low sedentary behaviour and adequate sleep have better adiposity and cardiometabolic health. The WHO and Canada recently released guidelines that recommended pre-schoolers to have three hours of physical activity with minimum one hour of moderate-vigorous physical activity, less than an hour of screen time, and 10-13 hours of sleep for children aged 4 years; while children aged 5-6 years should have less than 2 hours of screen time and 9-11 hours of sleep. This study aims to determine pre-schoolers’ compliance to these guidelines and its association with their body weight status. Participants comprised 230 pre-schoolers aged 4-6 years who were attending 22 kindergartens in Kuala Lumpur. Physical activity was measured by using hip worn Actical accelerometers. Screen time and sleep time were proxy-reported by their parents. Body mass index (BMI) and BMI-for-age (BAZ) were calculated from measured body weight and height. Mean weight and height were 18.9 ± 5.1 kg and 110.2 ± 6.9 cm, respectively; and 7.0% of children were overweight and 8.3% were obese. Only 6.5% (n=15) of pre-schoolers met all three recommendations for physical activity, screen time and sleep. About 17.0% (n=39) of pre-schoolers did not meet any of the three guidelines. Pearson Chi-square test showed that compliance with these guidelines was associated with body weight status of pre-schoolers (χ² = 7.869, p<0.05). Binary logistic regression showed that children who met two of the guidelines were less likely (OR: 0.267; 95% CI: 0.082-0.874) to be overweight or obese as compared to children who did not meet any of these guidelines. In conclusion, meeting the physical activity, sedentary and sleep behaviour guidelines is associated with healthier body weight status. Future research should examine the associations between compliance to these behaviour guidelines with other health indicators, including those for metabolic syndrome.
S8.4 Comparison of Nutritional Factors in Children with Autism Spectrum Disorder of Different Body Weight Status at an Autism Intervention Centre in Kuala Lumpur

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¹ Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia
² Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia
³ Department of Psychiatry, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

Childhood overweight and obesity in Malaysia have been increasing over the years. To date, there is limited information on the nutritional status of children with Autism Spectrum Disorder (ASD). This cross-sectional study aimed to compare parental feeding practices, child eating behaviour, and dietary intake between underweight (UW) and normal weight (NW) children with overweight (OW) and obese (OB) children. A total of 224 children with ASD (82.6% boys and 17.4% girls) with a mean age of 5.19 ± 0.87 years and their mothers were recruited from an autism intervention centre in Kuala Lumpur. A self-administered questionnaire on sociodemographic background, parental feeding practices, and child eating behaviour as well as a 3-day food diary were completed by the mothers. Weight and height of the children with ASD were measured. Results showed that 4.0% of the children were UW (4.9% boys and 0% girls), 76.8% were NW (75.1% boys and 84.6% girls), 9.4% were OW (8.6% boys and 12.8% girls), and 9.9% were OB (11.4% boys and 2.6% girls), with no sex difference was observed (p>0.5). Multiple logistic regression results showed that children with low birth weight (AOR=3.16, 95% CI=1.30-7.71), higher rank among siblings (AOR=2.84, 95% CI=1.02-7.91), and mothers with high perceived child weight (AOR=5.33, 95% CI=2.16-13.18) were more likely to be overweight or obese. In contrast, children with mothers who practiced high pressure to eat (AOR=0.50, 95% CI=0.29-0.85) were less likely to develop overweight or obesity. In conclusion, a high prevalence of overweight and obesity was observed in this study. Practicing healthy eating behaviours and good feeding practices may help to reduce the risk of overweight and obesity in children with ASD.
S8.5 Age Modifies the Association Between Gender and Body Adiposity Among Adolescents in Malaysia: (MyHeART) Study

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2 Julius Centre University of Malaya, Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur 50603, Malaysia.
3 Department of Paediatrics, Faculty of Medicine, University of Malaya, Kuala Lumpur 50603, Malaysia.

Obesity is a major modifiable risk factor for non-communicable diseases (NCD). In Malaysia, prevalence of obesity among adolescents has been increasing from 1990-2014. The objective of this study is to report the risk of body adiposity according to age by gender among adolescents in Malaysia. This is a longitudinal analysis of the MyHeART cohort (2012 -2016). MyHeART study used a multi-staged cluster sampling method to select participants among adolescents attending public secondary schools in Malaysia. A self-administered questionnaire was used to collect socio-demographic and lifestyle information. A portable body composition analyser (Tanita, SC 240 MA) was used to measure the Total Body Fat percentage (TBF%). The multivariate model was adjusted for confounders including race, location of school, diet intake and level of physical activity. For the analysis, we included all 1,118 participants who were followed up at least once. Compared to males, the adjusted Beta-coefficient for TBF% among female adolescents was 7.13 (95%CI 6.08, 8.19) at 13 years, 12.91 (95%CI 11.83, 13.98) at 15 years and 13.26 (95%CI 12.13, 14.39) at 17 years respectively with a significant p-interaction value of <0.001. Female adolescents have higher risk of body adiposity with increasing age as compared to male adolescents which potentially predisposes them for development of NCD in the future.
S8.6 High Dietary Glycaemic Index Is Associated with Gestational Diabetes Mellitus in Overweight and Obese Pregnant Women

Farah-Yasmin H1, Barakatun-Nisak MY2, Zalilah MS1, Zulida R3, Yong HY1, Mitri J4

1Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia
2Research Centre of Excellence, Nutrition and Non-Communicable Diseases (NNCD), Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia
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Maternal obesity increases the risk of gestational diabetes mellitus (GDM). However, studies on the role of dietary glycaemic index (GI) in overweight and obese pregnant women are limited. We aim to determine the association of dietary GI on the nutritional status and GDM risk in overweight and obese pregnant women. This is a cross-sectional analysis involving 60 overweight and 41 obese pregnant women from the Seremban Cohort Study. We grouped the subjects into high-GI (≥58) versus low-GI (<58) groups (n=84 and 17, respectively). Dietary GI was assessed using a 137-item semi-quantitative food frequency questionnaire (FFQ) during the second trimester of pregnancy. Women in high-GI group consumed significantly lower energy intake, proportion of protein and fat from total energy, sugar, fibre, calcium and iron intakes, but higher proportion of carbohydrate from total energy. Although not significant, there were more obese women in high-GI group. Women in high-GI group tended to be heavier at first and second trimesters of pregnancy, had a family history of diabetes, had lower household income and were more likely to be multiparous. Women with high-GI also had higher GDM rate compared to those in the low-GI group. 4.8% in high-GI group was diagnosed with GDM from the entire Seremban Cohort Study compared to 1.7% in low-GI group. Overall, overweight and obese women who consumed a high-GI diet had suboptimal diet intake, were presented with established risk factors of GDM, and were more likely to develop GDM. Appropriate nutritional strategies should be developed to prevent GDM in these high-risk women.
S9.1 The Impact of Combination of Behavioural Intervention and Nutrition Education with Brown Rice (COMBINE-BROWN) Weight Loss Program on Body Composition and Body Anthropometry in Overweight and Obese Adults

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Rice is the staple food in Malaysia. The scientific evidence for replacing brown rice as part of dietary intervention in weight loss program in Malaysia has not been reported. The study was aimed to determine the changes of weight, body mass index, anthropometric and body composition after a 12-week COMBINE-BROWN weight loss program. This was a quasi-experimental study conducted among overweight and obese adults in Kota Bharu, Malaysia. A total of 130 participants, aged between 18-59 years old were assigned to either the intervention group or the comparison group who received the usual care of a package of weight loss program over 12-week at Obesity Clinic. The program consisted of nutritional education, physical exercise and behavioural modification approach. The intervention group was prescribed with brown rice, whereas the comparison group continue their white rice consumption as their daily diet consumption. The waist and hip circumference were recorded, and body composition (body fat percentage, lean fat free mass percentage, and total body water) was assessed using Body Impedance Analyser (BODYSTAT 1500). Body weight, BMI, waist, hip, waist-hip ratio, and body fat percentage were significantly decrease at post intervention, whereas lean body mass percentage and body water percentage were significantly increased in both intervention group (n=59) and usual care group (n=44) (p<0.05). Usual group had greater reduction of weight changes (-6.31 kg [95% CI: -7.41, -5.21, p<0.001], as compared to the intervention group (-3.96 kg [95% CI: -4.9, -3.02, p<0.001]. This finding indicated that a brown rice intervention weight loss package was useful in reducing weight, improve body composition and body anthropology measurement in 12-week period. However, comparison group (consisted of white rice consumption) showed greater positive change in body weights, body composition and body anthropology as compared to intervention group. Longer intervention period and follow up for maintenance phase were recommended to compare the sustainability of the weight changes for both groups.
S9.2 Sustainability of a Culinary Nutrition Education Programme ‘Kids in Kitchen’ (KidChen): Children as Change Agent of Home Food Environment

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KidChen Study was a hands-on healthy meal preparation intervention among primary school children. This randomized-controlled trial aimed to improve children’s home food environment through culinary nutrition education. Two schools in Kuala Lumpur, Malaysia were randomly selected and assigned to either intervention or control group. Eligible children aged 10-11 from intervention group underwent five hands-on healthy meal preparation modules for 12 weeks, comprising of experiential learning through healthy meal preparation activities, storytelling and provision of healthy food ingredients. Parents of intervention group received one 60-minute interactive session on home food availability. Validated home food availability questionnaire assessed the availability of fruits, vegetables, healthy and unhealthy packaged foods at home from pre-intervention (0 week), post-intervention (12 week) and follow-up (24 week). Overall, 80 children completed follow-up assessment. More than half of children from intervention group (70%) and control (57%) had normal weight. Approximately a quarter of the children were overweight/obese in intervention (22%) and control group (33%). After follow-up, intervention group had significant increase (p<0.05) in the home availability of fruits [Δ=5.0(5.6) vs -1.1(2.1)], vegetables [Δ=3.0(4.1) vs -1.2(2.7)] and healthy packaged foods [Δ=2.4(2.9) vs -0.3(1.8)], as compared to control group respectively. Further, intervention group [Δ=-1.1(2.4)] had significant decrease in unhealthy packaged foods while control group [Δ=0.6(2.3)] had increased availability. General linear model showed that there was significant interaction effect between group and time on the availability of fruits (ES=0.25, p<0.001), vegetables (ES=0.20, p<0.001), healthy (ES=0.18, p<0.001) and unhealthy packaged foods (ES=0.06, p=0.009). In conclusion, KidChen Study made positive impact in improving children’s home food environment and the change was sustainable over 3 months follow-up.
9.3 Improvement of HbA1c in Type 2 Diabetes Mellitus Patients by Supplementation of Mixed Herbs

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Liver is the central organ of the body where all the absorbed compounds including the dietary components, drugs are dispatched for further metabolism. This action of liver causes altered production of enzymes. In medical practice particularly when dealing with lowering of blood lipids in type 2 diabetes (T2DM) patients it is essential to assess the liver function test. The aim of this study was to assess the effect of mixed herbs on the liver function tests and blood HbA1c in T2DM patients. In this study we examined the effect of four herbs in T2DM patients. Freshly purchased herbs were cleaned, freeze-dried, ground, mixed (25% of each herb), encapsulated and 4g were fed to the T2DM patients for 90 days. Blood samples were collected at day 0, 31, 61, 91 & 121. The effect was assessed on the HbA1c and creatinine, blood urea concentration. The liver enzymes i.e. Alanine Transaminase (ALT) or serum glutamic-pyruvic transaminase (SGPT), Aspartate aminotransferase (AST) or serum glutamic-oxaloacetic transaminase (SGOT), Alkaline phosphatase (ALP) concentration among the patients. The data was statistical analysed and the differences in the means was regarded as significant at 95% confidence interval. The HbA1c was highest on day 0 & 31 and significantly (p<0.001 & p<0.01) lower on the day 61, 91 and 121. Creatinine concentration was highest on day 61 and followed by day 91, 121. The blood urea concentration was highest on day 61 and followed by day 91, 121. The blood urea concentration in the blood was not affected due to the larger variation among the subjects. The ALT and AST concentration was higher (p<0.001) at day 61 and started to decline afterwards. The concentration of ALP was higher on the day 0 & 31 and started declining from day 61 onwards. Apparently, the consumption of mixed herbs was associated with an improvement of HbA1c in the T2DM patients.
S9.4 Legal Tools to Reduce Obesity in Malaysia

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In July 2019, a report published by Fitch Solutions Macro Research estimated that Malaysia has the highest costs in the South East Asian region as a result of high obesity, making up as much as a 20% share of overall healthcare spending of the country. This fiscal burden is to be reduced by enhancing the quality of health of our population in order to achieve the goal of a sustainable nation. To improve our health, there are current laws and potential laws to be implemented to combat obesity. In Malaysia, the government have introduced ‘soft policies’ approach such as Healthy lifestyle programmes and campaigns as means to curb obesity, yet its impact is questionable. ‘Hard policies’, such as regulations (e.g. imposing a tax, removal of subsidies, reduction of operational hours of eateries, menu-labelling, curbing of marketing of unhealthy food, implementation of pedestrian and bicycle paths, Metabo laws) may be used as legitimate interventions to combat obesity in Malaysia. The aims of this paper is to (i) analyse the legal justifications both in international laws such as the Convention of Child and Codex Alimentarius in which Malaysia is a signatory and national laws such as the Federal Constitution and Food Act for implementation of obesity prevention regulations, (ii) to compare and contrast the pros and cons of current and potential obesity prevention regulations to reduce obesity. The legal tools are drivers to facilitate the promotion of public health. In light of new scientific advances, gaps in the current regulatory framework, and the increasingly obesogenic environment, this paper proposes emerging legal approaches to address obesity in Malaysia. It is vital for legal scholars to devise pioneering strategies to address obesity from novel perspectives. The potential role for the law to rectify the status quo has yet to be fully explored. With reduction of obesity, the fiscal burden of the nation on medical bills could be reduced and productivity could be increased.
S9.5 A School-Based Interventional Study to Improve Healthy Eating Practices Among Malaysian Adolescents: A Feasibility of Quasi-Experimental Pilot Study

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This study examines the feasibility of providing healthier food options in collaboration with selected secondary school canteen operators in Malaysia. It also aims to measure the changes in food choices before and after the intervention. A pilot quasi-experimental feasibility study is conducted in six secondary schools (intervention, n=4; control, n=2) includes three rural and three urban schools in Selangor and Perak states in Malaysia. The intervention duration is four weeks among Malaysian adolescents (15 years of age). Two interventions are proposed which focus on providing healthier food options at the canteen and convenient shops in the selected schools. Intervention 1 and 2 entail training the canteen and school convenient shop operators. In addition, intervention 2 includes subsidizing the price of fruits, vegetables and low energy-dense kuih (traditional cake). The control group continues to sell the usual food. Trained dietitians will audit the canteen menu and food items sold by the school canteen and convenient shops in all schools. Study outcome measures will be assessed by 3-day diet history and anthropometric measurements conducted at baseline and post-intervention (4 weeks after intervention). Focus group discussions with students and interviews with headmasters, teachers and school canteen operators are conducted post-intervention to explore intervention acceptability. Under this Healthy School Canteen program, school canteens are prohibited from selling ‘red flag’ foods. This refer to foods which are calorie dense and not nutritious, such as confectionery and deep-fried food. They are also prohibited from selling soft drinks which are sugar-rich and without any nutritional content. Instead, the canteens are encouraged to sell ‘green flag’ food and drinks, such as fruits and vegetables). It is hope that this feasibility study can provide a framework for the design and implementation of nutritional interventions at school canteens in Malaysia.
S9.6 The Influence of Social Facilitation on Energy Intake Among Public University Students in Selangor

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While obesity levels have continued to rise, the factors thought to influence weight gain have broadened. The role of social influence may influence adoption of undesirable energy intake and thus weight status. This study assessed the social influence specifically social facilitation on the impact of energy intake in a laboratory setting. The objectives of the present study were to measure lunch intake of food among university students and to compare the influence of different meal conditions. A total of 64 participants (50 females, 14 male) from a public university participated in three standardized lunches: ate alone, ate with unfamiliar peers, ate with familiar peers. The participants were invited to serve themselves in lunches from buffet containing white rice, chicken dish and stir-fried vegetable and were scheduled at 1 week apart. Repeated measures ANOVAs revealed a statistically significant effect of social facilitation on energy intake with different meal conditions. On average, total energy intake at lunch was found to be increased when subjects ate with familiar peers (705 ± 170 kcal) compared to eating in a group with unfamiliar peers (587 ± 129 kcal) and eating alone 545 ± 119 kcal). This evidence supports the hypothesis that social facilitation affects subjects’ energy intake, the impact is greater when eating in a group with familiar peers.
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P01 Sociological Perspective on Eating Out and Obesity in Malaysia: Changes of Social Food Patterns and Their Influence on the Rise of Obesity

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Obesity rates are increasing in Malaysia. Most of the research conducted by nutritionists is focusing on obesity rates, factors, and the creation of messages to the public to promote better ways of healthy eating habits. This was also revealed in the literature review as it showed that less studies have been conducted on the changes of social and cultural aspects of the food in the society and the association between these changes and obesity compared to studies such on the idea of what is a proper meal. Hence, this communication aims at suggesting a conceptual framework drawn upon a sociological view, which analyses obesity as a social rather than an individual issue as it might be in nutrition discipline and discusses whether the increase of eating out in the Malaysian society is one of the factors influencing the increase of obesity rates in Malaysia. Sociology can also contribute to the explanation by its analysis of the society’s eating patterns - norms and habits - are changing due to modernization, which might be influencing the increase of eating out that might be one of the factors leading to the increase of obesity. This research will follow mixed methods; first the surveys which were collected using quantitative methods by the Malaysian adult nutrition survey and national health and morbidity survey and the two Malaysian Food Barometers (2013 and 2018) will be used for secondary data analysis to create a typology of respondents in categories such as age groups, BMI groups, economic situation and others, and it will be followed by qualitative approaches using focus groups or interviews to understand the social implication of eating out towards obesity. The study is expected to provide data on current changes in eating patterns and norms such as eating out and if it is one of the factors contributing in the increase of obesity. This could benefit public health authorities in creating policies drawn upon the Malaysian social and cultural context of food patterns.
P02 Breast Cancer Diagnosis – A Wake Up Call to Increase Physical Activity and Reduced Sedentary Behaviour?

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Physical activity (PA) and sedentary behaviour (SED) are established risk factors for breast cancer (BC) occurrence and recurrence. However, it is still unknown if BC diagnosis can induce lifestyle changes in BC survivors throughout the survival period. This study was conducted to determine the difference in PA and SED behaviour among healthy women, short-term breast cancer (BC) survivors and long-term BC survivors. In this cross-sectional study, purposive sampling method with predetermined inclusion and exclusion criteria were used to recruit 31 healthy women, 32 short-term BC survivors, and 48 long-term BC survivors from two government hospitals in Terengganu and Kelantan. Short-term and long-term BC survivors were defined as those with ≤5 years, or >5 years duration since BC diagnosis, respectively. PA and SED behaviour were objectively assessed for seven consecutive days using ActivPAL accelerometers and data processing was conducted using MATLAB software. Sociodemographic data and anthropometric measurements were also recorded. Difference between groups was analysed using one-way ANCOVA with age as covariate. The result of this study showed that healthy women had significantly lower number of SED sporadic bouts (<10 mins), lower number of SED breaks, shorter average SED bouts duration, lower number of low-intensity stepping, lower activity energy expenditure and shorter standing time when compared against short-term and long-term BC survivors. No significant difference was observed in all PA and SED parameters between short-term and long-term BC survivors. In conclusion, our findings suggest that a diagnosis of BC acted as a kick-start to increase PA levels and reduce SED behaviour, and the active lifestyle was maintained even after prolonged duration of BC survival. A comprehensive prospective cohort study spanning before and throughout cancer survival period is recommended to be done to ascertain this trend of PA and SED behaviour.
P03 Association of Body Image with Adiposity Changes in Malay Adolescents: A Longitudinal Study

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Obesity is a well-known risk factor for body dissatisfaction, but few studies have analysed the longitudinal relationship between adiposity and body dissatisfaction. Hence, the present study aimed to identify the effect of the change in adiposity on body satisfaction among Malay adolescents over a period of 18 months. A total of 234 participants (97 boys, 137 girls) aged 10 to 14 years were recruited from national schools in Kuala Lumpur using single-stage cluster sampling method. Body mass index (BMI) and BMI z-score (BAZ) were calculated from measured height and weight. Body fat percentage (%BF), fat mass and fat free mass were estimated from bioelectrical impedance analysis. Body satisfaction was assessed using Stunkard’s figure rating scale. Body dissatisfaction was determined by the difference between “current” and “ideal” figures chosen by the participants. Mean age at baseline was 12.1±1.6 years old. All anthropometric variables increased significantly in both sexes at 18-month follow-up (p<0.05), except BAZ. A greater proportion of girls who perceived themselves as “fat” compared to boys. A total of 74% girls and 41% boys who exhibit increased %BF over 18 months reported body dissatisfaction. Multinomial logistic regression analysis adjusted for confounding factors revealed that girls with increased %BF were less likely to feel thinner than ideal figure. Moreover, increased risk of dissatisfaction due to the perception that they were fatter than the ideal figure was similar for both boys and girls (relative risk ratio [RRR]=2.98, 95% confidence interval [CI]: 1.90-3.66 and RRR=2.42, 95% CI: 1.61-3.46, respectively) using −1.0 to +1.0% as the reference category. In conclusion, adolescents exhibiting increased %BF possess higher risks of developing body dissatisfaction over time. These findings are important as body dissatisfaction can cause psychological distress, eating disorders, low self-esteem and social dysfunction during adolescence, which may persist into adulthood.
P04 Anti-adipogenic Effects of Flavones: A Prospective Molecular Study

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The emerging dilemma of obesity has become an element of critical concern around the world due to its association with common morbidities including cancer, cardiovascular diseases and diabetes, thus is the main reason for the adverse effects on human health. Adipose tissue plays a critical role in the prevalence of obesity and is also known as the hub for the synthesis of triglycerides in mature adipocytes. The abnormal increase in size and number of adipocytes during adipogenesis results in increased fat storage in the body. Wnt β catenin-dependent pathway is known to be the negative regulator of adipogenesis. Activation of Wnt β catenin-dependent pathway inhibits the activation of adipogenic and lipogenic genes and their transcription factors and is widely considered the main therapeutic target of many natural and synthetic anti-obesogenic products. Flavone is a class of flavonoids with molecular formula C₁₅H₁₀O₂. They are found naturally in plants, but several synthetic methods have also been developed and modified to get flavones of the desired quality, higher yield and purity. The vast diversity in their structure-activity relationship has resulted in the discovery of many structurally different lead molecules in many diseases conditions. In our study, the efficacies of hydroxylated-methoxy flavones, polymethoxy flavone and polyhydroxy flavone will be evaluated for their anti-adipogenic properties by using 3T3-L1 fibroblast cells as in vitro model. The cell viabilities after treating the 3T3-L1 cell lines with the above-mentioned flavones will be checked by MTT assay. The expression of different genes (mRNAs) and their respective proteins in the Wnt/ β catenin-dependent pathway will be determined by RT-PCR and Western blot analysis. The translocation of β catenin (a crucial protein in this pathway and negative regulator of adipogenic genes) to the nucleus will be determined by immunocytochemistry analysis.
Type 2 diabetes is increasing at an alarming rate worldwide and one of the leading factors is obesity. The fundamental treatment of obesity is dietary interventions which have been proven to have positive impacts on weight reduction and the onset of diabetes. A meta-analysis of randomised clinical trials (RCT) of low glycaemic index (GI) diets for overweight and obesity was conducted using The Cochrane Library, MEDLINE, PubMed, EMBASE-CINAHL and Web of Science databases. The review was conducted based on the methodological standards for the conduct and reporting of Cochrane intervention reviews, Version 1.07 November 2018. Population, Intervention, Comparison and Outcomes (PICO) tool was used as the organising framework to define key elements of the review question. Meta-analysis revealed subjects receiving low GI diet had significantly lower body weight (SMD= -0.85; 95% CIs [-1.54, -0.15]), and improved high-density lipoprotein (SMD= 0.04; 95% CIs [0.01, -0.06]) compared to respondents receiving control diet. Higher adherence to recommended low GI diet (reduction of 20 GI value) has shown to result in significant improvements in the measured health parameters and overall health outcomes. Currently, there are no gold standards for monitoring low GI dietary practice and are typically monitored using traditional dietary assessment tools including food records, food frequency questionnaire and 24-h food recall. These techniques are laborious, resource intensive, requires close health professional supervision, and sensitive to the pitfalls of self-reporting. More recently continuous glucose monitoring via digital health devices allows an individual to monitor blood glucose responses in real-time. The devices show potential as a tool for monitoring for low GI diet practices. In our studies, we aim to implement this device to provide personalised, real-time biomarker information, with minimal input from the individual. This implementation increases self-efficacy and empowerment of the individuals, and as a result enhance adherence to the dietary intervention.
P06 A Case Study: Remission of Newly Diagnosed Type 2 Diabetes Mellitus by Intensive Diet and Lifestyle Intervention

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According to Diabetes Care, the definition of remission is to achieve glycaemia below the diabetic range in the absence of active pharmacologic (anti-hyperglycaemic medications, immunosuppressive medications) or surgical (ongoing procedures such as repeated replacements of endoluminal devices) therapy. By a sustained weight reduction of 15kg within three to five months increases the chances of putting diabetes into remission in individuals significantly. Therefore, weight reduction is of vital importance factor especially among obese Type 2 Diabetes Mellitus (T2DM) individuals. This is a case study of putting a newly diagnosed T2DM, a morbid obese 41-year-old Indian man with a strong family history of diabetes into remission. The patient had a Body Mass Index (BMI) of 43.5kg/m² (Weight 136.0kg, Height 1.76m) classified as Obese Class III. The blood test results showed an elevated Fasting Blood Glucose (FBG): 7.0 mmol/L (Fasting: 3.9-5.8mmol/L) and increased HbA1c: 8.8% (<6.5%). The patient was not keen for any anti-diabetic medications and preferred to manage the condition through diet and lifestyle modification. With intensive low-calorie diet and lifestyle intervention under dietitian's supervision, the patient lost 8.3kg in 8 weeks which was 6% of his initial body weight; showed an improvement in HbA1c 6.2% (<6.5%). Subsequently, the patient had a total weight loss of 19.3kg and reduced 17.1 kg of body fat mass in 19 weeks; FBG: 4.7 mmol/L (Fasting: 3.9-5.8mmol/L) and HbA1c: 5.3% (<6.5%) presented in normal range with the absence of any pharmacologic and surgical therapy. At the point of the medical visit to endocrinologist, clinical diagnosis of T2DM remission was recorded. This case nicely illustrates the importance of weight reduction in obese T2DM individuals and the potential of putting T2DM diabetes into remission with the intensive diet and lifestyle intervention.
P07 Leptin Enhances N-Methyl-N'-Nitro-N-Nitrosoguanidine (MNNG)-Induced Genetic and Histological Changes in Stomach of Male Sprague-Dawley Rats

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Gastric cancer is more prevailing among obese individuals, possibly owing to their elevated serum leptin levels. Leptin has been shown to promote the growth of gastric cancer cells in vitro, but its impact in vivo has not been investigated. Objectives: This study aimed to determine the effect of leptin in a rat model of N-methyl-N'-nitro-N-nitrosoguanidine (MNNG)-induced changes in the stomach. Six-week old male Sprague-Dawley rats (n=32) were divided equally into four groups. The experimental groups were treated with either intraperitoneal (i.p.) injections of leptin (60 µg/kg/day; LEPT) or MNNG in drinking water ad libitum (200 mg/L; MNNG), or both leptin and MNNG given simultaneously (MNNG+LEPT). The controls received daily i.p. injections of normal saline. Rats were euthanized after 40 weeks of treatment. Stomachs were collected for histopathology, microarray, and RT-qPCR analysis. Data were analysed using Fisher’s exact test and one-way ANOVA. Macroscopic tumours were mostly found in MNNG+LEPT-treated stomachs, followed by MNNG-treated and LEPT-treated stomachs. Hyperplasia (12.5 %) and dysplasia (12.5 %) were found in LEPT-treated stomachs, and the upregulated genes included transcription factors (Nupr1, Ybx1), oncogenes (Tmem134, Ptma), translation factors (Eef1a1, Eif4g2), cell proliferation (Reep5), vesicular (Tmed2) and membrane trafficking (Rab7a). Half of MNNG-treated stomachs had gastric hyperplasia (p<0.05), however, no changes in gene expression were found compared to controls. Microscopically, 75 % of MNNG+LEPT-treated stomachs showed either hyperplasia (25%), dysplasia (25%), hypertrophy (12.5%), or adenocarcinoma (p<0.01) (12.5%). The genes upregulated include microRNAs, olfactory and vomeronasal receptors, signal transduction (Pde4d), and cell proliferation (Lcn11). Leptin appears to induce gastric carcinogenesis, which is further enhanced with simultaneous administration of MNNG. The findings seem to highlight the possible role of leptin in the higher prevalence of gastric cancer reported in hyperleptinemic obese individuals.
The prevalence of obesity is increasing among Malaysians. Large scale obesity studies in the country show a two-fold increase in the overweight prevalence from 16.6% to 30% and a four-fold increase in the obesity prevalence from 4.5% to 17.7% in the last 2 two decades. Obesity prevalence is even higher using the Asian body mass index cut off point which is more appropriate for Malaysians. The obesity prevalence rate (30.6%) is almost comparable with that of more obese nations like that of the United States where roughly a third of the population were obese. Bariatric Surgery is the only effective therapy for morbid obesity at present. According to systematic reviews it is a cost-effective intervention for moderately to severely obese people compared with nonsurgical interventions. It improved patient quality of life by reducing BMI and other comorbidities. However, Bariatric Surgery is not well accepted in the cultural and social setting in this country. The lack of surgical training opportunity, public awareness and no insurance coverage for obesity might be the factors that hinder the progress of this surgery. This study aims to assess the effectiveness of bariatric surgery in managing obesity among the Malaysian population. We will investigate its cost-effectiveness in general for weight control and comorbidities resolution. We will review hospital charts of 150 patients who have undergone bariatric surgery procedure from 2015 to 2017. We will compare their weight, BMI, blood results as well as medication list pre-surgery and post-surgery. Physical and blood parameters will be analysed using Generalized estimation equation to control for some confounding variables while medication list will be examined using actuarial analysis. The outcome of this study is expected to contribute to the decision making of patients, doctors, and health insurance companies in Malaysia in the management of morbid obesity.
P09 Potential of Satiety- And Satiation-Enhancement of Milk Tea in Portion Control Via Physical Characteristics Modification of Foam and Emulsion

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With the resurgence in popularity of milk tea in Asia, this high calorie beverage is at the claiming place as an everyday F&B consumable, raising a red flag for the increasing obesity rate in Asia. This study focused on beverage (milk tea) matrix modification as one of the portion size control method which is the least explored in current healthy or functional food development. Milk tea matrix was modified using high-speed homogenisation ranging from 11,000rpm to 25,000rpm and hydrocolloids such as low-methoxy pectin, λ-carrageenan, κ-carrageenan, and sodium alginate at 0.1%. The significant changes of particle size, flow behaviour and viscosity of the beverage matrix obtained in this study showed the potential of matrix modification in controlling appetite and sustaining satiety. Homogenisation speed at 11,000 - 18,000 rpm could effectively produce emulsions with particle size below 10µm up to 120 minutes, which is an indication for enhanced creaminess and delayed stomach emptying. Enhanced creaminess in beverages leads to a higher satiation expectation while delayed stomach emptying leads to a sustained satiety. Addition of hydrocolloids such as carrageenan (λ- and κ-) and sodium alginate has substantially increased viscosity. Viscous beverage is documented to have high perceived satiation which is associated with high energy. In addition, shear thinning property of κ-carrageenan contributed to a ‘melt in the mouth’ sensation, which is often associated with creamy and high fats product that could elicit high satiation perception. On the other hand, positive correlation between viscosity and foam stability has also shown great potential in delaying stomach emptying due to the increased bulk volume of beverage. In conclusion, developing satiety–enhancing and satiation–enhancing milk tea by stabilising milk tea foam and emulsion using high-speed homogenisation with the aid of selected hydrocolloid can potentially be applied in beverage industry to offer healthier product choice without compromising its palatability.
Overweight and obesity is a major worldwide health problem that has close associations with many risk factors for non-communicable diseases or metabolic disorders. Despite of various efforts and numerous plans implemented by government agencies, health professionals and institutions, industrial and commercial companies, the combat against overweight and obesity is yet to succeed with satisfactory outcome. The causes of obesity are generally attributed to a variation of obesogenic environments including the availability of high-caloric foods, unhealthy and sedentary lifestyles, and unrestricted eating habits. One of the main issues in concern is the misinformation from some professionals or non-professionals that has reached out to the public, either deliberately or unintentionally. The aim of this study is to look into some common misconception and misinterpretation of data available in the formal recommended nutrient intakes and caloric information from various sources, including inappropriate calculation of daily total energy requirements. In order to accomplish for better understanding and to raise more public awareness of the obesity issue, a non-fasting method called “two-step down one-step up” (TDOU) scheme is proposed for reducing bodyweight of adults. Rationalization of this weight management scheme will focus on proper calculation of the balanced macronutrient intakes and justified with reasonable physical activity levels. Among five subjects participated in this investigation, one case study with fully follow-up monitoring has shown very encouraging results, a bodyweight reduction of 4 kg in three months has been recorded. Hopefully this TDOU diet plan could be adopted as a new strategy to counteract the escalating overweight and obesity prevalence in the nation.
Leptin, an adipokine, is implicated in obesity-related male reproductive dysfunction. The exact mechanism involved in this remains unclear. This study therefore examined the roles of PI3K and AMPK signalling pathways in leptin-induced adverse effects on spermatozoa and testicular tissue in rats. Sprague-Dawley rats aged 14–16 weeks, were randomised into four groups consisting of control, leptin, leptin+LY294002 (PI3K pathway inhibitor), and leptin+dorsomorphin (AMPK pathway inhibitor) treated groups with six rats per group. Intraperitoneal injections of leptin were given once daily for 14 days at a dose of 60 μg/kg/day. Rats in the leptin and inhibitor-treated groups received concurrently either LY294002 (1.2 mg/kg/day) or dorsomorphin (5 mg/kg/day) i.p. for 14 days. Controls received 0.1 ml of normal saline. Body weight and food intake of the rats were measured at the beginning and at the end of the treatment period. Upon completion, the rats were euthanized, and the weights of testes and cauda epididymis, sperm count, sperm morphology, seminiferous tubular epithelial height (STEH), seminiferous tubular diameter (STD), 8-hydroxy-2-deoxyguanosine (8-OHdG) were estimated. Data were analysed using ANOVA and Tukey's post-hoc analysis. Sperm count, STEH and STD were significantly lower, while the percentage of spermatozoa with abnormal morphology and 8-OHdG levels were significantly higher in rats treated with leptin and leptin+dorsomorphin when compared to those in controls and LY294002-treated rats. No significant differences were observed in body weight, food intake and weight of the organs of the rats in all the groups. In conclusion, LY294002, but not dorsomorphin, prevented the leptin-induced changes in rat sperm parameters and testes, suggesting the potential role of the PI3K signalling pathway in the adverse effects of leptin in the male reproductive system of rats.
P12 Obesity and Prolactin in Various Populations: A Systematic Review and Meta-Analysis

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Association of obesity with altered levels of serum prolactin (PRL), a marker of stress is well documented. The objective of this systematic review and meta-analysis was to estimate the association between obesity and PRL according to sex, ethnicity and age. PubMed, Web of Science (WoS) & EBSCO database were searched from the 5th to 20th of October 2018. Two reviewers independently extracted data from 12 cross-sectional studies that used body mass index (BMI), waist circumference (WC) or waist-to-hip ratio (WHR) as measures of obesity and aggregated using the random-effect model. The correlation (r) for BMI and PRL was -0.231; 95% confidence interval (CI) = -0.392 to -0.055) in adults and (r = -0.500; 95% CI = -0.622 to -0.354) in children. In adults, r for BMI and PRL was greater in women than men by -0.127 (95% CI = -0.178 to -0.05) and greater in European populations r=0.156 (95% CI = -0.0132 to -0.079) than Middle Eastern populations r = -0.655(95% CI = -0.880 to 0.191). Obesity is associated with decreased levels of PRL, and the association is greater among women and Europeans. The emergence of difference between different genders was observed only in adulthood.
Childhood overweight and obesity has become a health issue worldwide and it is associated with chronic diseases such as diabetes, high blood pressure and cardiovascular diseases in later life. This cross-sectional study was conducted to determine the prevalence of overweight and obesity and its association with sociodemographic factors, feeding practices, and dietary intake among pre-schoolers in Tabika Perpaduan in Seremban, Negeri Sembilan. Height and weight of the pre-schoolers were measured. Mother-administered questionnaire was used to obtain information on socio-demographic characteristics and feeding practices. A 3-day food record was completed by mothers to examine the nutrient intake of pre-schoolers. Results showed that 14.9% of the pre-schoolers were overweight/obese, with significant difference between ethnicity (Chinese: 27.7%; Non-Chinese: 13.2%; p<0.05). Majority of the pre-schoolers practiced breastfeeding (94.7%) and bottle feeding (87.6%). More than half of them (58.7%) were breastfed for less than 18 months. One third of the pre-schoolers (37.1%) did not achieve daily recommended intake for energy. Most of the pre-schoolers had adequate energy intake from carbohydrate (60.4%) and protein (88.1%), with mean intake of 181.80±41.08 g and 54.25±15.93 g, respectively. However, more than half of the pre-schoolers had excess energy intake from fat (56.9%) and sugar (52.2%), with mean intake of 48.56±14.91 g and 36.08±18.08 g, respectively. Multiple logistic regression results showed that pre-schoolers who were Chinese (AOR=3.03, 95% CI=1.22-7.56) and breastfed for less than 18 months (AOR=2.29, 95% CI=1.05-4.99) had high risk of being overweight/obese. Culturally appropriate education and workshops need to be done to encourage mothers to continue breastfeeding in order to improve nutritional status of their children.
P14 Development, Validation and Reproducibility of Whole Grain Food Frequency Questionnaire for Malaysian Schoolchildren

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Substantial scientific evidence suggested a negative association between whole grains consumption and the risk of childhood obesity. Thus far, there is no validated food frequency questionnaire (FFQ) to assess whole grain intake among Malaysian schoolchildren. Hence, this study aimed to develop and assess the validity and reproducibility of a FFQ to determine whole grain intake among Malaysian schoolchildren. Schoolchildren aged 10-11 years old were approached through cluster random sampling in Kuala Lumpur primary schools. A list of whole grain foods consumed by schoolchildren (n=392) was documented through a 3-day diet recall. Whole grain food list was created and categorized based on food groups, frequency and portion size were assigned to form the FFQ. Whole grain FFQ with 202 items was developed. The FFQ was validated against 3-day food record (FR) completed by 112 schoolchildren. Reproducibility was assessed by comparing the FFQ (FFQ1) with the second FFQ (FFQ2) administrated a month later (n=50). Spearman correlation coefficient (p=0.01) for whole grain intake based on FFQ and FR was r= 0.732. Classification into quartiles showed 99.1% of whole grain intakes derived from FFQ and FR were classified into same and adjacent quartile. Bland-Altman plots showed good agreement between the two dietary methods used. The reproducibility of the whole grain FFQ was assessed using Cronbach α index that measures reliability between FFQ1 and FFQ2 (α =0.96). Spearman correlation showed that FFQ1 was significantly correlated to FFQ2 (r=0.959, p=0.01). The intraclass coefficient between FFQ1 and FFQ2 was 0.989 showing good reliability between FFQs. In conclusion, development of whole grain FFQ was described. The FFQ was found to be valid and reproducible to assess whole grain intake among Malaysian schoolchildren.
P15 Effect of Glutamate on Appetite of Primary Schoolchildren in Malaysia

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Appetite is a determinant of food intake and plays a crucial role in the development of obesity. Glutamate has been shown to enhance satiety and reduce hunger among infants, adults and elderly; however, its effects among Asians, specifically Malaysian children, remains unknown. This study aimed to investigate the effects of glutamate on appetite of primary school-aged children. A total of 89 participants (Malays n=30; Chinese n=28; Indians n=31) aged 9 – 11 years were recruited into a randomized crossover trial. A vegetable-based preload soup (with MSG+ or without MSG-) was given to children on the experimental day, followed by an ad-libitum meal 45 minutes later. Appetite ratings of hunger, fullness, desire to eat (DE), desire to snack (DS), and thirst were recorded using visual analogue scale (VAS). Mean score for ratings of hunger and DE prior the preload soups (MSG-: hunger 72.2±22.2; DE 75.5±20.16; MSG+: hunger 76.4±17.5; DE 72.7±18.9) reduced immediately after the preload (MSG-: hunger 64.6±24.7; DE 72.3±21.8; MSG+: hunger 61.7±24.9; DE 71.5±20.3), and subsequently increased again before the ad-libitum meal (MSG-: hunger 82.9±14.3; DE 79.7±19.3; MSG+: hunger 79.9±15.2; DE 78.1±15.4). However, the differences in appetite ratings between preload soup conditions were not significant. The findings of the present study suggested that addition of MSG to preload soup did not influence the subjective appetite ratings of the subsequent meal. Further investigation is needed to investigate whether MSG-containing preload has potential longer-term effects on appetite of children.
P16 Exploring the Sustainability of C.E.R.G.A.S Obesity Intervention: A Mixed Methods Study

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School-based obesity intervention is important and when implemented, sustainability should be seriously considered to promote healthy lifestyles and behaviour changes in order to overcome childhood obesity. This mixed methods study aimed to explore the sustained impact of C.E.R.G.A.S intervention, which is a 12-week obesity intervention focussing on healthy eating, physical activity and physical fitness. A total of 52 participants of C.E.R.G.A.S were followed-up at 16 months after completion of intervention for anthropometric outcomes, and 21 participants were followed-up at 30 months with face-to-face in-depth interview to explore barriers and motivators that influence sustainability of behavioural changes. Body mass index (BMI), body fat percentage (%BF) and waist circumference (WC) were assessed. Assessments done at baseline [P0], 3rd [P1], 6th [P2] and 16th month [P3] post-intervention is reported. Repeated measures ANOVA with intention-to-treat principle were applied. Interviews were audio-recorded, transcribed verbatim and analysed thematically. At 16 months after completion of programme, significant differences were found in BMI-for-age Z-score (P0:2.51±0.89 vs P3:2.16±0.88, p<0.05) and %BF (P0:41.8±8.0 vs P3:36.8±7.6, p<0.001). Themes identified as promoting factors were: (1) support from family members, peers and school teachers; (2) self-awareness on mobility, health status, and body image; (3) knowledge on food pyramid and physical activity; (4) physical environment; and (5) practices after intervention on physical activity and healthy eating. Barriers were: (1) self-attitude, such as laziness, embarrassment, boredom, busyness, and lack of self-discipline; (2) knowledge inconsistency; (3) peer influence; (4) social pressure from family members and friends; and (5) school and home environment. Overall, this study demonstrated that the effect of C.E.R.G.A.S. intervention on BMI-for-age Z-score and %BF, but not WC, was successfully sustained over a period of more than a year after completion of programme. We also found that the main promoting factor for sustainability of C.E.R.G.A.S intervention is practices on physical activity and healthy eating, while the main barrier is peer influence. Future school-based obesity intervention programmes should consider these factors prior to implementation. We opine that C.E.R.G.A.S. obesity intervention programme can potentially be adopted and implemented at secondary schools throughout Malaysia to combat obesity.
P17 The Prevalence of Obesity Among Health Worker in Medical Based Research Institute

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The prevalence of overweight and obesity continues to increase both in developing and in developed countries. Study from NHMS showed that the prevalence of overweight and obesity among Malaysia adult (aged 18 and above) was 30% and 17.7% in 2015 and increased to 44% and 14% in 2017. The aim of this study was to determine the prevalence of overweight and obesity among the health workers in a research institute. This is a cross sectional study using a secondary data obtained from worker’s health surveillance program (KOSPEN Plus). In total of 459/590 healthcare workers in a research institutes participated in the program responding to multi sections questionnaires. All respondents were included and only selected data from this health surveillance were selected to be analysed for this study. The prevalence of overweight and obesity were 34% and 27% among 459 health workers. Majority of workers 76.7% (352) was female and 23.3% (107) was male, married (61.9%), single 34.2% or divorced 3.9%. Mean of age for the respondent was 34.91 + 8.1 years old with minimum age was 18 years old and maximum age was 55 years old. Majority of respondents are 77% (371) Malay and tertiary level of education 86.3% (396). About 35.9% of workers did not do exercise as compared to exercise group which were divided to exercise less than 150min per week (43.8%) and exercise more than 150 min per week (20.3%). Mean of personality score was 54.6 ± 10.4. About 54 % and 58.2% of workers at least once or twice experiencing overwhelmed with work has no time to rest. Working environment can be the platform to be used in creating an active and healthy lifestyle to help to reduce the bodyweight and a sustainable active lifestyle for all the workers. Time management and organized work will boost productivity and produce a good outcome of workers at work.
P18 Investigating the Metabolic Role of CD36 in Promoting the Malignancy of Endometrial Cancer

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Obesity is now recognised as one of the main risk factors for endometrial cancer (EC). Increased circulating free fatty acids (FFAs) have been shown to promote various malignancies; however, the molecular and metabolic mechanism underlying obesity-EC link is poorly understood. CD36, a surface glycoprotein that acts as a genuine fatty acid transporter has recently been shown to facilitate exogenous FFAs to fuel metastatic growth via CD36-mediated pathway. Hence, this study aims to investigate the metabolic role of CD36 in mediating FAs-induced malignancy in EC. The cancer genomic databases Gene Expression Omnibus (GEO) and The Cancer Genome Atlas (TCGA) were analysed via KM-Plotter and cBioPortal respectively to determine the clinical significance of CD36 expression in EC patients. In-vitro, the EC cell line ECC1, was treated with increasing concentrations of exogenous FFAs, palmitic acid conjugated with BSA. Cell viability was assessed via MTT assay after 24 and 48 hours of treatment. Expression of metabolic genes regulating glucose and fatty acid metabolism, including CD36 was quantified via RT-qPCR. According to GEO, higher CD36 expression levels correlated with poorer prognosis in EC patients (p=0.041, HR=1.59) and similar results were obtained from analysing TCGA (P=0.002, Spearman: -0.42). Exposure to increasing concentration of palmitic acid progressively increased the cell viability of ECC-1 cells after 24 and 48 hours of treatment. Palmitic acid altered the metabolic profile of ECC-1 cells which was accompanied by a 2-fold increase in CD36 gene expression. Our study provided evidence that CD36 is clinically important to EC patients and may mediate the role of FAs in promoting EC malignancy. Exploiting metabolic weakness in EC can aid the development of discovering therapeutic target for EC women, especially those who are obese.
P19 Investigating Cardiovascular Effect of Repeatedly Heated Oil in Animal Model of Type 2 Diabetes

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The rise in cardiovascular disease among obese and type 2 diabetic patient (T2DM) has been attributed to the nutritional transition towards westernised diet characterised by high amounts of refined fat and fried food. Worryingly, unregulated use of repeatedly heated cooking oil, such as palm oil is common practice to increase cost-effectiveness during food preparation. Repeatedly heated oil is associated with adverse health effects, but whether such deleterious effects extend to causing cardiovascular complication in T2DM is less understood. Repeatedly heated oil was prepared by repeatedly frying potatoes in the same oil (10x) at 180°C for 10 minutes and resulting oil was analysed for its peroxide, anisidine and acid values. Male Wistar rats (n=20) were divided into three groups: non-diabetic controls fed with chow diet and diabetic rats induced by high-fat diet fortified with 15% fresh palm oil (FPO) or 10x repeatedly heated palm oil (RPO) combined with low dose of streptozotocin (30mg/kg). Changes in body weight, blood glucose and blood pressure (via the tail-cuff method) were monitored throughout a 6-week protocol. After 6 weeks of feeding, rats were sacrificed, hearts were excised and weighed. Left and right epididymal fats were excised and weighed for adiposity assessment. Compared with non-diabetic controls, both groups of diabetic rats fed with FPO and RPO induced significant increase in adiposity, heart weight and blood pressure. The deleterious cardiovascular effect was more prominent among the diabetic rats fed with RPO, as they had a 16% increase in cardiac weight index (heart/body weight ratio) compared with the FPO fed group, indicating significant cardiac hypertrophy. This was accompanied by a 20% and 11% increase in systolic blood pressure when compared to the non-diabetic control and RPO group respectively. In a diabetic rat model, the consumption of repeatedly heated oil increased the susceptibility to T2DM associated cardiovascular complications. Repeatedly heating oil for frying should not be regarded as an effective strategy to enhance cost effectiveness during food preparation and should be highlighted as an important preventive strategy to combat growing disease burdens associated with obesity and T2DM.
P20 Cultural and Sociological Determinants of “Eating Out” in Mainland China and Diasporas: A Methodological Perspective

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The study of “eating out” within Sociology has gained momentum in recent years. This study focuses on “eating out” within China societies enabling comparative analysis between different social groups claiming “belonging” to Chinese culture. The analysis is through classical sociological determinants like age, gender, marital status, education, income, level of urbanisation and modernisation. Also included are aspects of Chinese cultural diasporas: historical context of migration, number of immigrant generations, Chinese region of origin, languages mastered orally and utilised in professional and family contexts. Additionally, the dimension of concrete living context will be studied: levels of urbanisation, modernisation, density of catering sector, and business times of restaurants. Further comparative analysis will be conducted comparing Mainland Chinese society (Beijing) with the Urban Chinese societies of Singapore, Kuala Lumpur and Hong Kong. This will offer perspective into socialization, urbanization, modernization, eating habits, public policy and the hospitality sector from different Asian perspectives. The mixed method approach (qual→QUAN) utilised draws on the methodologies employed Warde & Martens (2000) and Poulain et al. (2014). Focus groups are employed for the qualitative phase to build the knowledge related to eating out in each setting, specifically related to (social) norms, values and opinions of eating out. Findings from the focus groups will be used to further develop the questionnaires used for the quantitative data collection. The quantitative phase aims to understand the rebuilt practices of the participants, by statistical analysis of eating out practices in relation to socio-economic and demographic characteristics. The questionnaire employed will feature a 7-day meal recall, to understand the socialisation, location, time, and source for each meal from the previous week. Secondary data from the Malaysia Food Barometer, Asian Food Barometer, and the Eating Out in Asia survey will be used, all of which are conducted under the LIA-CNRS: “Food, Cultures and Health”.

KidChen Study was an experiential healthy meal preparation intervention among schoolchildren. This randomized-controlled trial aimed to improve food availability at home through children as change agent in the family. Two randomly selected schools in Kuala Lumpur, Malaysia were assigned to either intervention or control group. Overall, 83 children aged 10-11 completed the programme. Intervention group underwent five 60-minute nutrition modules for 12 weeks, which comprised of hands-on healthy meal preparation activities, storytelling and provision of healthy food ingredients. Parents of intervention group received one 60-minute interactive session on home food availability. Home food availability questionnaire was validated and self-reported by parents. More than half of children from intervention group (68%) and control (56%) had normal weight. About one quarter of children were overweight/obese in intervention (25%) and control group (33%). After the programme, intervention group had significant increase (p<0.05) in the home availability of fruits [$\Delta=4.9(5.6)$ vs $-1.0(2.1)$], vegetables [$\Delta=2.9(4.01)$ vs $-1.1(2.7)$] and healthful ready-to-eat foods [$\Delta=2.4(2.8)$ vs $-0.3(1.8)$], as compared to control group respectively. No significant difference was found for unhealthy ready-to-eat foods at home among intervention and control groups. Further analysis showed similar trend (p<0.05) in normal weight and overweight/obese children, but not in thin children. Findings revealed that KidChen Study made an impact in improving home food availability with children as the agent of change. A 3-months follow-up will be conducted to determine the sustainability of these outcomes.
The prevalence of obesity in adults and children emerged as a major health issue in Malaysia. Recent studies reported that mothers play an important role in their kids eating behaviour and food choices. This study aims to investigate the correlation between school-aged children’s Body Mass Index (BMI) with their mothers’ BMI. This study was conducted in selected primary schools located within the areas of Bangi, Kajang, Serdang, Puchong and Balakong in Selangor. A total of 357 children – mother pairs (145 males and 212 females) of healthy and non-pregnant women (25-60 years old) were recruited. Both children and mothers were invited to be present on the day of study. Body weight and height of children and mothers were measured using TANITA body analyser and SECA stadiometer, respectively. The body mass index (BMI) of these participants were calculated and categorized according to the World Health Organization (WHO) criteria for children and adults. The prevalence of overweight children (BMI ≥85th to <95th percentiles) and mother (BMI 25 to <29.9kg/m²) are 7.0% and 37.0% respectively; while the prevalence of obesity is 19.9% for children (BMI ≥95th percentile) and 22% for mother (BMI ≥30kg/m²). There appears to be a statistically significant association ($p<0.05$) between children’s and mothers’ BMI and the correlation between mother-daughter (coefficient, $r=0.354$, $p<0.05$) is slightly stronger than the mother-son (coefficient, $r=0.335$, $p<0.05$). Our results indicated that overweight or obese mothers were more likely to have overweight or obese children, as compared to the normal-weight mothers. Therefore, the study showed that mothers with excess weight have an important influence on their respective children’s BMI.
P23 Sociodemographic, Anthropometric and Frequency Intake of Sugar-sweetened Beverages (SSBs) and Snacks Among Schoolchildren in Kota Bharu, Kelantan: A Descriptive Analysis

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Sugar-sweetened beverages (SSBs) and snacks overconsumption contribute to the risk of developing overweight, type 2 diabetes, and dental caries. This study aimed to assess the sociodemographic, nutritional status, and frequency intake of SSBs and snacks among schoolchildren in Kota Bharu, Kelantan. The study was a cross-sectional study conducted on 463 schoolchildren aged 10 and 11 years old (45.1% boys and 54.9% girls). Sociodemographic questionnaires were used to collect information on ethnicity, gender, age, birth date, health status, number of siblings, food and financial assistance, parental education level, parental type of occupation, household income, and family financial assistance. The median (IQR) for family household income was 2000.00 (4170.00), where 65.2% family with low income less than RM3,860, 24.2% with medium income range from RM3,860 to RM8,319, and 10.6% with high income RM8,320 and above. Anthropometric measurements of the respondents, including body weight and height, recorded. Body mass index (BMI) calculated using the anthropometric calculator, WHO Anthroplus software. The median (IQR) of weight in kilogram was 29.8 (12.3), height in centimeter was 133.9 (10.4), and BMI in kg/m² was 16.6 (4.6). BMI-for-age status was 14.3% obese, 14.3% overweight, 65.9% normal, and 5.6% thinness. Beverages and snacks questionnaire (BSQ) were developed to assess the frequency and location intake of SSBs and snacks. SSBs classified into nine categories (fruit drink, soymilk, milk, cultured drink, carbonated, sports drink, malt drink, coffee/ tea, and vendor-made). Frequency intake was assessed on the previous week of consumption and was classified into four (1-3 days/ week, 4-6 days/ week, daily and never). Meanwhile, SSBs derived location classified into three groups (home, school, and other). In conclusion, the most frequent intake of SSBs and snacks were 1-3 days/ week and home as was their preferred location of SSBs and snacks consumption.
P24 Validation of Food Frequency Questionnaire (FFQ) for Dietary Assessment Among Pre-schoolers Participating in the ToyBox Study Malaysia

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Assessment of dietary intake among young children is undisputedly difficult, and accurate assessment tools are scarce. Food frequency questionnaires (FFQ) are known to capture habitual information and can be useful for dietary assessment of pre-schoolers. To date, limited FFQs are available for use to assess the dietary intake of young children in Malaysia. Thus, this study aimed to determine the validity and reliability of an FFQ for assessing the dietary intake of preschool children in Malaysia. A total of 210 pre-schoolers aged 4 to 6 years were involved in the validation study and a subsample of 66 subjects participated in the reliability study. The FFQ consisted of 108 food items was compared to 3-day dietary record as the reference method. Reliability was assessed by repeated FFQ administrations (FFQ2), 4 weeks after the first administration. Parent or guardian proxy-reported their child’s food intake. Spearman’s correlation coefficients for validity study showed moderate to high correlations between the two methods, ranging from $r_s = 0.363$ (fat) to $r_s = 0.511$ (energy). Bland-Altman plots showed that the majority of data-points lay between the limits of agreement. Cross-classification of quartile analysis showed moderate agreement between the two methods. The proportion of participants classified into the same and adjacent quartiles ranged from 77.6% (fat) to 83.3% (carbohydrate). As for reliability, Spearman’s correlation coefficients showed moderate to high correlations between FFQ1 and FFQ2, which ranged from $r_s = 0.464$ (carbohydrate) to $r_s = 0.665$ (protein). Cronbach’s alpha values ranged from 0.708 for carbohydrate to 0.824 for fat. Intra-class correlation coefficients (ICC) showed good agreement between the repeated FFQs with correlations ranging from 0.710 (protein) to 0.965 (energy). The results suggest that the FFQ has acceptable validity and good reliability. The FFQ will be useful for the assessment of dietary intake among preschool children participating in the Toybox Study Malaysia.
P25 Selenium Content in Selected Raw and Processed Food Products in the Malaysian Market

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Selenium is an essential micronutrient that is important to human biology. However, there are limited number of publications available on the selenium content of Malaysian foods, thus making it difficult to estimate the daily dietary selenium intakes amongst Malaysian population. This study aimed to determine the selenium content in 127 raw and processed food products that are commonly consumed by Malaysians. The samples include 30 cereal products, 9 starchy root and tuber products, 3 legume products, 8 nut and seed products, 4 vegetables, 5 fruits, 17 sugar and syrup products, 2 meat products, 3 eggs, 9 fishes, 13 milk products, 11 oil and fat products and 13 other food products. The samples were collected up to six different brands from local supermarkets in the Klang Valley using stratified sampling. Selenium content was determined using graphite furnace atomic absorption spectrometry. The samples were digested in a mixture of nitric acid and hydrogen peroxide by closed-vessel microwave digestion prior to analysis. Results showed that the highest selenium content was found in fish (2.96-690.15 µg/100g), eggs (41.90-52.54 µg/100g) and cereal products (1.97-51.70 µg/100g). Moderate level of selenium was found in starchy root and tuber products (2.97-43.45 µg/100g), nut and seed products (8.83-42.58 µg/100g) and milk products (1.27-35.59 µg/100g) while the lowest selenium content was found in vegetables (1.98-2.57 µg/100g) and fruits (1.35-3.47 µg/100g). In conclusion, raw and processed food products showed a wide range of selenium content. These findings can be used for better estimation of daily dietary selenium intakes and for making recommendations to improve the dietary status of Malaysian population.
P26 A Novel Diabetes Prevention Intervention Using a Mobile App Among Overweight Adults: Preliminary Findings

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This study aims to determine the feasibility and efficacy of lifestyle intervention to prevent type 2 diabetes among adults who are at risk of developing diabetes, an assessor-blinded, parallel-group, randomised controlled trial using the Malaysia Diabetes Prevention Programme (MyDiPP) app. ‘MyDiPP’ is a 12-month lifestyle intervention digital therapy with multiple approaches (weight loss, dietary modification, physical activity and quality of life). Eligible adults are aged 18-65 years, overweight/obese (BMI ≥ 23 kgm⁻²) and at high-risk for type 2 diabetes (American Diabetes Association (ADA) Diabetes Risk Score ≥ 5, or HbA1c of 5.6-6.2%). Each participant will be randomly assigned to one of two study groups in 1:1 ratio using simple randomisation to intervention or usual care control groups. The primary outcome is the change in weight at 6 months and 12 months, while the secondary outcomes are changes in HbA1c level, physical activity level, dietary intake and quality of life. The prevalence of overweight and obesity were 60.9% and 32.6% respectively. Their mean (SD) age was 39.9 (11.9) years old and 52.2% were females. The result showed that the prevalence of pre-diabetes is 17.4% with a mean HbA1c value is 5.9 (0.1) %. The MyDiPP programme is an assessor-blinded, parallel-group, randomised controlled trial, in which the app consists of educational lessons, group, technology-enabled discussions, tools to track nutritional intake, physical activity, body weight and blood glucose level as well as platform to communicate with the health coaches. This study is necessary to determine to what extent the intervention programme reduces risks of diabetes risk in comparison to the usual care.
P27 Social Facilitation Influencing Perceived Energy Intake Among Undergraduates in a Public University in Selangor: A Preliminary Study

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This study is a preliminary study to determine the influence of social facilitation on energy intake, through questionnaire and food visuals. Several past studies carried out outside the country observed the influence of social factors in energy intake. Other parameters, such as socio-demographic factors and the mechanism underlying social facilitation which was anxiety were also investigated. A sample of 140 students from three different courses from a faculty were selected to participate in the study. A self-administered questionnaire was given consisting of four parts. The instrument used was questionnaire adapted from Social Interaction Anxiety Scale (Mattick & Clarke. 1998), Level of Anxiety during Eating Scale (De Castro. 1994) and Food Photography (Carb and Calorie Counter Book. 2016). This research found that subjects perceived their energy intake the lowest when they ate with an unfamiliar peer (2.45±0.98) compared to when they ate with the familiar peers in a group of four (3.09±1.00) or ate alone (2.87±1.02). Furthermore, level of anxiety had negative and significant relationship with both perceived energy intake when subjects ate with an unfamiliar peer (p<0.001) and ate alone (p<0.001). Meanwhile, a significant relationship was found between social interaction anxiety with perceived energy intake when subjects ate with an unfamiliar peer (r= -.251. p<0.05). From the findings of this study, there were influences of social facilitation and socio-demographic factors (genders) on perceived energy intake. Thus, development of social factors such as social facilitation can be recommended as the antecedents to facilitate or inhibit the intake. The positive findings of this preliminary study were used as a basis to carry out actual social facilitation and food intake experimental study in a subsequent study.
P28 Psychosocial Factors Influencing Obesity Among Primary School Children: A Qualitative Study

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The prevalence of overweight and obesity among schoolchildren in Malaysia has increased in the last decade. It is well established that excessive food intake and physical inactivity are risk factors to obesity. This qualitative study explores the psychosocial factors affecting obesity among primary schoolchildren in Klang Valley. Twenty-seven overweight and obese Malay children from three primary schools participated in this study through in-depth interviews. Each interview was audiotaped and lasted 32 minutes on average. Interviews were transcribed verbatim and thematic analysis was used to analyse the data. The results showed 3 themes which are individual influences, parental/familial influences and community and social influences. Under individual influences, the subthemes were low self-control, stress, boredom, barriers to physical activity and sleep deprivation. For parental and familial influences, subthemes include feeding styles, family eating practices, availability of unhealthy foods at home and less involvement of parents in physical activity. For community and social influences theme, three subthemes were physical environment, peer influence, and body weight discrimination. In conclusion, this study showed that psychosocial factors played an important role in the development of overweight and obesity among primary schoolchildren. Future interventions should give serious considerations to psychosocial factors and its underliers to combat overweight and obesity among schoolchildren in Malaysia.
Pre-pregnancy Body Mass Index, Depression and Their Associations with Gestational Weight Gain Among Pregnant Women in Selangor and Kuala Lumpur

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Gestational weight gain (GWG) has been reported by substantial studies as an important anthropometric indicator of maternal nutritional status to reduce short- and long-term adverse health outcomes for both mothers and infants. Obesity and depression are also the two common health problems in perinatal care. However, associations of these two health problems with GWG remain inconsistent and underexplored in Malaysia. This study aimed to determine GWG status among pregnant women and its association with pre-pregnancy body mass index (BMI) and depression. This study is part of Mother and Infant Cohort Study (MICOS). Data from 429 third trimester pregnant women aged 18 to 40 years old, attending selected health clinics in Selangor and Kuala Lumpur were collected through face-to-face interviews and their medical records. GWG status was determined based on IOM recommendations. Pre-pregnancy BMI status was determined based on WHO classifications. Depression status during pregnancy was assessed using validated Edinburgh Postnatal Depression Scale (EPDS). Over a quarter (27.7%) had excessive GWG, with a mean of 12.5 ± 5.0 kg for total weight gains in overall. For pre-pregnancy BMI (mean=24.0 ± 4.9 kg/m²), over one-third (34.3%) were overweight or obese before pregnancy. Prevalence of depression during pregnancy was 6.5%, with a mean of 5.2 ± 4.1 for EPDS score. Significant association was found between pre-pregnancy BMI status and GWG status ($\chi^2=45.704$, $p<0.001$), whereby prevalence of excessive GWG was the highest among those who were obese (53.2%), followed by those who were overweight (43.0%), normal (19.9%) and underweight (7.3%). Besides, significant association was found between depression status and GWG status ($\chi^2=9.056$, $p=0.011$), whereby prevalence of excessive GWG was higher among those who were non-depressive (29.2%) than those who were depressive (7.1%). In conclusion, excessive GWG was more prevalent among those who were overweight or obese before pregnancy, or non-depressive during pregnancy. The findings emphasize that health promotion should target overweight or obese women in reproductive age group to prevent excessive GWG during pregnancy.
P30 Knowledge and Perception Towards KETO Diet Among General Population in Baghdad City, Iraq

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This study aimed to examine the knowledge and perception of general population towards KETO diet in Baghdad city, Iraq. A total of 203 respondents participated in this study using internet-based survey. Questionnaire was adopted from a previous study to measure the knowledge (18 questions) and perception (9 questions). Almost all participants (98.5%) heard about keto diet, (41.8&) currently on keto diet and (26%) tried it before. The most duration for keto diet following was 1 month (26%) and 44.3% of participants took supplements when following keto diet. Majority (44.8%) reported that the results of keto diet was losing weight and keep the weight they lose. In general, most of the participants had good knowledge on keto diet except regarding nutritional ketosis and long-term studies on keto diet effect as majority answered don’t know (70.9%, 43.3%) respectively. Regarding perception, majority (42.8%) agreed that keto diet should prescribed by doctors or nutritionist only and (40%) disagreed that keto diet is safe to be followed for lifelong. As a conclusion, keto diet is a popular weight loss diet nowadays and general population have good knowledge and perception, but more health promotion and education are needed.
**P31 Effects of POP-, SOS- and OOO- Rich High Fat Diets on Markers of Obesity and Lipid Profile in Male Sprague Dawley Rats**

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Effects of palmitic, stearic and oleic acids at the sn-1, 3 positions at the triglyceride backbone on markers of adiposity and lipid profile have not been studied extensively. The aim of this study is to investigate the effect of palmitic acid rich (POP-) and stearic acid rich (SOS-) fats on markers of obesity compared to that of an oleic acid rich (OOO-) fat. Male Sprague Dawley rats (n=8 per group) were randomly allocated with an isoenergetic meal, providing 40.0% of the total energy from fat in one of the formulated diets for 8 weeks. Palm mid fraction (PMF), shea stearin (SS) and high oleic sunflower oil (HOSF) were used as sources of POP-, SOS- and OOO- type of fats in the diets. Rats fed with POP- and SOS- diets have significantly lower total weight gain/total food intake compared with that of an OOO- diet. SOS-fed rats also showed a significantly lower (p<0.05) adipose tissue weight and adipose tissue/weight compared to OOO-diet but did not differ with that of a POP-diet. Meanwhile, POP- diet was found to raise serum high density lipoprotein cholesterol (HDLC) levels and lower serum total/HDLC ratios compared to both SOS- and OOO-diets. Our findings suggested that POP- and SOS- type of fats have lesser adiposity effects compared with that of an OOO- fat.
P32 Determination of Glycaemic Index and Satiety Scores of Bun Formulated with *Kappaphycus Alvarezii* Seaweed Powder

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Studies have suggested that foods which are categorized as low glycaemic index (GI) decrease the feelings of hunger and prolong satiety. Therefore, this study was conducted to determine the glycaemic index (GI) and satiety scores of buns formulated with *Kappaphycus alvarezii* seaweed powder (SWP). Three formulations of seaweed bun with different proportion of SWP inclusion, A (0% SWP), B (3% SWP), C (6% SWP) were prepared. The GI and satiety scores were conducted for 120 and 180 minutes accordingly. In the GI study, only 10 subjects with normal glucose baseline reading were selected and served with seaweed bun containing 50g of available carbohydrate. Capillary blood samples from fingertips were analysed before (0 min) and after consumption of seaweed bun at 15, 30, 45, 60, 90 and 120 minutes. The incremental area under the curve (iAUC) and area under the curve (AUC) was used to calculate the GI values and satiety scores for each sample respectively. As for the determination of satiety scores, 30 subjects eating habits were screened using Three Factor Eating Questionnaire (TFEQ) and assess their perception of fullness or hunger using the labelled magnitude satiety scale at 0, 15, 30, 45, 60, 90, 120, 150 and 180 min. The GI values were 43 to 50 (low GI). At 0 minute, no significance difference (p>0.05) was found for samples A, B and C in terms of satiety scores. The results showed that sample C with 6% SWP prolonged the satiety for 2 hours (120 minutes) with higher AUC values of 3325.0 compared to A (AUC = 2841.1) and B (AUC = 3187.0). Higher satiety scores were observed for samples with higher fibre content. In conclusion, the addition of SWP does affect the satiety scores of the seaweed bun without altering the quality attributes of the bun.
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WHAT DO MALAYSIAN CONSUMERS EAT FOR BREAKFAST?

Herbalife Nutrition Asia Pacific Healthy Breakfast Survey 2019*

TYPICAL BREAKFAST OPTIONS

- Coffee & Eggs: 30%
- Tea & Rice: 22%
- Coffee & Rice: 22%

REASONS FOR CHOICE OF TYPICAL BREAKFAST

- Convenience: 75%
- Delicious: 49%
- Cost-effective: 49%
- Healthy: 39%

TYPICAL BREAKFAST LOCATION

- At home: 56%
- At an eatery: 19%
- At work: 14%
- On-the-go: 10%
- Others: 1%

WHAT MALAYSIANS CONSIDERED AS HEALTHIER BREAKFAST OPTIONS:

- Malaysia: 32%
- Tea & Eggs: 32%
- Plain Water & Oatmeal: 28%
- Plain Water & Eggs: 27%

DESIRE TO CONSUME HEALTHIER BREAKFASTS

- Yes: 82%
- No: 18%

BARRIERS TO CONSUME A HEALTHY BREAKFAST

- Lack of time: 73%
- Lack of money: 38%
- Too much work/effort: 33%

TIME SPENT ON A HEALTHY BREAKFAST

- >30 mins: 4%
- <5 mins: 7%
- 5-10 mins: 23%
- 10-15 mins: 24%
- 15-20 mins: 20%
- 20-30 mins: 21%

* The Asia Pacific Healthy Breakfast Survey was conducted in March 2019 with 5,500 respondents in 11 markets - Australia, Hong Kong, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand and Vietnam. An online survey was sent to a general population sample from each of the markets, with 500 respondents interviewed in each market.

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