31st Scientific Conference

Theme

"Better Nutrition, Healthier Malaysians"

Programme & Abstracts

31 May – 1 June 2016
Hotel Istana, Kuala Lumpur

DUTCH LADY

No.1 BRAND IN MALAYSIA
FOR FORMULATED MILK POWDER FOR CHILDREN*

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Children between the ages of 1 and 2 years have high levels of **curiosity** and need nutrition to protect their **vision.**

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Children between the ages of 2 and 4 years need nutrition to help **strengthen their immune system** so they are free to **explore.**

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Children between the ages of 4 and 6 years become more **creative** and need nutrition to support **brain development and imagination.**

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Children of 6 years and above need nutrition to help raise their **focus and memory skills** and improve their ability to **learn.**

* Compared to previous formulated milk powder for children formulation (Year 2009)
** Based on Retail Audit for 12 months ending October 2015 in Total Peninsular Malaysia
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* 4-Step Nutri Plan includes Dutch Lady© Curious, Explore, Create and Learn formulated milk powder for children

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Contents

Conference Secretariat

VERSACOMM (263773-W)

12-A, Jalan PJS 8/4, Mentari Plaza, Bandar Sunway, 46150 Petaling Jaya, Selangor.
Tel: 03-5632 3301 Fax: 03-5638 9909 Email: versahealth@versa-group.com

Members of the 16th Council & Organising Committee of 31st Scientific Conference

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Dr Roseline Yap Wai Kuan

Dr Wong Jyh Eiin

Dr Hanis Mastura Yahya

President's Welcome Message

Welcome to the 31st Scientific Conference of the Nutrition Society of Malaysia (NSM)!

Being the main nutrition professional body in the country, the NSM is pleased to be able to continue organising this annual scientific event that all nutritionists look forward to. It is the goal of NSM to promote nutritional science and organising this annual conference is one of the ways towards achieving that. It is inspiring to note that the conference continues to draw a great deal of interest amongst the nutrition fraternity in the country, as participants come from various organisations throughout the country.

We warmly welcome and thank Yang Berhormat Dato' Seri Dr Hilmi bin Haji Yahaya, the Deputy Minister of Health Malaysia for graciously consenting to declare open this Conference. The presence of YB Dato' Seri is certainly meaningful to the NSM and the Conference.

With the theme: Better Nutrition, Healthier Malaysians, the 31st NSM Annual Scientific Conference is dedicated to provide a platform for all stakeholders to share research and intervention activities that contribute towards the implementation of the NPANM III (2016 – 2025).

The Scientific Programme is packed with 32 oral presentations from a mixture of international and local speakers from the academia, government agencies and private sector. There is a keynote lecture and two dedicated symposium sessions focused on the theme of the Conference, a focused session on infant and young child nutrition, a session for members to highlight a variety of nutrition research topics and a session where industry experts share their contribution in promoting better nutrition. The Young Researcher's Symposium will also see young researchers from local universities sharing their findings and presentation skills and vying for the top prizes. There are 160 poster presentations covering a wide range of nutrition-based research. A pre-conference scientific symposium on Nutrition & Health Benefits of Fibre is also offered to the participants in conjunction with this Conference.

In anticipation of the full enforcement of the Allied Health Professions Act 2016, the Conference also features a Meet the Experts Session: Implementation of the Allied Health Professions Act 2016. This is a session which many participants will look forward to. Facilities are provided during the Conference to enable participants to carry out pre-registration as a nutritionist.

I take this opportunity to place on record our sincere gratitude to all who have contributed in successfully organising this Conference which includes all speakers and poster presenters, all participants as well as the sponsors. I thank my colleagues in the 16th Council of the NSM for their cooperation and support throughout the year.

I trust everyone will take full advantage of this opportunity provided and have a fruitful conference.

Tee E Siong, PhD
President, Nutrition Society of Malaysia
president@nutriweb.org.my

Acknowledgements

The Nutrition Society of Malaysia gratefully acknowledges contributions from the following to the 31st Scientific Conference:

Major Sponsors

- A.Clouet & Co. (KL) Sdn Bhd (Ayam Brand)
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A collaboration among

Food and Nutrition Society of Indonesia

Nutrition Society of Malaysia

Nutrition Foundation of the Philippines, Inc

Nutrition Association of Thailand under the Patronage of Her Royal Highness Princess Maha Chakri Sirindhorn

Vietnam Nutrition Association

The **Southeast Asia Public Health Nutrition (SEA-PHN)** Network is a partnership of key stakeholders in the region, namely nutrition societies and corporate partners to promote public health nutrition among the population and alleviating nutrition problems in the region.

Please visit our website at http://sea-phn.org for more information.

Sign up for Free to download nutrition related documents at our resource area.

Save the Date!

1st Southeast Asia Public Health Nutrition Conference

In conjunction with

Nutrition Society of Malaysia 32nd Annual Scientific Conference

"Together In Advancing Public Health Nutrition"

May 14 (Sun) – 17 (Wed), 2017 • Hotel Istana, Kuala Lumpur, Malaysia

Conference Chair:
Dr Tee E Siong, Nutrition Society of Malaysia

Conference Advisors:
Prof Dr Ir. Hardinsyah Ridwan, Food and Nutrition Society of Indonesia
Emeritus Prof Dr Mohd Ismail Noor, Nutrition Society of Malaysia
Dr Rodolfo F. Florentino, Nutrition Foundation of the Philippines, Inc
Assoc Prof Dr Umaporn Suthutvoravut, Nutrition Association of Thailand
Prof Dr Le Thi Hop, Vietnam Nutrition Association

Conference Secretariat:
VersaComm Sdn Bhd
12A, Jalan PJS 8/4, Mentari Plaza, Bandar Sunway,
46150 Petaling Jaya, Selangor Darul Ehsan.
T: +603-5632 3301 F: +603-5639 9909
www.seaphnconference2017.org

Organiser:

Nutrition Society of Malaysia

Co-organisers:

Food and Nutrition Society of Indonesia

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Nutrition Association of Thailand under the Patronage of Her Royal Highness Princess Maha Chakri Sirindhorn

Vietnam Nutrition Association

Under the auspices of:

SEA PHN
Southeast Asia Public Health Nutrition Network

Official Opening

DAY 1	**TUESDAY 31 MAY, 2016**
0730 hrs	Registration
0900 hrs	**OFFICIAL OPENING** Mahkota II Grand Ballroom
0900 hrs	**Welcome address by** Tee E Siong President, Nutrition Society of Malaysia (NSM)
0910 hrs	**Speech and official opening by** Yang Berhormat Dato' Seri Dr Hilmi Bin Haji Yahaya Deputy Minister of Health Malaysia • Presentation of NSM Fellows Award • Presentation of NSM Undergraduate and Postgraduate Prizes • Presentation of NSM Publication Prizes
0945 hrs	**Tour of Trade Exhibition/Scientific Posters by invited guests** **Refreshment** **Poster Session: presenters in attendance for discussion**

Scientific Programme

DAY 1 **TUESDAY 31 MAY, 2016**

KEYNOTE ADDRESS
Chairperson: Mohd Ismail Noor
Taylor's University

1030-1115 hrs **The role of nutrition research to meet the current and future nutritional challenges in a developing country like Malaysia**
Christiani Jeyakumar Henry
Director, Clinical Nutritional Research Centre, Singapore
Institute for Clinical Sciences, A*STAR, Singapore

SYMPOSIUM 1 : Promoting Better Nutrition for Healthier Malaysians
Chairperson : Rokiah Don
Nutrition Society of Malaysia

1115-1145 hrs **Key findings of the recent Malaysian Adult Nutrition Survey (MANS) 2014**
Mohamad Hasnan Ahmad
Institute for Public Health, Ministry of Health Malaysia

1145-1215 hrs **The National Health and Morbidity Survey 2015: NCD risk factors**
Muhammad Fadhli Mohd Yusoff
Institute for Public Health, Ministry of Health Malaysia

1215-1245 hrs **MyBreakfast Study – Key findings and implications for intervention**
Mahenderan Appukutty
On Behalf of Research Committee, MyBreakfast Study, Nutrition Society of Malaysia
Sports Science Programme, Faculty of Sports Science & Recreation, Universiti Teknologi MARA, Shah Alam

1245 hrs **Lunch / Poster Viewing / Trade Exhibition**
Poster presenters in attendance for discussion

SYMPOSIUM 2 : Promoting Better Nutrition for Healthier Malaysians

Chairperson : Norimah A Karim
Universiti Kebangsaan Malaysia

1400-1425 hrs **The Third National Plan of Action for Nutrition of Malaysia (NPANM), 2016-2025**
Zalma Abdul Razak
Nutrition Division, Ministry of Health Malaysia

1425-1450 hrs **Malaysian Food Composition Database Programme**
Rusidah Selamat
Nutrition Division, Ministry of Health Malaysia

1450-1515 hrs **FBDGs of specific population groups – Pregnant and lactating women, elderly, vegetarians**
Gui Shir Ley
Nutrition Division, Ministry of Health Malaysia

1515-1540 hrs **MyNutriBaby – A contemporary parent education programme on infant and young child nutrition**
Tan Sue Yee
On behalf of Expert Committee, MyNutriBaby Programme, Nutrition Society of Malaysia
Division of Nutrition & Dietetics, International Medical University, Kuala Lumpur

SYMPOSIUM 3 : Young Researcher's Symposium
Chairperson : Zaitun Yassin
Nutrition Society of Malaysia

1540-1555 hrs **The Great-Child Trial: A quasi-experimental intervention to improve knowledge, attitude and practice (KAP) towards whole grain among overweight/obese schoolchildren in Kuala Lumpur, Malaysia**
Koo Hui Chin, Poh BK and Ruzita AT
Nutritional Sciences Programme, School of Healthcare Sciences, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur

1555-1610 hrs **Prevalence of functional constipation and symptoms characteristics among students in Universiti Putra Malaysia, Serdang**
Lim Ying Jye, Rosita J, Chieng JY, Hazizi AS, Yap P and Rajesh P
Department of Nutrition and Dietetics, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia, Serdang

1610-1625 hrs **Prevalence of malnutrition, soil-transmitted helminth infection and anemia among aboriginal children aged 1 to 6 in Gua Musang, Kelantan**
Oui Pek Geik, Razalee S and Ahmad Faris A
School of Chemical Sciences and Food Technology, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Bangi

1625-1640 hrs **Juara Sihat: Effectiveness of a school-based childhood obesity nutrition education programme with intervention on eating habits and physical activity in Kuala Lumpur, Malaysia**
Devanthini Dewi A/P Gunasekaran, Ruzita AT, Nik Shanita S, Sharif R, Mahadir A and Poh BK
Nutritional Sciences Programme, School of Healthcare Sciences, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur

1640-1655 hrs **Screening of aflatoxin M1 metabolite in urine samples among residents in Terengganu, Malaysia**
Farah Nadira Binti Ahmad, Rosita J, Norhaizan ME and Mohd Redzwan S
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang

1700-1800 hrs **MEET THE EXPERTS SESSION**

Implementation of the Allied Health Professions Act 2016 – Find out all you need to know

Panelists:

1. Dato' Tan Yoke Hwa,
   Director, Allied Health Sciences Division,
   Ministry of Health Malaysia

2. Ms Zalma Abdul Razak,
   Director, Nutrition Division,
   Ministry of Health Malaysia

3. Mr Nik Mohamed Hazmi bin Nik Hussain,
   Deputy Director, Dept of Professional Development,
   Allied Health Sciences Division,
   Ministry of Health Malaysia

Moderator:
Tee E Siong,
President of Nutrition Society of Malaysia

DAY 2 **WEDNESDAY 1 JUNE, 2016**

SYMPOSIUM 4 : Industry Contribution to Promoting Better Nutrition
Chairperson : Tee E Siong
President, Nutrition Society of Malaysia

0900-0940 hrs **Eat smart – Steer your metabolic and digestive health with science-based ingredients**
Goh Peen Ern
Manager Nutrition Communication, BENEO Institute, BENEO Asia-Pacific

0940-1020 hrs **The universal nutrition benefits of breakfast cereals & whole grain**
Cher Siew Wei
Corporate Wellness Manager, Nestlé Products Sdn Bhd

1020-1050 hrs **Refreshment / Poster Viewing / Trade Exhibition**

1050-1130 hrs **Oat basics & cooking with Oats**
Roseline Yap Wai Kuan
Senior Lecturer, School of Biosciences,
Taylor's University, Selangor

1130-1210 hrs **New frontiers in fibre: Emerging research and health benefits**
Connie Weaver
Distinguished Professor and Head of the Department of Nutrition Science, Purdue University, USA

1210-1250 hrs **The latest findings relating to fats: The new roles of Omega-3 and MCT**
Takuji Shirasawa
Visiting Professor, Neurology, University of Michigan, USA

1250-1400 hrs **Lunch / Poster Viewing / Trade Exhibition**
Poster presenters in attendance for discussion

SYMPOSIUM 5 : Focused Symposium on Infant & Young Child Nutrition (In Collaboration with International Medical University)
Chairperson : Khor Geok Lin,
Universiti Putra Malaysia

1400-1415 hrs **Dietary intake and blood status of gangliosides among Malaysian toddlers**
Sangeetha Shyam
Division of Nutrition & Dietetics, International Medical University, Kuala Lumpur

1415-1430 hrs **Dietary intake of mothers and gangliosides content in breast milk**
Hamid Jan Jan Mohamed
Nutrition and Dietetics Programme, School of Health Sciences, Universiti Sains Malaysia, Kubang Kerian

1430-1445 hrs **Compliance with WHO IYCF indicators and dietary adequacy of subjects aged 6-23 months from day care centres in Kuala Lumpur and Putrajaya**
Tan Sue Yee
Division of Nutrition & Dietetics, International Medical University, Kuala Lumpur

1445-1500 hrs **Weighing food intake of toddlers in Bambino Project: Sharing experiences**
Megan Chong
Division of Nutrition & Dietetics, International Medical University, Kuala Lumpur

SYMPOSIUM 6a : Nutrition Potpourri
Chairperson : Mohd Nasir Mohd Taib
Universiti Putra Malaysia

1500-1510 hrs **Association of serum leptin levels and LEP gene variation with body composition and insulin resistance in obese Malaysian adults**
Tan Pui Yee, Amini F and Mitra SR
School of Biosciences, Faculty of Science, University of Nottingham Malaysia Campus, Semenyih

1510-1520 hrs **Primary school obesogenic environment model: Case study in Brunei Darussalam**
Siti Rohaiza Ahmad, Lisa Schubert and Robert Bush
PAPRSB Institute of Health Sciences, Universiti Brunei Darussalam

1520-1530 hrs **Effect of 4 weeks probiotic supplementation on body weight, fasting blood glucose levels, waist circumference, waist-to-hip ratio and fecal short chain fatty acids among overweight Malaysian adults; A pilot study**
Muhammad Daniel Azlan Mahadzir, Ankur B, Sangeetha S, Purushottham K and Srinivasan R
Postgraduate and Research Institute, International Medical University, Kuala Lumpur

1530-1540 hrs **Meal pattern, dietary intake and prevalence of hypertension, hypercholesterolemia and diabetes mellitus among adults in coastal community in Semporna, Sabah**
Hazriani Harris, Ooi YBH and Jau-Shya L
Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, Kota Kinabalu

1540-1550 hrs **Metabolomics reveals metabolite changes following Cosmos caudatus supplementation in patients with type 2 diabetes: A randomized controlled trial**

Cheng Shi Hui, Amin I, Joseph A, Ng OC, Azizah AH and Barakatun-Nisak MY
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang

SYMPOSIUM 6b : Nutrition Potpourri
Chairperson : Wong Jyh Eiin
Universiti Kebangsaan Malaysia

1550-1600 hrs **Glycaemic responses to isomaltulose and to sucrose in isomaltulose tolerant and intolerant Chinese adults**

Chan Chee Shan, Barling PM and Shyam S
School of Postgraduate Studies, International Medical University, Kuala Lumpur

1600-1610 hrs **Early nutrition, growth and cognitive development of infants from birth to 2 years: Methodology and preliminary findings at 6 months**

Nurliyana Abdul Razak, Zalilah MS, Mohd Nasir MT, Gan WY and Tan KA
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang

1610-1620 hrs **Dietary polyphenols: Populations' intake estimation, dietary sources and potential health benefits**

Hanis Mastura Yahya
Nutritional Science Programme, School of Healthcare Sciences, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur

1620-1630 hrs **Dietary approach using probiotics as a potential strategy to prevent human dietary aflatoxin exposure**

Mohd Redzwan Sabran, Rosita J, Mohd Sokhini AM, Wang JS, Zuraini A, Kang MS, Nurul 'Aqilah AR, Nikbakht Nasrabadi E
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang

1630-1640 hrs **Development of the First Malaysian Active Healthy Kids Report Card on physical activity for children**

Razinah Sharif, Min Li O, Poh BK, Wong JE and Saad HA
Nutritional Science Program, School of Healthcare Sciences, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur

PRIZE GIVING CEREMONY AND CLOSING
Officiated by: Mohd Ismail Noor
Vice-President, Nutrition Society of Malaysia

1700 hrs **Young Researcher's Symposium and Best Undergraduate Poster Prizes**
Refreshment/ Conference Ends

Conference Information

REGISTRATION COUNTER

Registration Counter is located at **Foyer, Ballroom Level, Hotel Istana, Kuala Lumpur** Opening hours of the Registration Counter

- 31 May 2016: 7.30 am – 6.00 pm
- 1 June 2016: 8.30 am – 5.00 pm

SCIENTIFIC SESSIONS

All scientific sessions shall be held in the **Mahkota II Ballroom, Ballroom Level, Hotel Istana, Kuala Lumpur**

POSTER PRESENTATIONS

Poster Presentations shall be held at **Function Rooms Nilam, Delima, Berlian on Ballroom Level, Hotel Istana, Kuala Lumpur** and the opening hours are as follows:

- 31 May 2016: 8.30 am – 6.00 pm
- 1 June 2016: 8.30 am – 5.00 pm

TRADE EXHIBITION

Trade Exhibition is located at **Foyer, Ballroom Level, Hotel Istana, Kuala Lumpur** Opening hours for booths:

- 31 May 2016: 8.30 am – 6.00 pm
- 1 June 2016: 8.30 am – 5.00 pm

OFFICIAL LANGUAGE

The official language of the Conference is **English**.

CERTIFICATE OF ATTENDANCE

E-Certificate of Attendance will be given to all registered delegates upon request within 1 week after the Conference via email (soft-copy). Special certificates will be given to those participated in the Young Researcher's Symposium, Nutrition Potpourri (Oral Presentations) and Poster Presentations. To request for the E-certificates, kindly write your full name and email address at the Registration Counter.

NAME BADGES

Registered delegates are to wear their name badges at all times during the Conference for identification and security purposes. Admission to all Conference sessions and official functions is based on name badges.

LUNCH & COFFEE BREAKS

Lunch shall be served at **Mahkota I & III Ballroom**. Refer to the lunch tag for the location of your lunch venue.

Morning and afternoon refreshments shall be served around the trade exhibition area at the **Foyer, Ballroom Level, Hotel Istana, Kuala Lumpur**

FOR SPEAKERS: Submission of slides and preview

Speakers in Symposium 1 and 2 are requested to submit their presentation materials to the Speaker Preview Room during registration in the morning of Day1. Presentation materials for Symposium 3 (Young Researcher's Symposium) should be submitted during refreshment break of Day 1. Speakers for Day 2 sessions are requested to submit their presentations before the end of Day 1.

Please inform the Conference Secretariat staff once you have submitted the presentation materials.

Speaker Preview Room is located at the **Zamrud Room, Ballroom Level, Hotel Istana, Kuala Lumpur** and the opening hours are as follows:

Tuesday, 31st May, 2016 & Wednesday, 1 June 2016: 8.00 am – 5.00 pm

Please be present at your session room at least ***15 minutes*** prior to the start of the session and identify yourself to the secretariat staff

FOR CHAIRPERSONS

Please be present at your session room at least ***10 minutes*** prior to the start of the session.

CELLULAR PHONE

As a courtesy to all delegates and speakers, cellular phones, pagers and other electronic devices must be operated in silent/vibration mode throughout the Conference sessions. No telephone conversations are permitted in the session rooms.

WI-FI

Free WI-FI is available throughout the hotel. No password is required

PARKING

Parking in the hotel is charged at RM15 flat rate. Please have your parking ticket validated at the foyer area (please look for Hotel staff for assistance).

BREASTFEEDING ROOM

The Baiduri Function Room (Ballroom Level) has been reserved as special area for Breastfeeding / Expressing Milk area. (Please approach the Conference Secretariat to obtain the access key to the room and further assistance)

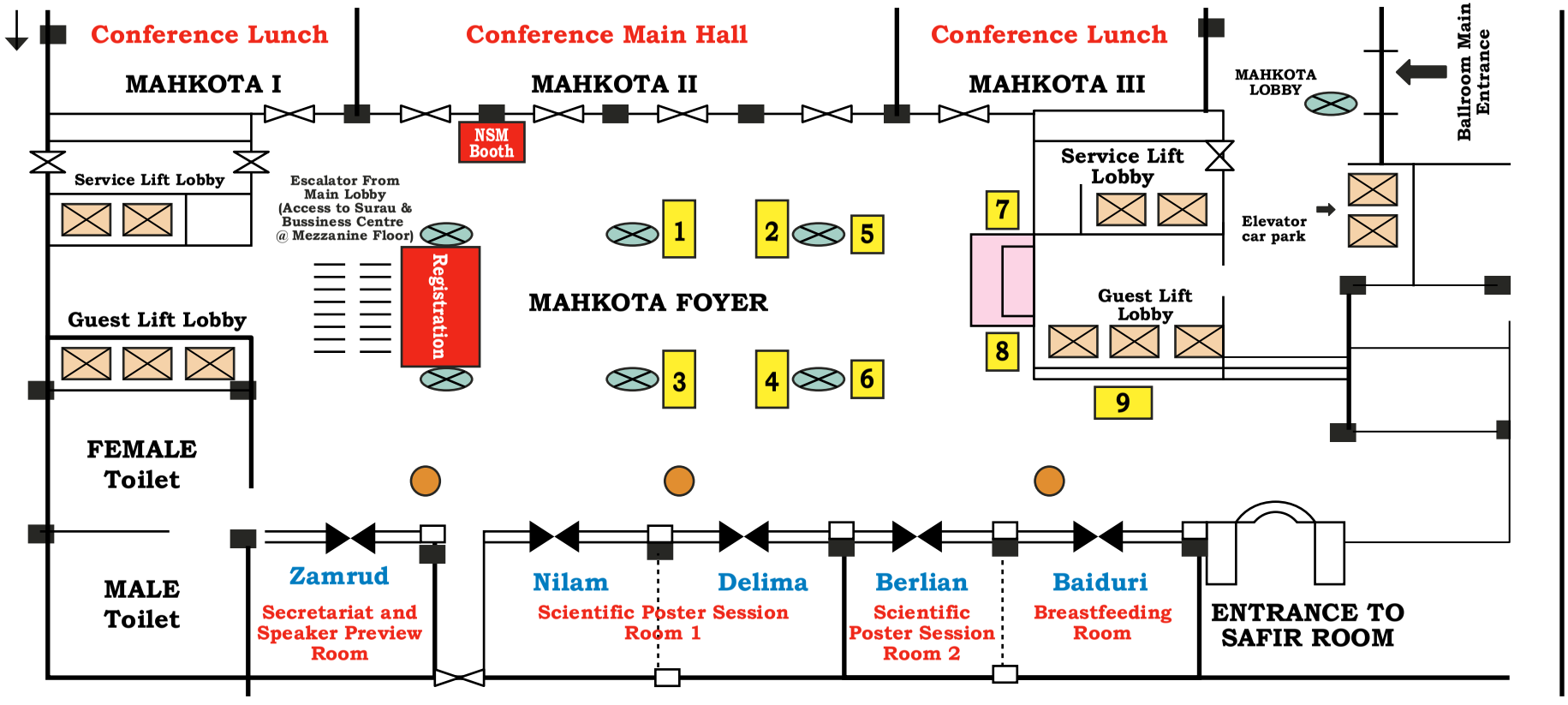
PRAYERS ROOM

Surau is located on the **Mezzanine Floor of Hotel Istana Kuala Lumpur**.

LIABILITY

The Organising Committee will not assume any responsibility for accidents, losses or damages, as well as delays or modifications of the Conference programme.

Venue Layout Plan



Pillar

Coffee Break Counter

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8) United Lifestyle
9) Allied Health Sciences Division, MOH

NSM Award/Prizes 2016

NSM Fellows Award

The Fellows of NSM are elected by recommendation of the Council based on their outstanding professional and meritorious contributions to the field of nutritional sciences. They consist of Life or Ordinary Members of the Nutrition Society of Malaysia nominated based on their regular contributions to or support of the activities organised by NSM for no less than 10 years.

The NSM Fellows are nominated based on outstanding and meritorious contributions to the field of nutritional sciences as indicated by:

A. Nutrition research projects/programmes
B. Publications
C. Consultations (including Working Groups/Technical Committee)
D. Inventions/Innovations/Patens
E. Awards
F. Community Service

For 2016, in commemoration of the 31st Scientific Conference of the Nutrition Society of Malaysia, the 15th Council is pleased to present NSM Fellows Award to the following members:

- Dr Mahenderan Appukutty (L 0718)
- Associate Prof Dr Hamid Jan Bin Jan Mohamed (L 0776)

Approved by the 31st Annual General Meeting of the NSM on 25 March 2016.

NSM Postgraduate and Undergraduate Prizes 2016

Two types of NSM Prizes are awarded under the Education Fund of the Nutrition Society of Malaysia, according to the Bye-Laws of the Society. The NSM Postgraduate Prize is awarded for a thesis accepted for a PhD or MSc degree whereas the Undergraduate Prize is awarded for a thesis accepted for a basic/first degree. Each prize comprises a cash award and a certificate, as follows: RM 1,000 for a PhD thesis, RM 750 for MSc thesis and RM 500 for the undergraduate prize.

In 2016, NSM is awarding five Postgraduate Prizes; two for PhD and three for MSc, with a total cash award of RM4,250. Three undergraduates receive Undergraduate Prizes with a total cash of RM 1,500. The total cash award for this year is RM5,750.

The recipients for the PhD thesis prizes are:

1. **Dr Chong Pei Nee**
   Body composition, metabolic phenotype and environmental factors in relation to obesity related gene polymorphisms among Malay children
   Supervisor: *Prof Dr Poh Bee Koon*
   Co-supervisors: *Emeritus Prof Dr Mohd Ismail Noor & Prof Dato Dr Wan Zurinah Wan Ngah*
   University: *Faculty of Health Sciences, Universiti Kebangsaan Malaysia*

2. **Dr Tiew Kee Fong**
   Efficacy of a plate model on glycaemic control among individuals with type 2 diabetes mellitus
   Supervisor: *Assoc Prof Dr Chan Yoke Mun*
   Co-supervisors: *Assoc Prof Dr Loke Seng Cheong, Prof Dato' Lye Munn Sann*
   University: *Faculty of Medicine & Health Sciences, Universiti Putra Malaysia*

The recipients for the MSc thesis prizes are:

1. **Chong Kar Hau**
   Association between adiposity and physical activity with cognitive function among young Malay adolescents in Kuala Lumpur
   Supervisor: *Prof Dr Norimah A.Karim*
   Co-supervisors: *Prof Dr Poh Bee Koon & Dr Ponnusamy Subramaniam*
   University: *Faculty of Health Sciences, Universiti Kebangsaan Malaysia*

2. **Nur Nadia Mohamed**
   Association of secondhand smoke exposure with maternal nutritional status, quality of life and children's cognitive function
   Supervisor: *Assoc Prof Dr Hamid Jan Jan Mohamed*
   Co-supervisors: *Assoc Prof Dr Azizah Othman*
   University: *School of Health Sciences, Universiti Sains Malaysia*

3. **Hiew Chu Chien**
   Development and validation of a questionnaire on knowledge, attitude and practice on healthy lifestyle for Malaysian adolescents in school hostels
   Supervisor: *Dr Chin Yit Siew*
   Co-supervisors: *Assoc Prof Dr Mohd Nasir Mohd Taib, Assoc Prof Dr Chan Yoke Mun*
   University: *Faculty of Medicine & Health Sciences, Universiti Putra Malaysia*

The recipients for the undergraduate thesis prizes are:

1. **Chen Yoke San**
   Development and usability of an electronic food diary to assess dietary intake among young adults
   Supervisor: *Dr Wong Jyh Eiin*
   Co-Supervisor: *Dr Nor Effendy Othman*
   University: *Faculty of Health Sciences, Universiti Kebangsaan Malaysia*

2. **Rebecca Wong Leh Ping**
   Association of dietary and lifestyle behavioral practices and quality of life among Malay survivors of breast cancer in Kelantan
   Supervisor: *Dr Foo Leng Huat*
   University: *School of Health Sciences, Universiti Sains Malaysia*

3. **Chai Wen Shin**
   Factors associated with food neophobia and fruit and vegetable consumption among preschoolers in Kuantan
   Supervisor: *Dr Gan Wan Ying*
   University: *Faculty of Medicine & Health Sciences, Universiti Putra Malaysia*

NSM Publication Prizes 2016

The NSM Publication Prizes are aimed at encouraging and promoting local research publications in nutrition science. Prizes are awarded by the Nutrition Society of Malaysia with financial support from Corporate Members of the Society.

Three categories of NSM Publication Prizes were offered in 2016. These are for different fields of nutrition research, namely: Maternal Nutrition; Dairy Nutrition and Mobility and Musculoskeletal Health and Nutrition.

Members are encouraged to apply for these Publication Prizes which are offered in 2017. The announcements for these prizes are given in this Programme and Abstract book. Further updates on these prizes shall be announced in the NSM website in 2017: www.nutriweb.org.my

NSM Publication Prize: Maternal Nutrition

For the Publication Prize in the filed of Maternal Nutrition, for the year 2016-2018, these prizes are sponsored by Fonterra Brands (M) Sdn Bhd. The intention was to provide 1 award each year, each to carry a cash prize of RM2,000 and a certificate by NSM.

For the year 2016, 2 applications were received for this category. The Selection Committee decided to award the prize to both applicants, as follows:

Name of recipient:	**Nurzalinda Zalbahar @ Zabaha** [O 1765] *Faculty of Medicine and Health Sciences, Universiti Putra Malaysia*
Publication:	Association of parental body mass index before pregnancy on infant growth and body composition: Evidence from a pregnancy cohort study in Malaysia *Obesity Research & Clinical Practice* *doi.org/ 10.1016/j.orcp.2015.08.002*
Name of recipient:	**Yang Wai Yew** [O 1256] *School of Health Sciences, International Medical University*
Publication:	The Family Diet Study: a cross-sectional study into the associations between diet, food habits and body weight status in Malay families *J Hum Nutr Diet doi: 10.1111/jhn.12356*

NSM Publication Prize: Dairy Nutrition

For the Publication Prize in the filed of Dairy Nutrition, for the year 2016-2018, these prizes are sponsored by Fonterra Brands (M) Sdn Bhd. There shall be 1 award each year, each to carry a cash prize of RM2,000 and a certificate by NSM.

For the year 2016, no applications for this Prize were received.

NSM Publication Prize: Mobility and Musculoskeletal Health and Nutrition

For the Publication Prize in the filed of Mobility and Musculoskeletal Health and Nutrition, for the year 2016-2018, these prizes are sponsored by Fonterra Brands (M) Sdn Bhd. There shall be 1 award each year, each to carry a cash prize of RM2,000 and a certificate by NSM.

For the year 2016, no applications for this Prize were received.

NSM Young Researcher's Symposium Prizes 2016

Winners of the Young Investigator's Symposium are awarded a certificate and the following cash prizes:

1st Prize – RM400

2nd Prize – RM300

3rd Prize – RM200

2 Consolation Prizes of RM100 each

Prizes for 2016, totalling RM1,100 are provided by International Life Sciences Institute (ILSI) Southeast Asia Region, Singapore

NSM Poster Competition Prizes 2016

This poster competition is only for undergraduates. Winners are awarded a certificate and the following cash prizes:

1st Prize - RM200

2nd Prize - RM150

3rd Prize - RM100

6 Consolation prizes of RM50 each

Prizes for 2016, totalling RM750 are provided by International Life Sciences Institute (ILSI) Southeast Asia Region, Singapore.

Announcements
NSM Publication Prizes 2017

Applications are invited for:

1. Maternal Nutrition

Members of the Nutrition Society of Malaysia (NSM) are invited to apply for the NSM Publication Prize: Maternal Nutrition

Objective:
To encourage and promote local research publications in the field of maternal nutrition.

The Prize:
There shall be a maximum of 1 award each year, each to carry a cash prize of RM2,000 and a certificate by the NSM. For the years 2016-2018, this Prize shall be sponsored by Fonterra Brands (M) Sdn Bhd.

Applications for the Prize:
Members of NSM are invited to submit their publications following a prescribed procedure given below. Applications shall be considered by a Selection Committee. The selection shall be based on a set of prescribed criteria described below.

Presentation of awards:
Prizes are to be presented during the opening ceremony of the Annual Scientific Conference of the Nutrition Society of Malaysia. Winners shall be invited to attend the ceremony, at his/her own expense, to receive the prize from the Guest of Honour officiating the opening ceremony.

Application procedure:
1. The NSM Council shall invite applications for the Publication Prize through NutriWeb (www.nutriweb.org.my), research institutions, academia and government departments.
2. Applicants must be Malaysian citizens and Ordinary (with no outstanding membership fees) or Life members of NSM.
3. Applications must be received before **15 April 2017.**

4. Applicants must submit 10 copies of each published paper and the following details for consideration by the Selection Committee:
    a. Name
    b. NSM membership number
    c. Address of work place
    d. Address for correspondence
    e. Email, phone and fax
    f. A note indicating intent to apply for consideration for the publication prize and stating the number of publications submitted as well as the full details of each publication (author(s), title of publication, journal details)
5. Provide a statement stating why the submitted publication(s) should be considered for the Prize, pointing out, for example, significance of study and findings, its usefulness and impact.
6. All applications must reach the President at the following address before the stipulated deadline:

    President
    Nutrition Society of Malaysia
    c/o 46, Jalan SS22/32
    47400 Petaling Jaya
    Selangor DE
7. All documents stated in items 4 and 5 should also be emailed to the President at: president@nutriweb.org.my to reach him before the deadline stated.

Criteria for Selection:

1. Publication(s) submitted for consideration by the Selection Committee must be in the field of maternal nutrition in the Malaysian context, arising from human intervention, epidemiology or clinical studies or critical reviews.
2. The publication(s) must be in the English language, published in a peer reviewed journal, in the year 2010 and later. There is no limit to the number of publications submitted for consideration.
3. The applicant must be the first author of the publication(s) submitted for consideration.
4. Selection of winners shall be based on multiple criteria, including relevance to focus area of Publication Prize, relevance to national nutrition scene, soundness of research methodology and overall presentation of the publication.
5. Criteria for selection may be amended from time to time by the NSM Council.
6. Decision of the Selection Committee is final.

20 May 2016

2. Dairy Nutrition

Members of the Nutrition Society of Malaysia (NSM) are invited to apply for the NSM Publication Prize: Dairy Nutrition.

Objective:
To encourage and promote local research publications in the field of dairy nutrition.

The Prize:
There shall be a maximum of 1 award each year, each to carry a cash prize of RM2,000 and a certificate by the NSM. For the years 2016-2018, this Prize shall be sponsored by Fonterra Brands (M) Sdn Bhd.

Applications for the Prize:
Members of NSM are invited to submit their publications following a prescribed procedure given below. Applications shall be considered by a Selection Committee. The selection shall be based on a set of prescribed criteria described below.

Presentation of awards:
Prizes are to be presented during the opening ceremony of the Annual Scientific Conference of the Nutrition Society of Malaysia. Winners shall be invited to attend the ceremony, at his/her own expense, to receive the prize from the Guest of Honour officiating the opening ceremony.

Application procedure:
1. The NSM Council shall invite applications for the Publication Prize through NutriWeb (www.nutriweb.org.my), research institutions, academia and government departments.
2. Applicants must be Malaysian citizens and Ordinary (with no outstanding membership fees) or Life members of NSM.
3. Applications must be received before **15 April 2017.**
4. Applicants must submit 15 copies of each published paper and the following details for consideration by the Selection Committee:
    a. Name
    b. NSM membership number
    c. Address of work place
    d. Address for correspondence
    e. Email, phone and fax
    f. A note indicating intent to apply for consideration for the publication prize and stating the number of publications submitted as well as the full details of each publication (author(s), title of publication, journal details)
5. Provide a statement stating why the submitted publication(s) should be considered for the Prize, pointing out, for example, significance of study and findings, its usefulness and impact.

6. All applications must reach the President at the following address before the stipulated deadline:

   President
   Nutrition Society of Malaysia
   c/o 46, Jalan SS22/32
   47400 Petaling Jaya
   Selangor DE

7. All documents stated in items 4 and 5 should also be emailed to the President at: president@nutriweb.org.my to reach him before the deadline stated.

Criteria for Selection:

1. Publication(s) submitted for consideration by the Selection Committee must be in the field of dairy nutrition in the Malaysian context, arising from human intervention, epidemiology or clinical studies or critical reviews.
2. The publication(s) must be in the English language, published in a peer reviewed journal, in the year 2010 and later. There is no limit to the number of publications submitted for consideration.
3. The applicant must be the first author of the publication(s) submitted for consideration.
4. Selection of winners shall be based on multiple criteria, including relevance to focus area of Publication Prize, relevance to national nutrition scene, soundness of research methodology and overall presentation of the publication.
5. Criteria for selection may be amended from time to time by the NSM Council.
6. Decision of the Selection Committee is final.

20 May 2016

3. Mobility and Musculoskeletal Health and Nutrition

Members of the Nutrition Society of Malaysia (NSM) are invited to apply for the NSM Publication Prize: Mobility and Musculoskeletal Health and Nutrition

Objective:
To encourage and promote local research publications in the field of Mobility & Musculoskeletal Health & Nutrition.

The Prize:
There shall be a maximum of 1 award each year, each to carry a cash prize of RM2,000 and a certificate by the NSM. For the years 2016-2018, this Prize shall be sponsored by Fonterra Brands (M) Sdn Bhd.

Applications for the Prize:
Members of NSM are invited to submit their publications following a prescribed procedure given below. Applications shall be considered by a Selection Committee. The selection shall be based on a set of prescribed criteria described below.

Presentation of awards:
Prizes are to be presented during the opening ceremony of the Annual Scientific Conference of the Nutrition Society of Malaysia. Winners shall be invited to attend the ceremony, at his/her own expense, to receive the prize from the Guest of Honour officiating the opening ceremony.

Application procedure:
1. The NSM Council shall invite applications for the Publication Prize through NutriWeb (www.nutriweb.org.my), research institutions, academia and government departments.
2. Applicants must be Malaysian citizens and Ordinary (with no outstanding membership fees) or Life members of NSM.
3. Applications must be received before **15 April 2017**.
4. Applicants must submit 10 copies of each published paper and the following details for consideration by the Selection Committee:
    a. Name
    b. NSM membership number
    c. Address of work place
    d. Address for correspondence
    e. Email, phone and fax
    f. A note indicating intent to apply for consideration for the publication prize and stating the number of publications submitted as well as the full details of each publication (author(s), title of publication, journal details)
5. Provide a statement stating why the submitted publication(s) should be considered for the Prize, pointing out, for example, significance of study and findings, its usefulness and impact.

6. All applications must reach the President at the following address before the stipulated deadline:

   President
   Nutrition Society of Malaysia
   c/o 46, Jalan SS22/32
   47400 Petaling Jaya
   Selangor DE

7. All documents stated in items 4 and 5 should also be emailed to the President at: president@nutriweb.org.my to reach him before the deadline stated.

Criteria for Selection:

1. Publication(s) submitted for consideration by the Selection Committee must be in the field of nutrition of Malaysian infant and children (up to 18 years), arising from human intervention, epidemiology or clinical studies or critical reviews.
2. The publication(s) must be in the English language, published in a peer reviewed journal, in the year 2011 and later. There is no limit to the number of publications submitted for consideration.
3. The applicant must be the first author of the publication(s) submitted for consideration.
4. Selection of winners shall be based on multiple criteria, including relevance to focus area of Publication Prize, relevance to national nutrition scene, soundness of research methodology and overall presentation of the publication.
5. Criteria for selection may be amended from time to time by the NSM Council.
6. Decision of the Selection Committee is final.

20 May 2016

List of Posters

Scientific posters have been grouped into the following themes and shall be presented according to the following schedule:

Day 1: Poster themes A, D and F
Day 2: Poster themes B, C, and E

Poster themes:

A = Nutritional Status (various groups) and Community Interventions
B = Dietary Intake, Consumption Pattern and Diseases
C = Nutrients and Other Components in Foods / Products
D = Clinical Nutrition / Intervention Trials
E = Food Science and Technology
F = Experimental Nutrition

The best 3 posters put up by undergraduates shall be awarded cash prizes!

Poster Presentations: Day 1 (Groups A, D and F)

Group A: Nutritional Status (various groups) and Community Interventions

A01. Association between sleep quality and nutritional status among pregnant women at Hospital Universiti Sains Malaysia (HUSM)
Aimi Yuhanis MR, Nurul Aini MI, Izyana MR and Hamid Jan JM

A02. Association of physical activity and sedentary behaviours on body composition and metabolic profile among Malay schoolchildren in Kuala Lumpur: A follow-up study
Ang YN, Wee BS, Mahadir A, Ismail MN, Kagawa M and Poh BK

A03. Sleeping quality and athletic performance among basketball players participating in National Community Basketball League (NCBL)
Arif A and Lau XC

A04. Associations between behavioral and psychosocial factors with body weight status among Indian adult vegetarians in Kuala Lumpur
Chan HM and Gan WY

A05. Exclusive breastfeeding intention and sosio-demographic characteristics among mothers in Hospital University Kebangsaan Malaysia
Guey YC, Nik Shanita S, Noor Zahila MI and Norimah AK

A06. Association between food insecurity and weight status among Orang Asli (Mah Meri) women in Kuala Langat, Selangor
Chong SP, Geeta A and Norhasmah S

A07. Associations between body image, weight status and sexual behaviours of private university students in Klang Valley
Naidu C and Serene Tung EH

A08. An Intervention Mapping (IM) Approach: Development of dietary behaviour change in Malaysian young adults
Aswir AR, Draper CE

A09. Evaluation of internet addiction on level of physical activity and weight status among adolescents in Kuala Lumpur
Hani Shifaa MH, Wan Manan WM

A10. Effectiveness of nutrition counselling among UPM employees: Changes on body weight, waist circumference, self-efficacy, self-esteem and quality of life
Haslina R and Siti Nur'Asyura A

A11. The association of sunlight exposure and vitamin D status among Malaysian indoor and outdoor athletes
Young HCC, Chong HZ, Izham M

A12. Factors associated with body weight status: Comparison between Chinese vegetarians and non-vegetarians
Ho MT and Gan WY

A13. Body composition and risks of eating disorder of rhythmic gymnasts: Comparison between individual and group gymnasts
Ivy Cheah HY, Hazizi AS, Hoh HS, Tania Lee XY

A14. The GReat-Child Trial: A quasi-experimental intervention to improve knowledge, attitude and practice (KAP) towards whole grain among overweight/obese schoolchildren in Kuala Lumpur, Malaysia
Koo HC, Poh BK and Ruzita AT

A15. Development and pilot testing of physical activity knowledge, attitude and practice questionnaire among adolescents: C.E.R.G.A.S school-based intervention programme
Lau XC, Ruzita AT, Wong JE, Koh D, Hazizi AS, Razalee S, Ng LO, Ahmad TJ, Hui SC, Poh BK

A16. Association of socio-demographic factors with screen time of Malaysian children aged 1 to 3 years old: Findings from SEANUTS survey
Lee ST, Wong JE and Poh BK

A17. Association between social support and metabolic syndrome among working adults in Melaka, Malaysia
Lee SC, Moy FM and Hairi NN

A18. Association between anthropometric indices and birth weight with blood pressure among Malay adolescents
Lee YZ, Ang YN and Poh BK

A19. Association between stress, anthropometry parameters and psychosocial factor with health related quality of life among allied health students in Universiti Putra Malaysia
Lim YC and Chan YM

A20. Vitamin D status and parathyroid hormone (PTH) response among Malaysian female adults
Melissa En Ying Leong, Geok Lin Khor, Megan Hueh Zan Chong, Seng Cheong Loke

A21. Urinary aflatoxin M_1 level and its associations with socio-economic status, dietary intake, knowledge on aflatoxin contamination and body mass index among Chinese adults in Kajang, Selangor
Moh SK, Siti Husna S and Rosita J

A22. Development and evaluation of nutrition and physical activity education creative module (imPRoVE kit™) by using play approach in science centre
Muhamad Faisal Y, Razinah S, Hanis Mastura Y

A23. Effectiveness of nutrition counseling intervention program among UPM employees: Changes on body weight, waist circumference, body composition, nutrition knowledge and physical activity status
Muhamad Nasrullah R and Siti Nur 'Asyura A

A24. Relationship between socio-demographic characteristics, workplace and home environmental factors with physical activity level among private sector working adults in Taman Tun Dr Ismail, Kuala Lumpur
Muhammad Afiq AMO and Hazizi AS

A25. Association between socio-demographic background, physical activity level, and nutritional status with academic achievements among adolescents in Kuching, Sarawak
Muliana E and Hazizi AS

A26. The impact of overweight and obese on quality of life among Malay breast and gynecology cancer survivors from two hospitals in Kuala Lumpur
Nadzirah HZ, Suhaina S, Razif MS, Yulianty A, Ibtisam MN, Zabedah O, Fuad I

A27. Development and evaluation of 3E (education, enjoyable, engaging) interactive games module as a nutrition education tools among school children age 10 to 12 years old
Nik Nuramalina Izati Z, Hanis Mastura Y, Razinah S and Ruzita AT

A28. The association of body mass index, dietary calcium intake, physical activity levels and vitamin D concentrations with bone mineral density among Malay university students in Malaysia
Noor Fairuzi Suhana Y, Norlida MD, Ika Aida Aprilini M and Qurratul Aini Salma AA

A29. Validation of mild cognitive impairment risk screening tool (TUA-WELLNESS) among older adults
Nor Amanina AR, Hanis Mastura Y, Divya V and Suzana S

A30. Cardiovascular disease knowledge among rescue firefighter personnel in Selangor, Malaysia
Nor Atiqah R, Razalee S, and Arnida Hani T

A31. What factors are related to Health-Related Quality Of Life (HRQoL) of adolescents in Sepang, Selangor?
Nor Farahsyikin AN and Mohd Nasir MT

A32. Assessment of physical activity and nutritional status among adolescents in Kuala Lumpur secondary school
Nor Fatahiyah MN, Wan Abdul Manan WM

A33. Relationship between socio-demographic characteristics, dietary practices, food insecurity, physical activity level and body image perception with body weight status among adolescents aged 13 and 14 years old in Sekolah Menengah Kebangsaan Cheras Jaya, Selangor, Malaysia
Nur Al-amirah Najwa MS, and Norhasmah S

A34. Development and evaluation of a booklet on nutrition falls prevention among older adults
Nur Alia Adibah Z, Hanis Mastura Y, Suzana S and Devinder KAS

A35. Factors associated with cognitive performance of preschoolers in KEMAS kindergarten, Petaling Perdana District, Selangor
Nur Amalin J and Chin YS

A36. The association of prenatal DNA damage and nutritional status in young children
Nur Nadia M, Loy SL and Hamid Jan JM

A37. What factors are associated with disordered eating behaviours among early adolescent girls in Sepang, Selangor?
Nur Najeehah Husna Z and Mohd Nasir MT

A38. Food safety knowledge, attitude and food handling practices among food background students in Management and Science University, Shah Alam
Syakila Khaleeda S and Sasimalani S

A39. Association between levels of parental physical activity and preschoolers physical activity pattern among children aged 4 to 6 years in Kuala Lumpur
Nur Sharmimi H, Lee ST, Wong JE and Poh BK

A40. Assessment of body somatotype and nutritional status among adolescent in Kuala Lumpur secondary school
Nur Shuhadah SB, Wan Abdul Manan WM

A41. A review of health-related outcomes of workplace physical activity and dietary interventions
Nur Suffia S, Choo WY and Hazreen AM

A42. Assessment of nutritional status and body somatotypes in relation to weight changes among overweight and obese office workers in Kota Bharu
Nurul Asyifa Ezrin AH, Wan Abdul Manan WM

A43. The development and evaluation of acceptance of a module towards active living (GERAK) for overweight and obese young adults
Nurul Ashikin A, Razinah S, and Ahmad Taufik J

A44. Socioeconomic status and body weight status among preschoolers aged 5 to 6 years old in Kota Bharu, Kelantan
Nurul Hasanah HC, Appannah G

A45. Assessment of nutritional status, psychological status, functional status, and quality of life among Malay rural homebound elderly in Alor Gajah district, Malacca
Nurul Hidayu S and Siti Nur'Asyura A

A46. Parental energy-balanced related behaviours as correlates of body weight status of adolescents
Ong YJ, Ong FM, Tan CH, Kandiah M, Sivapathy S

A48. Nutritional status of Malaysian children below five years: Finding from the National Health and Morbidity Survey 2015 (NHMS 2015)
Ruhaya S, Rashidah A, Mohd Hasnan A, Syafinaz MS, Nor Azian MZ, Azli B, Balkish MN

A49. How does screen time affect adolescents' dietary intake and physical activity?
Safiah MY, Arfah Hana Z and Siti Norazwani PR

A50. Differences of working hours, stress and physical activity level in relation to body mass index among working adults in Shah Alam, Selangor
Elangeswarry L and Sarina S

A51. Secondary school teachers', principals and canteen operators' nutritional knowledge and perception of school canteen food
Shashikala S, Teo YC and Mirnalini K

A52. Factors contribute to chronic diseases among the elderly in Petaling district, Selangor
Siti Farhana M, Zalilah MS, Zuriati I and Norhasmah S

A53. Associations between food insecurity, hemoglobin level and parasite infection with nutritional status among aboriginal children in Negeri Sembilan
Siti Fatihah M, Gan WY, Norhasmah S and Zalilah MS

A54. Relationship between body fat and bone in Malaysian adults
Hamzah SH and Mitra SR

A55. Effectiveness of nutrition counselling program on weight loss among employees in Universiti Putra Malaysia: Changes of body weight, waist circumference and dietary intake
Stepfhanie BJ and Siti Nur'Asyura A

A56. Determination of barriers and enabling factors for healthy lifestyle among adolescents: A qualitative study of adolescents, parents, fast food handlers and canteen owners' perceptions
Suhaila AG, Ruzita AT, Norimah AK

A57. Motivators and barriers in reducing weight among overweight and obese adults in Alor Gajah, Malacca: A qualitative study
Syaznie E, Wirdah M, Ruzita AT

A58. Food insecurity and childhood obesity in Kuantan, Pahang
Wan Azdie Mohd Abu Bakar, Aflah Afandi, Roselawati Mat Ya

A59. Are body weight status, sociocultural influences, body image and self-esteem associated with disordered eating behaviours among adolescents in Sepang, Selangor?
Wan Nur Fatihah WM and Mohd Nasir MT

A60. Multilevel of social organization and sustainability of long-term childhood obesity interventions: A systematic review
Mok WKH, Sharif R, Poh BK, Wee LH, Reilly JJ and Ruzita AT

A61. Motivation and barriers to participation of physical activity among Malay children
Wu SK, Ang YN, Ismail MN and Poh BK

A62. Association of stress and weight status among a group of Malaysian Punjabis
Yap Siew Chen, Satvinder Kaur

Group D: Clinical Nutrition / Intervention Trials

D01. Effect of zinc on the intestinal tight junction proteins
Jesmine Khan, Mohammed Nasimul Islam

D02. Association of salivary flow rate and amylase activity with fasting blood glucose and lipids among young Malaysian Adults
Lee JJ, Ng YY, Snigdha M, Valsala R, Shyam S

D03. Factors associated with compliance of dietary sodium recommendation among predialysis chronic kidney disease patients in Hospital Serdang, Selangor
Loh QE, Zulfitri 'Azuan MD, Nor Fadhlina Z

D04. Effect of gender on energy expenditure in young competitive triathletes during an incremental treadmill exercise test
Johari MH, Caszo B, Subramaniam A, Lumley S, Knight VF, Gnanou J

D05. Factors associated with dietary phosphorus compliance among maintenance hemodialysis patients in selected dialysis centres in Selangor
Muhamad Ariff AR, Fadhlina NZ and Mat Daud ZA

D06. Association between nutritional status, physical activity and psychological health among type II diabetes mellitus patients at Hospital Universiti Sains Malaysia (HUSM), Kelantan
Ng HC and Soo KL

D07. Dietary carbohydrate quality is associated with total and LDL cholesterol among young Malaysians
Ng YY, Lee JJ, Shyam S, Valsala R, Snigdha M

D08. Effect of soy milk consumption on ultraviolet protection and whitening of skin among the female students in FSK, UKMKL
Nor Azmirawati AB, Hasnah H and Adawiyah J

D09. Objectively measured physical activity among breast cancer survivors in East Coast of Peninsular Malaysia
Nurnazahiah A, Nor Syamimi Zakarai, Lua Pei Lin, Noor Aini Mohd Yusoff, Aryati Ahmad, Sharifah Wajihah Wafa, Suhaina Sulaiman, Mohd Razif Shahril

D10. Factors associated with metabolic syndrome among severe mental illness patients at selected government hospitals
Nur Sabrina Z, Gan WY, Chan YM, Ang JK and Ismail SIF

D11. Erythrocytes fatty acid composition between type-2 diabetes and non-diabetes volunteers
Nurul Fatin Farina H and Mohd Sokhini AM

D12. The effectiveness of an education program on the metabolic profile of type 2 diabetics in Iran
Shooka M, Norimah AK, Ruzita AT and Amani R

Group F: Experimental Nutrition

F01. Altered expression of M cells and tight junction proteins of ileum of rats fed high fat diet
Auni AZA, Effat O, Mohammed NI and Jesmine K

F02. Anti-obesity and anti-diabetic effects of *Elateriospermum tapos* crude extracts *in vitro*
Chang WL, Shafie NH and Bahari H

F03. Inhibitory effects of pancreatic lipase, α- amylase and α- glucosidase in *Lasia spinosa in vitro*
Saadiah AB, Nurul Husna S and Hasnah B

F04. The effect of Tween 80 on blood levels of lipid, leptin, and glucose in rat model
Valsala R, Siti Zulaiha, Peter EP, Selvaretnam A, Shyam S and Ho KL

Poster Presentations: Day 2 (Groups B, C and E)

Group B: Dietary Intake, Consumption Pattern and Diseases

B01. Associations between usage of nutritional label and nutrient intake, body mass index and physical activity level of consumers in the Klang Valley
Ling AYX and Mohamad M

B02. Consumption of fruits and vegetables may lower body mass index among adolescents in rural area Kuala Selangor
Anis Syuhada Zakaria, Wee Lei Hum and Norimah A. Karim

B03. Factors associated with satisfaction of hospital food among adult patients in Hospital Serdang, Selangor
Camilla Wahida N and Noraida O

B04. Validity and acceptability of image-based food record in assessing nutrient intake among undergraduates from Department of Nutrition and Dietetics, Universiti Putra Malaysia
Chan KS and Chin YS

B05. Study on dietary pattern, cognitive performance and mood among adolescent students in Kota Bharu
Chen SF

B06. Food addiction and its associated factors among white collar workers in Small and Medium-sized Enterprises (SMEs)
Cheng KE and Chin YS

B07. Salt intake and blood pressure in young university adults
Lim JJ and Mitra SR

B08. The associations between platescapes, foodscapes and dietary intake among road transport department staffs in Muar, Johor
Er YT and Rosita J

B09. Factors associated with plate waste among adult patients in Hospital Serdang, Selangor
Fatin Nadhirah MH and Noraida O

B10. The association of sugar-added food and beverages consumption with socioeconomic status and nutritional status among KEMAS preschool children in Kota Bharu, Kelantan
Hemala M and Ruhaya H

B11. Factors associated with picky eating among preschoolers aged 4 to 6 years in Petaling Perdana, Selangor
Tee JYH and Gan WY

B12. Factors associated with fruit and vegetable consumption among children aged 4 to 6 years old in Ipoh, Perak
Lam KY and Gan WY

B13. Beverage consumption, hydration status and nutritional status among secondary school adolescents in Petaling Perdana, Selangor
Mas Alia Syafiqah MA and Chin YS

B14. Adherence to WCRF/AICR guidelines for cancer prevention among breast cancer survivors: a preliminary observation from East Coast of Peninsular Malaysia
Mohd Razif Shahril, Nurnazahiah Ali, Nor Syamimi Zakarai, Lua Pei Lin, Noor Aini Mohd Yusoff, Aryati Ahmad, Sharifah Wajihah Wafa, Suhaina Sulaiman

B15. Nutrient intake, nutritional status, alcohol consumption, smoking habits and cardiorespiratory endurance among student football players at Lampung University, Indonesia
Ewit E Calely, Mury Kuswari, Rachmanida Nuzrina, Laras Sitoayu, Vitria Melani

B16. Associations between exposure to fast-food outlets, availability and accessibility of fruits and vegetables and fruits and vegetables consumption among adolescents aged 13 to 14 years in Hulu Langat District, Selangor
Nazirah Alia Zakaria and Appannah G

B17. Association between physical performance, cognitive status and depression with appetite among institutionalized older persons in Selangor, Malaysia
Nga MH and Chan YM

B18. Chicken meat: Eating trends and feed additive awareness among respondents from Universiti Kebangsaan Malaysia (UKM)
Noor Amiza Azhar, Aminah Abdullah

B19. Factors associated with satisfaction of hospital food among elderly patients in Hospital Serdang, Selangor
Nor Syafiqah Z and Noraida O

B20. Dietary intake pattern among breast cancer survivors in East Coast of Peninsular Malaysia
Nor Syamimi Zakarai, Nurnazahiah Ali, Sharifah Wajihah Wafa, Laila Ruwaida Mohd Zainuddin, Noor Aini Mohd Yusoff, Lua Pei Lin, Aryati Ahmad, Suhaina Sulaiman, Mohd Razif Shahril

B21. Dietary supplement use among undergraduate students of Universiti Kebangsaan Malaysia, Kuala Lumpur (UKMKL)
Noriza D and Norimah AK

B22. Perceptions toward microscale build environments and subjects' satisfaction in relation to energy intake among diners at cafeterias in Universiti Putra Malaysia
Nur Amalina A and Rosita J

B23. Influences of nutritional information on fast food purchasing among undergraduates at Universiti Sains Malaysia, Kubang Kerian, Kelantan
Nur Amalina S and Vijayakumaran R

B24. What factors are associated with disordered eating behaviours among early adolescent males in Sepang, Selangor?
Nur Fatihah M and Mohd Nasir MT

B25. Assessment of nutritional knowledge and practice on healthy eating at hawker stalls among adults in Kuala Terengganu
Nur Syahira I and Vijayakumaran R

B26. Dietary intake of pregnant women at Hospital Universiti Sains Malaysia (HUSM)
Nurul Aini MI, Aimi Yuhanis MR, Izyana MR and Hamid Jan JM

B27. Weight loss product intake among overweight and obese women in University Kebangsaan Malaysia, Kuala Lumpur (UKMKL)
Nurul Atikah MR and Norimah AK

B28. Milk consumption pattern among Malay female undergraduates in Universiti Kebangsaan Malaysia Kuala Lumpur (UKMKL)
Nurul Hanisa MA and Norimah AK

B29. Factors associated with fruits and vegetables intake among adolescents aged 13-14 years old in Hulu Langat district, Selangor.
Nurul Wahida J and Appannah G

B30. Relationships between quantity of protein intake, parental and infant feeding practices with body weight status among children aged 1 to 4 years old in Putrajaya
Pang KR, Tham CS and Appannah G

B31. Association of milk consumption and physical activity with nutritional status of Malaysian children aged 1 to 12 years
Poh BK, Wong JE, Jamil NA, Nik Shanita S, Norimah K, Ruzita AT, Khouw I, and Deurenberg P.

B32. Allergic diseases and its associated factors among children aged 5 to 11 years old in Hulu Langat District, Selangor
Siti Huzaifah MH, Intan Hakimah I, Woon FC and Chin YS

B33. Dietary intake patterns of lactating mother from Southern areas of Bangladesh
Saha S, Al Hasan SM, Islam MM, Billah MM, Hasan MM

B34. Effects of nutrition on brain growth and cephalic index in children – A study in Kuala Terengganu
Suwaibah AH, K.B. Swamy, A. Zubaidi AL, Azmi H., Norizhar K., Husbani MAR, Che Suhaili C.T.

B35. Association between socio-demographic factors, body weight status, fruits and vegetables intake and physical activity level with knowledge of colorectal cancer risk factors among undergraduate students in Universiti Putra Malaysia
Tan ZC and Zalina AZ

B36. The association between premenstrual syndrome with dietary calcium intake and body mass index (BMI) among early adolescent female in Sungai Buloh, Selangor
Tasneem S and Channika BD

B37. Relationships between quality of protein intake, appetite and sedentary behaviour with weight status among children aged 1 to 4 years old in Putrajaya
Tham CS, Pang KR and Appannah G

B38. Food insecurity associated with nutritional status and post-traumatic stress disorder among flood victim children ages 7-12 years in Kuala Krai, Kelantan, Malaysia
Umi Atikah MH and Norhasmah S

B39. Knowledge and attitude on nutrition related to cancer prevention among undergraduate students in Faculty of Medicine and Health Sciences in Universiti Putra Malaysia
Wan Nur Farah Hanna Z and Zalina AZ

B40. Fruits and vegetables intake among adolescents in Kelantan
Wong SY and Soo KL

B41. Parental influences on disordered eating among early adolescents in selected primary schools, Selangor
Woon FC, Chin YS and Mohd Nasir MT

B42. Glycaemic control and nutrition knowledge in diabetes individuals in Kota Kinabalu, Sabah
Jenarun G and Ooi YBH

B43. Factors associated with intuitive eating among university students in Universiti Putra Malaysia
Yeoh WC and Gan WY

B44. Awareness and use of food labelling for food choices by consumers in Kuching, Sarawak
Zainab T, Chana HN, Azmira Nurain Z, Yip WN and Nurul Izatti MS

Group C: Nutrients and Other Components in Food / Products

C01. Comparison between pomelo [Citrus *grandis*(L.) Osbeck] flavedo and albedo as source of potent antioxidant
Chang SQ and Azrina A

C02. Retention of EPA and DHA in selected fish using different cooking methods compared to salmon
Choo PY and Azrina A

C03. Determination of *in vitro*bioaccessibility of β-carotene in pumpkin and butternut squash by different cooking methods
Koh SH and Loh SP

C04. Antioxidant contents and activity of polyphenol rich mixture (PRM)
Kok YW and Azrina A

C05. Current status of iodized salt coverage in Sarawak
Lim KK, Chan YY, Hasimah I, Teh CH, Eraou B, Nur Azna M and Lim KH

C06. Detection of fresh oil adulteration with recycled cooking oil using fatty acid composition analysis and FTIR spectral analysis
Lim SY and Mohd Sokhini AM

C07. Physicochemical and nutritional properties of peels, pulp and arils of gac*(Momordicacochinchinensis)* fruits grown in Malaysia
Mohd Nazri AR, Amin I and Mohd Desa H

C08. A comparative study on the antioxidant activity of leaf, flower, stem and root extracts of *Peperomiapellucida* (L.) HBK (Piperaceae)
Mok SF and Hafzan Y

C09. Effect of selected cereal grains on *in vitro*bioaccessibility of isoflavones in soymilk
Ng CC and Loh SP

C10. Visceral fat weight, muscular fat content and fatty acid composition of organic and broiler chicken
Noorshamimi MR and Mohd Sokhini AM

C11. A survey on acceptance of innovative product (TempeCal nugget) among urban community in Klang
Nor Ida Elynna AR, Hasnah H and Nur Zakiah MS

C12. Determination of essential mineral and heavy metals in selected ready to eat canned seafood products commercially available in East Coast of Peninsular of Malaysia
Nurasyikin I and Wan Rosli WI

C13. Antioxidant capacity, total phenolic content, total flavonoid content of *apiumgraveolens l.* (celery) *and coriandrumsativum l.* (coriander)
Nurul Huda AT and Loh SP

C14. Determination of total phenolic content, total flavonoid content and antioxidant activity in *Lasiaspinosa*
Nurul Nadiah Hamdan, Nurul Husna Shafie, Amirah Haziyah Ishak and Hasnah Bahari

C15. Screening for total phenolic content, total flavonoid content and antioxidant activity of *ElateriospermumTapos* in aqueous and ethanol extracts
Nurul Syahirah Mohammad Bakhtiar, Nurul Husna Shafie, Amirah Haziyah Ishak & Hasnah Bahari

C16. Nutrient content in a new developed food product, TempeCal nugget
Umi Aiza and Hasnah H

C17. Glycaemic index of coconut pudding and Nata De Coco
Ling LWT and George R

C18. Fat soluble vitamins and carotenoids analysis in cooking oils by ultra performance convergence chromatography
Devi-Nair Rathi, Chen Yee Liew, M.N. Mohd Fairulnizal, D. Isameyah and Gitte Barknowitz

C19. Minerals and heavy metals contents of coconut milk (*santan*) in Malaysia
Saif Alyaqoubi, Aminah Abdullah, Muhamad Samudi, Norrakiah Abdullah and Ahmed Ali Al-Alawi

C20. Determination of total phenolic content, total flavonoid content and antioxidant capacity of various parts of *Manilkarazapota*(flesh, peels, leaves and seeds)
Siti Nursalwah CO and Norhaizan ME

C21. Price comparison between more and less nutritious food and drink products in three supermarket headquarters
Syahidah Amira R and Hanis Mastura Y

C22. Nutritional Composition of *Citrus microcarpa*and *Citrus hystrix*
Syaza Lyana Idris, Nurul Husna Shafie, Nai'mah Isa, Hasnah Bahari

C23. Determination of total phenolic content, total flavonoid content and antioxidant capacities of different parts (flesh, seed, peel and leaf) of Pulasan (*Nephelium mutabile* Blume)
Tan MC and Norhaizan ME

C24. Proximate and carotenoid compositions, and antioxidant capacity of pulp and aril of gac (*Momordicacochinchinensis*) fruits
Tan SY, Amin I and Mohd Nazri AR

C25. Effects of different drying methods and extraction solvents on the total phenolic content, total flavonoid content and antioxidant capacity of Chinese yam (*Dioscoreaoppositifolia* L.) extracts
Tan XY and Norhaizan ME

C26. Determination of elemental composition of selected infant and growing up formula in Malaysia
Wan Norfaezah WS and Marina AM

C27. Antioxidant and nitric oxide properties in human milk
Yong JJ, Tan SS and Khor GL

Group E: Food Science and Technology

E01. PROP (6-*n*-propylthiouracil) taster status and their association with sweet and fatty taste acceptance among obese and non-obese subjects
Ahmad Riduan Bahauddin, Roselina Karim, Nazamid Shaari and Zalilah Mohd Shariff

E02. Thyme leaves benefits on human health
Eqbal MAD and Aminah A

E03. Chemical composition in commercially produced fish sauce ('budu')
Foo KL and Shariza AR

E04. Comparison of physicochemical properties between tualang and kelulut honey
Ilyana MS and Hasnah H

E05. Effect of cooking methods on phenolic acids in *Hericiumerinaceus*
Kow HN and Neo YP

E06. The effects of inulin supplementation on the physical, chemical and functional properties of plain white bread
Fernandez NA and Yeo SK

E07. Development of beverage from cornsilk treated with different thermal treatments and its effect on morphological characterization and mineral composition
Nur Syafarah S and Wan Rosli WI

E08. Total microbial count in fermented fish sauce (budu)
Nurnadirah Z and Shariza AR

E09. Biochemical and nutritional analysis of biscuits supplemented with lemon peel powder
Mahi S, Shakoor S, Ismail A and Shehzad A

E10. Investigation on nutritional compositions and textural properties of wheat bread partially substituted with sweet potato flour
Suziana B and *Wan Rosli WI*

E11. Recovery of antioxidants from *Camellia sinensis*var.*assamica* leavesin an aqueous two-phase system using thermo-separating polymer
Teoh AN, Lim CW and Ng HS

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Pr. Takuji SHIRASAWA, M.D. & Ph.D.
Dokkyo Medical University, Department of Physiology, University of Michigan, Medical School, Neurology, Shirasawa Anti-Aging Medical Institute

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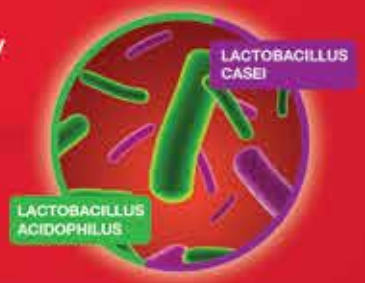

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** Norimah AK et al. (2015) Whole Grain Intakes in the Diets Of Malaysian Children and Adolescents – Findings from the MyBreakfast Study. *PLoS ONE* 10 (10): e0138247. doi:10.1371/journal.pone.0138247'

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Abstracts

Day 1

KEYNOTE ADDRESS

The role of nutrition research to meet the current and future nutritional challenges in a developing country like Malaysia

Christiani Jeyakumar Henry

*Director, Clinical Nutrition Research Centre, Singapore, Intitute for Clinical Sciences, A*STAR Singapore*

It is hard to imagine that the science of nutrition is merely a hundred years old. The discovery of vitamin in 1914 is conventionally viewed as the date of inception of the science of nutrition. During the intervening decades, numerous advances in nutrition have enabled us to understand the role of food on health outcomes. The Asian region has seen a resurgence of interest in human nutrition. Whilst economic growth and prosperity has improved the quality of life in many emerging nations, the double burden of over and under nutrition still plagues many nations. Using examples, this presentation will highlight how nutrition research can play a pivotal role in improving the health and well-being of mothers, infants, adults and elderly. Much of the early research in nutrition had focused on eradicating nutritional deficiencies. Today, nutrition is much about preventive health. With the eradication of infectious diseases, the profile of diseases contributing the most heavily today, are the chronic diseases: namely metabolic syndrome, CVD, and stroke. The escalating prevalence of type 2 diabetes, obesity and metabolic syndrome in Asia has made us the unenviable epicenter of chronic diseases. An increasing body of evidence has emerged on how food and food ingredients may be used to manage and treat chronic diseases. The food has now become the new medicine. This will be further highlighted in the presentation. The link between nutrition and health and the association between nutrition and productivity has encouraged several governments to focus and fund nutrition research. The future progress and progression in nutrition research can only be achieved if private-public partnership is nurtured. Given the unique ecology and environment of Asia, it is important that nutritional researchers in this region craft their research in context to their contemporary needs. The ultimate success in achieving these goals will only be realized if local researchers collectively addressed regional nutritional issues that plagued our world.

Day 1

Symposium 1: Promoting Better Nutrition for Healthier Malaysians

Key findings of the recent Malaysian Adult Nutrition Survey (MANS) 2014

Mohamad Hasnan A

Institute for Public Health, Ministry of Health Malaysia

In 2014, the Institute for Public Health (IPH) conducted its' second Malaysian Adult Nutrition Survey (MANS) by using the platform of the National Health Morbidity Survey (NHMS). This survey aimed to determine status of food insecurity, meal pattern, food intake by food group, habits in relation to food consumption, food label reading, vitamin, mineral supplement (VMS) and food supplement (FS) intake, physical activity, food consumption, nutritional status and nutrient intake. MANS was a nationwide cross-sectional study conducted in March to June 2014. Multistage stratified sampling design was used to select a representative sample of Malaysian adult population, aged 18 to 59 years old from 4044 selected living quarters. Ten scopes based on the ten aims were compiled to form a set of questionnaires for face-to-face interview by nutritionists and trained research assistants. NutriPro ver.5.1 and Statistical Package for Social Science (SPSS) software ver.20 have been used for nutrient and statistical analysis. MANS 2014 achieved 80.0% response rate for the whole country. By exploratory factor analysis, 24.8% of Malaysian households were at risk for food insecurity. For 'Meal Pattern', 93.7%, 94.5%, 96.4% and 31.9% of Malaysian adults reported taking breakfast, lunch, dinner and a heavy meal after dinner respectively. In the 'Food Intake by Food Group', four food groups have been discussed. Malaysian adults consumed about 1.79 servings of confectionary/day, 1.40 serving of fruit/day, 1.51 serving of vegetables/day and 7.01 serving of plain water/day. 'Habits in Relation to Food Consumption' show that about 99.0% and 89.0% Malaysian adults consumed plain water and fruits with their meals respectively. About 73.8% Malaysian adults chewed food less than 20 times before swallowing, 28.0% of them always use straws with carbonated drinks and 62.5% always rinsed their month after consuming sugary food. As much as 23.0% of adults reported 'always reading' food labels when buying or receiving food. In 'VMS and FS Intake', about 28.1% and 34.0% Malaysian adults consumed any VMS and FS respectively in the last 12 months. For 'Physical Activity', approximately 7.1 million Malaysian adults were physically inactive, which represented 36.9% of the adult population. From food consumption data, the ten most popular food consumed were cooked rice (98.4%) followed by hens egg (95.2%), green leafy vegetables (94.8%), chicken (94.5%), marine fish (93.5%), local kuih (79.9%), bread (78.3%), rice noodles (77.5%), wheat noodles (76.8%) and soy sauce (76.6%). Nutritional status based on the WHO (1998) classification of Body Mass Index (BMI) shows the prevalence of underweight, normal, overweight and obese to be 6.2%, 42.9%, 32.4% and 18.5% respectively. The daily median energy intake of adult men and women were 1489kcal/day and 1445kcal/day respectively. The percentage contribution by macronutrients for the energy intake was 55% from carbohydrate, 16% from protein and 29% from fat. On the whole, several nutritional issues need to be given attention such as high prevalence of risk for household food insecurity, high prevalence of heavy meal consumption after dinner, low consumption of fruits and vegetables, low prevalence of reading food labels, high prevalence of physical inactivity and high prevalence of overweight and obesity. This data is useful to develop food and nutrition policies towards healthier eating practices among Malaysians.

The National Health and Morbidity Survey 2015: NCD risk factors

Muhammad Fadhli MY

Institute for Public Health, Ministry of Health, Malaysia

Non-Communicable Diseases (NCDs) contribute to about 70% of total deaths in Malaysia with the biggest contributor being cardiovascular diseases. Realising the importance of NCD surveillance in the country, the prevalence of NCD risk factors are being monitored through a regular national survey, the National Health and Morbidity Survey (NHMS) by the Ministry of Health Malaysia. NHMS is a nationally representative health survey of population in Malaysia. It was first initiated in 1986 and has been used as an important method for monitoring the health of the population and utilisation of health services in the country. The interval of NHMS has been shortened from every 10 years to a 4 yearly cycle since 2011 to ensure timely information is obtained for planning of health programs. The NHMS 2015 has repeated most of the modules in the previous NHMS which include the non-communicable diseases risk factors. NHMS 2015 has adopted a standard methodology for a household survey to produce a nationally representative data. The sample covered both urban and rural areas and canvassed all states in Malaysia. Data collection was by face to face interview using structured questionnaires as well as self-administered method. Clinical assessment and biochemistry tests were performed based on the modules. Survey information was collected electronically using handheld devices. Data collections were conducted from early March until early June 2015. About 10,000 randomly selected living quarters (LQ) were sampled and 30,000 population responded to the survey with the overall response rate of 86.4%. Overall, prevalence of the major non-communicable diseases or the risk factors are either increasing or still high in Malaysia. The overall prevalence of diabetes among individuals 18 years and above was 17.5% (95% CI: 16.6%, 18.3%), hypertension was 30.3% (95% CI: 29.3%, 31.2%), hypercholesterolemia was 47.7% (95% CI: 46.5%, 48.9%) and obesity was 17.7% (95% CI: 16.9% - 18.5%). Among individuals 15 years and above, the prevalence of smoking was 22.8% (95% CI: 21.9%, 23.8%). More than half of population with diabetes, hypertension and hypercholesterolemia were the undiagnosed groups. The overall increasing or high prevalence of these major NCD risk factors will increase the burden of disease of NCDs in Malaysia. A more aggressive approach, combining both soft and hard policies need to be adopted to strengthen the NCD prevention and control in the country.

MyBreakfast Study – Key findings and implications for intervention

Tee ES[1], Mohd Nasir MT[2,1], Norimah AK[3,1], Hamid Jan JM[4,1], Appukutty M[5,1], Tan SY[6,1], Nurliyana AR[2,1], Thielecke F[7], Hopkins S[7], Ong MK[8] and Ning C[8]

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[5]Sports Science Programme, Faculty of Sports Science and Recreation, Universiti Teknologi MARA
[6]Department of Nutrition and Dietetics, School of Health Sciences, International Medical University, Malaysia
[7]Cereal Partners Worldwide, Switzerland
[8]Nestlé R&D Center, Singapore

The MyBreakfast Study was the first comprehensive nationwide study on breakfast habits among school children in Malaysia conducted by Nutrition Society of Malaysia. This cross-sectional study with a multi-stage sampling approach was carried out based on geographical location and ethnic group distribution. The aim of the study was to determine breakfast habits, including types of foods and beverages that are most commonly consumed at breakfast by primary (n= 5581) and secondary (n=3124) school children aged 6 to 17 years. Bodyweight status, physical activity level and daily dietary intakes were measured and their associations with breakfast habit were examined. A total of 68.4% from urban and 31.6% from rural area and ethnics breakdown; Malays (61.1%), Chinese (18.6%), Indian (8.2%), Bumiputera Sabah/Sarawak (11.3%) and children of other ethnic groups (0.7%). The prevalence of overweight and obesity among the children was 28.4%, there were more boys being overweight or obese (32.9%) than girls (24.7%). The prevalence of overweight and obesity was similar among primary (28.3%) and secondary (28.8%) school children. About a third of the children (34.8%) had low physical activity level and the prevalence was higher among secondary (46.7%) than primary (28.3%) school children. It was found that 1 in 4 children (24.6%) skipped breakfast at least 3 days per week. More girls (26.4%) skipped breakfast than boys (22.5%). Breakfast skipping was found to be associated with higher body mass index (BMI) and children who skipped breakfast were 1.34 times more likely to be overweight or obese. The prevalence of low physical activity level was also higher among breakfast skippers (42.0%) than eaters (32.5%). Breakfast contributed to 26.8% of total daily energy intake, 21.4% protein and 29.1% fat intake daily. Bread, eggs, chicken/meat, *nasi lemak* and fried rice were the most common breakfast foods, while malted beverages, tea/coffee, ultra-heat treated and powdered milk and fruit drink/cordial were the most common breakfast beverages. About 18% of the children consumed ready-to-eat cereal (RTEC) at breakfast. RTEC contributed to 34.6% to 49.2% of total daily intake of several micronutrients including calcium, iron, vitamin C and the B vitamins. Malted beverages (consumed by 60.6%) contributed to 5.7% of daily energy intake and about 19.4% to 26.0% intake of calcium and several B vitamins. Whole grain consumption was very low (about 2 g/day overall) and over 99% of the children did not meet the recommended intake of 48 g/day. Even among the consumers, the intake (about 9 g/day) was well below the recommendation. The main source of whole grain intake was wheat, while RTEC was the most common source of wholegrain food. The present study findings should be utilised by relevant ministries, agencies and other stakeholders to develop and implement appropriate nutrition and physical activity intervention programmes to tackle the high prevalence of overweight and obesity among school children. School health programme should accentuate on nutrition education in schools by promoting regular breakfast consumption. National dietary guidelines should include recommendations on consuming nutritious foods and beverages for breakfast along with recommended serving size to help educate children on how to achieve a balanced breakfast. Participation in physical education should be compulsory for every child in school and classes intended for physical education should be strictly utilised for this purpose. Nutritionists must be assigned in schools to effectively implement and carrying out nutrition education activities, monitoring of under- and over-nourished children and ensuring implementation of school canteen guidelines. Parents should be role models and be actively involved in all efforts to promote healthy eating among children. Healthy eating patterns in childhood and adolescence promote optimal childhood health, growth, and intellectual development for a healthier generation of Malaysian adults tomorrow.

Symposium 2: Promoting Better Nutrition for Healthier Malaysians

The Third National Plan of Action for Nutrition of Malaysia (NPANM), 2016-2025

Zalma AR and Khairul ZMY

Nutrition Division, Ministry of Health Malaysia

The National Plan of Action for Nutrition of Malaysia (NPANM) is the framework for action to address food and nutrition challenges in the country. The NPANM series are Malaysia's commitment towards the Rome Declaration on Nutrition arising from the International Conference on Nutrition (ICN) held in 1992 and 2014. The NPANM III, 2016-2025 is the follow up of the NPANM I, 1996 – 2000 and NPANM II, 2006 – 2015. The Plan was drafted taking into cognisance the nutrition situation in the country as well as international and regional food and nutrition development. It underlines the importance of nutrition in enhancing population health, preventing diet-related diseases and strengthening food and nutrition security. The Plan has identified nutrition indicators and set targets to be achieved by 2025. The targets and strategies of the NPANM III, 2016-2025 are in accordance to the international targets, such as Global Nutrition Target 2025 and various plan of action and framework at international and local level. Various activities have been outlined under the 11 strategies of the Plan which require collaboration and commitment from various agencies. The development of the NPANM III, 2016-2025 spearheaded by the Ministry of Health under the purview of the National Coordinating Committee of Food and Nutrition (NCCFN), with active participation and consensus from all stakeholders in food and nutrition in the country. Concerted effort through multi-stakeholder's engagement is imperative in the successful implementation of the Plan.

Malaysian Food Composition Database Programme

Rusidah S

Nutrition Division, Ministry of Health Malaysia

A reliable, relevant and up to date Food composition database (FCD) is the prerequisite and fundamental importance for nutrition and health, food science and food regulation. The first Malaysian FCD was published in 1988. The subsequent FCD was published in 1997 with a total of 783 foods and 19 nutrients. The updates of Malaysian FCD have been identified as one of the Seven Research Priority Areas for Nutrition for Malaysia under both the 10th and 11th Malaysia Plan. Therefore, the initiatives to update the Malaysian 1997's FCD has been undertaken with the formation of the National Technical Working Group (TWG) of Malaysian FCD in 2010. Members of the TWG are from 15 institutions in the country including universities, Public Health Laboratory, Institute for Medical Research, Chemistry Department, Malaysian Palm Oil Promotion Board and MARDI. The harmonization of the Protocol for Sampling and Nutrient Analysis had also been published in 2011. Although the updates of the Malaysian FCD is currently underway, both the 1997 FCD and the partial release of the current FCD to the data users can be accessed at https://myfcd.moh.gov.my. As compared to only 17 nutrients in the 1997's FCD, a total of 40 nutrients have been included in the current FCD. At the global level, Malaysia is a member of the Association of Southeast Asian Networks of Food Data Systems (ASEANFOODS) and International Network of Food Data Systems (INFOODS) which were established in 1986 and 1984 respectively. INFOODS is a worldwide network of food composition experts which

aims to improve the quality, availability, reliability and use of food composition data. At the ASEAN level, Malaysia has actively participated for the harmonization of the protocol and the updates of the ASEAN FCD. One of the way forward for the Malaysian FCD is to incorporate nutrient content of prepackaged foods into the national FCD with an additional module for industry.

FBDGs of specific population groups – Pregnant and lactating women, elderly and vegetarians

***Gui SL*[1] *and Ismail MN*[2]**

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According to FAO, Food Based Dietary Guidelines (FBDG) are intended to establish a basis for public food and nutrition, health and agricultural policies and nutrition education programmes to help inculcate healthy eating practices among population. It is to provide standards guide and advice on food, food groups and dietary patterns to promote health and prevent malnutrition including chronic NCDs. The development of FBDG is a crucial step towards empowering the community to make informed choices on their habitual dietary intake, which will influence their well-being. The TWG on Nutritional Guidelines under the purview of the National Coordinating Committee of Food and Nutrition (NCCFN) published the first dietary guidelines for Malaysia in 1999 which was later updated and published as Malaysian Dietary Guidelines (MDG) 2010. In view of the need to address diet-related health issues in various age groups, MDG for children and adolescents was published in 2013. Currently, for specific population groups, the TWG is in the midst of developing three dietary guidelines namely, 1) Dietary Guidelines for Pregnant and Lactating Women, 2) Dietary Guidelines for Elderly and 3) Dietary Guidelines for Vegetarians. Each set of dietary guidelines contains unique features to address the dietary needs of these population groups. These guidelines are primarily intended for use by health professionals to serve as reference to help recommend, educate and guide Malaysians towards improving their dietary habits and lifestyle.

MyNutriBaby: A contemporary parent education programme on infant and young child nutrition

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Good nutrition is especially essential during the first two years of life. Suboptimal feeding practices may contribute to malnutrition and associated risks of poor growth, impaired development, increased susceptibility to infections, and a predisposition to certain chronic diseases in later life. Nutrition Society of Malaysia recognises the importance of parents as the principal determinants of infants' nutritional status. As such, NSM has been driving an infant nutrition education initiative since 2011. It began as the Mother's Smart Choice programme and centred upon the publication of guide books for parents and talks for nurses. In 2014, the programme took on MyNutriBaby (MNB) as its new name. MNB aims at educating Malaysian parents on the infant feeding recommendations contained

within the Malaysian Dietary Guidelines for Children & Adolescents 2013. Specifically, the programme seeks to empower new mothers in initiating exclusive breastfeeding for the first 6 months and thereafter, continuing to breastfeed as part of complementary feeding until 2 years of age. MNB adopts a contemporary approach using online videos, Facebook memes and a dedicated website that stands as NSM's 1st online resource for parents on infant nutrition. MNB also collaborates with private hospitals to organise parent seminars that feature talks on breastfeeding and complementary feeding, as well as lactation diet for mothers. The food preparation demonstrations/hands-on sessions by a nutritionist and professional chef duo are a popular attraction. MNB has demonstrated a promising potential in terms of combining digital media and on-ground activities to increase parental awarenes of ideal infant feeding practices. MNB has been able to commemorate Breastfeeding Month in August over the last two consecutive years.

Symposium 3: Young Researchers Symposium

The GReat-Child Trial: A quasi-experimental intervention to improve knowledge, attitude and practice (KAP) towards whole grain among overweight/obese schoolchildren in Kuala Lumpur, Malaysia

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Studies have reported that healthy eating habits cultivated in the young and will normally be practised in adulthood; hence, the importance of conveying nutrition education at an early age. The government has undertaken numerous efforts to improve nutritional status of Malaysian schoolchildren to address the alarming rise of childhood obesity; however, none has emphasized whole grain as a strategy to manage childhood obesity. The GReat-Child Trial is a 12-week, quasi-experimental intervention with 6-month follow-up, comprising three components addressing behaviour, personal and environmental factors based on Socio Cognitive Theory; which emphasised whole grain and healthy balanced diet. This presentation aimed to evaluate changes of KAP towards whole grain among overweight/obese schoolchildren. Two schools in Kuala Lumpur with similar demographics were assigned as intervention (IG) and control (CG). Eligibility criteria were overweight/obese children aged 9 to 11 years who had no serious co-morbidity problems and who did not consume wholegrain foods. A total of 63 children (31 IG; 32 CG) completed the entire intervention, whereby IG underwent six 30-minute whole grain and healthy balanced diet education lessons and had free delivery of wholegrain food during school recess period. Parents of IG children attended 1-hour individual diet counselling to encourage them to increase the availability of wholegrain food and to practice balanced diet at home. KAP questionnaire on whole grain was administered at baseline and twice (at 3rd and 9th month) post intervention. IG attained significantly higher scores in knowledge (mean difference=4.23, 95% CI: 3.82, 4.64, $p<0.001$), attitude (mean difference=7.39, 95% CI: 6.36, 8.42, $p<0.001$) and practice (mean difference=6.13, 95% CI: 4.49, 7.77, $p<0.001$) towards whole grain compared to CG, after adjusting for confounders. The findings of the GReat-Child Trial indicate that intervention emphasising whole grain made an impact on improving KAP among children.

We anticipate the GReat-Child Trial to be a pioneer that could be adopted by the government and policy makers to increase whole grain consumption among Malaysian children.

Prevalence of functional constipation and symptoms characteristics among students in Universiti Putra Malaysia, Serdang

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The objective of this study was to determine the prevalence of functional constipation (FC) among students in Universiti Putra Malaysia, Serdang. The symptoms characteristics of FC was also determined with the intention to introduce treatment in the future. The screening activity was carried out through a cross-sectional, questionnaire-based survey from January 2015 to May 2015 in UPM Serdang campus. The students were recruited through convenience sampling method. The questionnaire consisted of four sections including general health status, anthropometrics data, constipation symptoms and socio-demographics data. The constipation module of Rome III diagnostic criteria, a five-point symptoms based diagnosing tool (0=never or rarely, 1=sometimes, 2=often, 3=most of the time, 4=always) and Bristol Stool Chart that classified human stools to seven types were used to characterize constipation symptoms. A total of 1662 students completed the questionnaire, with a response rate of 94.97%. The respondents aged from 19 to 53 years old with 75.93% of female. 63.93% of the students were reported to have normal body mass index. A total of 1403 respondents had at least one constipation symptoms. The prevalence of FC among UPM students was 16.25% whereas female student was found more prevalent ($p<0.05$) to have constipation (17.43%) as compared to male student (12.50%). Subjects reported that hard or lumpy stool, incomplete evacuation, anorectal obstruction and straining were experienced at least sometimes during defecations. The commonest stool consistency characterised using Bristol Stool Chart was Type 3 (35.2%) which is considered as normal consistency. Further research is essential to concentrate in the treatment recommendations with regards to improve the symptoms and overall well-being.

Prevalence of malnutrition, soil-transmitted helminth infection and anemia among aboriginal children aged 1 to 6 in Gua Musang, Kelantan

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The objectives of this study was to determine the prevalence of malnutrition, soil-transmitted helminth (STH) infections and anemia among aboriginal children at Pos Hendrop, Pos Balar and Pos Tohoi in Gua Musang, Kelantan as well as the association of the STH infection and anemia with malnutrition. A total of 256 children from Temiar subs-tribes aged 1 to 6 years (131 males and 125 females) were involved in this study. A pre-tested questionnaire was used to obtain the socio-demographic information and the anthropometric included body weight and height was measured. The children stools were collected and were examined

using simple direct wet smear for presents of STH. Blood from the capillary was drew out from the child finger to measure hemoglobin (Hb) level. This finding revealed that 203 subjects (79.3%) suffered malnutrition with the prevalence of underweight, stunting and wasting was 45.3%, 76.2% and 3.1% respectively. Of this total, 43.3% suffered from more than one malnutrition problems. A total of 161 subjects (62.9%) was positively infected by STH with 8.6% of the subjects were infected by two species STH. The dominants STH was *Ascaris lumbricoides* (41.0%), *Trichuris trichiura* (28.5%) and hookworm (2.0%). As for Hb level, 76.2% were identified as anemic with 3.5%, 46.1% and 26.6% was categorized as severe anemia, moderate anemia and mild anemia respectively. The mean Hb was 9.9g/dl with the range of Hb level of 4.3g/d and 13.4 g/dl. From the total of malnutrition subjects, 50.7% of them were also suffered from STH infection and anemia. However, there was no significant association between malnutrition with STH infection (p=0.287) and malnutrition with anemia (p=0.114). Although this study did not reveal the association of the three variables but it shows that malnutrition, STH infections and anemia are still a prevalent and major issue for the public health concern among the aboriginal children in Gua Musang, Kelantan. Thus, closely monitoring of clinical sign and symptom of malnutrition, a strong base care of nutrition program, and sustainable deworming activity is urgently needs in order to improve the children nutritional status.

Juara Sihat: Effectiveness of a school-based childhood obesity nutrition education programme with intervention on eating habits and physical activity in Kuala Lumpur, Malaysia

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The aim of this study was to evaluate the effectiveness of an education programme with intervention on nutrition and physical activity in improving anthropometric status, level of knowledge, attitudes and practices (KAP) of nutrition, physical activity level and dietary intake among overweight and obese children. This is a quasi-experimental trial that involved a total of 106 children aged 9-11 years old. Subjects were selected using cluster sampling method from two primary schools in Kuala Lumpur [intervention group (IG)=55, control group (CG)=51]. Pre-intervention data gathered included socio-demography, anthropometry, KAP, dietary and physical activity. Deliverance of nutrition education programme included healthy eating, physical activity and behaviour modification. The *Juara Sihat* intervention programme was conducted for 12 weeks among the intervention group. Post-intervention data were collected after three months (post-1) and six months (post-2) of intervention. The results showed that BMI z-score (-0.07), waist circumference (-4.6 cm) and body fat percentage (-3.6%) in IG decreased significantly ($p<0.05$) at post-1. However, post-2 results showed an increase in anthropometric measurements. As for CG, there were significant increase ($p<0.05$) in waist circumference and body fat percentage over the same time period. The study also found that there were significant increase ($p<0.05$) in nutrition KAP scores from pre-intervention to post-2 in IG. However, there were no significant changes in KAP scores in CG. Further, there were small improvements in dietary intake and physical activity level in IG, and no apparent effect in CG. In conclusion, this study successfully demonstrated small positive intervention effects on BMI-for-age z-score, waist circumference, body fat percentage, KAP of nutrition scores and physical activity level. Nonetheless, further improvements in terms of duration and/or intensity are needed

prior to implementing the *Juara Sihat* intervention on a larger scale to ensure sustainability of the programme.

Screening of aflatoxin M1 metabolite in urine samples among residents in Terengganu, Malaysia

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Nowadays, in conjunction with dramatic growth of population, food safety matter is of concern. The exposure of fungi producing toxin named mycotoxins is one example of food contamination. Aflatoxin M1 (AFM1) is a major metabolite of aflatoxin B1 (AFB1) which is one of many naturally occurring mycotoxins. A study was conducted to screen the occurrence and level of aflatoxin M1 (AFM1) in urine samples among 206 urban and rural residents in Terengganu, Malaysia. The level of AFM1 in urine samples was quantified by competitive enzyme-linked immune-absorbent assay (ELISA). Of 206 samples, 84 samples were positive with AFM1 (40.8%) ranging from 0.07 to 5.53 ng/L with a mean of 0.589 ng/L. The present study also revealed age group and marital status had significant associations with the occurrence of AFM1 in the urine samples of subjects, whereas in term of urinary level, subjects aged 30 and above, Chinese subjects and non-employed subjects showed significantly higher level of AFM1 contamination compared to their counterparts. It can be concluded that residents in Terengganu are moderately exposed to aflatoxin AFM1 compared to other countries. Since aflatoxin is a potent-carcinogen for liver cancer and continuous exposure to this toxin will cause death, the present findings could provide a baseline for future study where larger samples and more advanced and faster technique should be used to detect the level of aflatoxin exposure, and the possible effect of its exposure towards community health.

Day 2

Symposium 4: Industry Contribution to Promoting Better Nutrition

Eat smart – steer your metabolic and digestive health with science-based ingredients

Goh PE

BENEO Institute, BENEO Asia-Pacific, Manager Nutrition Communication

BENEO's contribution towards better health and nutrition in Malaysians is by offering innovative, science-based functional carbohydrates and fibre to food manufacturers that support better metabolic and digestive health throughout the lifespan. Making smart choices by eating right can have a positive impact on good health. Palatinose™ (isomaltulose) is a slow-release functional carbohydrate, which provides energy in the form of glucose in a more balanced and sustained way over a longer period of time. This leads to a more favourable metabolic profile with an overall lower blood glucose and insulin response. Body composition is also improved by the reduction of visceral fat accumulation and the higher levels of fat oxidation. Substituting high glycaemic carbohydrates with Palatinose™ can help steer metabolic health. This is especially important since reducing metabolic risk factors may prevent or delay the onset of non-communicable diseases, including diabetes and cardiovascular disease. Inulin and oligofructose (FOS) from chicory are dietary fibres extracted from the chicory root. These fibres are essentially indigestible in the small intestine, and instead are fermented by the colonic microbiota. This fermentation process results in short-chain fatty acids (SCFAs), which play an important role in improving digestive health by positively influencing the environment of the gut. It selectively promotes the growth of bacteria beneficial to health, especially the increase in bifidobacteria. The prebiotic chicory root fibre also promotes bowel regularity, faecal bulk and consistency, thereby reducing constipation and improving quality of life. Chicory root fibre is a non-available carbohydrate that supports metabolic health when readily-digestible carbohydrates in a food product are partially reduced or completely replaced with inulin or oligofructose. As a consequence, chicory root fibre does not increase postprandial glycaemia and insulinaemia and supports efforts of food manufacturers to reduce the glycaemic response of food and at the same time enhance the food with dietary fibre made by nature. Chicory root fibre also promotes satiety and reduces energy intake, thereby contributing to weight management to improve overall metabolic health. BENEO's nutritional ingredients thus form part of the solution to better metabolic and digestive health that are substantiated by the latest scientific research and extensive knowledge on their physiological benefits.

The universal nutrition benefits of breakfast cereals & whole grain

Cher SW

Nestlé Products Sdn. Bhd. Malaysia

Breakfast, as the first meal of the day, is crucial to refuel the body and the brain because it provides energy and nutrients needed to start the day and kick-start the metabolism. Research suggests that children who eat breakfast do better in memory tests and problem

solving. After a night of sleep, glycogen stores may be depleted and breakfast can contribute positively to glucose's homeostasis. Maintaining glucose supply to the brain over time seems to play a major role in maintaining good cognitive performance. Studies have demonstrated that eating breakfast plays a key role in helping people manage their energy intakes and their weight. Regular breakfast eaters have healthier body weight, lower body mass index (BMI) and are more likely to keep weight off in the long term. People who eat breakfast regularly also have more adequate micronutrient intakes and tend to consume less fat during the day. Eating breakfast also encourages healthy eating habits for children and the entire family. Historically, cereals have been an important staple food in the diets of our ancestors. Scientific studies consistently show that people who eat at least 48 grams of whole grains each day can reduce the risk of coronary heart disease and diabetes by between 20-40% and certain cancers by up to 40%. Whole grain intake has also been inversely associated with the metabolic syndrome. The health advantages of whole grain are largely associated with consuming the entire whole grain "package", which includes fibre, vitamins (B vitamins, vitamin E), minerals (iron, magnesium, zinc, potassium, selenium), essential fatty acids, phytochemicals and other bioactive food components such as the flavonoid antioxidants. The MyBreakfast Study is the first most comprehensive cross-sectional, nationwide dietary survey of Malaysian primary and secondary school children conducted by the Nutrition Society of Malaysia in 2013. Study show that one out of four children skipped breakfast at least three days in a week. The prevalence of overweight and obesity was also higher among breakfast skippers with 1.34 times more likely to be overweight and obese. Higher micronutrient intakes were observed among children who consumed ready-to-eat cereals at breakfast and they had higher consumption of milk compared to other breakfast eaters. Among the ready-to-eat cereal consumers, four out of five children who are not getting enough whole grain in their diets. Compared to other countries, whole grain intake was the lowest.

Oat basics and cooking with oats

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Oats are a type of whole grain that are commonly sold in supermarkets as instant, quick cooking or rolled oats. Oats are also found in cookies, ready-to-eat cereals, flavoured sweet and savoury porridge, and cereal beverages. Like any other whole grain, all three layers of the oat grain: the bran; germ; and endosperm are intact. Hence, oats are rich in dietary fibre, protein, starch, and phytonutrients. In addition, oats also contain vitamins and minerals such as vitamins B1, B12, and E; and phosphorus, magnesium, iron, and zinc. More importantly, years of scientific research have established that oat soluble fibre beta-glucan can help reduce both total and LDL-cholesterol levels considerably, when consumed as part of a diet low in saturated fat and cholesterol and a healthy lifestyle. In view of this evidence, the Ministry of Health Malaysia has also granted an approved "other function" claim: beta–glucan from oats helps lower or reduce blood cholesterol level. More recently, research focused specifically on oats shows that oats may be associated with reduced risk of cardiovascular disease, lower blood sugar levels, and improvement in satiety. Regular inclusion of oats in the family menu is therefore advisable. Going beyond a sweet or savoury porridge, oats can be used in a variety of delicious dishes. Oats can be: added into shakes and smoothies, mixed in with gravies and sauces to thicken them, used as a binder in patties or to coat meat or fish nuggets, used to bake muffins and cakes, roasted and tossed into salads or added into pancakes. Rolled oats can also be used instead of rice. This presentation will also include a demonstration of presentation of 2 foods using oats, adapted from the publications of the Nutrition Society of Malaysia. The Malaysian Dietary Guidelines recommend that at least half of the recommended intake for grains should be derived from whole grains. Consumption oats can be one of the ways of meeting this recommendation of the Guidelines.

New frontiers in fibre: Emerging research and health benefits

Weaver CM

Distinguished Professor, Head of the Department of Nutrition Science, Purdue University

Around the globe, fibre and calcium intakes are below recommended levels contributing to potential long-term public health implications. While years of research support the core health benefits of dietary fibre in digestion, more emerging research indicates that fibre may play a role in bone health. Research indicates that prebiotic fibres alter the gut microbiome, which enhances fermentation of the fibres causing production of short-chain fatty acids. These changes have been positively correlated with increased calcium absorption in humans and increased bone density and strength in animal models. The influence of prebiotics on increasing mineral absorption and enhancing bone properties through shifts in gut microbiota offers a strategy to improve calcium nutrition and bone health. Bone health and calcium nutrition are significant health concerns in Asia, where building peak bone mass in adolescence and retaining it during adulthood is a key strategy to reduce risk of osteoporosis with calcium being a fundamental raw material for bone health. Prebiotic fibres can improve calcium absorption and net bone balance. During growth, prebiotic fibres, including soluble corn fibre, have resulted in increased calcium absorption. In rats, these fibres have further been associated with increased bone mineral density and bone strength. An increase in peak bone mass by 10% has been estimated to delay osteoporosis by over a decade. Prebiotic fibre consumption has been associated with shifts in gut microbial communities. These shifts are significantly positively associated with increases in calcium absorption. In postmenopausal women, the prebiotic soluble corn fibre, improved bone calcium retention in a dose-responsive manner. The same fibre shifted the gut microbiome and altered several functional pathways in healthy men. The interactions among host characteristics, the diet, our gut microbiome, and health is a new frontier. Dramatic advances in methodology, formulating important questions and interpreting substantial new data should excite future generations of scientists.

The latest findings relating to fats: the new roles of Omega 3 and MCT

Takuji SHIRASAWA

Dokkyo Medical University, at the Department of Physiology; University of Michigan, Medical School, Neurology; Shirasawa Anti-Aging Medical Institute, President

Dr. Takuji Shirasawa is an Anti-Aging Practitioner and Professor of Aging Control Medicine. He obtained his Ph.D. in immunology at Chiba University Graduate School of Medicine and has been researching molecular pathology and the molecular genetics of gerontology for the past 25 years. Population age repartition charts have always been referred to as "Age Pyramids" simply because the structure of a healthy nation's population should be the shape of a triangle. For many developed countries, this shape is becoming a Kite; these populations are aging fast. This process will have many repercussions: economic, social and medical. It will change the focus of nutrition and nutritionists. Principal nutrition-related issues, like diabetes or cardio-vascular problems will remain, but they will have increasingly to be considered in light of an aging population. New issues will become predominant like frailty, nursing and brain disorders. For age-related pathologies, especially various forms of brain degeneration, medicine seems to be far from finding effective cures. Nutrition can however, play its part, especially in prevention and mitigation. Over the last 10 years, researchers have made tremendous findings relating to the anti-aging benefits of Omega 3 and Medium-Chain-Triglycerides. Pr. Shirasawa, the renowned Japanese anti-aging medicine specialist, will present the anticipated benefits of these two families of fatty acids and their nutritional values for an aging population.

Symposium 5: Focused Symposium on Infant & Young Child Nutrition

Dietary intake and blood status of gangliosides among Malaysian toddlers

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Gangliosides (GA) are complex bio-active lipid components found in plasma membranes. Primarily found in foods of animal origin, GA are known to promote gut health and cognitive skills in infants. Therefore GA is a dietary component of interest in early childhood nutrition. Dietary GA intake and plasma GA levels among toddlers is currently unknown. Dietary sources of GA and their contribution to overall GA intake was determined among Malaysian (Malay) toddlers aged 15 – 21 months (n=150) in this study. The toddlers were enrolled in the licensed day-care centres in the Klang Valley. Mean and median daily GA intake was computed based on weighing food and beverages consumed over two days. Average GA contribution from major five food sources namely, growing up milk products (GUMPs), bakery/biscuits, dairy products, meat and fish were computed. We also assessed the plasma GA status and its association with diet GA intake in Malaysian toddlers in a sub-group of 74 subjects. Median and mean daily GA intakes were 4.62 and 5.86 (±0.56) mg. GUMPs were the major dietary source of GA (~ 85% of intake). Plasma GA concentrations in toddlers was highly variable (5.05 ug/mL to 16.15 ug/mL). With this variability, no significant correlation was discernable between dietary intake and plasma gangliosides status. Although older subjects (aged ≥ 19 months) consumed higher amounts of gangliosides from dairy products, bakery/biscuits, meat and fish than younger subjects, overall GA intakes and plasma GA levels were not significantly different between the age groups. The wide variations in plasma GA levels may reflect overall GA intake, rather than that of any individual dietary item in this study setting where GA intake is low. The findings suggest that toddlers' consumption of GUMPs, dairy products, fish, chicken, and meat improves their GA intake. Further studies are recommended to evaluate the effectiveness of increasing GA intake on toddler health and cognition.

Dietary intake of mothers and gangliosides content in breast milk

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Gangliosides (GA) are sialic acid-containing glycosphinolipids which play an important role in neurological development, memory formation and synaptic signal transduction. They are found particularly high in human breast milk. However, there are currently no GA data

published on Malaysian population. Hence, we aimed to investigate the concentrations of GA in breast milk at several time points after delivery. A subsample of The Universiti Sains Malaysia Pregnancy Cohort study participants was selected (n=48). Mother's colostrum, transitional and mature breast milk GA was measured using the validated high performance liquid chromatography-mass spectrometry method. The Human Milk Analyzer was used to measure milk macronutrients such as lactose, protein and fat. Mothers' colostrum and transitional milk GA results were 26.8 and 18.9 mg/L, respectively. In mature milk, the average GA concentrations at 2, 6, and 12 months lactation were 14.8, 25.3, and 16.6 mg/L, respectively. The average fat concentration increased across these 3 lactation time points, from 32 to 38 and to 40 g/L, respectively. There was a significant correlation between the level of GA and fat concentration ($r=0.6$, $P<0.001$). Large intra-individual variability in human breast milk GA concentrations was also found during each time point. Mother's dietary intake of GA and fat during pregnancy and lactation may influence the concentrations of breast milk GA.

Compliance with WHO IYCF indicators and dietary adequacy of subjects aged 6 – 23 months from day care centres in Kuala Lumpur and Putrajaya

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The 2010 WHO Infant Young Child Feeding (IYCF) Indicators is a set of population-level questionnaire for assessing breastfeeding and complementary feeding practices among children aged 6 to 23 months. The objectives of this cross-sectional study were to (i) estimate prevalence of compliance with IYCF indicators in Malaysian children aged 6.0-23.9 months, and (ii) determine extent of compliance with the core complementary feeding indicators predicts dietary adequacy. A total of 300 Malay subjects were recruited from licensed child care centres around Kuala Lumpur and Putrajaya using convenient sampling, targeting approximately 100 subjects for each of the age groups of 6.0-11.9 months, 12.0-17.9 months and 18.0-23.9 months. Dietary intake of a sub-sample of 120 subjects (approximately 40 subjects in each age group) was assessed using a 2-day weighed food record to predict compliance with the core complementary feeding indicators. The study population showed high compliance for (i) timely introduction of complementary foods at 6-8 months (97.9%), (ii) minimum meal frequency among non-breastfed children aged 6-23 months (95.2%), (iii) consumption of iron-rich foods at 6-23 months (92.3%) and minimum dietary diversity (78.0%), but low compliance for minimum acceptable diet among non-breastfed children (39.5%) and breastfed children (50.6%). Dietary diversity was identified as the "most sensitive" core complementary feeding indicator in predicting dietary adequacy among subjects. Subjects who complied with dietary diversity were 11.10 times (95% CI: 3.09, 39.87) ($p<0.001$) more likely to have met dietary adequacy. Generally, the subjects showed good compliance with the WHO IYCF indicators, but continued efforts remain essential for improving feeding behaviours to ensure adequate and quality complementary feeding in Malaysian children.

Weighing food intake of toddlers in Bambino Project: Sharing experiences

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Assessing dietary intake of young children is fraught with methodological challenges. Widely used assessment methods such as the 24-hour recall and food frequency questionnaire are subjected to memory lapses and perception biases of parents/care givers. An objective dietary assessment method was used in the Bambino Project to reduce such shortcomings and minimise respondent burden. Dietary intake over two days was assessed by weighing and accounting for all foods and beverages consumed by study subjects in day care centres. A total of 150 subjects aged 15-24 months were recruited from licenced care centres in Putrajaya and Selangor. Weighing of foods was carried out by trained research assistants. Duplicate plates of each meal were prepared and individual items were weighed using a kitchen scale with weight capacity of 2kg and weight graduation of 1gm (TANITA-KD160WH). Foods not consumed and spilled foods were deducted from the total amounts weighed. Parents/care givers were instructed to record foods consumed by the child while at home during the study period. Not all parents/care givers were able to provide adequate descriptions and estimations of foods consumed by the participating child. Thus, due diligence had to be exercised by research assistants to follow up gathering missing and incomplete data. Food preparation and child feeding practices observed posed as potential sources of errors affecting data collection accuracy. Limitations of the weighing food intake procedure include its demand for close working cooperation with the centre management, well-trained and perceptive research assistants, as well as being a relatively costly method as it is time-consuming coupled with a high researcher burden. As the Project Bambino involved a number of research assistants collecting data from different study sites, quality assurance is essential to ensure that standardised procedures and tools are used toward minimising measurement errors and observation biases.

Symposium 6a: Nutrition Potpourri

Association of serum leptin levels and LEP gene variation with body composition and insulin resistance in obese Malaysian adults

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Effect of leptin on insulin resistance in obese Malaysians has seldom been reported. Leptin gene has been frequently studied in different populations for its contribution to genetic predisposition to obesity. The objective of our study was to identify correlation between *LEP* rs7799039 gene polymorphism with anthropometric variables, blood biochemical markers and serum leptin levels in overweight and obese Malaysian adults. Anthropometric parameters of 40 Malaysian adults with BMI >23kg/m^2 was measured by bioelectrical impedance analysis. Serum leptin was measured using in-vitro enzyme-linked immunosorbent assay, Human Leptin ELISA Kit. Insulin resistance was evaluated using the homeostasis model assessment of insulin resistance (HOMA-IR, calculated as

fasting glucose (mmol/L) * insulin (μIU/mL)/22.5). LEP rs7799309 was genotyped by using PCR-RFLP (n=34). Serum leptin level (9.0±5.0ng/ml) was positively correlated with BMI (29.7±5.7kg/m^2) (r=0.583,p=0.001), waist circumference (90.6±15.1cm) (r=0.453,p=0.04), fat mass (31.5±12.5kg) (r=0.600,p=0.001), fat percentage (38.8±7.1%) (r=0.559,p=0.001), fasting insulin (8.0±6.0mmol/L) (r=0.385,p=0.014) and HOMA-IR (1.0±8) (r=0.391,p=0.013). Stepwise multiple linear regression revealed that percent fat and fasting insulin were the independent variables associated positively with serum leptin levels. With a 1-point increase in body fat percent, serum leptin increased by 0.4%. With a 1-point increase in fasting insulin, serum leptin increased by 0.33 uU/ml. In *LEP* (rs7799039), the frequency of minor allele A to major G was 0.46 and 0.54 respectively. It was found that overweight/obese participants with HOMA-IR <1.7 carrying AA allele compared to GA allele had significantly higher ($p<0.05$) blood triglyceride level (3.4±0.9 against 1.2±0.4); total cholesterol / HDL cholesterol ratio (6.2±2.6 against 3.6±0.9); lower HDL cholesterol (0.9±0.5 against 1.6±0.5mmol/L). GA carriers showed higher body fat percent than AA carriers (41.2±7.1 against 28.4±7.0) ($p<0.05$). Interaction of gene polymorphisms and obesity phenotypes can affect the outcome of weight reduction intervention programs. We suggest personalized intervention based on genetic makeup for successful outcome in weight management.

Primary School Obesogenic Environment Model: Case study in Brunei Darussalam

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Rising levels of childhood overweight and obesity in Brunei Darussalam have to date been addressed with policy responses that emphasis personal responsibility and individual responses. Our alternative starting point was one of social responsibility, requiring a closer examination of obesogenic environments. Obesogenic environment for children differ from that experienced by adults because until a certain age, children's environments are mostly controlled by parents and schools. Schools have been considered to be one of the most influential environments for shaping children's health behaviours. Policy establishments may help to improve the condition of the school environment to combat obesity. The research aim was to assess the obesogenicity of the primary schools in Brunei Darussalam. Five schools were selected via purposeful sampling based on their geographical location and their environment to reflect a range of school settings in Brunei. We have utilized an audit tool that covers different dimensions of the school which includes analysis of the 'internal canteen service', 'external canteen service/food stall vendors', 'school food/ nutrition policy', 'nutrition environment', ' school physical activity policy', 'school physical activity environment' and 'external neighborhood physical activity environment'. From the research findings, we have identified the main elements of the primary school environment of Brunei that may have contributed towards obesogenicity and constructed them into a proposed model. The aspect of the environment influenced by the Brunei Government includes the canteen services, certain nutrition policy and compulsory curriculum for physical activity. In conclusion, more coverage or incorporation of formal policies to include the wider environmental aspects of the primary school that may contribute to obesogenicity is recommended. Therefore, the model is very useful for policy makers to make informed decisions on the aspect of strengthening the various policies in order to support effort by the school administration and teachers.

Effect of 4 weeks probiotic supplementation on body weight, fasting blood glucose levels, waist circumference, waist-to-hip ratio and fecal short chain fatty acids among overweight Malaysian adults; A pilot study

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Recent evidence show that the alterations in GM contributes to the pathophysiology of metabolic disorders including obesity and type 2 Diabetes Mellitus (DM). This double-blind randomized controlled trial investigated the effect of a four-week probiotic supplementation in 24 apparently healthy, overweight (with BMI ≥ 23 kg/m^2) Malaysian adults' aged 18-50y. Subjects were randomized to receive either probiotics powder (n= 12) containing a mix of six strains namely, Lactobacillus *acidophilus*, Lactobacillus *lactis*, Lactobacillus *casei*, Bifidobacterium *longum*, Bifidobacterium *bifidum* and Bifidobacterium *infantis* (3.0 x 10^{10} cfu) or placebo powder (n=12), twice daily for four weeks. Fasting blood glucose (FBG), body weight (BW), waist circumference (WC), and fecal short chain fatty acids (SCFA) were measured during the baseline (Day 0) and end-of-trial (Day 28). Subjects were required to maintain their usual diet and lifestyle during the trial. Baseline characteristics were comparable between groups. All subjects completed the study. Changes in FBG levels (Placebo vs Treatment: 0.2±0.4 vs. -0.1±0.6 mmol/L, p = 0.094), BW (0.3±1.5 vs. 0.3±1.7 Kg; p=0.314) and WC (-0.1±0.5 vs. 2.1±7.1 cm; p= 0.908), after four weeks of probiotics supplementation, were not significantly different between the placebo and treatment groups. Changes in fecal SCFA (lactic, acetic, propionic and iso-butyric acids) were also not significantly different between groups. Subjects in the probiotic group significantly reduced their energy intake when compared to baseline (P=0.045). No other significant differences in dietary intake or physical activity level was observed within either group or between the groups. A 4-week supplementation of the probiotic mix studied did not have significant effects on the variables studied. However, the significant reduction in dietary energy intake in the probiotic arm suggests that probiotics modulate energy intake. in this population. Therefore, further studies with longer intervention and larger sample size, including the study of gut hormones as objective indicators of appetite and satiety, are warranted.

Meal pattern, dietary intake and prevalence of hypertension, hypercholesterolemia and diabetes mellitus among adults in coastal community in Semporna, Sabah

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A cross-sectional study in seven coastal villages in Semporna examined the meal pattern, dietary intake and prevalence of Non-Communicable Diseases in adults aged ≥19 years (n=330). Body mass index (BMI), body fat percentage (BF%), waist circumference (WC), blood pressure (BP), fasting blood glucose (FBG) and total cholesterol (TC) were measured. The results showed that most subjects (97.6%) took three meals daily; 98.8% consumed breakfast and dinner, while 100% consumed lunch. The under-reporters of energy intake were determined as <1.2 of EI/BMR; 78.2% were under-reporters and 21.8% were good reporters. BMI of under-reporters (26.2 ± 5.2 kg/m^2) were significantly higher (p<0.001)

than good reporters (22.4 ± 5.2). The daily mean energy and macronutrient intakes of good reporters were 1681 ± 249 kcal, 234.6 ± 41.4 g carbohydrates, 87.1 ± 19.5 g proteins and 43.4 ± 12.2 g fats. More than half of the subjects met the recommended intakes for carbohydrates (51.4%) and fats (68.1%). Majority (98.6%) exceeded the recommended protein intake. The prevalence of hypertension (HPN), hypercholesterolemia (HPC) and diabetes mellitus (DM) were 29.4%, 42.1% and 6.4%, respectively. About 24.6%, 40.6% and 5.8% were newly diagnosed with HPN, HPC and DM. Energy and macronutrient intakes of subjects with no diabetes and previously undiagnosed diabetes were similar, but intakes of known diabetics were lower, however the difference was not significant ($p>0.05$). Only 3.3%, 0.3% and 0.9% of subjects already diagnosed with either HPN, HPC and/or DM had well controlled BP, TC and FBG level. Among those whose BP, TC and FBG have never been checked, 20.9%, 39.1% and 5.2% were diagnosed with HPN, HPC and DM. The prevalence of HPN, HPC and DM increased with increasing age, BMI, BF% and WC ($p<0.05$). Nutrition and health education among the community are crucial to improve their nutrition and health status.

Metabolomics reveals metabolite changes following Cosmos caudatus supplementation in patients with type 2 diabetes: a randomized controlled trial

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Cosmos caudatus, or locally known as "*Ulam Raja*" is a medicinal plant in Southeast Asia countries with reported medicinal benefits. We previously found that *C. caudatus* was able to reduce blood glucose in patients with type 2 diabetes mellitus (T2DM), but the underlying mechanism was not established. In this study, a ^{1}H NMR-based metabolomics approach was applied to determine the metabolic effects of *C. caudatus* supplementation. A total of 101 T2DM patients with mean HbA1C: 8.8 ± 1.6 % and BMI: 29.8 ± 4.7 kg/m^2 were randomly assigned to diabetic-ulam group or diabetic controls. Patients in diabetic-ulam group consumed 15g of raw *C. caudatus* daily for 8 weeks. Both groups received standard lifestyle interventions. Thirty-nine healthy volunteers were recruited as healthy controls, and their urine and blood serum metabolic profiles were compared with those obtained from diabetic controls and diabetic-ulam groups. Orthogonal partial least squares-discriminant analysis was used for group comparisons of multivariate data. Following supplementation with *C. caudatus*, the metabolomics analysis of serum showed significantly lower concentration of alanine, lactate and N-acetylglutamate in diabetic-ulam group, indicated altered glycolysis, gluconeogenesis and glutamate metabolism. In addition, supplementation with *C. caudatus* was found to increase the concentration of urinary hippurate in diabetic-ulam group as compared to diabetic controls, suggesting changes in gut microflora metabolism. In conclusion, metabolomic data showed that *C. caudatus* supplementation partially reversed some known diabetes-induced metabolic changes in blood serum. ^{1}H NMR-based metabolomics has the potential to unravel the metabolic response following *C. caudatus* supplementation in T2DM patients.

Symposium 6b: Nutrition Potpourri

Glycaemic responses to isomaltulose and to sucrose in isomaltulose tolerant and intolerant Chinese adults

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Isomaltulose (IM) is an isomer of sucrose (SC), in which glucose is α-1,6 linked to fructose. IM is digested more slowly than sucrose. The tolerability and glycaemic responses to a 75 g bolus of IM were compared to SC by serial measurements of breath hydrogen (BH) and blood glucose (BG). Six healthy male and five female young adults with BMIs from 19.2 to 31.2 kg/m^2 were fasted overnight. Each subject then ingested IM or SC. BH was quantified hourly for 5 hours and BG at 15/30 minute intervals for 2 hours. Each subject received IM and SC in random sequence with a minimum washout period of 14 days. The area under the curve (AUC) of the BG response to IM (115 ± 21 mmol × min/L (mean ± SEM) was less ($p = 0.001$) than to SC (276 ± 34 mmol × min/L). Participants were categorised into an IM tolerant group (IMTG) who gave a BH increment < 20 ppm within the experimental period, and an IM intolerant group (IMITG) with a greater BH response. Interestingly, the AUC response to IM in the IMITG (132 ± 27 mmol × min/L, n=4) was greater than for the IMTG (85 ± 32 mmol × min/L, n=7). A similar result was seen with SC: In the IMTG, the AUC was 212 ± 22 mmol × min/L whereas in the IMITG, it was 312 ± 48 mmol × min/L. These results are not statistically significant due to the small sample size. However, a possible explanation is that the differences resulted from a more intense GIP response in the IMTG as a consequence of faster rates of duodenal disaccharide hydrolysis, generating more glucose compared to the IMITG. This would induce augmented insulin secretion in the IMTG, accounting for the counterintuitive magnitude of BG responses in the two groups.

Early nutrition, growth and cognitive development of infants from birth to 2 years: Methodology and preliminary findings at 6 months

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This is a preliminary report of an on-going cohort study of infants to determine the association between early nutrition with growth and cognitive development from birth to 2 years. Mothers and full-term infants are recruited from government health clinics in Seremban, Negeri Sembilan. Infants are followed-up at 6, 12, 18 and 24 months of age. Information during pregnancy and at birth is obtained from patient cards. Anthropometric measurements, feeding practices, dietary intake and cognitive development of the infants are assessed at each follow-up. Iron status is assessed at 6 months, infant temperament and home environment are evaluated at 12 months and maternal intelligence is determined at 18 months. Of 220 infants (m=113; f=107), mean birth weight, length and head circumference were 3.06kg (*SD*=0.41), 49.89cm (*SD*=3.10) and 33.12cm (*SD*=2.16) respectively, and 7.7% had low birthweight. The mean weight, length and head circumference at 6 months were 7.11kg (*SD*=0.85), 65.66cm (*SD*=2.49) and 42.38cm (*SD*=1.59) respectively. The

rates of weight and length gain were 0.68kg (*SD*=0.14) and 2.62cm (*SD*=0.56) per month respectively. There were 51.4% breast-fed and 48.6% formula-fed infants, 47.7% were exclusively breast-fed until 6 months, while 15.0% received complementary feeding before 6 months. About 40.3% were anaemic. The mean cognitive scores at 6 months was 100.91 (*SD*=14.08). Birthweight was significantly correlated with weight (r=0.32, p<0.001), length (r=0.36, p<0.001), weight-for-age (r=0.27, p<0.001), length-for-age (r=0.35, p<0.001), head circumference-for-age (r=0.14, p=0.03), haemoglobin (r=0.20, p=0.02), and rates of weight (r=-0.17, p=0.01) and length (r=-0.17, p=0.02) gain at 6 months. The relative risk for stunting was higher among low birthweight infants than normal birthweight infants (RR=1.94, 95%CI=1.04-3.64). Low birthweight infants also had lower cognitive scores (*M*=97.65, *SD*=16.40) than normal birthweight infants (*M*=101.18, *SD*=13.88), however, the difference was not significant. These preliminary findings showed that birthweight is associated with growth at 6 months.

Dietary polyphenols: Populations' intake estimation, dietary sources and potential health benefits

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The aim of this presentation is to provide an overview on types of polyphenol, the database and methods used to estimate dietary polyphenol and their potential health benefits. Polyphenols are secondary metabolites that are present in many plant-based food sources. These compounds can be divided into several groups such as flavonoids, phenolic acids, lignans and stilbenes. Polyphenol intakes are associated with health benefits including reducing the risk of diabetes, metabolic syndrome and improvement of cognitive performance. Due to the complex chemical structure, the discovery of naturally present polyphenols are still on–going. Many studies have estimated the population's polyphenol intake and their major dietary sources. A comprehensive polyphenol database called Phenol-Explorer® is the most widely used database to estimate the polyphenol content of selected foods. In addition, USDA Flavonoid Database is used as a complimentary reference. The two main methods used to estimate polyphenol intake in diets include food frequency questionnaire and 24-hour dietary recall. The major dietary sources of polyphenols reported in existing population studies include coffee, tea, fruits, vegetables and wine. Certain dietary practice such as Mediterranean diet can contribute to a higher polyphenol intake. In Malaysia, estimation of polyphenol intake has been limited by the incomplete data of polyphenol contents in local ingredients and foods. This presentation will highlight findings from several local studies on total polyphenol content of Malaysian foods. More research is needed to determine the polyphenol content of Malaysian foods in order to identify the association between polyphenol intake and beneficial health outcomes.

Dietary approach using probiotics as a potential strategy to prevent human dietary aflatoxin exposure

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Aflatoxin is a food contaminant commonly found in cereals, nuts, spices and herbs. It is produced by Aspergillus species of fungi. The main route of aflatoxin exposure is through the diet and human exposure to this food contaminant is linked to the development of liver cancer. Prevention strategy of aflatoxin exposure in humans is categorized into two categories; primary and secondary prevention strategies. Primary prevention strategy includes pre- and post-harvest preventive measures, whereas secondary prevention strategy focusing on intervention and clinical study. Since human dietary aflatoxin exposure is ubiquitous and incessant, various methods have been developed. The concept of probiotic-mediated detoxification is proposed as one of the dietary approaches to prevent aflatoxin exposure. In fact, probiotics as functional food is an immense value in the area of detoxification and decontamination biotechnology. Probiotics act as adsorbent to prevent and limit aflatoxin absorption in the small intestine. Previous animal study indicated that the supplementation of probiotics reduced aflatoxin biomarker in aflatoxin-induced rats. Predicated upon this finding, a 4 week-intervention study using fermented milk drink containing probiotics was conducted in a population exposed to aflatoxin. The findings showed that probiotics supplementation reduced specific aflatoxin biomarkers namely serum AFB1-lysine adduct and urinary AFM1 in certain subjects participated in the study. Although the finding was inconclusive, the use of probiotics as a potential adsorbent of aflatoxin is promising and further investigation is required. Perhaps, a longer intervention study is warranted to assess the effect of continuous consumption of probiotics to prevent human dietary aflatoxin exposure.

Development of the First Mal*aysian Active Healthy Kids Report Card on physical activity for* children

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Childhood and youth obesity has become a public health concern in Malaysia and physical inactivity has claimed to be one of the key contributors. In order for government and different social sectors to implement effective policies and strategies, main indicators that influenced physical activity level have to be first identified. This current research was conducted to publish the first Malaysian Active Healthy Kids Report Card 2016 that collects current and comprehensive data on Malaysian children and adolescents aged 6 to 18 years physical activity level. The report card is modeled from Active Healthy Kids Canada Report Card. Online databases, national surveys and government documents were searched and reviewed for relevant studies examining physical activity and ten other indicators (organized sports and physical activity participation, active play, active transportation, sedentary behaviours, school, physical education and physical activity participation, family and peers, community and the built environment, government strategies and diet). 3 studies (SEANUT Survey, Global School-health Survey 2012, ministry report) met the inclusion criteria and were included in the report card. The data were reviewed and letter grades (A, B, C, D, F) were assigned by consensus by three groups of content experts (academicians and from governmental agencies) across Malaysia. Overall physical activity level, active transportation and sedentary behaviours indicators had been graded a "D". There are four indicators graded as 'inconclusive' which are organized sports and PA participation, active play, physical education and physical activity participation, community and the built environment due to insufficient Malaysian data to represent. Government strategies and investments received a 'B' while diet indicator received an 'F'. This first report card highlighted that there are research gaps among the indicators and more research is needed in order to understand the influencers and outcomes of Malaysian children physical activity level.

Poster Presentations: Day 1 (Groups A, D and F)

Group A: Nutritional Status (various groups) and Community Interventions

A01 Association between sleep quality and nutritional status among pregnant women at Hospital Universiti Sains Malaysia (HUSM)

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The objective of this study was to determine the association between sleep quality and nutritional status among pregnant women at HUSM. The validated Pittsburgh Sleep Quality Index Malay Version (PSQI-M) questionnaires were distributed to pregnant women aged 20 to 40 years old at Obstetrics and Gynecology Clinic HUSM within their second to third trimester. The questionnaire measure seven domains; subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction over the last month. The Global PSQI-M score was summed up from all the seven domains and the score range are between 0 to 21. The respondents with Global PSQI-M score less than or equal to 5 are considered having good sleep quality and respondents with Global PSQI-M score more than 5 are considered having poor sleep quality. Anthropometry indicators include pre-pregnancy weight, weight and height during pregnancy and body composition. Body fat percentage was measured using body composition analyzer (TANITA SC-330GS). A total 99 respondents completed the study. A total of 11.1% of the respondents were normal, 35.4% respondents were overweight and 53.5% respondents were obese during pregnancy. 36.2% of the respondents did not achieve the recommended weight gain and 63.8% of the respondents achieved the recommended weight gain. The Global PSQI-M score ranged from 0 to 15 with the mean of 6.92. A total of 70.8% women had poor sleep quality while 29.2% women had good sleep quality. There was significant correlation between sleep quality and body fat percentage among pregnant women ($r=0.25$, $p<0.05$). This study showed that poor sleep quality was significantly associated with increasing body fat percentage during pregnancy.

A02 Association of physical activity and sedentary behaviours on body composition and metabolic profile among Malay school children in Kuala Lumpur: A follow-up study

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Physical inactivity increases obesity risk, but the relationship between physical activity (PA) with adiposity and metabolic profile among children remained inconsistent. The present study aims to investigate the relationships of PA and sedentary behaviours with changes of body composition and metabolic risk among schoolchildren after 18 months from

baseline. A total of 225 participants (94 boys, 131 girls) aged 9 to 14 years were recruited from national schools using single stage cluster sampling. Anthropometric measurements included weight, height and waist circumference (WC). Body fat percentage (%BF), fat mass (FM) and fat free mass (FFM) were determined by bioelectrical impedance analysis. Blood pressure (BP), total cholesterol (TC), HDL-cholesterol (HDL-C), LDL-cholesterol (LDL-C), triglycerides (TG) and fasting blood glucose (FBG) were measured. Metabolic syndrome (MS) was defined using 2007 International Diabetes Federation's pediatric criteria. PA was assessed by physical activity questionnaire (PAQ) and step counts using pedometer for at least three weekdays and one weekend day. Sedentary behaviour was assessed with a questionnaire adapted from the Child and Adolescent Physical Activity and Nutrition Survey. All measurements were repeated after an interval of 18 months. Mean age, weight, height, BMI and WC at baseline were 12.1±1.7 years, 44.0±15.2 kg, 146.6±11.0 cm, 20.1±5.2 kg/m^2, and 64.9±12.6 cm, respectively. All anthropometric variables, FM and FFM increased at follow-up ($p<0.001$). On the other hand, lower BP ($p<0.05$) and HDL-C ($p<0.001$) were observed at follow-up. Mean daily pedometer step counts per day was lower at follow-up (8,559±3,409 steps) compared to baseline (9,311±3,270 steps, $p<0.05$); with 75% of children not meeting the recommendation for pedometer step counts. Among 36 participants (16%) with abdominal obesity; two participants were diagnosed as having MS at baseline, and the number increased two-fold at follow-up. Baseline screen time was found to be significantly associated with later BMI-for-age Z-score (BAZ) (Beta=0.23, $p<0.05$) and FM (Beta=1.29, $p<0.05$) after adjusted for age and sex. There were significant association between baseline PAQ score with HDL-C (Beta=1.03, $p<0.05$) and also between step count with systolic BP (Beta=-1.81, $p<0.05$) diastolic BP (Beta=-1.66, $p<0.05$) at follow-up after adjusting for covariates. In conclusion, higher PA levels were related to some individual components of MS, such as higher HDL-C and lower BP while screen time was related to gain in BAZ and FM. These findings highlight the importance of increasing physical activity and decreasing sedentary time, particularly screen time, for metabolic health and obesity prevention during adolescence.

A03 Sleeping quality and athletic performance among basketball players participating in National Community Basketball League (NCBL)

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An increasing body of evidence indicated that sleep plays a major role in the performance of athletes, however, most of the studies were conducted on professional athlete and less attention was given to amateur group. Present study provides insights into the role of sleep in athletic performance. This was a cross-sectional study comprised 101 male basketball players (mean age: 24.14 ± 3.79 years-old) who participated in National Community Basketball League (NCBL) that hold annually at basketball court Taman Connaught, Cheras. Subject's weight, height, waist circumference, total body fat percentage was measured and body mass index (BMI) was determined. Athletic performance was assessed by Beep test (20 meter), and subsequently maximum oxygen consumption (VO_2max) was calculated. Sleeping quality was measured using Pittsburgh Sleeping Quality Index (PSQI), a total score of five or greater is indicative of poor sleeping quality. Spearman's Rho was employed to examine the correlation between VO_2max and sleeping quality. Mean BMI of the subjects was 23.86 ± 3.96 kg/m^2. Mean score of Total Global PSQI was 5.58 ± 2.71, there were 47.5% subjects having poor sleep quality. While for VO_2max, mean attained was 42.81 ± 6.41 ml/kg/min. Total 4.9% subjects were categorised under superior performance and 9.7% under bad performance. Majority of the respondents (36.6%) had fair performance. Present study showed there was a positive correlation between VO_2max and PSQI score ($p<0.05$). This demonstrated that players with poor sleeping quality may score poorer in performance test as indicated by VO_2max. In conclusion, good quality of sleep likely contributed to improved athletic performance. Optimal sleep habits and obtaining sleep will play an important role

in peak performance in all levels of sports. Our findings contribute a relevant data to inform sport scientist and team managers the importance of sleep quality on sport performance.

A04 Associations between behavioral and psychosocial factors with body weight status among Indian adult vegetarians in Kuala Lumpur

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This cross-sectional study examined the associations between behavioral and psychosocial factors with body weight status among Indian vegetarians. Respondents completed a self-administered questionnaire on socio-demographic background, behavioral factors (consumption of fruits, vegetables, milk and dairy products, eating behaviors, physical activity) and psychosocial factors (nutritional knowledge, use and understanding of nutrition labeling, body image perception). Dietary intake was assessed using a 2-day 24-hour dietary recall whereas weight, height, waist circumference and body fat percentage were measured. A total of 130 lactovegetarians (54.6% males and 45.4% females) with a mean age of 42.2±14.9 years were recruited from an Indian temple located at Kuala Lumpur. A majority of the respondents were overweight (35.4%) or obese (14.6%), had abdominal obesity (63.8%) and high body fat percentage (76.2%). More than half of the respondents did not meet the recommended levels for energy, vitamin A, D, E, niacin, zinc and folate. However, more than half of them met the recommended levels for macronutrients, vitamin C, thiamin, riboflavin, calcium and iron. Significant association was found between body image and body weight status ($p < 0.01$), in which more overweight and obese respondents (80.0%) than underweight and normal weight respondents (56.9%) desired to have a smaller body size, whereas more underweight and normal weight respondents (23.1%) than overweight and obese respondents (4.6%) desired to have a bigger body size. No significant associations were found between socio-demographic characteristics, energy and macronutrients intake, eating behaviors, physical activity, and nutritional knowledge with body weight status. In conclusion, high prevalence of overweight and obesity was found among Indian vegetarians in this study. Most of them intended to have a smaller body size. Health promotion programs should highlight the importance of consuming a well-planned vegetarian diet as well as promoting healthy body weight status among Indian vegetarians.

A05 Exclusive breastfeeding intention and sosio-demographic characteristics among mothers in Hospital University Kebangsaan Malaysia

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The National Health Morbidity Survey III reported the prevalence of exclusive breastfeeding below 6 months was 14.5% among Malaysians. This cross sectional study was carried out among 471 mothers aged 20 to 42 years old who gave birth in Hospital University Kebangsaan Malaysia. This study aimed to determine the prevalence of mothers who intends to exclusive breastfeed their babies up to 6 months and to evaluate the socio-demographic characteristics of these mothers. Mothers were interviewed on the definition of exclusive breastfeeding, exclusive breastfeeding intention, working status, living area and parities.

Out of 471 mothers, only 16.3% mothers (n=77) intended to exclusive breastfeed their babies. The mean age of mothers was 29.5±4.1 years. 55.8% mothers were working full time (n=43) and returned to work 2 to 3 months after delivering their babies. Meanwhile 44.2% mothers were housewives (n=34). All mothers were non-smokers and non-alcohol drinkers. Nearly half of the mothers (44.2%, n=34) being first time mothers intended to exclusive breastfeed up to 6 months. In contrast, 27.3% mothers were having their second babies (n=21) while 26% of mothers having their third babies intended to exclusive breastfeeding (n=20). Majority (97.4%) of the babies were term babies (n=75) with mean gestational age of 38.8 ± 1.3 weeks. All mothers reported they were exclusive breastfeeding their babies and did not give any foods or drinks to their babies other than breast milk. The prevalence of intention to initiate exclusive breastfeeding among mothers was low. More education and promotion on benefits of breastfeeding should be carried out to promote exclusive breastfeeding among mothers.

A06 Association between food insecurity and weight status among Orang Asli (Mah Meri) women in Kuala Langat, Selangor

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The objective of this study was to examine the association between food insecurity and weight status of Mah Meri women in Kuala Langat, Selangor. This cross-sectional study was conducted among 222 women aged from 18 to 59 years old. Household food insecurity was assessed using Radimer/Cornell Hunger and Food Insecurity Instrument. Demographic and socioeconomic data and food insecurity status were obtained through face-to-face interview with respondents. Anthropometric measurements including weight, height and waist circumference were conducted. About 17.1% households were food secure and majority (82.9%) of the households experienced some kinds of food insecurity. Among them, 27.0% were household food insecure, 24.8% were individual food insecure and 31.1% were child hunger. The total prevalence of overweight and obese respondents was 57.2% and 53.6% women had at-risk waist circumference (≥80 cm). Pearson correlation analysis showed that age of women ($r=0.21$, $p<0.01$), number of children ($r=0.14$, $p<0.05$), household income ($r=0.21$, $p<0.01$) and food expenditure ($r=0.24$, $p<0.001$) were positively correlated with body mass index. Besides, there were also positive relationships between age of women ($r=0.26$, $p<0.001$), number of children ($r=0.19$, $p<0.01$), household income ($r=0.17$, $p<0.05$) and food expenditure ($r=0.25$, $p<0.001$) with waist circumference. Although the prevalence of overweight, obesity and at-risk waist circumference were high, no significant association was found between food insecurity with body mass index and waist circumference after adjusting for the covariates. In general, majority of Mah Meri households were food insecure and the women were overweight, obese and had at-risk waist circumference. To address this problem, implementation of nutrition-related intervention programs is needed by taking the factors related to weight status into consideration. However, the association between food insecurity and weight status should be further investigated.

A07 Associations between body image, weight status and sexual behaviours of private university students in Klang Valley

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This is a cross sectional study which investigated associations between body image, weight status and sexual risk behaviours of private university students in Klang Valley. Multi-stage sampling method was used to recruit a total of 330 private university students aged 18 to 24 years. A self-administered questionnaire was used to assess the socio-demographic factors, sexual behaviours, knowledge, attitude and body image of the university students. Anthropometric measurements included weight and height whereas body mass index (BMI) was calculated. Of the 330 university students, 7.6% (n=25) of the respondents reported to have experienced sexual intercourse in the past. In terms of knowledge on sexual and reproductive health, girls (24.17±±3.07) had a slightly better knowledge than boys (24.07±±3.21) whereas boys had a more permissive attitude (32.93±±6.47) on sexual activity compared to girls (30.88±±6.60). Body image was reported to be associated with sexual behaviours (χ^2= 4.903; p = 0.027) as more students (n=14) who had sexual experience in the past have body image dissatisfaction compare to those less dissatisfied. However, no association was reported between weight status and sexual behaviours (χ^2= 4.753; p = 0.191). The results of the current study suggests that body image and sexual behaviours are indeed related, however further research is to done to understand why this association exist.

A08 An Intervention Mapping (IM) Approach: Development of dietary behaviour change in Malaysian young adults

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Non-communicable diseases (NCDs) in Malaysia accounted for an estimated 67% majority of all mortality in 2008. From 1996 to 2015, a dramatic increase in the prevalence of behaviour-linked diseases was recorded in Malaysia. Systematic and meta-analysis reviews discovered the extensive use of health promotion theories tend to have larger effects on behaviour. Hence, a 5-day workshop was conducted to develop a community-based dietary behaviour change interventions for young adult in reducing the number of NCD cases in Malaysia by using the Intervention Mapping (IM) approach. An international consultant from abroad was invited and fifteen highly competent people (aged 34–58) were engaged to deliver ideas and thought based on the 6 principle steps of IM as follows: 1) needs assessment of the community and culture; consideration of evidence-based, policy and practice; 2) selecting theory-based methods and practical strategies (e.g., strategies for responsive feeding); 3) formulation of change objectives (intervention objectives and their determinants) (e.g. knowledge, self-efficacy, intention); 4) developing and creating organised program components; 5) adoption and implementation; 6) evaluation plan. The various skills exercised and tools used for completing the six steps of the IM approach have helped to increase participants' capacity to not only develop evidence and theory-based interventions, but also to further develop and enhance local NCD strategies, thereby assisting prevention and control of NCDs in Malaysia. Data were transferred onto several themes after getting consensual agreement from all the participants. Following agreement on the identified themes, a table of themes was drawn up and the text passages were coded accordingly. The reliability of the analysis was ensured and certified through a review of the data by all members of the expert group who managed to demonstrate that IM is a feasible and helpful method for providing an evidence-based and theoretical structure to a complex health behaviour change intervention. The next stage will be to organise a meeting with a relevant stake holders to discuss further about the required intervention module on behaviour change and clinical factors associated with NCDs.

A09 Evaluation of internet addiction on level of physical activity and weight status among adolescents in Kuala Lumpur

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The purpose of this study was to evaluate the level of internet addiction in relation to physical activity and weight status of adolescents in Kuala Lumpur. A cross-sectional survey was carried out by using a multistage sampling approach, 121 number of adolescents were recruited from five secondary schools in Kuala Lumpur. Their body weight and height were taken and calculated their body mass index (BMI), their physical activity level was measured by using Physical Activity Questionnaire for Adolescents (PAQ-A). Barriers to physical activity was assessed by using domain barriers in International Physical Activity and Network (IPEN) questionnaire. Half of the respondents were given accelerometer GT3X-BT to measure their steps. The level of internet addiction was measured by using Malay Version of Internet Addiction Test (MVIAT). Mean age of respondent was ±15.85 and mean BMI was 22.2 Kg/m^2. Out of 121 numbers of respondent 27.4% was overweight, 69.4% was normal and 4.2% was thin. As for physical activity, 3.3% of the respondent were classified as active and 58.7% were classified as having low physical activity by using PAQ-A. While when using accelerometer 76.7% of the respondents were classified as inactive and 23% of the respondents were classified as inactive. Only 0.8% of the respondents were classified as excessive internet users, 15.7% as moderate users and 83.5% were low users of internet. There are a significant correlation between level of internet addiction and reduced physical activity level, and also a significant correlation between level of physical activity and barrier indicators.

A10 Effectiveness of nutrition counselling among UPM employees: Changes on body weight, waist circumference, self-Efficacy, self-esteem and quality of life

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Overweight and obesity are a serious health problems among adults at worksites as it could lead to metabolic syndrome and increase co-morbidity and mortality. However, there were limited weight loss intervention at worksites in Malaysia. Thus, an intervention study was carried out to evaluate the effectiveness of nutritional weight loss counselling among adult employees on self-efficacy, self-esteem and quality of life. The study was conducted in two phases which were screening phase and intervention phase. In the screening phase, 86 adult employees (>20 years old) were screened to identify the eligible subjects to participate in the intervention study. Result showed 59 (67%) employees were overweight and obese, and thus eligible to participate in the intervention study but only 19 of the employees agreed to participate. In the intervention phase, a quasi-experimental study was conducted in UPM for 6 weeks to evaluate the effectiveness of the nutrition weight loss counselling among 19 employees who were overweight and obese, recruited as intervention group (n=9) and control group (n=10). Repeated measurement analysis of covariance (ANCOVA) was used to analyse the intervention effects of nutritional counselling on health and psychology outcome such as anthropometric, self-efficacy, self-esteem and quality of life. Results showed that waist circumference was reduced after the intervention ($p<0.05$). Besides that, self-esteem and quality of life especially on emotional well-being and social functioning were also improved after the intervention ($p<0.05$). In conclusion, the 6 weeks weight loss nutrition counselling intervention program had positive effects on waist circumference, self-esteem and quality of life.

A11 The association of sunlight exposure and vitamin D status among Malaysian indoor and outdoor athletes

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The objective of the study was to determine the association between sunlight exposure and serum 25(OH)D levels among Malaysian athletes. Duration of sunlight exposure is known to influence vitamin D status which is reflected by serum 25(OH)D levels. Athletic populations even though presumed to be exposed to more sunlight are reported to have high prevalence of vitamin D deficiency globally. With vitamin D playing major roles in muscle and skeletal functions, a deficiency in vitamin D may affect athletic performance. In the local context, there have been limited information regarding vitamin D status of athletes and none have assessed the aspects of sun exposure in relation to vitamin D status. This was a cross sectional study whereby 35 athletes were recruited from International Medical University and National Sports Institute. Serum 25(OH)D level was assessed using the Automated immunoassay method. The sun exposure over one week was measured using sun exposure questionnaire adapted from Nurbazlin *et al*, sun exposure index and skin tone chart. The body composition of the athletes was determined using 4-point skinfold measurements (Harpender skinfold caliper), waist circumference (SECA measuring tape) and Bioelectrical Impedance Analysis (Inbody 770). Among the total athletes participated in the research, sixty-seven percent of the athletes were found to be vitamin D deficient and none were having sufficient levels of vitamin D of 50 to 70 nmol/L as recommended by IOM. The mean serum 25(OH)D level for indoor athletes was 22.78 ± 8.03 nmol/L whereas outdoor athletes was 18 ± 6 nmol/L. The sun exposure analysis showed that the outdoor athletes had significantly higher percent body surface area (BSA) exposed and sun exposure time compared to indoor athletes ($p<0.05$). The duration of sun exposure for indoor athletes was 2.51 ± 2.43 hours/ day whereas outdoor athletes was 6.34 ± 2.78 hours/day ($p<0.001$). The sun exposure index (SEI) per day of indoor athletes was found to be 146.04 ± 159.11 whereas outdoor athletes was 186.3 ± 114.77. Nevertheless, there was no correlation found between serum 25(OH)D level and sunlight exposure ($r = -0.134$; $p = 0.62$). There is no significant association between sunlight exposure and serum 25 (OH)D status among indoor and outdoor Malaysian athletes in this population.

A12 Factors associated with body weight status: Comparison between Chinese vegetarians and non-vegetarians

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In Malaysia, there is an increasing trend of individuals practicing vegetarianism. However, there is limited study in Malaysia examining nutritional status of vegetarians. This cross-sectional study aimed to compare factors associated with body weight status between Chinese adult vegetarians and non-vegetarians. A total of 140 vegetarians and 143 non-vegetarians from a Buddhist society in Klang participated in this study. They completed a self-administered questionnaire on socio-demographic background, disordered eating, physical activity, smoking, sleep quality, body image, and nutrition knowledge. Their height, weight, body fat percentage and waist circumference were measured and dietary intake was assessed using a 2-day 24-hour dietary recall. More vegetarians (31.5%) were overweight and obese as compared to non-vegetarians (20.3%; $p=0.004$). More vegetarians (45.0%) had unhealthy body fat percentage than non-vegetarians (24.5%; $p<0.001$). Vegetarians showed significantly higher intakes of carbohydrate, fibre, vitamin C, thiamin, folate and calcium than non-vegetarians. Vegetarians were older ($p<0.001$), married ($p<0.001$), had lower

educational level (p=0.014), and higher personal income (p<0.001) than non-vegetarians. Non-vegetarians (10.5%) had higher risk of disordered eating than vegetarians (7.1%; p=0.007). Stepwise multiple linear regression results showed that negative body image (β=-0.618, p<0.001) and increased carbohydrate intake (β=0.174, p=0.014) significantly predicted increased in BMI among vegetarians (R^2=0.388); whereas for non-vegetarians, negative body image (β=-0.407, p<0.001), decreased nutrition knowledge (β=-0.287, p<0.001) and increased risk of disordered eating (β=0.173, p=0.043) predicted increment in BMI (R^2=0.357). In conclusion, vegetarians showed higher body weight status than non-vegetarians. Different factors were associated with body weight status among vegetarians and non-vegetarians. Nutrition intervention programs on weight management among vegetarians and non-vegetarians should include body image component.

A13 Body composition and risks of eating disorder of rhythmic gymnasts: Comparison between individual and group gymnasts

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This study was conducted to compare the anthropometry profiles and the risks of eating disorder amongst Malaysian individual and group gymnasts. A total of 39 rhythmic gymnasts, 27 individual gymnasts and 12 group gymnasts training in the Bukit Jalil Sports Complex were studied. Individual gymnasts were aged 13.56 ± 2 years while group gymnasts were 15.75 ± 1.29 years old. Height and weight of the subjects were measured using the SECA Body Meter and the TANITA electronic weighing scale. Skinfold thickness measurements were taken using the Harpenden Callipers at 2 sites (triceps and medial calf). Body fat percentage was calculated using sum of 2 sites (triceps and calf). Risks of eating disorder were assessed using the Eating Attitude Test (EAT-26). Based on the body mass index (BMI), most of the individual gymnasts (n=19, 70.4%) and group gymnasts (n=11, 91.7%) were classified as normal. Although there were no significant differences between the BMI classification between the two groups, BMI of the individual gymnasts (15.22 ± 1.22kgm^{-2}) was significantly lower compared to the BMI of group gymnasts (17.62 ± 1.18kgm^{-2}), t(37)=-5.729, p=.000. Body fat percentage of group gymnasts (15.39 ± 2.36%) was also significantly higher than that of the individual gymnasts (13.34 ± 2.20%), t(37)=-2.043, p=.013. The EAT-26 results showed that individual gymnasts (n=12, 44%) had significantly higher risk of developing an eating disorder compared to group gymnasts (n=1, 8.3%), p=0.028. The group gymnasts are less competitive amongst themselves compared to the individual gymnasts where selection for the national representatives is more limited. Individual gymnasts had lower BMI, lower body fat percentage and higher risk of developing eating disorders compared to group gymnasts. Therefore, tailored nutrition education and intervention programmes are crucially important for adolescent girls in rhythmic gymnastic and their caregivers to ensure proper weight management.

A14 The GReat-Child Trial: A quasi-experimental intervention to improve knowledge, attitude and practice (KAP) towards whole grain among overweight/obese schoolchildren in Kuala Lumpur, Malaysia

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Studies have reported that healthy eating habits cultivated in the young and will normally be practised in adulthood; hence, the importance of conveying nutrition education at an early age. The government has undertaken numerous efforts to improve nutritional status of Malaysian schoolchildren to address the alarming rise of childhood obesity; however, none has emphasized whole grain as a strategy to manage childhood obesity. The GReat-Child Trial is a 12-week, quasi-experimental intervention with 6-month follow up, comprising three components addressing behaviour, personal and environmental factors based on Socio Cognitive Theory; which emphasised whole grain and healthy balanced diet. This presentation aimed to evaluate changes of KAP towards whole grain among overweight/obese schoolchildren. Two schools in Kuala Lumpur with similar demographics were assigned as intervention (IG) and control (CG). Eligibility criteria were overweight/ obese children aged 9 to 11 years who had no serious co-morbidity problems and who did not consume wholegrain foods. A total of 63 children (31 IG; 32 CG) completed the entire intervention, whereby IG underwent six 30-minute whole grain and healthy balanced diet education lessons and had school delivery of wholegrain food on a daily basis. Parents of IG children attended 1-hour individual diet counselling to encourage them to increase the availability of wholegrain food and to practice balanced diet at home. KAP questionnaire on whole grain was administered at baseline and twice (at 3rd [T1] and 9th month [T2]) post intervention. IG attained significantly higher scores in knowledge (mean difference=4.23, 95% CI: 3.82, 4.64, p<0.001), attitude (mean difference=7.39, 95% CI: 6.36, 8.42, p<0.001) and practice (mean difference=6.13, 95% CI: 4.49, 7.77, p<0.001) towards whole grain compared to CG, after adjusting for confounders. The findings of the GReat-Child Trial indicate that intervention emphasising whole grain made an impact on improving KAP among children. We anticipate the GReat-Child Trial to be a pioneer that could be adopted by the government and policy makers to increase whole grain consumption among Malaysian children.

A15 Development and pilot testing of physical activity knowledge, attitude and practice questionnaire among adolescents: C.E.R.G.A.S school-based intervention programme

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This study aimed to develop and examine the validity and reliability of a knowledge, attitude and practices (KAP) questionnaire on physical activity among adolescents. The KAP questionnaire was developed based on the physical activity module of the C.E.R.G.A.S programme which is an obesity management programme for overweight and obesity adolescents in secondary schools. This KAP questionnaire is self-administered and consisted of 25 knowledge, 18 attitude and 18 practice items. The content validity of the developed KAP was assessed by seven expert panels and face validity was examined by 10 secondary school adolescents. The revised questionnaire was further pre-tested among 290 adolescents from two secondary schools in Kuala Lumpur. Item analysis or

construct validity, internal consistency and test-retest reliability of KAP were examined. Knowledge items were examined for difficulty and discrimination indices. Construct validity for attitude and practice domains was assessed using exploratory factor analysis with principal component method and varimax rotation. Two knowledge items which had low discrimination indices, and two knowledge items which had high difficulty index were removed from the final questionnaire. Five factor-solutions emerged for attitude and practice domains, respectively. Internal consistency was good-to-excellent for knowledge (KR20=0.71), attitude (CA=0.70) and practice (CA=0.73) domains. Intraclass correlation coefficients (ICC) for test-retest reliability of knowledge, attitude and practice domains were 0.74, 0.81 and 0.75, respectively ($p<0.05$). The finalised physical activity KAP comprises 57 items, namely 21 knowledge, 18 attitude and 18 practice items. We conclude that the physical activity KAP developed was adequately valid and reliable, and can serve as an assessment tool to evaluate the effectiveness of the C.E.R.G.A.S. programme among Malaysian adolescents.

A16 Association of socio-demographic factors with screen time of Malaysian children aged 1 to 3 years old: Findings from SEANUTS survey

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Excessive screen time has been reported as an unhealthy lifestyle habit that develops in early childhood, but factors associated with screen time of children under 3 years old is unclear. The aim of this study is to determine the socio-demographic factors associated with screen time of Malaysian children using data from SEANUTS Malaysia. This survey is part of a larger multi-centric study carried out among 16,744 children aged 0.5 to 12 years in four Southeast Asian countries. This analysis included data of 429 children aged 1 to 3 years from urban and rural areas in six regions of Malaysia. Screen time and socio-demographic characteristics were proxy-reported by parents. Screen time was on average 1.35 ± 0.09 hours per day. Children had longer screen time during weekends (1.85 ± 0.14 hours) compared to weekdays (1.15 ± 0.08 hours). A total of 23.1% (95%CI: 18.3%-28.7%) exceeding the recommended 2 hours of daily screen time. General linear model showed that age was positively associated with screen time after adjusting for covariates (β:0.447; $p<0.05$). Children whose father had secondary education had significantly lower daily screen time as compared to children whose father had tertiary education (β:-0.577, $p<0.05$). No association was found between sex, area of residence, ethnicity, household income, maternal education and number of children with screen time. In conclusion, age and paternal education were significantly associated with the screen time of Malaysian children. Further research using both objective and subjective measures of screen time of children is needed. Additionally, behavioural, environmental and sociocultural factors should be studied to better understand the factors associated with screen time of young children.

A17 Association between social support and metabolic syndrome among working adults in Melaka, Malaysia

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Social support is the perception and actuality that one is cared for, has assistance available from family, friends, partners and co-workers. Social support has been linked to reduced

cardiovascular and metabolic syndrome incidence in the West. However, the findings among Asians were inconsistent and scarce. The objective of this study was to determine the association between social support and metabolic syndrome among secondary school teachers in Melaka, Malaysia. A cross-sectional study was carried out using multi-stage sampling involving 1511 teachers. Anthropometric and biochemical measurements were performed as per protocol. Participants completed self-reported questionnaires that included validated 8-item Multidimensional Perceived Social Support (MSPSS-M) questionnaire, Job Content Questionnaire (JCQ), socio-demographic profile and lifestyle behaviours questionnaires. Metabolic syndrome was diagnosed using the Harmonization criteria. The prevalence of metabolic syndrome was 23.3% (95% CI 20.7, 26.1). Univariately, metabolic syndrome was associated with age groups of 40 to 49 and 50 to 59 years, males, Malays, Indians, usage of saturated fat in cooking, short sleep duration (< 7 hours/day), high job strain and total social support. In the multivariate analysis, total social support (OR 0.96; 95% CI 0.93, 0.99), age group of 50 to 59 years (OR 4.31; 95% CI 1.62, 11.45), males (OR 1.56; 95% CI 1.05, 2.32), Malays (OR 1.87; 95% CI 1.03, 3.39) and Indians (OR 3.32; 95% CI 1.46, 7.52) remained significantly associated with metabolic syndrome. The odds of metabolic syndrome reduced by 4% with every unit increased in total social support score. In conclusion, social support is a potential modifiable risk factor for metabolic syndrome. Individuals with metabolic syndrome should be screened for social support to ensure early targeted intervention could be conducted.

A18 Association between anthropometric indices and birth weight with blood pressure among Malay adolescents

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Elevated blood pressure in adolescents has been previously associated with obesity and birth weight. Anthropometric indices are commonly used to assess obesity, but research linking them as predictors of blood pressure in Malaysian adolescents is scarce. This study aimed to determine the association between anthropometric indices and birth weight with blood pressure among Malay adolescents. A cross-sectional study involving 254 adolescents (127 boys, 127 girls) aged 10-16 years was carried out in primary and secondary schools in Kuala Lumpur. Body weight, height, waist (WC) and hip circumferences were measured. Body mass index (BMI), waist-to-hip ratio (WHR), waist-to-height ratio (WHtR) and a body shape index (ABSI) were calculated. Birth weight was obtained from birth certificate and blood pressure was measured with digital sphygmomanometer. Mean age, body weight, height and birth weight were 13.1±1.8 years, 48.2±16.2 kg, 151.6±10.6 cm, and 3.1±0.5 kg, respectively. Mean BMI, WC, WHR, WHtR and ABSI were 20.6±5.3 kg/m^2, 67.4±13.0 cm, 0.8±0.1, 0.4±0.1, and 0.07±0.01, respectively. Mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) were 102.9±11.4 mmHg and 58.0±8.1 mmHg, respectively. Body weight, height, WC ($p<0.05$), WHR ($p<0.001$) and SBP ($p<0.01$) were significantly different between the sexes. Some participants (31.5%) were categorized as overweight or obese according to BMI-for-age z-score, 16.5% had WC ≥90th percentile, and 21.7% had WHtR >0.5. Significant differences were found in SBP and DBP between BMI, WC and WHtR categories ($p<0.01$). SBP was positively correlated with BMI ($r=0.54$, $p<0.001$), WC ($r=0.55$, $p<0.001$), WHR ($r=0.30$, $p<0.001$) and WHtR ($r=0.36$, $p<0.001$), but not with ABSI and birth weight. Significant and positive correlations were also found between DBP with BMI ($r=0.26$, $p<0.001$), WC ($r=0.23$, $p<0.001$), WHR ($r=0.14$, $p<0.05$) and WHtR ($r=0.17$, $p<0.01$). Regression analysis identified that BMI, WC and WHR could significantly predict blood pressure. However, WC was better predictor of SBP (beta=0.487, $p<0.001$) and DBP (beta=0.141, $p<0.001$) than BMI or WHR. In conclusion, these findings indicated that anthropometric indices such as BMI, WC and WHR were associated with blood pressure. Hence, researchers should consider the use of these parameters when predicting blood pressure among Malaysian adolescents.

A19 Association between stress, anthropometry parameters and psychosocial factor with health related quality of life among allied health students in Universiti Putra Malaysia

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Health related quality of life (HRQOL) had been reported to be low among Malaysian, with limited data available on allied health students. This study aimed to assess stress, anthropometry parameters and psychosocial factor among allied health students and their correlation with HRQOL. A cross-sectional study was conducted using convenience sampling among allied health undergraduate students from Bachelor Program of Nursing, Dietetics, Nutrition and Community Health, Environmental and Occupational Health as well as Biomedical Sciences at the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia. The following aspects were evaluated: socio demographic factors, stress, anthropometry parameters, psychosocial factor and HRQOL. Descriptive statistics and Pearson's product moment correlation tests were employed (SPSS 22). A total of 200 respondents (21.0% males; 79.0% females) were recruited. Means age, body mass index (BMI) and waist hip ratio (WHR) of respondents were 20.59 ± 1.25 years, 21.75 ± 4.09kg/ m^2 and 0.779 ± 0.060, respectively. More than half of the students faced high score of stress, dissatisfied with their body shape and had low HRQOL. Stress score (r=-0.408, p=<0.001) and psychosocial factor (r=-0.330, p=<0.001) were significantly correlated with HRQOL, while no significant correlations were found between age (r=-0.079, p=0.268) and anthropometry parameters such as BMI (r=-0.069, p=0.329) and WHR (r=0.029, p=0.683) with HRQOL. More research are needed to delineate the possible factors contributing to HRQOL among allied health students to enable relevant authorities to formulate effective strategies to increase HRQOL among them.

A20 Vitamin D status and parathyroid hormone (PTH) response among Malaysian female adults

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Adequate vitamin D level is recognized for its role in maintaining optimum bone health, as well as prevention of metabolic disorders. Nevertheless, vitamin D insufficiency is a world-wide problem. Even so in Malaysia, tropical country located nears the Equator with yearlong sunshine. Vitamin D deficiency is seen across all ages, and higher prevalence observed among women. Data on vitamin D status among women of reproductive age in Malaysia is scarce, hence posing challenges in determining the ideal intake and supplements dosage (if required). The aim of this study was to determine the vitamin D status of Malaysian adult women of reproductive age and it's correlation with parathyroid hormone. Women in the age of 20-45 in Klang Valley were recruited. Fasting intravenous blood samples were collected for determination of serum 25-hydroxyvitamin D (25(OH)D) and intact parathyroid hormone (PTH) using Centaur Analyser. Questionnaires on socioeconomic demographic background, sun exposure, validated vitamin D food frequency questionnaire (FFQ) and anthropometry measurements were administered. A total of 106 women were recruited. The average age is 25.5 ± 5.7 with highest proportion being Malays (43.4%). In

this study, the median vitamin D level is 29nmol/L. This median falls into the category of deficiency according to the definition by IOM. A total of 90.8% Malaysia women at reproductive age are insufficient (<50nmol/L) in serum 25(OH)D, and nearly 52% are in the deficient classification (<30nmol/L). It was also observed that there was a negative inverse relationship observed between vitamin D status and PTH. High prevalence of vitamin D deficiency and insufficiency has been observed among Malaysian female adults. These findings further emphasize the important need for appropriate intervention to overcome the poor vitamin D status among Malaysian female adults.

A21 Urinary aflatoxin M_1 level and its associations with socio-economic status, dietary intake, knowledge on aflatoxin contamination and body mass index among Chinese adults in Kajang, Selangor

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Aflatoxins are secondary metabolites produced by *Aspergillus* species of fungi. The prolonged high-level aflatoxin exposure in human can increase the risk of liver cancer. One of the biomarkers of aflatoxin that can be measured is urinary aflatoxin M_1 (AFM_1). A cross-sectional study was carried out to determine the associations between socio-economic status, dietary intake, knowledge on aflatoxin contamination and body mass index (BMI) with AFM_1 level among Chinese adults in Kajang, Selangor. A questionnaire assessing socio-demographic background, dietary intake and knowledge on aflatoxin contamination was completed by the respondents. Anthropometric measurement was also performed. Urine samples collected from respondents were analyzed for the presence of AFM_1 by using urine-based enzyme-linked immunosorbent assay (ELISA). A total of 104 Chinese adults with the mean age of 26.35±10.74 years and BMI of 21.82±3.64kg/m^2 participated in this study. About 45% of them (n=47) had low knowledge level on aflatoxin contamination. For the dietary intake, cereals and cereals product was the most consumed product (27.03±16.81g/day). Ninety (86.5%) had detectable urinary AFM_1 level (detection rate=86.5%) and the mean level was 0.42±0.28ng/ml. Moreover, the respondents with primary or lower education level had statistically significantly higher urinary AFM_1 level (p=0.019) as compared to those with higher education level. However, there was no significant association found between socio-economic status, dietary intake, knowledge on aflatoxin contamination and BMI of respondents with the level of urinary AFM_1. Based on the finding from this study, it can be postulated that Chinese adults in Kajang, Selangor are likely to be exposed to AFM_1. Additionally, this study demonstrated that the urinary AFM_1 level in respondents aged ≤30 (0.44±0.29ng/ml) was significantly higher than respondents aged ≥31 (0.27±0.14ng/ml; p=0.038) which is in contrast to another study done in Penang showed respondents aged ≥31 were more likely to have high aflatoxin level compared to those aged ≤30.

A22 Development and evaluation of nutrition and physical activity education creative module (imPRoVE kit™) by using play approach in science centre

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Integrating concept of play and nutrition education can be an effective tool for education. This study aimed to develop and evaluate nutrition and physical activity education module (imPRoVE kit™) by using play approach among children and adolescents in science centre

based on Malaysian Dietary Guidelines 2010. Three phases were conducted for this study. Phase 1 involved needs assessment among 30 students age from 9 to 17 year-old in Petrosains which answered questionnaires on knowledge and the preference of interactive games among children and adolescents. Phase 2 involved development of nutrition and physical activity modules called imPRoVE kit™, which contain 4 games consist of planning variety of food intake in a plate, moving and counting steps with pedometer, balancing energy with mini see saw and spotting differences food labelling. Final phase involved evaluation on changes in nutrition knowledge by answering pre and post questionnaires, before and after playing the imPRoVE kit™. Two sets of modules (A = healthy plate and physical activity; B = food labelling and energy balance) with a total of 260 subjects (set A, n=160; set B, n=100), aged between 9 to 17 year-old who had visited Petrosains. Each set divided into 2 groups of age; primary and secondary school. Means age of set A for primary and secondary school were 11.5 ± 0.94 years (n=142) and 15.4 ± 1.54 years (n=18) respectively whereas set B were 10.1 ± 1.64 years (n =86) and 14.3 ± 1.39 years respectively. Overall, the module improve nutrition knowledge for each games significantly ($p < 0.01$). Moreover, nutrition knowledge improved significantly for primary school subjects based on age groups ($p<0.01$).and Malay subject based on race groups ($p<0.01$) In conclusion, imPRoVE kit™ improved nutrition knowledge for children and adolescents to practice healthier lifestyle. Therefore, it may be useful as an effective nutrition education module in science centre.

A23 Effectiveness of nutrition counseling intervention program among UPM employees: Changes on body weight, waist circumference, body composition, nutrition knowledge and physical activity status

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Overweight and obesity problems were at the alarming state and had become widely prevalent in almost every country. There were many intervention programs on weight loss conducted nationally and globally, but not many were focused on adult employees. Thus, a sixth-week intervention study was carried out to evaluate the effects of nutrition counseling intervention program on weight loss among employees in UPM. Health screening in Phase I of the study was conducted to determine the overweight and obesity status of each respondent. A total of 86 adult employees were screened and results indicate that 59 (68.6%) of them were overweight and obese and thus eligible to participate in the intervention study. However, only 19 employees agreed to participate. Phase II, the intervention program was conducted to facilitate on improving anthropometry, body composition, nutrition knowledge, and physical activity status among subjects who were overweight and obese in intervention group (n=9) compared with control group (n=10). Based on repeated measures of analysis of covariance (ANCOVA), the results showed that there was decline in waist circumference (p=0.047) after the intervention program. Meanwhile, there were no significant changes observed in nutrition knowledge score and physical activity status after the intervention program. However, the decline in walking activity (p=0.008) and increased in body fat percentage (p=0.029) among subjects in intervention group need to be further investigated. Overall, this intervention program was effective in improving waist circumference among subjects in intervention group. These findings will be useful in further improvements for the effectiveness of intervention program focusing on prevention and management of obesity among employees.

A24 Relationship between socio-demographic characteristics, workplace and home environmental factors with physical activity level among private sector working adults in Taman Tun Dr Ismail, Kuala Lumpur

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Physical inactivity has been identified as the fourth leading risk factor for mortality worldwide and has become one of the major influences towards public health issue. This cross-sectional study was conducted to determine the relationship between socio-demographic characteristics, home and workplace environmental factors with physical activity level among private sector working adults in Taman Tun Dr Ismail, Kuala Lumpur. A total of 125 respondents were randomly selected from three private-sector companies with a mean age of 38.73±10.84 years old. Data collected included; socio-demographic characteristics, perception on workplace environmental factors using Perceived Workplace Environment Scale (PWES), home environmental factors using Neighbourhood Environmental Walkability Scale (NEWS) and physical activity level assessed by Global Physical Activity Questionnaire (GPAQ). The total MET-min/week among the respondents was 984.74±1674.19 MET-min/week, with distribution between male and female respondents were 1601.74±2311.31 MET-min/week and 750.28±976.55 MET-min/week respectively (p=0.006). Results have shown no significant relationship was found between socio-demographic characteristics and physical activity level. No significant relationship emerged between workplace environmental factors and physical activity level, except for physical environmental factor (r=0.227, p=0.011). Home environmental factors consisting of streets in neighbourhood (r=0.181, p=0.044), neighbourhood surroundings (r=0.273, p=0.002) and safety from crime (r=0.218, p=0.014) showed significant relationship with total physical activity level. Thus, appropriate interventions are required and necessary to encourage physical activity involvement among the study population.

A25 Association between socio-demographic background, physical activity level, and nutritional status with academic achievements among adolescents in Kuching, Sarawak

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Academic achievement is particularly important during the early stage of life as it determines an individual's future academic career and health. This study aimed to determine the associations between socio-demographic background, physical activity level, and nutritional status with academic achievements among adolescents in Kuching, Sarawak. A total of 165 respondents (40.6% male and 59.4% female) aged 15.56 ± 0.30 years from a secondary school in Kuching participated in this study. Respondents completed a questionnaire which included Physical Activity Questionnaire for Adolescent (PAQA), 2-items in modified Eating Behaviors Questionnaire (EBQ), and two-days of 24-hour dietary recall. Anthropometric measurements were also measured. Meanwhile, respondent's academic achievements were assessed by using results for Pentaksiran Tingkatan 3 (PT3) in the previous year. Results showed that the mean academic achievement score was 3.29$\pm$0.69 with a maximum score of 4.14. Male respondents found to have higher academic achievement compared to female respondents. Skipping breakfast (χ^2=11.469, p=0.001), snacking time like afternoon snack (χ^2=4.330, p=0.025) and evening snack (χ^2=8.549, p=0.003) were found to be associated with academic achievement. Total energy from fat (r=0.183, p<0.05), total intake of iron (r=0.160, p<0.05) and total intake of sodium (r=0.233, p<0.01) were positively associated with

academic achievement, while total intake of vitamin C (r=-0.178, p<0.05) and total intake of Thiamine (r=-0.178, p<0.05) were negatively associated with academic achievements. Stepwise methods showed that five predictors (dummy for never skip a meal, dummy for never snack between meals, total energy intake, total intake of Thiamine and total intake of calcium) toward academic achievement which explaining 26.2% of the variance. The findings of this study emphasized that better dietary behaviours and better dietary intake linked to better academic achievement among adolescents. Therefore, by having a healthy eating in early stage of life is crucial to achieving a better academic achievement.

A26 The impact of overweight and obese on quality of life among Malay breast and gynecology cancer survivors from two hospitals in Kuala Lumpur

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Overweight and obesity are factors that contribute to increase risk of non-communicable diseases and cancer recurrence. Therefore, a study was conducted to identify the effects of body mass index (BMI) towards quality of life among breast (BrCa) and gynecology (GynCa) cancer survivors. A cross-sectional study using purposive sampling method was conducted among 101 Malay BrCa (63.4%) and GynCa (36.6%), was at stage II cancer (41.2%) and recruited from Outpatient Clinics of Hospital Kuala Lumpur and Hospital Canselor Tuanku Muhriz. Their mean age were 51.1 ± 8.3 years and had completed treatment for 4.2 ± 3.4 years. Physical activity level was assessed using IPAQ (2002). A general questionnaire measuring quality of life (QoL) for cancer EORTC QLQ C30 and specific questionnaires related to types of cancers (QLQ BR 23, QLQ OV23, QLQ EN24, QLQ CX24) were used. Results showed that mean body weight and mean BMI of subjects for both types of cancers were 66.2 ± 15.6 kg and 28.0 ± 5.4 kg/m^2 (p>0.05) respectively. BMI status indicated that more than half of subjects were in the category of overweight (31.4%) and obese (34.3%). Similar sitting time (p>0.05) and low level of physical activity (p>0.05) were observed among BrCa (74.6%) and GynCa (78.8%) subjects. The main barrier in performing physical activity amongst both types of cancer subjects were fatigue due to cancer treatments. Global health QoL (QLQ 30) score showed BrCa and GynCa subjects had good mean score (70/100). Subjects experienced similar functional and symptom problems for all scales of QLQ C-30 (p>0.05). No significant difference was seen in all categories of BMI for all QoL scales. In conclusion cancer survivors of all categories of BMI had similar effects on the QoL scales. Hence, the development of educational module can be adopted for all categories of BMI with focus on Malay socio-culture.

A27 Development and evaluation of 3E (education, enjoyable, engaging) interactive games module as a nutrition education tools among school children age 10 to 12 years old

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Nutrition education can be more interactive with the aid of game-based learning. This cross-sectional study aimed to develop and evaluate the 3E (Education, Enjoyable, Engaging) Interactive Games Module which can be used as a nutrition education tools among primary school children. This study consists of four phases. Phase I was need assessment among 49 primary school children where a simple questionnaire were used to get the general overview of their nutritional knowledge. Phase II was the development of the games module that involved nutrition knowledge about healthy eating and physical activity. Four games were included in the module and developed based on key message in Malaysian Dietary Guideline for Children and Adolescent (2013). Phase III was content validity among 18 individuals including health professionals, teachers and parents to validate the suitability of the games module. Phase IV was the knowledge evaluation among 30 primary school children (15 from urban and 15 from rural). The changes in nutrition knowledge before and after playing the games were analyzed based on questionnaire. Evaluation on module's acceptance was done in this phase to evaluate the acceptance among subjects. Total nutrition knowledge score among subjects for both locations was increased significantly where score for urban subjects was 12.13 ± 1.8 at pre-test and 16.73 ± 1.8 in post-test ($p<0.05$) while score for rural subjects was increased from 11.40 ± 2.17 at pre-test and 14.87 ± 2.00 in post-test ($p<0.05$). However, total nutrition knowledge score at pre-test had no significant different when compared between both locations. The score for post-test was significantly higher ($p<0.05$) among urban subjects (16.7 ± 1.8) as compared to rural subjects (14.9 ± 2.0). In conclusion, 3E (Education, Enjoyable, Engaging) Interactive Games Module was well-accepted as a nutrition education tools to promotes healthy eating and physical activity among primary school children.

A28 The association of body mass index, dietary calcium intake, physical activity levels and vitamin D concentrations with bone mineral density among Malay university students in Malaysia

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To date, studies on bone health status and its associated factors among young adults in Malaysia are still lacking compared to postmenopausal studies. Malay is one of the races in Malaysia that prone to have low BMD due to the lack of dietary calcium intake (DCI). The objectives of this study were to determine body mass index (BMI), DCI, physical activity (PA) levels and serum concentrations of 25-hydroxyvitamin D (25(OH)D) among young Malay students. The association between these parameters and bone mineral density (BMD) were also determined. A total of 100 Malay students (50 males and 50 females) with mean age of 23.9 ± 4.7 years and BMI of 24.4 ± 5.9 kg/m^2 at Universiti Kebangsaan Malaysia participated in this study. They were asked to complete Food Frequency Questionnaire (FFQ) and International Physical Activity Questionnaire (IPAQ) to assess their DCI and PA respectively. Serum 25(OH)D was measured using electrochemiluminescence binding assay whilst BMD was measured using quantitative ultrasound. Results showed that DCI was not significant ($p>0.05$) between male and female subjects. Although the mean PA levels was in the moderate range (2760.49 ± 1951.21 MET-min/weeks), male subjects (3400.73 ± 2086.44 MET-min/week) have significantly higher ($p<0.001$) PA levels compared to female subjects (2133.05 ± 1593.23 MET-min/week). Similarly, male subjects were shown to have a significant increase ($p<0.001$) serum 25(OH)D concentrations and BMD levels compared to female subjects although the mean measurements were in the normal range. The BMI and PA levels were significantly correlated ($p<0.05$) with BMD. However, DCI and serum 25(OH)D were not significantly correlated ($p>0.05$) with BMD. This study revealed that BMI and PA were the main factors that contributed to bone health in Malay students. Thus, encouraging young adults to have an ideal BMI and adopt regular PA in daily lives may help them to maintain healthy bone status.

A29 Validation of mild cognitive impairment risk screening tool (TUA-WELLNESS) among older adults

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Focus on screening for cognitive impairment has to be given particular importance with the rising of geriatric population. The objective of this study was to examine the validity of a mild cognitive impairment (MCI) risk screening tool (TUA-WELLNESS) among older adults. The TUA-WELLNESS screening tool consist of 10 items including questions on education level, dietary intake, social, physical activity, health status, and psychosocial which can be self-administrated by the older adults. The validation was performed in a cross sectional study among 114 older adults aged 60 years and above. TUA-WELLNESS was validated against neurological and functional tests which include Mini Mental State Examination (MMSE), Montreal Cognitive Assessment (MoCA), digit span, Rey Auditory Verbal Learning Test (RAVLT), Geriatric Depression Assessment (GDS-15), Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL). Subjects with mean aged of 68.1±5.6 consist of 40.4% men and 59.6% women. The prevalence risk of MCI assessed by TUA-WELLNESS among men and women subjects was 43.6% and 56.4% respectively. TUA-WELLNESS was correlated with IADL ($r = 0.387$, $p<0.05$), followed by RAVLT ($r = 0.341$, $p<0.05$), digit span ($r = 0.313$, $p<0.05$), GDS-15 ($r = -0.306$, $p<0.05$), MoCA ($r = 0.235$, $p<0.05$), and MMSE ($r = 0.104$, $p>0.05$). TUA-WELLNESS showed the highest sensitivity when tested with digit span (100.0%), followed by GDS-15 (75.0%), MoCA (54.9%), RAVLT (38.2%), MMSE (52.4%), and IADL (71.4%). Whilst, the specificity for TUA-WELLNESS was highest in MoCA (62.8%), followed by RAVLT (61.4%), GDS-15 (53.8%), IADL (53.3%), MMSE (52.7%), and digit span (52.7%). In conclusion, the TUA-WELLNESS was validated to be used as a screening tool risk of MCI among older adults.

A30 Cardiovascular disease knowledge among rescue firefighter personnel in Selangor, Malaysia

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Rescue firefighters (RFF) had contacted with various dangerous of work natures and had experience occupational fatalities due to heart attack. The health and wellbeing of RFF may affects public safety. Therefore an understanding on the cardiovascular disease among Malaysian RFF should be given attention. The purpose of the study was to evaluate the status of cardiovascular knowledge among RFF personnel in Selangor and explore their relationship with selected socio demographic and physical characteristics. A total of 330 male RFF aged 20 to 50 years based in nine different district in Selangor had participated in this study. Questionnaire was used to assess the socio-demographic variables and cardiovascular disease knowledge. Questionnaire on cardiovascular disease knowledge consisted of five domain included dietary, epidemiology, risk factor, medical and symptoms. Anthropometric measurements included height, weight and waist circumference (WC). The results shows that the mean age, height, weight, BMI, and WC were 32.4±8.8 years, 169.4±5.3 cm, 74.5±12.2 kg, 25.9±3.8 kg/m^2 and 90.7±48.3 cm respectively. The mean cardiovascular knowledge score was 48.8±15.6% corresponding to a low level of knowledge. A total of 55.2% subjects had low level of cardiovascular disease knowledge, moderate knowledge (34.8%) and high knowledge (10.0%). The highest percentage of subjects answer correctly were in epidemiology domain (57.2%) followed by dietary domain (48.9%), symptom domain (47.3%), risk factor domain (46.2%) and medical domain (44.5%). Cardiovascular

knowledge score were significantly correlated with age (r=0.048,p<0.05), household income (r=0.021,p<0.05), BMI (r=0.018,p<0.05) and WC (r=0.019,p<0.05) but with low correlation. This baseline study is expected to provide useful information to the RFF and it is suggested that nutrition education be incorporated in the RFF training programmes to ensure that the good health status of the personnel to be maintained.

A31 What factors are related to Health-Related Quality Of Life (HRQoL) of adolescents in Sepang, Selangor?

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This is a cross sectional study to determine factors related to Health-Related Quality of Life (HRQoL) among 610 adolescents in three randomly selected secondary schools in Sepang district, Selangor. Weight, height and waist circumference were measured. BMI was calculated and categorised based on WHO 2007 growth references whereas waist circumference was classified using waist circumference percentile curves for Malaysian children and adolescents. Pubertal status, disordered eating behaviours, psychological distress and HRQOL were assessed using Pubertal Development Scale, Eating Attitude Test (EAT-26), Depression, Anxiety and Stress (DASS-21) Scale, and Paediatric Quality of Life Inventory ™ 4.0 (PedsQL) respectively. There were equal percentages of boys and girls (50%), 89.0% were Malay, 7.5% Chinese, 2.1% Indian and 1.3% other ethnicities. There were 41.0% of the respondents who were overweight and obese and 6.8% thin and severely thin. The prevalence of abdominal obesity and disordered eating were 29.65% and 37.7% respectively. Around 21.7%, 41.0% and 15.0% of the adolescents were severely depressed, severely anxious and severely stressed respectively. Overall, the mean HRQOL was 72.42 ± 21.36, with girls (76.36 ± 18.38) scoring higher than boys (68.48 ± 23.35). The lowest score of the four domains in HRQOL among boys was school functioning while emotional functioning was the lowest among girls. The highest domain score was in social functioning for both boys and girls. Sex (t=-4.631,p<0.05), household income (r=0.100,p<0.05), BMI-for-age (r=-0.061,p<0.05), disordered eating behaviours (r=-0.233,p<0.05), depression (r=-0.647,p<0.05), anxiety (r=-0.618,p<0.05) and stress (r=-0.595,p<0.05) were significantly correlated with HRQOL. Multiple linear regression analysis showed four factors, namely, depression, anxiety, mother's secondary education level and disordered eating behaviours were predictors for HRQOL, explaining 47.7% of the variance. Planning for intervention programs to improve health-related quality of life of adolescents should take these factors into consideration.

A32 Assessment of physical activity and nutritional status among adolescents in Kuala Lumpur secondary school

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A sedentary lifestyle and unhealthy dietary intake pattern are risk factors for the development of overweight and childhood obesity. The objective of this study was to assess level of physical activity and nutritional status among adolescents in Kuala Lumpur secondary school. A cross-sectional survey was conducted in Kuala Lumpur area involving several districts of Kuala Lumpur. A total of 128 secondary school students were selected using a multistage systematic sampling approach. Body weight and height were measured to

determine their body mass index (BMI). Respondents were asked to answer a validated Physical Activity Questionnaire for Adolescent (PAQ-A) and half of respondents wore GT3X-BT accelerometer for 7 days to assess their level of physical activity. Dietary intake pattern of respondents were assessed by using a modified food frequency questionnaire (FFQ). Anthropometric results showed the proportion of overweight and obese respondents based on the World Health Organisation (WHO) were 13.3% and 11.7% respectively. The PAQ-A scoring indicated that 4.7% of respondents achieved high physical activity levels while 56.3% reported low physical activity levels. The accelerometer results present 36.7% of them had high physical activity levels while 63.3% had low physical activity. Food items which identified as frequently consumed among respondents were rice, chicken eggs and *roti canai* with 81.3%, 60.2% and 50% respectively while most of fruits such as watermelon, banana, apple and papaya with 39.8%, 37.5%, 35% and 30.5% respectively were not frequently consumed. There is significant association of most frequently consumed food (rice) ($p<0.05$) with body mass index (BMI). However, there is no significant association between physical activity and BMI. Evidence suggests that, adolescents need to improve the level of physical activity and healthy dietary intake by providing nutrition education on the prevention of obesity and its consequences.

A33 Relationship between socio-demographic characteristics, dietary practices, food insecurity, physical activity level and body image perception with body weight status among adolescents aged 13 and 14 years old in Sekolah Menengah Kebangsaan Cheras Jaya, Selangor, Malaysia

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Adolescent's health is the major health concern nowadays. The rapid growth of obesity over the last few decades has alarmed health professionals worldwide and makes it urgent to understand the driving factors for these developments. A cross-sectional study was conducted to examine the relationship between socio-demographic characteristics, dietary practices, food insecurity, physical activity level and body image perception with body weight status among adolescents aged 13 and 14 years old in Sekolah Menengah Kebangsaan Cheras Jaya, Selangor. A self-administered questionnaire was conducted to obtain socio-demographic characteristics, dietary practices, food insecurity, physical activity level and body image perception. Height, weight and waist circumference was measured by trained researchers. A total of 172 adolescents aged 13 and 14 with were 34.3 % males and 65.7% were females were selected in this study. Majority of respondents were Malay (82.6%), followed by Chinese (12.2%), India (4.1%) and others (1.2%). The prevalence of overweight and obesity (29.6%) was three times higher than thinness and severe thinness (8.7%). The prevalence of abdominal obesity and non-abdominal obesity were 12.2 % and 87.8% respectively. The findings reported that race ($x^2=6.458$, $p=0.04$) and body image perception ($x^2=16.881$, $p=0.001$) were associated with BMI-for-age. Besides, physical activity level ($r=-0.145$, $p=0.05$), body image perception($x^2=8.89$, $p=0.003$) were associate with waist circumference. In conclusion, race, body image perception and physical activity level can contribute to the body weight status among adolescents. The reported findings could be used as guidelines for planning nutrition intervention program among adolescents.

A34 Development and evaluation of a booklet on nutrition falls prevention among older adults

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In Malaysia, one in five older adults are at risk of falls. Falls is multifactorial including nutritional, health status, and environmental factors. The objective of this study was to develop and evaluate a booklet on nutrition and falls prevention among older adults as a nutritional education material for falls prevention. This study was performed in three phases. Phase one involved the development of the booklet. In this phase, market and online survey was conducted in several bookstores and online websites to obtain ideas on the booklet's content and design. Besides, interview was also conducted among 30 respondents by using need assessment questionnaire. A 32 pages booklet in A5 size was developed which consisted of falls related important nutrients for bone and muscle, recommended high protein and calcium menus, exercise suitable for older adults and general tips to falls prevention. Phase II comprised of content validity that was conducted among six health professionals to validate the suitability and the understanding of the content in the booklet. The final phase (Phase III) was the evaluation of the booklet which was performed among 24 subjects aged 60 years and above. Based on the needs assessment, 43.3% participants stated that information on the importance of nutrients to reduce risk of falls is essential. While, 36.7% chose that information on healthy bone is needed in the booklet. Other information such as exercise for older adults and recommended menus is important to them with the response of 33.3% and 43.3% respectively. Half of the respondents stated that it is essential to be informed on general tips to reduce risk of falls. Overall, majority of the respondents stated that all the information is essential and needed in the booklet. This booklet may be beneficial as an educational guideline for older adults as a part of the many strategies for prevention falls.

A35 Factors associated with cognitive performance of preschoolers in KEMAS kindergarten, Petaling Perdana District, Selangor

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Previous study has determine the association between various factors with cognitive performance among children, but there are still limited published study for preschoolers particularly in Malaysia. This study aimed to determine the cognitive performance of preschoolers and the its associated factors. A total of 167 of preschoolers (80 boys and 87 girls) with their parents from eight selected KEMAS Kindergartens, Petaling Perdana District, Selangor were participated in this study. Anthropometric measurement of body weight and height and cognitive performance assessment of Raven's Coloured Progressive Matrices (R-CPM) for preschoolers were conducted by the researchers. Information on socio-demographic background, children's eating behaviour, parental feeding practices, and parenting styles were completed by the parents. The present study found that most of the preschoolers have achieved average cognitive performance (64.67%), 19.77% of them were have below than average and 15.58% were higher in cognitive performance with a mean standard R-CPM score of 96.16 ± 5.58. Further, the results showed that preschoolers

with higher satiety responsiveness (r = 0.17, p < 0.05) and higher emotional regulation (r=0.17, p<0.05) were correlated with higher cognitive performance. In other words, preschoolers who have high potential to control their food intake after eating and have parents who more likely to use food to regulate their emotion had high scores in cognitive task. However, there were no significant differences in cognitive performance of preschoolers by monthly household income (F=0.893, p=0.412), father's educational level (t=-1.408, p=0.161), mother's educational level (t=-1.383, p=0.169), BMI-for-age (F=1.445, p=0.221), Weight-for-age (F=0.534, p=0.587), Height-for-age (F=0.985, p=0.376) and parenting styles (F=0.081, p=0.970). In conclusion, parental feeding practice (emotional regulation) and eating behaviour of the children (satiety responsiveness) may influence their cognition. Thus, to improve cognition of preschoolers, early nutrition education should be conducted for both parents and their children.

A36 The association of prenatal DNA damage and nutritional status in young children

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This study aimed to examine the association of maternal deoxyribonucleic acid (DNA) damage during the pregnancy with young children's nutritional status. Mother-child pairs (n=102) from the Universiti Sains Malaysia (USM) Pregnancy Cohort were studied. Blood samples of the mothers were drawn in the third trimester of pregnancy. Maternal fasting blood samples were drawn to measure oxidative stress, as determined by DNA damage using Comet assay. At 2 to 3 years of age, children's weight and height were measured and converted to World Health Organization (WHO) standard for height-for-age *z*-score (HAZ), weight-for-age *z*-score (WAZ) and body mass index-for-age *z*-score (BAZ). Multiple linear regressions were performed to assess the association of maternal DNA damage at third trimester of pregnancy with children's nutritional status. As DNA damage, which is demonstrated by tail moment increased, children's mid-upper arm circumference (MUAC) (β=0.476, 95% CI=0.179; 0.772; p=0.028) and BAZ (β=0.329, 95% CI=0.025, 0.633, p=0.034) increased, with confounders adjustment. However, no significant association was noted for HAZ and WAZ after adjusting the confounders. In conclusion, increased prenatal oxidative stress during pregnancy was associated with increased adiposity in young children, suggesting the importance of intrauterine oxidant status in affecting future growth. Randomized trials are needed to validate this association.

A37 What factors are associated with disordered eating behaviours among early adolescent girls in Sepang, Selangor?

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This cross sectional study determined factors associated with disordered eating behaviours among 305 adolescent girls in three randomly selected secondary schools in Sepang, Selangor. Weight, height and waist circumference were measured. BMI was calculated and categorized based on WHO 2007 growth references whereas waist circumference was classified using waist circumference percentile curves for Malaysian children and adolescents. Sociocultural influences, pubertal status, perception of body image and

disordered eating were assessed using Sociocultural Influences on Body Image and Body Change Questionnaire, Self-Rating Scale for Pubertal Development, Contour Drawing Rating Scale, Body Appreciation Scale and Eating Attitude Test (EAT-26) respectively. The sample consists of 88.9% Malay, 7.9% Chinese, 1.6% Indian and 1.6% other ethnicities. Around 5.9% of the respondents were thin and severely thin, 37.7% overweight and obese, 29.7% abdominally obese, 32.5% were at risk of eating disorders and 75.0% were dissatisfied with their body size. Age ($r=0.160, p<0.05$), father's educational achievement ($r=4.193, p<0.05$), BMI-for-age ($r=0.229, p<0.05$), waist circumference ($r=0.269, p<0.05$), perception of body size ($r=0.270, p<0.05$), perceived pressure to lose weight from father ($r=-0.376, p<0.05$), mother ($r=-0.376, p<0.05$), peers ($r=-0.400, p<0.05$), media ($r=-0.337, p<0.05$), perceived pressure to gain weight from father ($r=-0.173, p<0.05$), mother ($r=-0.124, p<0.05$), peers ($r=-0.255, p<0.05$), media ($r=-0.252, p<0.05$), perceived pressure to gain muscle from father ($r=-0.367, p<0.05$), mother ($r=-0.325, p<0.05$), peers ($r=-0.343, p<0.05$), media ($r=-0.206, p<0.05$) were significantly associated with disordered eating behaviours. Multiple linear regression analysis showed ten factors namely perceived pressure to lose weight from peer and media, perceived pressure to gain muscle from father, mother and media, perceived pressure to gain weight from media and peers, waist circumference, age and father's secondary educational achievement were predictors for disordered eating, explaining 38.2% of the variance. Preventive intervention programmes targeting disordered eating among adolescent girls should take these predictors into consideration in their planning.

A38 Food safety knowledge, attitude and food handling practices among food background students in Management and Science University, Shah Alam

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Food poisoning has been an uprising issue these days. The cause of such case is due to the lacking of food safety knowledge, attitude and food handling practices (KAP) among food handlers. A research was conducted in MSU to identify the scores of food safety KAP among food-background students from Nutrition, Food Service and Technology, Culinary Arts and Hospitality and Tourism courses. A self-administered questionnaire was distributed among 100 students which comprised of 37 male students and 63 female students that were selected purposively. Data were analysed and results showed that these students posed high score of KAP (Mean: 6.53±0.95) in food safety. Results also revealed that there were no significant differences between male and female students in terms of knowledge and attitude ($p>0.05$). However, there was a significant difference between these two genders where female students have better food handling practices as compared to male students ($p<0.01$). In another analysis, students from the Culinary Arts (Mean: 19.667±1.457) have the highest KAP score followed by students from Nutrition (Mean: 18.306±1.747) and Food Service and Technology (Mean: 16.533±2.926). Meanwhile, students from the Hospitality and Tourism (Mean: 15.453±1.986) have the least score of KAP. In conclusion, it was found that these food-background students have high score of KAP when it comes to food safety. This proves that these students applied the knowledge they have learned in class and implemented it into their skills in the kitchen and home settings therefore producing students that are aware of the safety and cleanliness of the foods prepared.

A39 Association between levels of parental physical activity and preschoolers physical activity pattern among children aged 4 to 6 years in Kuala Lumpur

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Physical activity among preschoolers is important for physical growth and mental development of preschoolers and may help in prevention of childhood obesity. This cross-sectional study aimed to determine the association between parental physical activities with preschoolers' physical activity. A total of 106 children were recruited using purposive sampling from 30 preschools in Kuala Lumpur. Anthropometric measurements included weight, height, and waist circumferences. Body mass index (BMI) was calculated and categorized based on WHO BMI-for-age Z-scores. Physical activity of preschoolers was proxy-reported by parents using the validated preschool-aged children's physical activity questionnaire (pre-PAQ). Time spent in four levels of physical activity according to intensity (sedentary, low, moderate and high) were determined. Parental physical activity level was self-reported using the International Physical Activity Questionnaire (IPAQ). Mean age, weight, height, BMI and waist circumferences were 5.3±0.7 years, 16.7±2.9 kg, 109.9±6.1 cm, 14.1±2.7 kg/m2 and 48.5±7.0 cm, respectively. Some 34.9% of preschoolers were underweight, while 8.5% were overweight or obese. Median time spent daily on high-, moderate- and low-intensity level of physical activity were 23 minutes, 80 minutes, and 54 minutes respectively, while three and a half hours were spent on sedentary activity daily. Higher paternal education and children attending private preschools spent significantly ($p<0.05$) more time in low intensity physical activity. Spearman correlation between parental sedentary activity and preschooler's sedentary activity was weak ($r_s=0.322$, $p<0.01$). These findings indicated that preschoolers' sedentary activity was associated with parental sedentary activity. Hence, the findings suggested that parental involvement should be a focus to promote physical activity of preschoolers.

A40 Assessment of body somatotype and nutritional status among adolescent in Kuala Lumpur secondary school

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The objective of this study was to determine the body somatotype and nutritional status among adolescent in Kuala Lumpur. Cross-sectional survey was conducted using a multi-stage systematic sampling method. A total of 120 students were recruited from five secondary schools located in Kuala Lumpur. Body weight, height and other anthropometric measurements including skinfold, bone breadth and limb girth were measured to determine their body mass index (BMI) and body somatotypes. Physical activity level was determined using Physical Activity Questionnaire for Adolescent (PAQ-A) whereas modified Food Frequency Questionnaire (FFQ) was used to determine the dietary pattern among participants. The anthropometric measurements of participants based on World Health Organization (WHO) classification indicated 26.6% of them were overweight and obese. In term of body somatotypes, 68.3% and 8.3% were classified as endomorph and mesomorph somatotype groups, while another 23.3% were ectomorph. Further, result between genders showed 85.3% of female and 46.2% of male participants were classified as endomorph somatotype. PAQ-A scoring indicated 51.7% of them had low physical activity level, while 45% reported moderate physical activity level and only 3.3% achieved high physical activity level. FFQ recorded rice as food frequently consumed among participants with 80.8% followed by chicken, chicken/ duck/ quail eggs, bread, as moderately consumed with 60%, 58.3%, and 57.5% respectively. Meanwhile, fruits such as mango, watermelon and banana

were recorded as less frequent consumed with 42.5% 40% and 39.2% respectively. Positive association was found between BMI (p<0.05) with body somatotype. However, no result shows significant association between physical activity and body somatotype. This study shows that somatotyping method could be used as supplementary tool to the standard BMI for determining adiposity. Further, intervention program focusing on body weight by providing nutrition education is needed to overcome overweight and obesity problems among adolescent.

A41 A review of health-related outcomes of workplace physical activity and dietary interventions

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Adults spend about half of their waking hours at work and the workplace is deemed a good place to promote healthy behaviour. Workplaces should consider incorporating a culture which includes an environment conducive for health promotional activities such as maintaining good physical activity and appropriate nutrition for workers. The workplace provides opportunities to address overweight and obesity problems. A database search for workplace physical activity and/or dietary interventions, from the year 2000 to 2015, was conducted on PubMed, ScienceDirect and Google Scholar using the key words "work", "workplace", "worksite", "physical activity", "dietary intake" and "obesity". A review of 27 workplace health interventions which included physical activity and/or dietary interventions showed many positive health-related outcomes. These include increased muscle strength and reductions in weight, body mass index, waist circumference, blood pressure and body fat. Reduced blood levels of cholesterol and glucose were observed. There was improvement in workers' mood, with reduced depression, anxiety and hostility. Lower calorie intake and higher consumption of fruits and vegetables were also reported. Workers exhibited improved physical activity levels such as taking more steps a day, increased leisure-time energy expenditure and reduced sitting time at their workplace. Workplace physical activity and dietary intake interventions can produce good health-related outcomes. Organisations should be encouraged to adopt a policy to promote health. This would be an important public health measure to reduce overweight and obesity problems in the community and lessen risks for the development of non-communicable diseases.

A42 Assessment of nutritional status and body somatotypes in relation to weight changes among overweight and obese office workers in Kota Bharu

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The objective of this study was to assess the relationship between body somatotypes with weight changes in overweight and obese office workers in Kota Bharu. A total of 97 overweight and obese office employees from nine government agencies in Kota Bharu, Kelantan were recruited. Anthropometric measurements such as body weight, stature, skinfolds (triceps, subscapular, supraspinale and medial calf), bone breadth and limb girth were taken to determine their body mass index (BMI) and body somatotypes. Short Form - International Physical Activity Questionnaire (IPAQ) was used to determine respondents' physical activity level. Food Frequency Questionnaire (FFQ) was also used to determine

the dietary pattern of respondents. The respondents were assigned to two different groups (intervention and control). Respondents in intervention group were provided with portion plate with guideline to use it and were advised to apply it to control their meal portion and food intake. Among respondents, 35.1% are male and 64.9% are female, with 27.8% were classified as overweight and 72.2% were obese according to World Health Organization (WHO). Body somatotype results showed that respondents were mainly endomorph and mesomorph and no ectomorph. The findings were 64.8% and 35.2% who were endomorph and mesomorph, respectively. In terms of physical activity, 17.8% has low physical activity level, and 58.9% and 23.3% has moderate and high physical activity level, respectively. There is no significant different observed on weight changes between endomorph and mesomorph, as well as between overweight and obese respondents. Weight and BMI were significantly reduced in intervention group (-2.3 ± 2.2, $p<0.001$ and -0.9 ± 0.8, $p<0.001$) but no significant changes observed in control group.

A43 The development and evaluation of acceptance of a module towards active living (GERAK) for overweight and obese young adults

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The prevalence of adult obesity in Malaysia is higher than the global prevalence. Obesity is the major risk factor of many other non-communicable diseases including diabetes mellitus type 2, hypertension and cardiovascular disease. Physical activity intervention is one of the important component in obesity intervention. The objective of this study was to develop module for the overweight and obese young adult to promote an active lifestyle. There were three phases in this study. Phase one involved the needs assessment whereby 30 respondents were interviewed using a questionnaire. The information obtained from this phase were used to develop a module in Phase II. In phase II, two different types of modules were developed; one for the use of overweight and obese young adults and one for the use of a mentor or facilitator. Phase III of this study comprised of the content validity that was conducted among five nutrition professionals to validate the suitability and the understanding of the content of the module. This module may be useful as an educational guideline for overweight and obese young adults and their mentor or facilitator to practice an active lifestyle to fight obesity.

A44 Socioeconomic status and body weight status among preschoolers aged 5 to 6 years old in Kota Bharu, Kelantan

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Obesity is seen to be an increasingly important public health concern among children and adolescents. Children who were obese during early ages tend to be obese in future and usually were presented with many clinical manifestations. This study aimed to determine the associations between socioeconomic status, socio-demographic status, dietary intakes, family structure and childcare arrangement with body weight status among preschoolers aged 5 to 6 years old in Kota Bharu, Kelantan. A self-administered questionnaire which consisted of socio-demographic, socioeconomic status, family structure and childcare arrangement was used for data collection. Parents were asked to record the dietary intake of the child in food diary in order to obtain the dietary intakes data. The height and weight of the

subjects were measured and body mass index (BMI) was calculated. There was a total of 168 preschoolers participated in this study. Finding showed that BMI-for-age (-0.28±1.45SD), weight-for-age (-0.54±1.42SD) and height-for-age (-0.59±1.01), were generally in normal classification. There was significant positive correlation between monthly household income with child's body weight status ($r=0.230$, $p<0.05$) after adjusting to potential confounders. A positive correlation was also found between loans and rentals payment with child's body weight status ($r=0.304$, $p<0.01$). In contrast, no significant correlations were observed between socio-demographic status such as age of the children, parents' education level and employment status, family structures and childcare arrangement with child's body weight status. Dietary intakes such as macronutrients and total energy intake of the children were also not significantly correlated with body weight status. In conclusion, household income and loans and rentals payment may have influences on child's body weight status.

A45 Assessment of nutritional status, psychological status, functional status, and quality of life among Malay rural homebound elderly in Alor Gajah district, Malacca

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Homebound elderly refer to elderly who cannot easily leave home and need help from others to do so due to medical impairments or mobility limitation. Studies have found that homebound elderly were having more malnutrition and depression problems compared to non-ambulatory elderly. Besides, due to isolation, homebound elderly were found to have low cognitive mobility ability that leads to low quality of life. However, there were very limited studies about this group of elderly in Malaysia. Thus, we conduct this cross-sectional study aim to assess the nutritional status, psychological status, functional status, and quality of life among Malay homebound elderly. This study was conducted in Alor Gajah district, Malacca. Sixty homebound elderly aged 60 and older were enrolled in this study through multi-stage random sampling. Home visit and face-to-face interview were done by using questionnaire which includes Mini Nutritional Assessment (MNA), 15-item Geriatric Depression Scale (GDS), Barthel Index (ADL), Elderly Cognitive Assessment Questionnaire (ECAQ), and SF-36. The findings of this study show that more than half (60.0%) of the homebound elderly were overweight/obese. Based on MNA, half of the respondents (53.3%) were classified as at risk of malnourished while 5.0% of the homebound elderly were classified as malnourished. However, despite having difficulties to going out, almost all of the respondents (98.3%) were classified as Activities of Daily Living (ADL) independent. 28.3% of the homebound elderly were found to probably cognitive impairment and 28.3% of them were found to be in a depression. As higher score indicate more favorable health state, based on the SF-36, almost all of the homebound elderly can be considered as having a good quality of life. In conclusion, the result of this study highlight the serious malnutrition problems among homebound elderly, thus, intervention to tackle this issue may be warranted.

A46 Parental energy-balanced related behaviours as correlates of body weight status of adolescents

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Consistent global evidence showed the problem of overweight and obesity among adolescents. Parents are the role models for inculcating healthy eating habits and physical activity (PA).

A cross-sectional study was conducted to explore the relationship between parents' Energy Balance Related Behaviours (EBRB) and body weight status (BWS) of adolescents. Data were obtained on the anthropometric measurement of students and from a self-administered questionnaire for parents. The EBRB included general dietary behaviour, soft drink and fruit juice consumption, breakfast intake, PA and TV-viewing. A total of 241 students from 7 secondary schools in Klang Valley and an equal number of parents were involved in this study. Descriptive data analysis and correlations among the variables were examined. Results showed that 68.9% of the students were of normal weight. Most of the parents (63.9%) were educated up to Sijil Pelajaran Malaysia (SPM) level. Parents were found to eat unhealthy snacks (83.4%), drank soft drinks (14%) and fruit juices (49.4%) regularly. Daily breakfast consumption was practiced by nearly all parents. Nearly 36% of parents were physically active while 34.4% watched TV regularly. A significant correlation was found between parents' soft drinks consumption with body mass index (BMI), body fat percentage (BF%) and waist circumference (WC) of adolescents ($r=0.129$, $r=0.131$, $r=0.162$, $p<0.05$), fruit juices consumption with BMI and WC of adolescents ($r=0.164$, $r=0.127$, $P<0.05$), parents TV-viewing showed significant correlation with adolescents' BF% ($r=0.132$, $p<0.05$) and parental educational level was positively correlated with BF% and WC of adolescents ($r=0.166$, $r=0.145$, $p<0.05$). No significant relationships were found between parents' general dietary behaviour, breakfast intake, and PA with children's BWS. In conclusion, specific parental EBRB appear to be important factors in the BWS of their children. Efforts should be directed towards improving parental knowledge of factors promoting obesity among adolescents.

A48 Nutritional status of Malaysian children below five years: Finding from The National Health and Morbidity Survey 2015 (NHMS 2015)

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Nutritional status of children below five years is a public health concern. Adequate nutrition is fundamental to unlock a child's full potential and it will determine the child's health in the future. Nutritional status is directly influenced by food intake and the occurrence of infections. The National Health and Morbidity Survey 2015 (NHMS 2015) was a cross sectional study with a two-stage stratified random sampling aimed to determine the current nutritional status of the Malaysian children below five years old. Weight and height were taken to determine their nutritional status using standardised protocols. Indicators of the nutritional status; weight for-age (WAZ), height-for-age (HAZ) and BMI-for-age were compared with the Z-scores table (WHO, 2006). Data of 2652 children was analysed and found that the national prevalence of underweight was 10.3% (95%CI: 8.9-11.9). The prevalence of underweight were; by gender [boys 10.9% (95%CI: 8.9-13.2) and girls 9.7% (95%CI: 7.8-12.1)] and by strata [urban 10.0% (95%CI: 8.3-12.0) and rural 11.2% (95%CI: 9.0-13.8)]. The national prevalence of stunting was 12.5% (95% CI: 11.0-14.2], by gender [boys 13.0% (95%CI:10.9-15.5) and girls 12.0% (95% CI:9.9-14.5)] and strata [rural 15.7% (95%CI: 13.0-18.8] and urban 11.3%, (95% CI :9.5-13.4)]. Based on the BMI-for-age, the national prevalence of overweight was 7.6% (95%CI: 6.1-9.5), by gender [boys 9.0% (95%CI: 6.6-12.1) and girls 6.3% (95%CI: 4.7-8.4)] and strata [urban 7.9% (95%CI: 6.0-10.5) and rural 6.9% (95%CI: 5.3-8.9)]. The findings indicate that the Malaysian children below five years are facing malnutrition problem, suffering from both undernourishment and overweight in both the urban and rural areas. Interventions to promote childhood nutrition must be continue to overcome problems of malnutrition among the children.

A49 How does screen time affect adolescents' dietary intake and physical activity

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The media play a big role in determining adolescent's food choices, and excessive screen times has been associated with displacements of physical activity. The objective of this study was to determine the effects of screen time on food choices and dietary intake and level of physical activity among adolescents in Puncak Alam. A self-administered questionnaire on screen times were distributed to 292 students aged 14 and 16 years. Physical activity was assessed by using the Physical Activity Questionnaires for Adolescents. 99.3% watched TV, 78.8% used the computer, 71.2% used the smart phone or iPod, and 49.3% used video games at home. Mean total screen time during weekdays and weekend was 422.59 ± 256.14 and 654.06 ± 383.28 minutes respectively. 89.7% of students spent more than two hours on screen time per weekday and 94.5% per weekend day, which exceed the recommendation made by the American Academy of Paediatric. 41.8% of students consumed the foods advertised on those screen time devices, and this concurred with the study done by (Scully et al., 2012). There was no association between total screen time and food choices. On physical activity, 23.7% of students were classified as highly active, 51.9% moderately active and 23.7 were very active. There was no association between total screen times and physical activity level. This finding was supported by Lacy et al., (2012) of similar recent study where adolescents with low screen based media are not necessarily physically active.

A50 Differences of working hours, stress and physical activity level in relation to body mass index among working adults in Shah Alam, Selangor

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Different working hours based on a variety of job scope contributes to different available opportunity to perform physical activity and exercise, which may be associated with an increase in obesity prevalence over the years. This cross sectional study was conducted to identify the contribution of differences in the number of working hours, stress level and physical activity status on body mass index (BMI) status of employees in Management and Science University. Respondents consisted of 167 employees (male, n=51 (30.5%), female, n=116 (69.5%)). Self-administered structured questionnaires were distributed among respondents which consisted of socio-demographics information, work hours information, Cohen Perceived Stress Scale and International Physical Activity Questionnaire (IPAQ) Short Version. The height and weight of individual were measured using SECA Stadiometer, model 213 and TANITA Digital Scale, model HD 319. Most of the respondents were academic staffs (40.1%), married (62.3%), with bachelor degree qualification (53.9%) and from Malay ethnic group (88.0%). Approximately, 46.1% respondents were overweight, with higher prevalence among male (56.9%) as compared to female respondents (41.4%). About 96.6% of the respondents work for more than 9 hours/day including extra work hours and take home task at workplace. Higher percentages of female respondents (58.6%) were seen having high stress level as compared to male (39.2%). About 29.3% of the respondents were reported of having high physical activity level. BMI was significantly associated with physical activity level ($p<0.05$), but not on stress level and total working hours in a day ($p>0.05$). Overall health and quality of life among Malaysia could be improved by formulating and enforcing public policy towards healthy lifestyle especially on physical activity at workplace.

A51 Secondary school teachers', principals and canteen operators' nutritional knowledge and perception of school canteen food

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School environment stakeholders including principals, teacher and canteen operators play an important role in promoting healthy eating among students. Students partake 1-2 meals from the canteen. A cross-sectional study was conducted to determine the nutritional knowledge of school principals, teachers and canteen operators and their perception towards school canteen food. Ten government secondary schools in Kuala Lumpur were selected using multistage random sampling. Total of 254 teachers and 20 canteen operators participated in this study. Self-administrated questionnaires were used which consists of socio-demographic background, principals and teachers nutritional knowledge and perception of school canteen food and canteen operators' nutritional knowledge. Nutritional knowledge questions were on food groups and servings, food and nutrients and diet and health aspects. Reliability test was run for the questionnaire. Principals and teachers were Malay, between the ages of 30-39 years and Degree holders. The canteen operators were Malay, female and had secondary school education. About 31% of school principals and teachers scored good nutritional knowledge and with a mean score of 25.94 ± 6.87. Only 30% of the canteen operators scored good nutritional knowledge with a mean score of 18.35 ± 3.03. A weak but positive correlation was found between years of teaching and nutritional knowledge (r=0.168, p<0.05). Significant association was also found between total monthly household income and the nutritional knowledge (x^2>15.210, p<0.05). No significant relationship was found between the socio-demographic background and nutritional knowledge of the canteen operators. About 53% of teachers rated average perception on whether the school is following the guidelines and about 60% rated moderate on whether the school is effectively promoting healthy eating among students. In conclusion not many teachers and canteen operators had good knowledge score which indicates more efforts are needed to improve their nutritional knowledge.

A52 Factors contribute to chronic diseases among the elderly in Petaling district, Selangor

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The objective of this study was to determine the factors contribute towards chronic diseases among the elderly at selected mukim in Petaling district. In this cross-sectional study, a total of 211 elderly aged 60 years and above from six villages at selected mukim in Petaling district were chosen by using random cluster sampling. Face to face interview was carried out to obtain their information on socio-demographic background, body weight status and self-reported chronic diseases. The body weight, height, waist circumference and body fat percentage were measured by calibrated instruments after the interview session. The relationship between the variables was analyzed by using Pearson correlation and Multiple Linear Regression. The mean age of elderly was 67.12±5.72 years. In addition, the mean BMI of elderly was 25.40±4.90 (33% was overweight and 14.8% was obese) while the mean waist circumference and body fat percentage of elderly were 92.03±10.71 cm and 31.80±7.47 % respectively. The prevalence of comorbidity (≥ 3 chronic diseases) was 29.3%. About 52.1 % of elders had hypertension, 39.3 % of elderly had diabetes mellitus, 21.8% of elderly had hyperlipidemia and 12.8% of elderly experienced arthritis. There was significant and positive relationship between BMI (r=0.308, p<0.001), waist circumference (r=0.275, p<0.001) and body fat percentage (r=0.257, p<0.001) with number of chronic

diseases reported by elderly. About 10.4% of chronic diseases was explained by BMI, waist circumference, and body fat percentage (F= 9.046, p< 0.001). However, there was no significant relationship between the age (r=0.097, p>0.05), years of schooling (r=-0.045, p>0.05), personal income (r=-0.129, p>0.05) with number of chronic diseases. Hence, high BMI, high waist circumference and high body fat percentage were related positively with high number of chronic diseases among elderly. More health education and interventions are needed to delay the severity of diseases among elderly.

A53 Associations between food insecurity, hemoglobin level and parasite infection with nutritional status among aboriginal children in Negeri Sembilan

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This cross-sectional study aimed to determine associations between food insecurity, hemoglobin level and parasite infection with nutritional status among aboriginal (*Orang Asli)* children in Negeri Sembilan, Malaysia. A total of 264 children (51.1% boys and 48.9% girls) aged 2 to 6 years old (*M*=4.05, *SD*=1.22 years) and their mothers from 13 aboriginal villages in Negeri Sembilan participated in this study. Mothers were interviewed to obtain information on socioeconomic status and food insecurity. Height and weight of children and their mothers were measured. Both children and their mothers were undergone field estimation of capillary hemoglobin level. Children were also screened for parasite infection using stool samples. Nearly one third of the children were underweight (29.3%) and stunted (35.6%). Almost half of the mothers were overweight (48.4%) and 23.1% were obese. Two in five (38.3%) of the mothers were anemic and one in five (21.6%) of the children were anemic, whereas one third of the children had parasite infection (35.0%). Almost all of the respondents (96.4%) experienced food insecurity (29.9% households were food insecure, 12.1% individuals were food insecure and 54.2% were in child hunger category). Multiple linear regression results showed that child hemoglobin level (β=0.144, *p*=0.015), birth weight (β=0.276, *p*<0.001), parasites infection (β=-0.146, *p*=0.013), individual food insecurity (β=-0.276, *p*=0.015), and child hunger (β=-0.350, *p*=0.023) predicted height-for-age. Meanwhile, weight-for-age was predicted by birth weight (β=0.218, *p*=0.001) and individual food insecurity (β=-0.242, *p*=0.043). Future under-nutrition prevention programs for aboriginal children should consider child's birth weight, hemoglobin level, parasite infection and food insecurity status.

A54 Relationship between body fat and bone in Malaysian adults

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Weight and body compositions parameters influence skeletal modelling throughout life stages and hence are important determinants of bone density (Timpson et al 2009). However to what extent fat mass affects bone mass is controversial. To evaluate this relationship in a multi-ethnic population, this study was carried out in participants aged between 18 and 60 years (n=87). Bone health was measured by quantitative ultrasound sonometry (Sahara Clinical Bone Sonometer, Hologic, USA) and body composition was measured by bioelectrical impedance analysis (InBody 230, Biospace Co., Ltd). The mean (±SEM) BUA in male participants was 84.1 (±2.9) dB/MgHz and in females was 86.7 (±1.9) dB/MgHz. Malay participants had significantly higher percent body fat (34.9 ±1.8 %) compared to

Chinese participants (25.5 ±1.6 %), ($p<0.001$) and an average BUA higher than the Chinese (difference not statistically significant). After adjustment of age and categorising of Body Mass Index (BMI) to different classifications, obese individuals had the highest BUA (89.8 ±4.5 dB/MgHz) though the difference with other categories of BMI was not statistically significant. BUA of underweight individuals was the lowest (77.3 ±4.4 dB/MgHz). Between the two ethnic categories, Malay underweight individuals had the lower BUA (76.63 ±5.28 dB/MgHz) than Chinese 73.91 ±6.28 dB/MgHz. In the Normal BMI category Malays scored higher BUA (91.63 ±5.91 dB/MgHz) than Chinese (86.49 ±2.40 dB/MgHz). Within overweight category, Malays scored higher BUA 87.67 ±3.85 dB/MgHz than the Chinese 87.21 ±6.52 dB/MgHz; In the Obese category Chinese individuals scored higher BUA (98.64 ±11.73 dB/MgHz) than Malays (86.13 ±4.09 dB/MgHz). These differences were not statistically significant. Population-based strategies to combat obesity in adults may end up in reduced bone strength in some individuals and add to the already existing burden of osteoporotic fractures. We suggest screening of bone for BUA at primary care level simultaneously with measures of combating obesity.

A55 Effectiveness of nutrition counselling program on weight loss among employees in Universiti Putra Malaysia: Changes of body weight, waist circumference and dietary intake

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Overweight and obesity had been at the alarming state and becoming widely prevalent among the population in almost every country. Overweight and obesity are major risk factors for developing some chronic diseases such as cardiovascular diseases, diabetes mellitus, and various types of cancer and thus decreased quality of life. Nevertheless, addressing the nutritional issues among employees in Malaysia is a big challenge because most of them are busy working and have no time to do physical activity. Therefore, a study was conducted to evaluate the effectiveness of nutrition counselling program on weight loss among UPM employees. The study was carried out in two phases. For the first phase, a screening program was conducted. 86 subjects had being screened for their sociodemographic, anthropometry and body composition data. There was about 59 subjects (68.5%) were overweight and obese with BMI >23 kg/m^2 based on Asian BMI cut-off point. 19 subjects had agreed to participate in the intervention program. For the second phase, which was the intervention program, 9 subjects were assigned in the intervention group while another 10 subjects were assigned in the control group. It was a quasi-experimental study to evaluate the effectiveness of nutrition counselling program on weight loss among the UPM employees. Repeated measurement analysis of covariance (ANCOVA) was used to analyse the intervention effects on health outcomes such as anthropometric, body composition and dietary intake. Result indicated that the waist circumference had reduced significantly after the intervention program ($p<0.05$). Then the calcium intake had improved significantly after the intervention program ($p<0.05$). However, there was increased significantly in body fat percentage after the intervention program ($p<0.05$). For the conclusion, this six weeks nutrition counselling program on weight loss among the UPM employees had some positive effects on the health outcomes including waist circumference and calcium intake.

A56 Determination of barriers and enabling factors for healthy lifestyle among adolescents: A qualitative study of adolescents, parents, fast food handlers and canteen owners' perceptions

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The prevalence and magnitude of adolescent obesity are increasing tremendously. The causes of obesity are multifaceted and involve a complex interaction between individual, family and food environment. This study aimed to explore qualitatively specific factors on perception, belief and behavior related to healthy lifestyle among adolescents, parents, fast food handlers and canteen owners. A qualitative study is developed and adopted using Individual, Socioeconomic and Ecological Model (ISEEM). A purposive, multi-ethnic sample of ninety-two respondents from four targeted groups were interviewed through semi structured, in-depth interviews and all sessions were audio recorded. The interviews were fully transcribed and analyzed qualitatively using Atlas.Ti. The transcribed texts were coded into similar and related themes such as eating behaviour, meal pattern, food environment, source of information, self-awareness, social marketing and food facilities. The findings revealed the factors that inculcate healthy lifestyle among adolescents were high self-awareness to reduce high dense food intake and to have ideal body image, supportive family members and a conducive food environment. Meanwhile, the accessibility to fast food outlets and hawker stalls within walking distance, time constraint due to excess workload and taste preference were identified as barriers to live healthily. As conclusion, this current study has highlighted an insightful information on the barriers and enabling factors for healthy lifestyle from the targeted respondents. Therefore, the findings should mediate in designing effective and multilevel awareness raising interventions in order to combat obesity problems in Malaysia.

A57 Motivators and barriers in reducing weight among overweight and obese adults in Alor Gajah, Malacca: A qualitative study

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This paper aims to report on motivators and barriers in reducing weight among overweight and obese adults in Alor Gajah, Malacca. This qualitative study involved 23 overweight and obese Malay adults (6 males, 17 females) aged between 30-59 years. Data collection was conducted through three focus groups discussion (FGD) which consists of seven to nine subjects per group. The FGD were audiotaped, transcribed and coded by independent ratters and themes were captured through consensus among the researchers. Data was analysed by thematic analysis using the computer software package, NVivo 11. An ecological theory consists of four levels (intrapersonal, interpersonal, community and macro policy) was used as a guide to determine the motivators and barriers. Results showed that intrapersonal motivators were categorised into 3 themes ie, self-appearance, perception of being obese and health status. Whereas only one theme for interpersonal motivator which is tangible social support (family and friends). Availability and accessibility to physical activity and health information was found as community motivators while food pricing for macro motivators. There were two themes for intrapersonal barriers which included lack of nutrition knowledge and physical limitation (painful joints, shortness of breath, etc.).

Peers influenced and time constraints were categorised under interpersonal barriers. As for community barriers, three themes were found in this study included neighbourhood safety, eating out and availability and accessibility to unhealthy foods. This study concludes that overweight and obese people in semi-rural area are more motivated to reduce their weight. Therefore, weight reduction intervention program should sustain the motivators and eliminate the barriers as found in this study.

A58 Food insecurity and childhood obesity in Kuantan, Pahang

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The purpose of this study was to investigate household food security status and its relationship with childhood obesity in Kuantan, Pahang. This study was conducted in Kuantan among 128 mothers aged 18 to 55 years old. Data on food security was collected using Radimer/Cornell hunger and food insecurity instrument through telephone call interview. Height and weight were measured among 7 and 13 years old school children during schools visits. The result shows that 23% of the households were food secure, while 77% experienced food insecurity. Out of food insecure category, 52% were considered household food insecure, 9% women were individual food insecure and 16% fell into the child hunger category. Education of mother (p=0.047), income percapita (p=0.024) and household size (p=0.043) were the significant risk factors for household food insecurity. Among their children, the prevalence of overweight and obesity were 11.2% and 14.9% respectively. The prevalence of overweight/obesity were 51.7% in food secure households which was higher compared to food-insecure households (39.4%) but there is no association between childhood obesity and food security status. This study shows that the prevalence of food insecurity and childhood obesity in this area as a major concern. The results warrant the need for further investigation to identify the possible complex interaction of food insecurity and childhood obesity. Health intervention programs should include food security into consideration based on its adverse implications towards public health.

A59 Are body weight status, sociocultural influences, body image and self-esteem associated with disordered eating behaviours among adolescents in Sepang, Selangor?

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This cross-sectional study investigated factors associated with disordered eating behaviours among 610 adolescents from three randomly selected secondary schools in Sepang, Selangor. Height, weight and waist circumference were measured. Body mass index-for-age (BMI-for-age) was calculated and categorised according to WHO reference whereas waist circumference was classified using waist circumference percentile curves for Malaysian children and adolescents. Pubertal status, sociocultural influences, perception of body image, self-esteem and disordered eating behaviours were assessed by using Pubertal Development Scale, Sociocultural Influences on Body Image and Body Change Questionnaire, Contour Drawing Rating Scale and Body Appreciation Scale, Rosenberg Self-Esteem Scale and Eating Attitude Test-26(EAT-26) respectively. There were equal percentages of boys and girls (50%), 89.0% were Malay, 7.5% Chinese, 2.1% Indian and 1.3% other ethnicities participating in

this study. Around 41.0% of the respondents were overweight and obese and 6.8% thin and severely thin, 29.65% abdominal obesity, 37.7% were at risk of disordered eating and 18.9% were dissatisfied with their body size respectively. BMI-for-age($r=0.197, p<0.001$), waist circumference ($r=0.202, p<0.001$), self-esteem($r=-0.190, p<0.001$), feedback about size and shape of body from mother($r=-0.143, p<0.001$) and father($r=-0.141, p<0.001$), peers($r=-0.198, p<0.001$), perceived pressure to lose weight from father($r=-0.360, p<0.001$), mother($r=-0.347, p<0.001$), peers($r=-0.424, p<0.001$), media($r=-0.343, p<0.001$), perceived pressure to gain weight from father($r=-0.139, p<0.001$), mother($r=-0.155, p<0.001$), peers($r=-0.267, p<0.001$), media($r=-0.253, p<0.001$) and perceived pressure to gain muscle from father($r=-0.379, p<0.001$), mother($r=-0.356, p<0.001$), peers($r=-0.366, p<0.001$), media($r=-0.295, p<0.001$) were significantly associated with disordered eating behaviours. Mean disordered eating scores were significantly different between boys and girls ($t=3.725$, $p<0.001$) with girls scoring higher than boys. Multiple Linear Regression analysis showed that pressure to lose weight by peers, pressure to gain muscle by father, pressure to lose weight from media, pressure to gain weight by media, bmi-for-age, perception of body image and self-esteem were predictors for disordered eating behaviour explaining 31.0% of the variance. Intervention programs to prevent disordered eating among adolescents should take into consideration these factors.

A60 Multilevel of social organization and sustainability of long-term childhood obesity interventions: A systematic review

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Obesity has become a global epidemic and the prevalence of childhood obesity is increasing in Asia-Pacific region, including Malaysia. Many childhood obesity intervention programmes has been reported; however, empirical evidence investigating the sustainability of these interventions is of limited scope. This study aims to explore the extent of sustainability of childhood obesity interventions based on different levels of the Socio-Ecological Model (SEM), which comprises individual, interpersonal, organisation, community and policy levels by using a systematic review. Keyword search was conducted using online databases EBSCO, PubMed and Science Direct. Inclusion criteria included primary research, long-term childhood obesity intervention, overweight or obesity treatment or prevention intervention, papers published between January 2004 to November 2015 and available in the English language. This systematic searches lead to very little evidence of sustainability of long-term childhood obesity interventions. Out of 987 articles, only six studies met the inclusion criteria. The number of SEM levels that each intervention involved were: individual level (n=6), interpersonal level (n=3), organizational level (n=2), community level (n=5) and policy level (n=1). Furthermore, these findings shows a lack of long-term treatment studies and policy level intervention. Based on SEM, it was found that multilevel and cross-level childhood obesity intervention is still largely lacking. Building on sustainable childhood obesity interventions, future interventions should aim to incorporate sustainable components in interventions and include as many levels as possible. Attention should be given to implementing longer duration interventions, which is more than 12 months, to ensure long-term effectiveness in childhood obesity management programmes.

A61 Motivation and barriers to participation of physical activity among Malay children

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Physical inactivity is a major risk factor for obesity and other health-related consequences in children. Hence, it is important to understand the motivation and barriers to participation of physical activity (PA) as determinants of PA. This investigation aimed to identify the motivation and barriers to PA for Malay children and to examine the association between these motivation and barriers with PA. A total of 294 Malay children (165 boys and 129 girls) aged 9 to 14 years were recruited from national primary and secondary schools in Kuala Lumpur using single stage cluster sampling. Body weight and height were measured and body mass index (BMI) was calculated. Information on PA level, motivations and barriers to PA were obtained from self-administered Physical Activity Questionnaire for Older Children (PAQ-C) and PA-related barriers and motivation questionnaires, respectively. Participants were categorised as low PA (PAQ-C score below 2.05), moderate PA (2.05 to 2.89) or high PA (2.90 or more) according to Noorashikin 2014. Mean age, weight, height and BMI were 12.2±1.7 years, 44.6±16.4 kg, 147.6±11.6 cm, and 20.0±5.6 kg/m^2, respectively. More than half the children (52.1%) had moderate PA level while only 21.2% had high PA level. A greater proportion of boys reported higher PA than girls (Chi-square=31.70, $p<0.001$). Intrapersonal and physical-environment were two of five domains of barriers to participation of PA that were reported by more than 50% of the children. Fear of injury (Chi-square=7.18, $p<0.05$) and inappropriate clothing (Chi-square=12.34, $p<0.05$) were associated with low PA level. However, none of the motivators were associated with PA level. Overall, this study showed that children's physical activity is associated with certain intrapersonal barriers. Hence, strategies to address intrapersonal barriers to PA participation should be emphasised in future PA intervention programmes among children in Malaysia.

A62 Association of stress and weight status among a group of Malaysian Punjabis

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Stress has been linked to be a contributing factor to the emerging obesity epidemic globally. This study was aimed to explore the association of stress with weight status among the Punjabis mainly because Punjabis has been reported with rapidly increasing percentage of obese adults. There were 217 Punjabi adults recruited through convenient sampling method in this cross sectional study. A total of 110 males (51%) and 107 females (49%) participated in the study. Weight status was determined using the Body Mass Index (BMI) standards and abdominal obesity through the waist circumference measurement. Perceived Stress Scale-10 (PSS-10) questionnaire was used to assess perceived stress level of the participants. The mean score for PSS-10 was reported at 19.39 ± 3.75, and the mean BMI was 25.5±4.5 kg/m^2. Pearson correlation coefficient revealed a significant positive relationship of BMI ($r=0.33$, $p<0.05$) and waist circumference ($r=0.36$, $p<0.05$) with age. Besides that, significant differences ($p<0.05$) in BMI across different educational level was also noted whereby those with primary education level had the highest BMI (28.68 ± 5.34). PSS-10 score had an inverse relationship with age ($r=-0.212$, $p< 0.05$). Those in the middle (20.36 ± 3.67) income range had significantly higher mean PSS-10 scores followed by those from the lower (19.67 ± 3.96) and higher (18.49 ± 3.44) income groups. Perceived stress was found not to be significantly associated with BMI and abdominal obesity. In conclusion, the findings of the present study did not reflect the association of perceived stress with obesity

in a sample of Malaysian Punjabis. Longitudinal studies are recommended to further explore this association with obesity.

Group D: Clinical Nutrition/Intervention Trials

D01 Effect of zinc on the intestinal tight junction proteins

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Intestinal tight junction proteins (ITJPs) are situated in between the enterocytes of the intestine and are important component of intestinal barrier. ITJPs include claudin, occludin, junctional adhesion molecules. Structurally intact and functionally active tight junction proteins prevent the passage of luminal harmful agents into the systemic circulation. However, several factors such as high fat diet, malnutrition and inflammation of the intestine are associated with disruption of tight junction proteins. Disruption of tight junction proteins leads to increased passage of antigenic materials into the circulation, which is responsible for different pathologic conditions in the body. Zinc is an important trace element for the health and development of the components of intestinal barrier including tight junction proteins. Objective of this research was to review the articles about the effect of zinc, either supplementation or deficiency on the ITJPs. We searched pubmed, google scholar and scopus using the key words zinc, tight junction proteins, intestinal permeability, claudin, occludin, junctional adhesion molecules. We retrieved a total of 39 articles. After initial screening, we selected 9 articles for this review. Out of the 9 studies, 5 were animal experiments, 3 were in vitro experiments and 1 study had both animal and in vitro components. Two studies observed deleterious effect of zinc deficiency on the ITJP. Seven studies observed beneficial effect of zinc on the ITJPs. These findings have great promise in clinical setting for the management of patients with impaired intestinal barrier including ITJPs.

D02 Association of salivary flow rate and amylase activity with fasting blood glucose and lipids among young Malaysian Adults

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The alarming increase in type 2 diabetes mellitus (T2DM) especially among the Indian ethnicity in Malaysia, underscores the need for efficient screening and preventive strategies. Many people go undiagnosed in the early stages due to the fear of being pricked. As diabetes alters saliva composition, salivary markers have aroused interest as alternative biomarkers for the diagnosis and prognosis of diabetes. Salivary amylase with its effect on carbohydrate tolerance is specifically of interest. This pilot cross-sectional study investigated the association of salivary flow rate, amylase concentration and activity with fasting blood glucose (FBG), and fasting serum lipids (FSL) among healthy Malaysians of Indian ethnicity (n=80). Unstimulated saliva and blood was collected after overnight fasting. FBG and FSL were analysed using capillary blood samples. Salivary amylase was analysed using commercial Enzyme-Linked Immunosorbent Assay (ELISA) kits. The subjects had a median age of 22 (4) years and a mean BMI of 22.3±6.8 kg/m2. Mean FBG was 5.30 +0.8 mmol/L, with 90% of the subjects having normal FBG levels. Despite their young age, acceptable BMI and FBG of the subjects, 69% of the subjects had LDL-cholesterol >2.59 mmol/L and 46% of the subjects had TC:HDL ratio >3.5mmol/L. Around 4% of the subjects had triglycerides >1.69mmol/L. Salivary flow rate (0.8 (0.75) vs. 1.21(0.65)

ml/min, p =0.002) and amylase activity (37.11 (52.8) vs 78.6 (83.2) μg/min, p=0.012) were significantly reduced in subjects with triglyceride levels above the group median as compared to those with triglycerides at or below the median . Salivary flow rate was found to be inversely associated with FBG after being adjusted for BMI (r = - 0.292, p = 0.009). Therefore, salivary flow rate could be further investigated as a novel non-invasive and economical measure to stratify diabetes risk among individuals. The association between salivary amylase activity and triglycerides levels also needs further investigation.

D03 Factors associated with compliance of dietary sodium recommendation among predialysis chronic kidney disease patients in Hospital Serdang, Selangor

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Cardiovascular disease is one of the most common causes of morbidity and mortality in chronic kidney disease (CKD) patients. Compliance with dietary sodium recommendation is essential in controlling blood pressure and preventing further deterioration of kidney function. However, data regarding dietary sodium intake of predialysis patients in Malaysia is scarce. Therefore, a cross-sectional study was conducted to determine the factors associated with compliance of dietary sodium recommendation among predialysis patients in Hospital Serdang, Selangor. The respondents were patients aged above 19 in Nephrology Outpatient Clinic, and they were recruited on convenient sampling basis. A structured questionnaire comprising of socio-demographic characteristics, WHO's Knowledge Attitude and Practice questionnaire and Food Frequency Questionnaire was used during interview session. The anthropometric data, biochemical data and clinical factors were obtained from medical records. Compliance to dietary sodium intake was calculated based on K/DOQI Guideline 2004 (<2.4g/day). The level of statistical significance was set at $p<0.05$. A total of 111 respondents with mean age of 64.5±11.1 years old were participated in the study. There were 58 males and 53 females, while majority were Malay (64%) and unemployed (84.7%). A total of 51 respondents had prior exposure to nutrition education. The non with dietary sodium recommendation was 38.7%, with the mean dietary sodium intake of 1874±983 mg/day. There was a positive association between exposure to nutrition education with compliance towards dietary sodium recommendation (x^2=4.224 p=0.04). Knowledge level was statistically associated with compliance of dietary sodium recommendation (x^2=4.869, p=0.027) where higher proportion of respondents who complied (86.9%) had higher knowledge level compared to those who were not complied (67.4%). Specific food groups that contributed to high sodium intake were cereals and grains products, fast food, fish and seafood, confectionaries and condiments. In conclusion, these findings are vital to manage the determinants to control blood pressure in CKD.

D04 Effect of gender on energy expenditure in young competitive triathletes during an incremental treadmill exercise test

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The triathlon is an endurance sport consisting of three disciplines namely swimming, cycling and running over a variety of distance. Knowing the Energy Expenditure (EE) required for the activity is important in order to plan the nutritional strategy for the athletes. The

present study was designed to determine the EE required during the different completed stages of an incremental exercise test among young competitive male and female triathletes from Malaysia. A total of 9 male and 7 female triathletes (age and BMI match) took part in the study. They performed a running test (Bruce Protocol) on a treadmill connected to a metabolic cart (COSMED Quark CPET) which measures breath by breath values of gas flow and exchange. At every stage, the speed and gradient of the treadmill increased at 3 minute interval. The average EE at each stage was calculated for male and female triathletes and Student t-test was used to test for statistical significance. A p value of <0.05 was considered significant. The result showed male triathletes' EE were significantly higher in Stage 1 (14.47±3.10 kcal) and Stage 2 (21.80±2.823 kcal) than female (12.47±0.546 kcal & 18.70±0.961 kcal respectively). As the exercise entered the Stage 3 and 4, the differences in EE between male and female young triathletes were absent. Our results indicate that male and female triathletes required a different amount of calories at the initial stage of exercise to supply the energy needed by the muscles to complete the test.

D05 Factors associated with dietary phosphorus compliance among maintenance hemodialysis patients in selected dialysis centres in Selangor

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Hyperphosphatemia are highly prevalent in dialysis patients and implicated in pathophysiology of cardiovascular disease in this population. Thus, dialysis patients are required to follow a strict dietary regimen to control their phosphate level. However, data regarding dietary phosphorus compliance in Malaysian dialysis population is scarce. Therefore, this study was conducted to determine the factors associated with dietary phosphorus compliance among maintenance hemodialysis patients in selected dialysis centres in Selangor. This was a cross-sectional study conducted in selected dialysis centres in Selangor. Subjects completed a set of questionnaire comprising sociodemographic background, anthropometry, biochemical, patient adherent and a set of food frequency questionnaire to estimate the energy, protein and dietary phosphorus intake. A total of 88 subjects (58% male and 42% females) with a mean age of 53 ± 12 years old were recruited. 23.9% of the sujects reported has high dietary phosphorus intake. Mean dietary phosphorus intake estimated was 808 ± 472 mg/day while it is still within the range of recommended dietary phosphorus intake. The serum phosphorus level (1.95 ± 0.79 mmol/L) shows that 52.3% of the subjects were reported have high serum phosphorus level. There was a negative correlation between dietary phosphorus intake and age ($r= -0.332$, $p<0.01$). Dietary phoshophorus intake was positively correlated with inter-dialysis weight gain (IDWG) ($r= 0.278$, $p<0.01$), serum calcium ($r= 0.21$, $p<0.05$), and total energy ($r= 0.644$, $p<0.01$). Interestingly, there were no association between sociodemographic data and anthropometric data with dietary phosphorus compliance. This study concludes unsatisfactory compliance level towards dietary phosphorus, fluids and prescribed medication. Energy intake of hemodialysis patients is relatively low compared to recommended (13 ± 7 kcal/kg body weight). The compliance toward dietary phosphorus recommendation were associated with age, IDWG, serum calcium level and total energy intake.

D06 Association between nutritional status, physical activity and psychological health among type II diabetes mellitus patients at Hospital Universiti Sains Malaysia (HUSM), Kelantan

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This study examined the association between nutritional status, physical activity (PA) level and psychological health among type II diabetes mellitus (T2DM) patients aged from 18 to 69 years old, using the cross sectional study from patients who attended outpatient diabetic clinic, Hospital Universiti Sains Malaysia (HUSM), Kelantan between January 2016 and April 2016. Respondents completed three questionnaires, which included personal data questionnaire, International Physical Activity Questionnaire (IPAQ) that examined their PA level through questions on the number of days and time spent in walking, moderate and vigorous intensity PA and Hospital Anxiety and Depression Scale (HADS) questionnaire that used to screen their psychological health (anxiety and depression) in the past 7 days on the time of data collection. Nutritional status of the respondents were determined through the measured standing height and weight by using SECA stadiometer and weight scale. BMI was then calculated using the measured standing height and weight. A total of 148 respondents participated in this study. The mean weight, standing height and BMI were 72.7 ± 13.9kg, 158.6 ± 8.4cm and 29.0 ± 5.4kg/m^2 respectively. Based on the WHO revised cut-offs BMI for Asian population, the prevalence of overweight and obesity of the respondents were 30.4% and 58.1% respectively. A total of 23.0% of the respondents were physically inactive, while 37.8% and 39.2% were physically minimally active and health-enhancing physical activity (HEPA) active respectively. Of the total, 13.5% and 19.6% of the respondents were detected with anxiety and depression respectively. Significant association was found between BMI and anxiety ($p<0.05$). Nevertheless, no association was detected between BMI and depression as well as PA with anxiety and depression. The absence of association between these variables demonstrates the needs of future findings to be conducted with regard to other possible associated factors that may contributed to deterioration of psychological health among T2DM patients.

D07 Dietary carbohydrate quality is associated with total and LDL cholesterol among young Malaysians

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Cardiovascular disease (CVD) accounts for the largest number of deaths in Malaysia. Growing evidence shows that the risk of CVD increases in people with higher dietary glycaemic index (GI) and glycaemic load (GL). Therefore, this study investigated the association of dietary GI and GL with fasting serum lipids, among healthy adult Malaysians of Indian ethnicity. This cross-sectional study included 80 men and women, aged 18-45y, staying in Kuala Lumpur. Dietary GI and GL of subjects were assessed using the Malaysian Adult Nutrition Survey food frequency questionnaire and analysed using DietPLUS version 3. Total and HDL and LDL cholesterol were measured using a handheld serum lipid analyser (AccuTrend Plus, CardioChek PA, New Zealand). LDL cholesterol was calculated using the standard formula. The mean calorie intake of the subjects was 2110 Kcal, with a GI and GL of 57 and 164 units respectively. Despite their young age (median 22 (4) years) and acceptable BMI range (22.3±6.8 kg/m^2), 69% of the subjects had LDL- cholesterol >2.59 mmol/L and 46% of the subjects had TC: HDL ratio >3.5mmol/L. Around 4% of the subjects had triglycerides >1.69mmol/L. A small but significant positive correlation was observed between GI and LDL cholesterol ($r = 0.261$, $p = 0.019$). After adjustment for caloric intake, GL was positively

correlated with total (r = 0.258, p = 0.023) and LDL cholesterol (r = 0.268, p = 0.016). In the stepwise regression model, GI and calorie adjusted GL remained significant predictors of LDL and total cholesterol respectively. Every 10 unit decrease in GL/1000 kcal resulted in 0.2mmol/L decrease in total cholesterol. Furthermore, every 10 unit decrease in GI also decreased LDL by 0.54 mmol/L (i.e. ~ 10% CVD risk reduction). These magnitude of GI/GL changes are easily achievable through minimal dietary changes in the Malaysian context. There is a need to verify these findings in larger studies and in older participants.

D08 Effect of soy milk consumption on ultraviolet protection and whitening of skin among the female students in FSK, UKMKL

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This study was conducted to investigate the effect of soy milk on ultraviolet (UV) protection and whitening of skin among female subjects. This interventional study involved 30 female students of Universiti Kebangsaan Malaysia Kuala Lumpur, who were selected using convenience sampling method. Each subject was provided with two boxes of soy milk a day, for duration of 8 weeks. Measurement for skin brightness and UV protection was carried out in the Dermatology Laboratory, Universiti Kebangsaan Malaysia Medical Center. UV protection was measured using UVA for skin pigmentation and UVB for skin burning using a Mexameter. Radiation doses of UVA were given from 2.0. 2.8, 3.5, 4.3 and 5.0 J/cm^2. The UVB doses given were 32, 44, 56, 68, 80, 52, 72, 91, 111 and 130 mJ/cm^2. The study found that soy milk increased skin brightness significantly ($p<0.05$) on the face and gluteal region with a value increase from 30.07±3.09 to 30.89±2.94 and 29.00±6.32 to 29.94±6.18 chromameter units, respectively. Results for skin UV protection showed significant values ($p <0.05$) at high doses of UVA with the reductions in erythema at the dose of 4.3 J/cm^2 was 14.51±2.48 to 13.76±2.60 Mexameter units and at a dose of 5.0 J/cm^2 was 14.53±2.62 to 13.61±2.59 Mexameter units, respectively. Results for UVB protection showed significant ($p<0.05$) reduction in erythema of the skin to all doses of the UVB with reading of erythema decreased from 14.68±2.46 to 13.84± 2.92 for the lowest dose and for the highest dose from 18.01±2.21 to 16.19±1.81 Mexameter, respectively. There was a positive association between the consumption of soy products with the effect of brightness and UV protection of the skin. In short, this intervention study of consuming soymilk for 8 weeks showed promising results in protecting and whitening the skin of the young females in this study.

D09 Objectively measured physical activity among breast cancer survivors in East Coast of Peninsular Malaysia

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The rationale for recommendation of physical activity in cancer survivors relates to minimizing the biological processes associated with cancer promotion and enhancing behavioural changes linked with minimising lifestyle risk factors for cancer recurrence. This study aims to measure physical activity objectively among breast cancer survivors. A cross-sectional study involving 60 breast cancer survivors was carried out in two main government referral hospitals in the East Coast of Peninsular Malaysia. Participants wore

an activPAL^{3TM} monitor for seven consecutive days on the midpoint of the anterior aspect of the right thigh. The activPAL^{3TM} directly records total time spent sitting or lying, standing and stepping every 15 seconds and number of steps per day. Participants were required to provide at least four days of valid data (including one weekend day) for their data to be included in the analysis. A valid day was considered to be 600 minutes or more of recording during waking hours (i.e. from 6 am to 11 pm). The mean age and BMI of breast cancer survivors were 54.0 ± 7.5 years and 27.9 ± 4.9 kg/m², respectively. The majority of the survivors were diagnosed at stage 2 (58.3%). Most of their daily time were spent sitting/ lying/sleeping (16.61 ± 1.93 hours/day; 69.2%) compared to standing (5.35 ± 1.55 hours/ day; 22.3%) and stepping (1.84 ± 0.61 hours/day; 7.7%). The total steps among survivors were 6583 ± 2326 steps/day and the total sleeping hours were 5.97 ± 1.09 hours/day. Mean step counts per day were then classified into four categories i.e. sedentary lifestyle (21.7%), low active (43.3%), somewhat active (28.3%), active (6.7%). None were categorised as highly active. A small proportion of survivors (6.7%) met the physical activity recommendation (≥10,000 steps/day). The physical activity pattern was comparable between weekdays and weekends ($p>0.05$). However, there was a significant difference in total steps per day between weekdays and weekends (7561 steps vs. 7861 steps; $p<0.001$). In conclusion, breast cancer survivors spent most of their waking hours doing sedentary activities. Strategies to displace sitting or lying with stepping or standing, increasing number of breaks from sedentary activity, and reducing sedentary bouts might be beneficial in increasing survivorship and preventing cancer recurrence.

D10 Factors associated with metabolic syndrome among severe mental illness patients at selected government hospitals

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This cross-sectional study aimed to determine factors associated with metabolic syndrome (MetS) among severe mental illness patients attending psychiatric outpatient clinic in Hospital Kuala Lumpur and Hospital Kajang. A total of 151 outpatients (45.0% males and 55.0% females) with a mean age of 41.84±12.19 years fulfilled the selection criteria were informed to fast prior to blood taking in order to check for lipids profile and glucose level. The diagnosis of severe mental illness was based on the Mini International Neuropsychiatric Interview (MINI) while MetS was defined based on the Harmonized criteria. Information on socio-demographic background, clinical characteristics, physical activity level, smoking behavior, alcohol consumption, and nutritional supplement used were collected in a face-to-face interview. Body weight, height, waist circumference and blood pressure were measured. The prevalence of MetS was 51.0% and higher among males (48.5%), unmarried (56.2%), middle aged group (57.5%) and Schizophrenia (52.1%) patients. Overweight and obese patients were approximately 3 times and 11 times more likely to develop MetS, respectively (overweight: OR=2.9, 95% CI:1.2-7.3; obese: OR=10.8, 95% CI:3.6-32.3). Middle age group (OR=2.7, 95% CI:1.0-7.1) and older age group (OR=4.1, 95% CI:1.1-15.8) were also associated with MetS. In conclusion, prevalence of MetS among mental illness patients was high. Intervention programs targeted at preventing and reducing MetS should be planned for mental illness patients, especially among those who are overweight and obese and those in middle and older age groups.

D11 Erythrocytes fatty acid composition between type-2 diabetes and non-diabetes volunteers

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Lipid composition of membrane erythrocyte partially determined blood viscosity which can affect membrane flow and oxygen circulation. The alteration of erythrocytes structure of diabetic may due to modification of the membrane lipid composition hence membrane fluidity. Erythrocytes membranes fatty acid of diabetes patient has abnormal properties as they are less fluid, fragile and less flexible. The objective of this study is to investigate the erythrocyte fatty acid composition between diabetes and non-diabetes. 40 erythrocytes samples (20 diabetes & 20 non-diabetes) from another bigger study were selected for the determination of fatty acid composition. Erythrocyte lipid content was extracted by Folch method and the lipids (neutral and polar lipid) were further hydrolysed before derivatised into fatty acid methyl ester (FAME). The fatty acid composition of membrane erythrocyte was determined by gas chromatography. The percentage of total saturated fatty acid, SFA (C14:0, C15:0, C16:0, C18:0, C21:0 & C24:0) was higher in non-diabetes (67.67%) and in diabetes samples (65.69%). The percentage of total monounsaturated fatty acid, MUFA (C16:1, C18:1n9c & C20:1) was higher in non-diabetes sample with 18.13% compared to diabetes sample (15.72%). In contrast, the percentage of total polyunsaturated fatty acid, PUFA (C18:3n3, C20:3n3, C18:2n6c, C18:3n6, C20:3n6 & C40:4n6) was higher in diabetes samples (18.19%) than in non-diabetes sample (10.09%). There were significant different in the C15:0 content in the diabetes (1.81 ±± 1.03) and non-diabetes (3.56 ±± 2.89; t= -2.222, p= 0.040). Similarly there is a significant different on the content of C18:2n6c in the diabetes (12.01 ±± 3.28) and non-diabetes (1.98 ±± 0.51; t= 2.185, p= 0.045). The P/S and M/S ratio for diabetes group was 0.284 and 0.269 respectively. For non-diabetes group the P/S ratio was 0.155 and M/S ratio was 0.320. The result are varies and not consistent. More study need to be done to concrete the result.

D12 The effectiveness of an education program on the metabolic profile of type 2 diabetics in Iran

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Patients have a major role in the control and treatment of type 2 diabetes and their knowledge on different aspects of this disease is very important. This interventional study with experimental and control groups was conducted to determine the changes of metabolic profile of diabetics after 12 weeks educational intervention and 6 months follow-up. This intervention study was carried out among 200 Iranian type 2 diabetics, aged 34 to 65 years, attending the Diabetes Clinic at Golestan Hospital, Ahvaz, Iran. Clinical parameters including glycated hemoglobin A1c level (HbA1c), fasting blood glucose and metabolic parameters which included anthropometric measurements and lipid profile were measured pre and post intervention. The intervened diabetics were given educational intervention which included dietary and physical activity modules to improve their metabolic profile. Fifty percent of the diabetics were female and 50 % were male. At week 36, for follow-up visit diabetics in intervention group had significantly reduced FBS, HbA1c, TG, TC and BMI compared to control group ($p<0.001$). At this visit, all metabolic variables of the intervened diabetics had significantly larger reduction than control group. In conclusion, 3 months intensive educational program and six months follow-up demonstrated a clinically

relevant significant improvement of metabolic profiles and HbA1c in the intervention group compared to the control group. These effects were sustained even at 6 months, indicating that the intervention had an impact on the self-care behaviors of patients with type 2 diabetes. These findings emphasize the importance of improving knowledge and awareness related to diabetes. Health care providers should develop educational programs and encourage diabetes patients to have healthy lifestyle.

Group F: Experimental Nutrition

F01 Altered expression of M cells and tight junction proteins of ileum of rats fed high fat diet

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High fat diet (HFD) compromises intestinal barrier. But, the mechanism is poorly understood. M cells and intestinal tight junction proteins (TJPs) of the villi and Peyer's patches (PP) are important component of intestinal barrier which might be compromised by consumption of high fat diet (HFD). Objective of this study was to investigate the effects of HFD on the expression of M cells and TJPs claudin-3, claudin-4 and occludin in the villi and PP of rats fed high fat diet (HFD). Four weeks old, twenty male Wistar rats were divided into chow (n=10) and HFD (n=10) groups. After 6 weeks, ileum segment containing Peyer's patches (PP) were collected and immunohistochemical staining was performed. Fecal calprotectin (FCP) level was measured using enzyme linked immunoassay kit. M cell expression in the PP (2.3 ± 0.675 vs 1.125 ± 0.354, p = 0.004) and villi (2.3 ± 0.458 vs 1.625 ± 0.518, p= 0.045) were significantly higher in HFD group than the control. Claudin-3 expression in the PP and villi was not different significantly between the two groups. Claudin-4 expression in the PP (1.6 ± 0.669 vs 2.1 ± 0.583, p = 0.018) and villi (1.55 ± 0.597 vs 1.975 ± 0.670, p = 0.015) was significantly decreased in HFD group than the control. Occludin expression in the PP of HFD group was significantly decreased compared to the control group (1.2 ± 0.4 vs 2.0 ± 0. 633, p = 0.001) but was not significantly decreased in the villi. FCP level in HFD group was significantly higher compared to the control (49.058 ± 1.174 vs 40.172 ± 4.0852, p = 0.016). HFD consumption for 6 weeks leads to increased M cell expression and reduced claudin-4 and occludin expression in male Wistar rats which were associated with intestinal inflammation.

F02 Anti-obesity and anti-diabetic effects of *Elateriospermum tapos* crude extracts *in vitro*

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Elateriospermum tapos is rich in fatty acids and phytochemicals. These compounds are well-known to have anti-obesity and anti-diabetic effects. This study was aimed to investigate the anti-obesity and anti-diabetic potentials of *E. tapos* seed and shell via the inhibition of pancreatic lipase, α-amylase, and α-glucosidase *in vitro* using hot aqueous, cold aqueous, and ethanol extracts. Enzymatic inhibition assays were performed with porcine pancreatic

lipase, α-amylase, and α-glucosidase using respective assay kit. Percentage of inhibition was determined. Results showed that all the sample extracts (0.1 mg/ml) inhibited the activities of pancreatic lipase, α-amylase, and α-glucosidase. The inhibitions varied depending on the extraction condition. Ethanol extracts had the highest lipase inhibition (22.50 ± 1.11%) in seed but the lowest (20.93 ± 0.37%) in shell. For α-amylase and α-glucosidase inhibitions, ethanol extracts were the highest in both seed (61.97 ± 1.16% and 53.65 ± 3.23% respectively) and shell (22.27 ± 8.59% and 32.60 ± 7.73% respectively). By taking into consideration of extraction temperature, hot aqueous extract exhibited stronger lipase inhibitory effect than cold aqueous extract in both seed (16.49 ± 0.81% vs. 4.84 ± 5.65%) and shell (39.79 ± 5.01% vs. 37.74 ± 4.04%) but cold extracts were relatively much suitable for heat-labile α-amylase and α-glucosidase inhibitors in both seed (31.52 ± 4.33% vs. 32.03 ± 2.89% and 16.54 ± 1.60% vs. 7.52 ± 1.60% respectively) and shell (37.65 ± 6.51% vs. 7.24 ± 9.76% and 23.31 ± 1.60% vs. 15.98 ± 0.80% respectively). Among the plant parts, shell generally had higher lipase and α-glucosidase inhibitory effects but lower α-amylase inhibition than seed. By inhibiting the main digesting enzymes for lipid (lipase) and carbohydrate (α-amylase and α-glucosidase), the digestion and absorption of these nutrients could be reduced, controlling the energy and sugar intakes. These outcomes demonstrated the great potential of *E. tapos* as natural therapeutic agent for obesity and diabetes.

F03 Inhibitory effects of pancreatic lipase, α- amylase and α- glucosidase in *Lasia spinosa in vitro*

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Lasia spinosa (L.) Thwaits (Araceae) is a spinous perennial herb. Various parts of it are widely used in many Southern Asia countries to manage wide range of diseases in local traditional medicine practices. This study was aimed to investigate the anti-obesity and anti-diabetic potential of *Lasia spinosa in vitro*. The present study evaluated anti-obesity and anti-diabetic potential of various parts (leaf, stem and root) of *Lasia spinosa* via inhibition of pancreatic lipase, α-amylase and α-glucosidase using hot aqueous, cold aqueous and ethanol extracts. Percentage inhibitions of these three enzymes were determined using Sigma Aldrich Co. commercial kits. Most of sample extracts (0.1 mg/ml) showed inhibition activities against pancreatic lipase, α-amylase and α-glucosidase. *Lasia spinosa* stem showed the highest inhibitory effect in ethanol extract (45.48 ± 1.76%) while root in ethanol extract showed the lowest (15.30 ± 0.44%) against pancreatic lipase activity. For α-amylase inhibition activities, *Lasia spinosa* leaf showed the highest result in hot water, cold water and ethanol extracts (46.03 ± 0.01%, 45.71 ± 0.44% and 33.80 ± 3.27%, respectively) when compared to stem and root parts. The result of α-glucosidase inhibition, leaf and root part in ethanol extracts showed the highest α-glucosidase inhibitory effects (36.23 ± 0.86 % and 27.73 ± 2.88 %, respectively). Among the plant parts, stem has higher pancreatic lipase inhibitory effects while leaf had generally higher α-amylase and α-glucosidase inhibitory effects compared with stem and root parts. Hence, the observed inhibitions of pancreatic lipase, α-amylase and α-glucosidase suggest that the stem and leaf extracts of *Lasia spinosa* may have the potential in treatment of obesity and diabetes mellitus, respectively.

F04 The effect of Tween 80 on blood levels of lipid, leptin, and glucose in rat model

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Tween 80 (polysorbate 80) has been commonly used as a food additive, acting as an emulsifier in many processed food such as ice creams, pudding and frozen desserts. Previous research reported Tween 80 to cause metabolic dysfunction leading to obesity hence, suggesting additional studies to determine the effect of Tween 80 on metabolic parameters. Therefore this study investigated the effects of Tween 80 on fasting blood lipid, leptin and fasting blood glucose (FBG) while monitoring each rat for its body weight, water and food intake. Sprague Dawley (SD) rats, were orally gavaged with three different concentrations of Tween 80 (0.5%, 1%, 2%), and compared with control (distilled water) (n=6 per group), for a duration of 35 days. The results are expressed as MEAN±SEM and the hypothesis was tested with one-way analysis of variance (ANOVA) using Tukey HSD test. The results showed that 1% of Tween 80 increased rat serum lipid levels of total cholesterol (8.30±0.17 vs 1.38±0.27, $p<0.001$), high density lipoprotein (6.80±0.16 vs 1.16±0.19, $p<0.001$), low density lipoprotein (0.40±0.08 vs 0.00±0.00, $p<0.01$), very low density lipoprotein (1.50±0.08 vs 0.30±0.09, $p<0.001$), triglyceride (3.40±0.18 vs 0.62±0.16, $p<0.01$) and ratios of total cholesterol : high density lipoprotein (4.91±0.05 vs 0.85±0.04, $p<0.001$) significantly in comparison to the control. Rat weight, water intake, food intake, FBG and leptin were not significantly different when compared with control ($p>0.05$). Tween 80 shows significant hyperlipidaemic effects in rats. The, hyperlipidemic effect seen with Tween 80 suggests that further evaluation of the metabolic effects of emulsifiers are necessary.

Poster Presentations: Day 2 (Groups B, C and E)

Group B: Dietary Intake, Consumption Pattern and Diseases

B01 Associations between usage of nutritional label and nutrient intake, body mass index and physical activity level of consumers in the Klang Valley

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Ministry of Health Malaysia has initiated the Nutritional Labelling and the Food Regulation Act to make nutrition labelling compulsory for certain foods in 2003. Although nutrition education is not the primary aim of the Nutritional Labelling and the Food Regulation Act, it does support the nutrition education activities as it promotes sound nutrition principles in the formulation of foods. Therefore, this study was carried out to determine the association between the usage of nutritional label and nutrient intake, body mass index (BMI) and physical activity level (PAL) of consumers in Klang Valley. A total of 97 adults Malaysian consumers participated in this study. The information on socio-demographic, usage of nutritional label, dietary intake and PAL were collected using questionnaires, Food Frequency Questionnaire (FFQ) and Short-International Physical Activity Questionnaire (s-IPAQ) respectively. Energy and nutrient intake were analysed using Diet-plus software and physical activity level was categorised based on Metabolic Equivalent scores (METs). Body weight and height were measured using TANITA HD 319 weighing scale and SECA 213 collapsible stadiometer. The results indicated that 84.5% respondents do read the information on nutritional claims and 73.2% used the nutritional facts table during food purchase. There was no significant difference in total energy and nutrient intake, BMI, and PAL between those who read nutritional claims and those who did not ($P > 0.05$). However, with the nutritional facts table, we found a significant difference in total energy and protein intake between users and non-users ($p < 0.05$), nonetheless no difference in BMI and PAL. We concluded that the usage of the nutritional facts table was associated with only energy and protein intake but not with other nutrients, BMI or PAL.

B02 Consumption of fruits and vegetables may lower body mass index among adolescents in rural area Kuala Selangor

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Increasing fruits and vegetables consumption has played important role in weight management among adolescents.This cross-sectional study was carried out to determine relationship between consumption of fruits and vegetables with body mass index (BMI) among adolescents. A total of 412 adolescents (n=233 girls and n=179 boys) aged between 13 to 14 years old randomly selected were participated in this study. Antropometric measurements taken were weight, height and subsequently BMI was calculated. 3 days 24-hour diet recall (2 weekdays, and 1 weekend) by face-to-face interviewing to determine consumption of fruits and vegetables based on Malaysian Dietary Guideline 2010 (MDG).19.5% (n=36) adolescents were thin, 48.1% (n=309) were normal body weight,

18.6% (n=40) were overweight and 13.8% (n=27) were obese. Based on 24-hour diet recall, 47.3% (n=195) never consumed fruits. Only 10.7% (n=44) consumed 2 or more serving of fruits per day and meet the requirement, while 42% (n=173) not meet the requirement for consumption of fruits per day. The result also showed 31.3% (n=129) adolescents never take vegetables. While only 1.5% (n=6) meet the requirement for consuming 3 serving vegetables per day and 67.2% (n=277) not meet the requirement for consumption of vegetables per day. The mean BMI of adolescents who consumed 2 servings of fruits were lower (19.86 ± 4.19 kg/m^2) than adolescents who never consumed fruits (23.34 ± 4.47kg/m^2).While mean BMI of adolescents who consumed 3 servings of vegetables were lower (19.20 ± 4.51 kg/m^2) than adolescents who never consumed vegetables (24.32 ± 4.57kg/m^2). Mean BMI of the adolescents were not significantly correlated with the consumption of vegetables (r=-0.023, p=0.672) nor fruits (r=-0.052, *p*=0.445).The findings of this study suggest that increasing the consumption of fruits and vegetables based on MDG may be an effective strategy to control BMI among adolescents.

B03 Factors associated with satisfaction of hospital food among adult patients in Hospital Serdang, Selangor

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This is a cross sectional study that was aimed to identify the factors associated with satisfaction of hospital food among adult patients in Hospital Serdang, Selangor. Questionnaire consists of sociodemographic background, medical background, nutritional status, plate waste, food access and satisfaction with hospital food. The nutritional status of subjects was measured using Malnutrition Universal Standard Tools (MUST). 54 subjects were recruited with the mean age of 31.96±10.558 year old. The mean BMI for subjects was 25.57±5.99 kg/m^2 which female showed higher mean BMI compared to male 27.017±6.763 and 24.497±5.200 respectively. Majority of the subjects (68.5%) were in low risk of malnutrition and 31.5% of them were in medium and high risk of malnutrition based on MUST Tool Screening. Food wastage category of below 75% was found to be the highest count (37%) among subjects during hospitalization. In term of food access in the hospital, subjects rated highest in the food quality domain with the mean score of 12.57±3.33 whereas physical barrier is the domain which has the lowest mean score 7.76±2.95 Majority of the subjects (70.4%) rated overall satisfaction of hospital food service as "Okay" and only 1.9% of them rated it as "Very poor". Statistical test showed that there was significant association between plate waste with satisfaction of hospital food (r=-0.145, p<0.05). In conclusion, plate waste variable was found to be associated with overall satisfaction of hospital food among adults in Hospital Serdang.

B04 Validity and acceptability of image-based food record in assessing nutrient intake among undergraduates from Department of Nutrition and Dietetics, Universiti Putra Malaysia

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Considering limitations of current dietary assessments methods, attention is recently being

drawn to the image-based food record (IBFR) in assessing nutrient intake. The IBFR is referred to the used of captured image or video on food and beverage taken during all eating episodes to assess individual dietary intake. This study aimed to validate the IBFR (Phase I) and to determine acceptability of the IBFR and its associated factors (Phase II). A total of 46 students (Male: 6.5%; Female: 93.5%) were randomly selected from Department of Nutrition and Dietetics, UPM to participate in Phase I of the study. They were trained to complete one day IBFR and 24-hour dietary recall (reference method) was interviewed by researchers on the following day. Next, 85 students (Male: 12.9%; Female: 87.1%) from the same department were randomly selected to participate in Phase II of the study. They completed the questionnaire that assesses the socio-demographic background, perceived usefulness (PU), perceived ease of used (PEU), social influence (SI) and acceptability toward IBFR, and their body weight and height were measured. Bland-Altman analysis found wide limits of agreement for energy between both methods (-428kcal to 355kcal). Pearson correlation tests also showed strong relationship (r=0.756-0.859, p<0.05) between two methods for energy and macronutrients, while the strength of correlations for micronutrients was medium to strong (r=0.616-947, p<0.05). It should be noted that majority of the participants did not meet the Malaysian Recommended Nutrient Intake for energy and nutrients. Participants showed acceptances toward the IBFR (M=7.52±2.4). Being younger (r=-0.257, p<0.05), higher PU (r=0.709, p<0.05), PEU (r=0.415, p<0.05) and SI (r=0.572, p<0.05) were correlated with higher acceptability of IBFR, but not body-mass-index. This study showed that the IBFR is valid and accepted dietary assessment methods for measuring nutrient intake. Future study is suggested to further determine other types of validity and reliability of the instrument in different group of the population.

B05 Study on dietary pattern, cognitive performance and mood among adolescent students in Kota Bharu

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The objective of this study is to investigate the relationship between dietary pattern, cognitive performance and mood among adolescent students in Kota Bharu, Kelantan. A total of 191 adolescent students aged 14 years were recruited from three secondary schools located in Kota Bharu. Questionnaire consisted of socio-demographic data, breakfast consumption habit, mood assessment, and food frequency questionnaire (FFQ) was distributed. Anthropometric data was obtained by measuring student's body weight and height, and body mass index (BMI) was calculated. Students' academic achievements were obtained from academic records based on their final examination results. A cognitive test was conducted by using Raven's Standard Progressive Matrices (R-SPM) to assess students' cognitive performance. The respondents are made up of 93 male (48.7%) and 98 female students (51.3%). Most of the students (60.2%) reported to have breakfast more than 5 times per week, while 39.8% of the students reported that they had breakfast less than 5 times for the past one week. For dietary intake, the top three food items with highest consumption frequency are rice, chicken, and bread, with 99.4%, 54.3%, and 50.9% of the students, respectively reported that they consumed those foods more than 5 times per week. There are no significant differences of mean score of all subjects among students with different breakfast consumption frequency. No significant differences of mean R-SPM cognitive test scores were observed between students with different breakfast and dietary intake frequency. There are significant mean differences of energy ($p<0.05$) and tiredness score ($p<0.05$) between breakfast eaters and breakfast skippers. In conclusion, breakfast consumption is found to have positive effect on mood state but not on academic and cognitive performances of adolescent students. Further investigations are needed to examine the relationships between dietary intake with academic achievements and cognitive performance among adolescent students in this district.

B06 Food addiction and its associated factors among white collar workers in Small and Medium-sized Enterprises (SMEs)

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Food addiction is a condition whereby individuals lose control over their food consumption, suffer from abstain from certain types of food or reduce consumption in the face of negative consequences. However, information related to food addiction remains lacking especially in the context of Malaysian population. Therefore, a cross-sectional study that aimed to assess food addiction and its associated factors was conducted among Malaysian white collar workers in eight randomly selected SMEs in Johor. A total of 121 white collar workers (73 females, 48 males), with mean age of 35.40±11.51 years, participated in this study. They completed a self-administered questionnaire assessing food addiction (Yale Food Addiction Scale; YFAS), socio-demographic background and dietary factors. Results showed that one third of the white collar workers (31.4%) were at risk of food addiction and 5.8% (6 females, 1 male) were having food addiction, with mean food addiction symptoms of 2.29±1.46. White collar workers with larger household size (F=4.048, p=0.004) and moderate monthly household income (F=7.519, p<0.001) had higher number of food addiction symptoms. Uncontrolled eating (r=0.274, p=0.002) and emotional eating (r=0.332, p<0.001) were correlated with food addiction symptoms. Meal skippers (t=-2.226, p=0.028) and fast food eaters (t=-0.267, p=0.009) were prone to show more food addiction symptoms. Higher intakes of high-fat foods (r=0.187, p=0.040) like French fries (r=0.203, p=0.025) and meat (r=0.205, p=0.024); high-protein foods (r=0.198, p=0.030) like squid (r=0.255, p=0.005); salty foods like dried squid (r=0.180, p=0.049); sugary foods and beverages like canned fruit (r=0.271, p=0.003), lolly ice (r=0.298, p=0.001), *AisKacang*(r=0.257, p=0.004), fruit juice (r=0.181, p=0.047) and cordial syrup (r=0.188, p=-0.039) were correlated with higher number of food addiction symptoms. However, higher intakes of vegetables such as cabbages(r=-0.245, p=0.007) and brinjal (r=-0.181, p=0.047) were correlated with lesser food addiction symptoms. To conclude, about one third of the white collar workers were at risk of addicting to high fat, protein, salt or sugary foods. Future nutrition intervention among white collar workers should take into consideration the food addiction issue and its associated factors.

B07 Salt intake and blood pressure in young university adults

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Limited Malaysian studies have employed 24-hour urinary sodium to estimate dietary salt intake in young Malaysians. The diet of young university adults is mainly dependent on the food providers in and around the campus. The objective of this study was to investigate the salt intake and blood pressure among university adults and the relationship between these two variables. 28 participants aged between 18 to 25 years old were recruited. Blood pressure was measured using digital blood pressure monitor (HL858JA, FOCAL, Japan). Body composition was measured using InBody 230, (Biospace Co Ltd). 24-hour urinary sodium was analysed by Atomic Absorption Spectrophotometry (ASS). Food intake survey was designed to identify the sources of dietary salt. The questionnaire was administered by the researcher. The mean salt intake of the participants of the current study was 10.80 ±0.78g/day, (range- 5.71g/day to 20.02g/day) exceeding the WHO and National

Coordinating Committee on Food and Nutrition Malaysia recommendation of 5g/day, by 116%. The mean systolic blood pressure (SBP) was 104.43±1.68mmHg, and the mean diastolic blood pressure (DBP) was 66.46±1.23mmHg. No significant correlation was found between salt intake and blood pressure although a positive correlation was found between salt intake and SBP (r=0.21; p=0.30). Salt intake was significantly associated with body weight (r=0.47, p=0.01), BMI (r=0.45, p=0.02) and fat free mass (r=0.44, p=0.02); SBP was also significantly correlated with body weight (r=0.61, p=0.00), BMI (r=0.54, p=0.00) and fat free mass (r=0.56, p=0.00). Individuals who consumed salt more than 10g/day were frequent consumers of dried anchovies/cuttlefish/prawns, fried rice/noodles, noodles with soup and noodles with soy sauce. Educating the local food providers to reduce salt into their recipes must be part of an integrated strategy to reduce salt intake among the population. Additionally, weight control might be useful in terms of reducing both salt intake and blood pressure.

B08 The associations between platescapes, foodscapes and dietary intake among road transport department staffs in Muar, Johor

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In built environment, elements in microscale environment such as platescapes and foodscapes have become a concern as they may influence human's energy intake. Platscapes are view and/or appearance of a container from which the food is consumed while foodscapes are view and/or appearance of an edible item that will be consumed. This cross sectional study investigated the associations between platescapes, foodscapes and dietary intake among subjects. A total of 133 subjects (54 males, 79 females) with mean age 36.83±7.26 years participated in this study. Subjects completed a self-administered questionnaire on sociodemography, platescapes and foodscapes preference. For platescapes, plate mapping method was used, where subjects were requested to place various sized of food models on different sized of plates (9-inch and 11-inch) based on their preferences. For foodscapes preferences, subjects were requested to place various sized of food models differentiated by shapes and colours on a 9-inch plate. 2-day 24-hour dietary recall were obtained by interview. The average energy intake of the subjects were 1741±339 kcal (males) and 1625±247 kcal (females). Significant difference were found between sex (t=2.165, p=0.033), age (F=3.941, p=0.010) and platescapes (t=-12.069, p=0.000) with energy intake.11-inch plate (561±143 kcal) resulted in significantly higher energy intake than 9-inch plate (419±124 kcal). However, only 11-inch plate (r=0.292, p=0.001) was associated with energy intake, but not 9-inch plate. There were significant difference and association between white rice and multicoloured rice (t=-9.182, p=0.000; χ^2=9.017, p=0.003), unicoloured and multicoloured protein (t=-5.367, p=0.000; χ^2=4.556, p=0.033) and unicoloured and multicoloured vegetables (t=-15.763, p=0.000; χ^2=10.787, p=0.01) with energy intake. Moreover, significant difference was also found between circular- and cube-shaped protein preference (t=-3.025, p=0.03). Only the shape of carrots in vegetables (χ^2=7.889, p=0.005) was significantly associated with energy intake. Subconsciously, these elements increased an individual's energy intake, thus should be considered in assessing one's dietary intake.

B09 Factors associated with plate waste among adult patients in Hospital Serdang, Selangor

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The objective of this cross sectional study was to determine associations between sociodemographic factors, medical background, nutritional status, appetite status and hospital dining experience with plate waste during one lunch meal. This study was conducted among adult patients aged between 18 to 55 years old. Total of 54 Malaysian subjects who consumed normal hospital diet during lunch were included in this study. The subjects were assessed on nutritional status using Malnutrition Universal Screening Tool (MUST) and have been interviewed using self-developed questionnaire, Simplified Nutritional Appetite Questionnaire (SNAQ) and Hospital Dining Experience (HDE) questionnaire. Visual estimation plate waste was used to determine the percentage of leftover food. The overall mean percentage of plate waste was 48.6%. Vegetables were the most wasted food items (29.9%). Since 90.7% of the subjects reported poor appetite during hospitalization, this may explained by 48.6% of them had plate waste of 25% to 100%. Thus, 75.9% of them had inadequate calorie intake. This situation could lead to malnourishment as 31.5% of them had been identified as either medium or high risk of malnutrition based on MUST score. There was significantly negative correlation between appetite score and percentage of plate waste (r=-0.52, p<0.01). However, there was no significant association between hospital dining experience with plate waste (X^2=0.000, p=1.000). In conclusion, appetite was one of the factor that associated with plate waste.

B10 The association of sugar-added food and beverages consumption with socioeconomic status and nutritional status among KEMAS preschool children in Kota Bharu, Kelantan

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The objective of this study was to assess the association between frequency of sugar-added foods and beverages consumption with socioeconomic status (SES) of family and nutritional status (height-for-age, weight-for-age, and Body Mass Index (BMI)-for-age) of preschool children aged 4 to 6-years old in Kota Bharu district, Kelantan. This was a cross sectional study of 219 participants from 17 TABIKA (KEMAS). Anthropometric measurement were performed on the preschool children and questionnaire was answered by their parents on the socio-demographic and SES and also frequency of sugary foods and drink consumption by their children. The result showed that, the mean monthly household income was RM 1891.43. For the nutritional status, BMI-for-age showed 20.5% of them were in thinness category and 8.7% in severe thinness category but only 2.7% of them in obese category. The height-for-age and weight-for-age result revealed that 9.6% of the children were stunted and 21.0% were underweight. The association between SES and frequency of sugary food and beverage revealed that there is association between few type of food and beverage with mother's age and father's age, monthly household expenses for food, mother's education and father's education. The results also showed that, there is association between nutritional

status (weight-for-age) and frequency of bran flakes consumption ($X^2(1)=4.124$, N=219, $p<0.05$), and also apple and grape juice ($p<0.05$).As a conclusion, there was a significant association between a few sugar-added foods and beverages with SES and nutritional status of preschool children in Kota Bharu.

B11 Factors associated with picky eating among preschoolers aged 4 to 6 years in Petaling Perdana, Selangor

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Picky eating is characterized by strong food preferences, persistently rejecting many novel as well as familiar foods. A cross-sectional study was conducted among 8 randomly selected preschools in PetalingPerdana to determine factors associated with picky eating among preschoolers aged 4 to 6 years. A total of 167 preschoolers (47.9% boys and 52.1% girls) with a mean age of 4.5±0.5 years participated in this study. A self-administered questionnaire was answered by mothers to obtain information on socio-demographic background, infant feeding practices, parental feeding practices, parenting styles and picky eating. Weight and height of the preschoolers were measured, while their cognitive performance was assessed using Raven's Colored Progressive Matrices in one-to-one basis. Nearly half of the respondents (44.3%) were classified as high pickiness, in which 31.5% had their total food fussiness score above the third quartile. Almost half of them were not exclusively breastfed up to 6 months (49.1%), while 34.1% did not receive complementary feeding at 6 months. Some 7.2%, 12.0% and 3.0% of the respondents were underweight, stunting and wasted/ thinness, respectively. For cognitive performance, two third of the respondents (64%) were at average level. Mothers' age was positively correlated with picky eating (r=0.152, p=0.05). More picky eaters (59.5%) were not exclusively breastfed for 6 months as compared to their counterparts (40.9%; χ^2=4.984, p=0.026). No significant associations were observed between parenting style, body weight status and cognitive performance with picky eating. Parental feeding practices including emotional regulation (r=-0.154, p=0.047), encourage balance and variety (r=-.207, p=0.007), teaching nutrition (r=-0.107, p=0.028), environment (r=-0.237, p=0.002), and involvement (r=-0.253, p=0.001) were negatively correlated with picky eating. Picky eating is possibly preventable and correctable with early interventions including promotion of exclusive breastfeeding for 6 months and appropriate use of feeding practices by parents as they play pivotal roles in shaping healthy eating practices in children.

B12 Factors associated with fruit and vegetable consumption among children aged 4 to 6 years old in Ipoh, Perak

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This cross-sectional study aimed to determine factors associated with fruit and vegetable intake (FVI) among preschoolers aged 4 to 6 years old. A total of 147 preschoolers (49.7% boys; 50.3% girls) with a mean age of 4.8±0.7 years from 10 randomly selected *Tabika KEMAS* in Ipoh participated in this study. Mothers completed a self-administered questionnaire on sociodemographic characteristics, eating behaviours, feeding practices and sleep duration. FVI of the preschoolers was recorded using a 3-day food diary, and

their weight and height were measured. The prevalence of possible risk of overweight, overweight and obesity were 6.1%, 12.9% and 6.8%, respectively, while the prevalence of underweight, stunting and wasting/thinness were 13.0%, 19.7% and 8.1%, respectively. The mean FVI were 1.02±0.52 servings and 0.84±0.50 serving, respectively. Only a small proportion of the respondents met the recommended daily intake of fruit (4.8%) and vegetable (2.7%), with 19.0% and 24.5% did not consume fruit and vegetable daily, respectively. Age was correlated negatively with fruit intake (r=-0.172, p=0.038), but not vegetable intake. Duration of breastfeeding (r=0.202, p=0.014), food neophobia (r=-0.213, p=0.009) and enjoyment of food (r=0.210, p=0.011) were related to vegetable intake, but not fruit intake. Age of introduction of fruit and vegetable was negatively related to fruit (r=-0.243, p=0.003) and vegetable intake (r=-0.184, p=0.026). No relationship was found between child's sleep duration with FVI. The strongest predictor of fruit intake was age of introduction of fruit (β=-0.263, p=0.001), followed by age (β=-0.197, p=0.014) and weight-for-age (β=-0.196, p=0.015), while vegetables intake was most strongly predicted by food neophobia (β=-0.188, p=0.019), followed by duration of breastfeeding (β=0.184, p=0.021) and age of introduction of vegetables (β=-0.175, p=0.028). Findings in this study suggested that FVI was low among preschoolers and different factors were associated with FVI. More researches are needed to assess effective strategies to increase FVI among preschoolers.

B13 Beverage consumption, hydration status and nutritional status among secondary school adolescents in PetalingPerdana, Selangor

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Water should be the main beverage consumed by people to keep the body hydrates, however consumption of caloric beverages has increased considerably worldwide. This study aimed to determine the correlations of beverage consumption (water and caloric beverages) with hydration status and nutritional status among secondary school adolescents. A total of 210 adolescents (Male: 87; Female: 123) aged 13 to 16 years old from two selected secondary schools in PetalingPerdana, Selangor, participated in the study. Socio-demographic characteristics and beverage consumption questionnaire were completed by respondents. Body weight and height, two-day hydration status using urine colour chart, and two-day 24-hour dietary recalls were assessed by the researchers. The study showed that respondents consumed an average of 2257.6±1131.7ml/day, with means water consumption of 1229.2±892.7ml/day and caloric beverages consumption of 1028.4±74.6ml/day. Tea (147.6±181.9ml/day), fruit juice (123.5±169.0ml/day) and milk (113.7±139.3ml/day) were the top three caloric beverages consumed by respondents, respectively. Although all respondents were hydrated (Well hydrated: 64.8%; Hydrated: 35.2%), the present study found that respondents who consumed higher volume of caloric beverages were correlated with lower water consumption (r_s=0.036,p<0.01). The study found that higher water consumption was correlated with higher BMI of the respondents (r_s=0.201,p<0.01). Water consumption showed weak, negative correlation with energy intake (r_s=-0.148,p<0.01), meanwhile caloric beverages consumption showed positive yet weak correlation with sugar intake (r_s=0.219,p<0.01) and carbohydrate intake (r_s=0.160,p<0.01). In conclusion, water consumption was associated with BMI and energy intake while caloric beverages were associated with sugar and carbohydrate intake. The intake of caloric beverages should be reduced as it may affect the hydration status and nutritional status of the respondents. In future, study on beverage consumption should be more in depth by taking into consideration of types of the beverages and its health consequences.

B14 Adherence to WCRF/AICR guidelines for cancer prevention among breast cancer survivors: a preliminary observation from East Coast of Peninsular Malaysia

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The World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR) guidelines encourage cancer survivors to follow its cancer prevention recommendations. This preliminary study evaluated adherence to the WCRF/AICR guidelines for cancer prevention among breast cancer survivors from East Coast of Peninsular Malaysia.Participants were 74 women aged 37 to 72 years who had been diagnosed with breast cancer according to American Joint Committee on Cancer (AJCC) stages I to III and completed conventional treatment at least six months before the interview. All participants were recruited from two main referral hospitals in Terengganu and Kelantan. Adherence scores for the WCRF/ AICR guidelines for body weight, physical activity, and diet were computed; assigning 1, 0.5 or 0 points to each of eight recommendations depending on the degree of adherence. Total adherence score was then categorised as high (score ≥ 5), moderate (score < 5 to >3) and poor (score ≤ 3). Socio-demographic background and clinical data were compared by the total adherence score categories besides evaluating the adherence for each of the eight recommendations. This preliminary observation noted 66.2% of breast cancer survivors highly adhered to the WCRF/AICR guidelines while only 1.4% was categorised as poor adherence. The least adhered were on physical activity (5%) and plant food intake (4%). However, differences in total score categories among these survivors were not attributed to thesocio-demographic background and clinical data ($p>0.05$). As a conclusion, the majority of breast cancer survivors from East Coast of Peninsular Malaysia adhered to the WCRF/AICR guidelines for cancer prevention. This preliminary report also addresses that strategies for preventing cancer recurrence should emphasize on behavioural change to increase physical activity and intake of plant foods while maintaining a balanced diet.

B15 Nutrient intake, nutritional status, alcohol consumption, smoking habits and cardiorespiratory endurance among student football players at Lampung University, Indonesia

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Football is one of a sport requires good cardiorespiratory endurance. To support endurance, athletes need good nutrient intake, optimal nutritional status, good physical activity and healthy lifestyle. This study aimed to determine the relationship of nutrient intake, nutritional status, alcohol consumption, smoking habits and cardiorespiratory endurance among student football players. This cross sectional study was involving 48 Student Football Players. Pearson product moment and independent t-test was employed to test the hypothesis. Sample's age was 18-23 years, average of VO_2max was 47.40 ml / kg / min± 7.512, most of them have normal BMI (79.2%), normal body fat (77.1%). Average energy intake 1921 ± 372.08 kcal, Protein 68g ± 13,32, Fat 32 g ± 11.3, Carbohydrates 266.6 g ± 54.4, Vitamin B6 0.41 mg ± 1.1, Vitamin B12 is 4.8 µg ± 7.04, Vitamin C 29.5 mg ± 2.1, and Iron 2.1 ± 2.7 mg. Total of 43.8% of students were regular smoker and 87.5%

of students never consumed alcohol. There was a significant correlation between percent body fat, intake of energy intake, protein, fat, carbohydrate, vitamin B6, Fe ($p< 0.05$). There was a significant difference on cardiorespiratory endurance between smoker and alcohol drinker. ($p< 0.05$). There was nosignificant correlation between BMI, vitamin B12, vitamin C to cardiorespiratory endurance among students. There is a need to educate an athletes and their coach on the important optimal nutrient intake, good nutritional status and healthy lifestyle to maintain otimal cardiorespiratory endurance.

B16 Associations between exposure to fast-food outlets, availability and accessibility of fruits and vegetables and fruits and vegetables consumption among adolescents aged 13 to 14 years in Hulu Langat District, Selango

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Adolescents are known to have low intake of fruits and vegetables and environmental factor is one of the determinant for such low intakes. The purpose of this study is to determine associations between exposure to fast-food outlets, availability and accessibility of fruits and vegetables and fruits and vegetables consumption among adolescents. The study was conducted among adolescents aged 13 and 14 years at selected secondary schools in Daerah Hulu Langat. Questionnaires were distributed to students and their parents to determine students' socio-demographic factors, fruits and vegetables consumption, availability and accessibility of fruits and vegetables at home. Google Maps were used in absent of appropriate software to indicate the shortest distance from fast-food outlets to the student's home and school. Differences between respondent's socio-demographic factors and fruits and vegetables consumption were examined. Results showed that there were significant differences in mean consumption of fruits and vegetables between males and females even when measuring fruits and vegetables separately (Total FV: t=-3.590, p=0.001, Total V: t=-2.329, p=0.022, Total F: t=-3.041, p=0.004). There were positive correlations between total vegetables consumption with fast-food exposure from home and school (Exposure to home: r=0.185, p=0.084, Exposure to school: r=0.033, p=0.714) after adjusting for confounders. Positive correlations between availability and accessibility of fruits and vegetables and total fruits and vegetables consumption (r=0.220, p=0.125 and r=0.012, p=0.937, respectively) were also observed. The assessment of fruits and vegetables separately also showed positive correlations between availability and consumption (Total V: r=0.214, p=0.247, Total F: r=0.102, p=0.346). However, all these correlations were not significant ($p>0.05$). The results suggest that exposure of fast-food outlets, availability and accessibility of fruits and vegetables were not associated with adolescent's fruits and vegetables consumption. More research is needed to focus on this area using appropriate assessment because studies regarding environmental factors are limited in Malaysia.

B17 Association between physical performance, cognitive status and depression with appetite among institutionalized older persons in Selangor, Malaysia

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Poor appetite is prevalent among elderly who often experience physiological, psychological, mental and physical changes. Declined appetite is recognized as contributory factor to malnutrition among elderly that highly correlated with mortality risks. Hence, the aim of the present study was to investigate the association between cognitive status, physical performance and depression with appetite among institutionalized older persons in Selangor, Malaysia. A total of 66 institutionalized elderly aged 60 and above were recruited to ascertain information on appetite, cognition status and depression using Simplified Nutritional Appetite Questionnaire (SNAQ), Elderly Cognitive Assessment Questionnaire (ECAQ) and, Malays version of Geriatric Depression Scale (M-GDS-14), respectively. Performance-based test (Short Physical Performance Battery (SPPB) and self-reported Katz Index of Independence in Activities of Daily Living (ADL) were used to assess the physical performance of the subjects. Mean age of subjects was 74.7years old, comprised of 51.5% of male and 48.5% of female. The prevalence of poor appetite in this studied population was 45.5%, with 47.0% of probable cases of cognitive impairment and 18.2% of them had major depression. ADL detected 9% of subjects had moderate to total functional impairment while a total of 25.8% subjects was categorized as physically disabled according to SPPB test. There was significant lower appetite score among depressed subjects as compared to their non-depressed counterparts (t=2.913, p=0.005). Appetite level was significantly correlated with marital status (χ^2=6.852, p=0.009) and negatively associated with depression (r=-0.300, p=0.014). However, no significant associations were observed between cognitive status (r=0.127, p=0.310) and physical performance (SPPB r=-0.051, p=0.686; ADL r=-0.016, p=0.898) with appetite level. In conclusion, depressed and unmarried institutionalized older persons were associated with poor appetite. Depressed elderly had significant lower appetite level. The magnitude of poor appetite is alarming in this studied cohort. Appropriate intervention strategies should be formulated to improve appetite status among institutionalized elderly.

B18 Chicken meat: Eating trends and feed additive awareness among respondents from UniversitiKebangsaan Malaysia (UKM)

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The objectives of this study were to investigate the chicken meat consumption among 240 respondents from three major ethnics in Malaysia (mean age: 24.2 ± 4.8 years old) and their knowledge regarding the usage of feed additive in poultry industry. The data were collected using questionnaire focused on the 1) prevalence of chicken meat and chicken-based fast food and 2) awareness of the feed additive usage such as antibiotic, probiotic and enzyme in local poultry industry. Total of 98% Malays consume broiler chicken compared to 95% Chinese and 94% Indians respondents. However, the consumption of chicken meat was reported to be 4-6 times per week regardless of the ethnics studied ($p>0.05$). Factors that affect their preference on chicken meat were easily available, delicious, favourite and it is relatively cheap. Out of five parts (breast, drumstick, drumette, thigh and wing), thigh was identified as the most preferred. Most of the respondents cooked the chicken together with skin (62%) while only 48% of them ate chicken meat without the skin. For chicken-based fast food, majority of the respondents enjoy the taste and take it due to its availability (95%) and they normally eat the chicken-based fast food during lunch time (54%). About 63% of the respondents are alert and aware with the usage of feed additive in poultry industry. However, less than 50% of respondents knew the function of feed additives. Only 40% were aware about the effect of its addition in chicken feed. Chicken meat is a good source of protein and it is well accepted among respondents, yet the awareness of feed additive usage need to be improved.

B19 Factors associated with satisfaction of hospital food among elderly patients in Hospital Serdang, Selangor

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This cross sectional study was aimed to determine associations between socio-demographics status, nutritional status, plate waste, experience of food access and satisfaction of hospital food among elderly patients in Hospital Serdang, Selangor. Subjects were required to answer questionnaire either by self-administered or interview after obtained their consent. Quarter-waste method was used to assess visual plate waste during lunch. The nutritional status was assessed using Malnutrition Universal Standard Tools (MUST). Fifty elderly patients were recruited with 52% were male and 48% were female with total mean age of 69.94±7.36 years. Based on BMI classification, 16% subjects were reported underweight with proportion of both male and female subjects were 8%, respectively. The MUST score found higher proportion of subjects with low risk of malnutrition (66%) than medium (8%) and high risk of malnutrition (26%). Total proportion of plate waste found majority of subjects wasted food under category of ≤75% (34%) followed by food wastage of category <100% (26%). Food wastage of category ≤75% was reported higher proportion among subjects who were at low risk (22%) and high risk of malnutrition (10%). However, there was no significant association between plate waste and risk of malnutrition ($p = 0.295$). Experience of food access found subjects had difficulties in accessing food choice with mean and standard deviation of 21.28 ± 3.928. Finding of satisfaction with hospital food found that 46% of the subjects rated 'okay' for overall satisfaction of hospital food. Result indicated that male was highly significant rated 'okay' for overall satisfaction of hospital food ($p<0.05$). In conclusion, gender was associated with satisfaction of hospital food among elderly subjects.

B20 Dietary intake pattern among breast cancer survivors in East Coast of Peninsular Malaysia

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Dietary intake plays a significant role in the prognosis of breast cancer and is one of the modifiable factors in preventing cancer recurrence. This study aims to describe the dietary intake pattern among breast cancer survivors in East Coast of Peninsular Malaysia. A total of 74 breast cancer survivors, aged 37 to 72 years, withmean duration of survivorship of 6.1 ± 4.4 years were recruited from two main referral hospitals in Terengganu and Kelantan. Majority of the respondents were Malay (93.2%) with a mean BMI of 27.9 ± 4.9 kg/m^2, and were diagnosed with stage II cancer (37.8%). Dietary intake was estimated using a validated interviewer administered semi-quantitative food frequency questionnaire, which included 203 food items. These food items were then grouped into several food groups for assessment of adherence towards the Malaysian Dietary Guidelines.The mean daily intake of energy was 2051 ± 897 kcal, protein was 81.9 ± 34.4 g (16% of energy), carbohydrate was 295.6

± 128.9 g (57% of energy) and fat was 60.5 ± 32.7 g (27% of energy). Overall, breast cancer survivors in this study had an adequate daily intake of vitamins and minerals according to RNI recommendations except for dietary fibre (12.5 ± 7.3 g), calcium (640.7 ± 367.4 g) and potassium (2112.4 ± 902.1 mg). In comparison to Malaysian Dietary Guidelines respondents showed adequacy of meat, poultry, egg intake (1.0 serving/day), while higher intake of cereal and grains (10.6 servings/day), fruits (2.7 servings/day) and fish, shellfish and seafood (1.8 servings/day). Inadequate intake was reported for vegetables (1.7 servings/day), legumes (0.1 serving/day), milk and dairy products (0.6 serving/day). In a nutshell, breast cancer survivors in East Coast of Peninsular Malaysia had an adequate intake of most macro-, micro-nutrients, and major food group recommendations. Additional time spend to reinforce good nutrition by medical doctors during biannual follow-up consultation had improved intake and perhaps this could be followed by other hospitals.

B21 Dietary supplement use among undergraduate students of Universiti Kebangsaan Malaysia, Kuala Lumpur (UKMKL)

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Dietary supplement (DS) use is increasing and the market is huge especially in developing countries.The objective of this study was to determine dietary supplements use among undergraduate students in UKM. This cross-sectional study involved 324 students from three faculties namely, Health science, Pharmacy and Dentistry. Convenience sampling was employed where data was collected using self-administered questionnaire. Survey questions included sociodemography, types, reasons and frequency of DS used. The student comprised of 91 men and 233 women with mean age 21.95 ± 1.41 years. Majority of students were Malays (80%) followed by Chinese (10%), Indians (8%) and others (2%). 58.6% of the students took DS of which 46.9% were taking vitamin-mineral supplements (VMS) and 37.3% consume non-vitamin non-mineral supplements (NVNMS). Of students taking VMS, 25% students used vitamin C, 12% multimineral/multivitamin and 11% used vitamin B complex. With regards to frequency of intake, 42% used VMS occasionally, 38% used VMS while 16% used VMS one to three times per month. The main reasons for consuming DS are for health (53%), to increase energy (15%) and doctor's prescription (7%). For NVNMS, 16% students used royal jelly, 12% used fish oil and 7% used health powder. With regards to frequency of intake, 33% used NVNMS occasionally, 27% used every day and 16% used more than once a week. The reasons for consuming NVNMS were for health (44%), beauty (17%) to improve memory (15%). In conclusion, the prevalence of DS use among students is high. Students should be educated on how to eat a healthy diet and be less dependent on supplement use for nutrient adequacy.

B22 Perceptions toward microscale build environments and subjects' satisfaction in relation to energy intake among diners at cafeterias in Universiti Putra Malaysia

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Attention has been given to the built environment since it can influence obesity in both of macroscale and microscale environments yet the number of studies in this area was not

enough. Microscale build environments that were included in this study were platescapes, foodscapes, and physical environments. This study was conducted in 6 cafeterias in Universiti Putra Malaysia. Respondents were given self-administered questionnaire consistedof 6 sections which included socio-demographic backgrounds, platescapes(perceptions on size of plate, plate colour among others), foodscapes(perceptions for example on size of food provided, and temperature of food), physical environment (perceptions for example on lighting at the dining room and wall decorations), subjects' satisfaction and energy intake. All questions were answered by the respondents themselves except for food intake sections, where the researcher interviewed respondents on their food intakes for a meal at the cafeteria. Energy intake was calculated using Nutritionist Pro version 2.4. From a total of 293 subjects, subjects' satisfaction was found significantly correlated with platescapes($r=0.275$, $p=<0.001$), foodscapes($r=0.258$, $p=<0.001$), and physical environments ($r=0.352$, $p=<0.001$). Associations between satisfied and not satisfied subjects were significant with scores on perception towards platescapes ($\chi^2=10.900$, $p=0.001$), foodscapes (($\chi^2=6.304$, $p=0.016$) and physical environment ($\chi^2=25.432$, $p=<0.001$). Besides, subjects' satisfaction and food intake were found to be significantly correlated ($r= 0.359$, $p<0.001$). Correlation between energy intake with satisfied and not satisfied subjects were also found significant ($\chi^2=30.783$, $p=<0.001$). In conclusion, microscale build environments influenced customer's satisfaction, thus influencing their food intake in the food outlet. In order to improve customer's satisfaction, microscale environments aspects should be taken into consideration.

B23 Influences of nutritional information on fast food purchasing among undergraduates at Universiti Sains Malaysia, Kubang Kerian, Kelantan

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Eating out, especially at fast food restaurants is often regardless unhealthy option and related to health issues such as obesity. Nutritional information is often provided in many restaurants to allow customers to make informed choice. Thus, this study was carried out to determine the influences of providing nutritional information on fast food restaurant menu, especially among undergraduates at UniversitiSains Malaysia Health Campus, who often eat outside during the term time. This is quantitative study, where validated questionnaire adapted from previous study was used to determine the general perception on nutritional information, nutrient intake and purchasing intention when eating out. A total of 185 undergraduates participate from three different school, PPSP (n=54, 29.2%), PPSG, (n=54, 29.2%), PPSK (n= 77, 41.6%) in USM, Health Campus. In general, majority of the undergraduates eat fast food at least once in a week (n= 105, 56.8%) and most of them prefer to eat outside on weekend (n=156, 84.3), and they consume fast food mainly as socialising event with friends. Majority perceived that it is importance to provide nutritional information at fast food restaurant (n=183, 98.9%). Mean for calorie, fat and sodium intake of their food choices were significantly different between before and after providing nutritional information of the food items on the food menu ($p<0.001$). Majority indicated that they were likely to purchase healthier food items when nutritional information was provided (n=159, 85.9%). There is an association between the perception on nutritional information would influence the food choices and purchasing intention ($p=0.004$). It can be concluded that nutritional information is crucial in selecting food, especially when dining out at fast food restaurant among students who often dine outside.

B24 What factors are associated with disordered eating behaviours among early adolescent males in Sepang, Selangor?

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This cross-sectional study determined factors associated with disordered eating behaviours among 305 adolescent boys from three randomly selected secondary schools in Sepang, Selangor. Weight, height and waist circumference were measured of each student. Body mass index-for-age was calculated and categorised according to WHO reference whereas waist circumference was classified using waist circumference percentile curves for Malaysian children and adolescents. Information on socio-demographic background, pubertal status, sociocultural influences, perception of body image and disordered eating were assessed using Pubertal Development Scale, Sociocultural Influences on Body Image and Body Change Questionnaire, Contour Drawing Rating Scale andBody Appreciation Scale, and Eating Attitude Test-26(EAT-26) respectively. The sample consists of 89.2 % Malay, 7.2 % Chinese, 2.6% Indian and 1.0% other ethnicities. Around 7.9% of the respondents were thin and severely thin, 19.1% overweight, 25.3% obese, 32.2%abdominally obese, 68.2% dissatisfied with their body size and 42.4% were at risk of eating disorder. The mean scores of perceived pressure to lose weight, gain weight and gain muscles were highest for peers, mother and media respectively. BMI-for-age ($r=0.165, p<0.01$), waist circumference ($r=0.14, p<0.01$), perception of body size ($r=-0.13, p<0.05$), feedback about size and shape of body from mother ($r=-0.13$, $p<0.05$), peers ($r=-0.214, p<0.01$), pressure to lose weight from father ($r=-0.316, p<0.01$), mother ($r=-0.308, p<0.01$), peers ($r=-0.423, p<0.01$), media ($p=-0.350, p<0.01$), pressure to gain weight from father ($r=-0.10, p<0.01$), mother ($r=-0.157, p<0.01$), peers ($r=-0.252, p<0.01$), media ($r=-0.222, p<0.01$) and pressure to gain muscle from father ($r=-0.346, p<0.01$), mother ($r=-0.330, p<0.01$), peers ($r=-0.340, p<0.01$), media ($r=-0.307, p<0.01$) were significantly associated with disordered eating behaviours. Multiple linear regression analysis showed three factors namely perceived pressure to lose weight from peers and media and perceived pressure to gain muscle from father were predictors for disordered eating, explaining 25.0% of the variance. Planning for intervention programs targeting disordered eating among adolescents should take these factors into consideration.

B25 Assessment of nutritional knowledge and practice on healthy eating at hawker stalls among adults in Kuala Terengganu

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Eating out, especially at a hawker stalls has been often regarded as a Malaysian culture. However, it is not clear whether people are aware of nutrition and healthy eating practice when eating out at hawker stalls. As such, this study was conducted to determine the nutritional knowledge and practice on healthy eating when eating out at hawker stalls among adults in Kuala Terengganu. This is a quantitative and cross-sectional study, a questionnaire (socio-demographics, frequency of eating out, nutritional knowledge, and practice on healthy eating) was used to collect the data at two main hawker's centre in Kuala Terengganu (Taman Shah Bandar and China Town). A total of 137 respondents, where more female (n=88, 64.2%) than male (n=49, 35.8%) participated in this study. Majority were Malays (n=124, 90.5%) followed by Chinese (n=11, 8.0%) and India (n=2,

1.5%). Regardless of the knowledge of respondents, most of them have a good knowledge on classification foods into group (n=128, 93.4%) and poor nutritional knowledge (n=7, 5.1%). Their practice of eating habits mostly unhealthy practices (n=123, 89.8%) and healthy (n=12, 8.8%). Findings were significant association between the nutritional knowledge and practices of healthy eating (p=0.000, p<0.05). Therefore, it can be conclude that nutritional knowledge is necessary for changes in consumer's food behaviours.

B26 Dietary intake of pregnant women at Hospital Universiti Sains Malaysia (HUSM)

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Maternal nutrition is one of the important factors in determining fetal growth and subsequent health development for both mother and child. This study aimed to compare the dietary intake of pregnant women with the Malaysian Recommended Nutrient Intake (RNI). A total of 71 pregnant women in their second or third trimester, aged 20 to 40 years old were recruited from Obstetrics and Gynecology Clinic, Hospital UniversitiSains Malaysia. The dietary intake of the pregnant women was determined using a validated semi-quantitative food frequency questionnaire. Nutritionist Pro™ software analysis was used to analyze the participants' dietary intake. The mean (SD) calorie intake, carbohydrate intake, protein intake and fat intake were 2736.6 (970.34), 365.4 (141.90), 117.2(47.28) and 89.8(36.42), respectively. For calorie intake, 56.3% of the participants met the requirement of RNI and for protein, 91.5% of pregnant women met the requirement of RNI. A total of 91.5% of the participants met the recommended range of 55% to75% for their carbohydrate intake and 57.7% of them met the recommended range of 15% to 30% for fat intake. Exactly 51% of the participants met the recommended vegetable serving intake per day by the Malaysian Dietary Guidelines and for fruits, 76.3% participants achieved the recommended fruits serving intake per day. These findings suggest that most pregnant women at HUSM met their nutrient intake as recommended by RNI for protein intake carbohydrate intake and met the Malaysian Dietary Guidelines for fruits intake.

B27 Weight loss product intake among overweight and obese women in University Kebangsaan Malaysia, Kuala Lumpur (UKMKL)

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Consumption of weight loss products is one of the methods that is practiced by individuals wanting to lose weight. The objective of this study is to determine the prevalence of weight loss product intake among overweight and obese women in UKM campus Kuala Lumpur. This cross sectional study involved 126 women in UKM campus Kuala Lumpur aged 20-59 years (mean age 26.41 ± 8.6 years). Intakes of weight loss product were determined by using self-administered questionnaire. Body weight status was also assessed by Body Mass Index (BMI), waist circumference and body fat percentage. Overall subjects have mean BMI of 28± 4.3, waist circumference of 81.3±13.8cm and body fat percentage of 36.8±5.2%. Prevalence of weight loss product intake was 31.7% while 68.3% subjects did not take any weight loss product. For those not taking any weight loss products, methods used by these subjects to lose weight were reducing food intake (13%), exercise (5%), combination

of reducing food intake and exercise (35%), increasing intake of fruits and vegetables (25%), fasting (19%), intake of diuretics and laxatives (1%), visit slimming centers (1%) and others (2%). Type of weight loss products consumed by subjects were slimming tea (46%), diet formula (34%), fat burner(11%), appetite suppressant (7%) and fat and carbohydrate absorption blocker (2%). Factors associated with the intake of weight loss product were to decrease body weight (47.5%), decrease risk of disease (20%), to look attractive (15%), peer influence (10%) and media influence (7.5%). There were no significant different ($p<0.05$) in the marital status, age, race, job and educational levels between those taking weight loss products and those who did not. In conclusion, prevalence of weight loss product intake is low among overweight and obese women in UKM campus Kuala Lumpur. Women need to be educated on the proper weight management to achieve a sustainable weight loss.

B28 Milk consumption pattern among Malay female undergraduates in UniversitiKebangsaan Malaysia Kuala Lumpur (UKMKL)

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A cross sectional study was carried out to determine the milk consumption pattern among female undergraduates in UniversitiKebangsaan Malaysia Kuala Lumpur (UKMKL). A total of 147 undergraduates aged between 20-29 years old participated in this study. An interview administered 24 hour diet recall was used to determine number of serving per day while questionnaire was used to determine milk consumption pattern of the undergraduates. Anthropometric measurement such as weight, height and waist circumference (WC) were taken. There were 21.8% of the undergraduate who are underweight, 55.8% normal body weight, 17.0% overweight and 5.4 % obese. Majority (89.8%) of the undergraduates reported drinking milk . However, only 6.1% drank milk every day. Mean serving of milk consumed by daily milk drinkers was 1.11±0.31 glasses per day. The types of milk frequently drank by the undergraduates were flavoured milk (64.6%), low fat milk (46.3%) and followed by full cream milk (41.5%). Milk was mostly consumed during breakfast (54.4%), morning tea (25.9%) and followed by before going to bed (22.4%). Milk was usually consumed with cereals (44.1%),bread (28.4%) or mixed with chocolate malted powder (25.6%) . 52.4% of undergraduates drank milk because of its taste while, 42.9% believed that milk helped to strengthen their bones and teeth. Other than milk, milk products consumed by the undergraduates were cheese (81.6%) and yoghurt (74.1%) respectively. In conclusion, daily milk consumption of the undergraduate was below the recommendation by the Malaysian Dietary Guideline. Education and promotion on milk drinking and its benefits need to be carried out to promote milk consumption pattern in all age groups in Malaysia.

B29 Factors associated with fruits and vegetables intake among adolescents aged 13-14 years old in Hulu Langat district, Selangor.

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Fruits and vegetables are crucial components of a healthy diet especially among the young people, whose fruits and vegetables inadequate. This study attempts to investigate

relationships between sociodemographic characteristics, body weight status and physical activity factors, and fruits and vegetables intake among adolescents aged 13-14 years old recruited from several secondary schools in Hulu Langat district, Selangor. A total of 167 adolescents and their parents participated in this study. Self-administered questionnaire were distributed to the respondents and data collection was assisted by the researchers. An adopted Food Frequency Questionnaire (FFQ) was used to determine fruits and vegetables intakes, while Physical Activity Questionnaire for Children (PAQ-C) was used to assess physical activity level of the respondents. Weight and height were measured to determine BMI-for-age of the study respondents. Parent questionnaire was sent to the parents for them to fill in the family socioeconomic part. Mean consumption of total fruits and vegetables was (298.65±169.60) g/day, where the consumption of fruits alone (149.36±98.55 g/day) was higher to that of vegetables (88.76±67.97 g/day). These results showed more than half of the respondents (67.5%) did not achieve the WHO recommendation to eat at least 400 g of fruits and vegetables per day. There were no significant differences between sex, age, ethnicity, BMI-for-age, physical activity, parent/guardian's education, parent/guardian occupation and household income, and fruits intake as well as vegetables intake. There was no correlation between maternal income [fruit (r=0.079, p=0.592), vegetable (r=0.148, p=0.150)] and monthly household income [fruit (r=-0.006, p=0.969), vegetable (r=-0.005, p=0.959)], and fruits and vegetables intake after adjusting for covariates. In summary, the intake of fruits and vegetables during adolescence was not according to the recommendations. Thus, an intervention program is needed to establish healthy diet towards eating enough fruits and vegetables daily.

B30 Relationships between quantity of protein intake, parental and infant feeding practices with body weight status among children aged 1 to 4 years old in Putrajaya

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Previous studies had reported positive relationships between protein intake during early childhood and overweight and obesity later in life in western countries but few had been conducted in Malaysia. This cross-sectional study aimed to determine relationship between quantity of protein intake with body weight status in children aged 1-4 years in Putrajaya. Factors such as parental and infant feeding practices that may contribute to childhood overweight and obesity were investigated. Self-administered questionnaires were distributed to parents of children consisting questions on socio-demographic characteristics, infant and parental feeding practices and 3-day dietary record to assess the protein intake of children on 2 weekdays and one weekend. Weight and height of children were measured by researcher. A total of 250 parents of children from 13 Taman AsuhanKanak-kanak in Putrajaya completed the questionnaires. No significant difference was observed for weight-for-length/height and BMI-for-age classifications between boys (χ^2=1.156, p=.561) and girls (χ^2=.505, p=.777). Breastfeeding practices, period of introduction to complementary foods and parental feeding practices were also not significantly associated with weight-for-length/height and BMI-for-age (p>.05), respectively. Both boys and girls showed no difference in total protein intake (t =.324, p=.746) and percentage of energy from protein (t=.882, p=.379) but their protein intake were 54% more than adequate based on Recommended Nutrient Intakes (RNI) for Malaysia 2005 and it showed no difference between sex. After adjusting for confounding factors, percentage of energy from protein was positively correlated with weight-for-length/height (r=.238, p=.048) and BMI-for-age (r=.249, p=.038) in boys. Positive correlation was also observed between protein exceeding recommendation and weight-for-length/height (r=.255, p=.033) and BMI-for-age (r=.264, p=.027) in boys. In conclusion, the higher the percentage of energy from protein and percentage of protein exceeding

recommendation, the higher the weight-for-length/height and BMI-for-age among boys under 5 years of age in Putrajaya.

B31 Association of milk consumption and physical activity with nutritional status of Malaysian children aged 1 to 12 years

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Dairy consumption and physical activity reportedly have an impact on the prevalence of overweight and obesity. The Malaysian SEANUTS data were analysed on the association between overweight and obesity on the one hand and physical activity and milk consumption at the other hand. A representative sample of 3470 children, aged 1 to 12 years, was included in this analysis. Overweight and obesity was defined based on the WHO body mass index for age- and sex-specific Z-scores (BAZ). Physical activity level was assessed by age specific questionnaires and categorised into low, moderately active and active. Food consumption, including dairy, was assessed by food frequency questionnaires. Milk drinkers were defined at a consumption of at least 200 ml milk per day. Socio-demographic variables were obtained by questionnaires and were controlled for in the analyses. A total of 992 children (28.6%) reportedly consumed more than 200 ml milk per day, whereas 1221 children (35.2%) consumed any amount but less than 200 ml. Another 1257 children (36.2%) did not drink any milk at all. The milk-consuming children had the lowest BAZ scores and they showed the lowest proportion of overweight and obesity. The risk of being overweight or obese was highest in non-milk drinking inactive children, followed by non-milk drinking active children. The lowest risk of being overweight or obese was in children who were active and consumed at least 200 ml milk per day. It is concluded that drinking at least 200 ml per day has a protective effect on overweight and obesity, independent of activity level.

B32 Allergic diseases and its associated factors among children aged 5 to 11 years old in Hulu Langat District, Selangor

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This study aims to determine the prevalence of allergic diseases and its associated factors among children in Hulu Langat, Selangor. A total of 340 pairs of parent-child (aged 5-11 years) from three selected primary schools that comprised pre-schools were participated in this study. Parent answered a self-administered questionnaire that assesses the dietary

intake, environmental exposure, family history of allergic diseases and allergic diseases development of their children. Body weight and height were measured and their body weight status was determined by BMI-for-age (z-score) based on WHO Growth Reference (2007). This study found that about half (55.0%) of the children were found to have at least one type of allergic diseases, whereby 17.4% of them were having asthma, 15.6% with allergic rhinitis, 12.6% with eczema and 9.4% with food allergy. Children who were having food allergy reported that they were allergic to shellfish (100.0%), egg (21.9%), milk (9.4%), chicken (6.3%), soy products (6.3%), fish (6.3%) and peanut (6.3%). Further, half (50.9%) of the children reported that they have family history of allergic diseases. Family history was associated with children's food allergy (χ^2=12.328,p=0.001), allergic rhinitis (χ^2=9.727,p=0.002), and asthma (χ^2=39.479,p=0.001). Industrial dust emission (χ^2=4.619,p=0.023) and high intake of cereal and cereal products were associated with allergic rhinitis among children (χ^2=8.481,p=0.014). Low intake of nut and nut products (χ^2=7.315,p=0.026) and milk and dairy products (χ^2=7.014,p=0.030) were associated with children's food allergy. No association was found between body weight status and allergic diseases. In conclusion, the study found that there was a high prevalence of allergic diseases among children, whereby family history of allergic diseases, dietary intake, and environmental exposure were associated with allergic diseases. Therefore, there is a need to develop a nutrition intervention program targeted on children with allergic diseases considering the rapid growth and development of children.

B33 Dietary intake patterns of lactating mother from Southern areas of Bangladesh

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To identify and quantify the consumed foods by rural lactating mothers with a view to predicting the derived nutrients from the usual food consumption pattern in some selected areas of southern Bangladesh. A cross-sectional study was designed of total 107 rural lactating mothers of 16-40 age ranges who were surveyed by using AMPM steps of 24-hour dietary recall method. These methods were used for assessing dietary consumption pattern of the lactating mothers. Data on socio-demographic characteristics and frequency of foods eaten was collected using a pre-tested, standard and structured questionnaire. The mean energy intake of lactating women was about 1490 kcal. Segregated on study areas the mean daily energy intake of lactating women of *Satkhira,Khulna* and *Barisal* district were about 1415 kcal, 1428 kcal and 1690 kcal respectively. Protein intake varied from 36 to 46.6g/day and fat intake varied from 5.8 to 6.5g/day. Mean iron, calcium, zinc, Vitamin A and folic acid was 6.7, 207.1, 6.8, 199.9 and 125.6 mg respectively. Daily iron intake in Satkhira district was about 5.6mg, Khulna district was about 6.9mg and Barisal district was about 8.4mg. Mean zinc intake was high in Barisal district (8.1mg) compare to the other two districts. The mean intake of vitamin A and folic acid in Satkhira (179.5 and 114.6 microgram), Khulna (320.8 and 133.2 microgram) and Barisal (287.2 and 137.3 microgram).Dietary intakes of the rural lactating women were underneath the DRI for lactating women. Mean energy, protein, iron, folic acid, zinc and calcium intake was not adequate to uphold sound health. Therefore, sustainable as well supportable health and nutrition education is recommended to the women and their families and communities on increased food intake, proper dietary practices and dietary diversification during lactation in order to improve health and nutrition consequences of lactating women.

B34 Effects of nutrition on brain growth and cephalic index in children – A study in Kuala Terengganu

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This cross-sectional study was performed on primary and secondary school students in Kuala Terengganu. There were 419 healthy students aged between 6 to 16 years participated in this study. Anthropometric measurements including weight, height and body mass index were taken. The cephalic index calculation was performed according to Martin *Saller Scale 1957*. According to BMI for age percentiles, 65.6% (n=274) were having normal (healthy) weight where as 9.8% had overweight (n=41), 6.9% subjects fell into obese group (n=29), 14.6% were underweight (n=61) and 3.1% were found severely obese (n=13).For percentage of body fat, 29.6% were at average level (n=124), compared with 16.9% were in fitness, 17.9% were obese, 12.6% athletes and 2.6% had essential fat. Energy intake of the subjects was found low according to the Recommended Nutrient Intake (RNI) in Malaysia, i.e.1503.00 ± 347.87 kcals. Mean of fat intake was 29.88 %. Male's mean protein intake was 59.29g/d and female 48.93g/d lower than the normal intake recommended for children. Nutrient intake for vitamin D, vitamin E, thiamin, folate and calcium was low than normal recommended requirement, i.e.0.55 ± 0.91 ug, 3.40 ± 2.25 mg,0.64 ± 0.29mg, 83.88 ± 45.52ug and 414.88 ± 204.59mg, respectively. The mean cephalic index for male was higher with 81.48 (n= 203) when compared to female 79.51 (n=216). The dolichocephalic type is the highest, 32.7% (n=137) and ultrabrachycephalic type was the lowest 3.8% (n=16). The head shape could be classified as dolichocephalic as the commonest head shape. Match nutrient with specific developing brain region that is dependent on the nutrient. Use specific brain assessments that are sensitive to the nutrient deficiency. Testing of specific brain areas can be done at a very young age, but becomes more reliable as the child ages.

B35 Association between socio-demographic factors, body weight status, fruits and vegetables intake and physical activity level with knowledge of colorectal cancer risk factors among undergraduate students in Universiti Putra Malaysia

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Colorectal cancer (CRC) is the leading cause of death among males and second highest among females in Malaysia. However, poor knowledge level on CRC risk factors is observed among Malaysians. Similar trend of knowledge level is observed among university students in Malaysia. The objective of this study was to determine the factors associated with knowledge of CRC risk factors among undergraduate students in Universiti Putra Malaysia. Data were collected at Universiti Putra Malaysia, in which 80 undergraduate students were randomly selected from Faculty of Medicine and Health Sciences and Faculty of Human Ecology respectively to achieve a sample size of 160 subjects. The respondents were asked to

answer a set of questionnaire which comprised of socio-demographic characteristics, fruits and vegetables consumption, physical activity level, and knowledge of CRC risk factors. The body weight, height, waist and hip circumference of the respondents were measured by the researcher to obtain the data on their body weight status. From 160 respondents, the mean knowledge score on CRC risk factors for male and female were 4.00±2.64 and 5.03±2.64 respectively. Female students had a significantly higher mean knowledge score on CRC risk factors than male students (p=0.037). The knowledge of CRC risk factors was significantly associated with gender [χ^2=6.083, p=0.048] and fruits and vegetables intake [χ^2 = 9.772, p=0.008]. There was a negative correlation between waist-hip ratio and knowledge of CRC risk factors, which was statistically significant (r=-0.165, p=0.040). In conclusion, gender, fruits and vegetables intake and waist-hip ratio are more likely to associate with knowledge of CRC risk factors and this allows better and easier identification of participants who should be targeted for any intervention program.

B36 The association between premenstrual syndrome with dietary calcium intake and body mass index (BMI) among early adolescent female in Sungai Buloh, Selangor

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Premenstrual Syndrome (PMS) including physical and behavioral symptoms such as cramps and bloating that occur during luteal phase of menstrual cycle leading to negative effects on health and social well-being. PMS are caused by modifiable factors such as diet and individual's body weight status. Deficiency of calcium among early adolescent female as well as being underweight or overweight have an impact on the severity of premenstrual symptoms. Therefore, the aim of this study is to determine the association between premenstrual syndrome with dietary calcium intake and body mass index (BMI) of early adolescent female in Sungai Buloh, Selangor. This cross-sectional study involved 180 female students of early adolescents from secondary schools in Sungai Buloh, selected through purposive sampling. PMS symptoms were assessed using the Shortened Premenstrual Assessment Form (SPAF) and dietary calcium intake was evaluated using the Food Frequency Questionnaire (FFQ) for calcium. The height and weight were measured using SECA body meter and TANITA weighing scale. The BMI was determined based on the World Health Organization (WHO), 2007 BMI-for-Age percentile. Data was analyzed using SPSS version 21 and Nutritionist Pro. Spearman Correlation and Kruskal-Wallis test were used for the statistical analyses. Of the 180 females, the most severe symptom was bad temper with n = 84 (46.7%) followed by backache and muscle pain with n = 71 (39.4%). The association between dietary calcium intake and PMS was significant ($p<0.05$). However, there was no association found between BMI and PMS scoring in this study ($p>0.05$). Therefore, education and awareness on dietary calcium intake and management of symptoms is essential among early adolescent female.

B37 Relationships between quality of protein intake, appetite and sedentary behaviour with weight status among children aged 1 to 4 years old in Putrajaya

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Childhood obesity has become one of the most serious global public health problem and dietary factors, especially specific types of protein seem to play an important role on obesity in early childhood. A cross-sectional study was conducted to determine associations between quality of protein intake, appetite and screen time sedentary behaviour with weight status among children aged between 12 to 48 months old who attended *Taman AsuhanKanak-Kanak* in Putrajaya. Self-administered questionnaires were distributed to parents of the children and were asked to record children's dietary intake using 3-day dietary record. Animal and plant protein intakes were corrected for total energy intake by expressing them as percentage of energy from animal and plant protein intake. A total of 250 respondents with a mean age of 30.22 ± 11.14 months (49.2% female) were enrolled in this study. This study found that the children at younger age was significantly associated with higher weight-for-length/height and BMI-for-age ($r=-0.163$, $p<0.05$; $r=-0.219$, $p<0.001$). After adjusting for confounders, positive correlations were found between percentage of energy intake from animal and plant protein and weight-for-length/height among respondents whose protein intake exceeded protein requirement by 50% but both the correlations were not statistically significant ($r_p=0.100$, $p=0.336$; $r_p=0.004$, $p=0.966$). Similar findings were also found for BMI-for-age ($r_p=0.096$, $p=0.356$; $r_p=0.004$, $p=0.972$). There was positive but not significant relationship between food responsiveness with weight-for-length/ height and BMI-for-age ($r_p=0.015$, $p=0.866$; $r_p=0.021$, $p=0.810$). Similarly, no significant association between enjoyment of food with weight-for-length/height and BMI-for-age of the children was observed ($r_p=-0.020$, $p=0.814$; $r_p=-0.008$; $p=0.930$). Screen time sedentary behaviour was negatively associated with weight-for-length/height and BMI-for-age ($r_p=-0.084$, $p=0.327$; $r_p=-0.087$; $p=0.308$). This study suggests no relationships between quality of protein intake and weight status among young children but further longitudinal studies should be conducted to draw conclusive evidence.

B38 Food insecurity associated with nutritional status and post-traumatic stress disorder among flood victim children ages 7-12 years in Kuala Krai, Kelantan, Malaysia

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Natural disaster such as flood, mudslides, earthquakes and other disasters had leads to food insecurity,post-traumatic stress disorder (PTSD) and poor access to potable water and hygiene practices. This study aimed to identify association between socio-demographic, food insecurity, sanitation and hygiene with the nutritional status and post-traumatic stress disorder among children ages 7- 12 years old in Kuala Krai, Kelantan. A random sampling method was used to select a total of 123 children in KampungManekUrai, Kuala Krai.The questionnaires consist of six sections such as socio-demographic, one day 24-Hour Dietary Recall, Radimer/Cornell hunger and food insecurity items, Harvard Traumatic Questionnaire as well as Sanitation and Hygiene Practices. Height and weight was measured and BMI was determined. The prevalence of normal weight and overweight were (92.7%) and (7.3) respectively. This study found that (99.2%) and (0.8%) of children had positive and negative PTSD. It was reported that household food secure (8.9%), household food insecure (22.8%), individual insecure (12.2%) and child hunger (56.1%). All of the respondents were practiced good sanitation and hygiene. Most of the participants did not meet the Malaysian Recommended Nutrient Intake (RNI) for energy, vitamin A, zinc and calcium meanwhile they had achieved RNI levels for vitamin E, vitamin C and iron. The result showed that they had exceeded RNI level for protein and fat. There was a significant correlation between PTSD, age ($p<0.001$), total monthly household income ($p<0.05$) and significant correlation between age, sanitation as well as hygiene and household income with nutrient intake ($p<0.05$) meanwhileno association between food insecurity, BMI-for-

age and PTSD. In conclusion, after disaster most of the respondents had good mental health, sanitation and hygiene practices whereas they have poor nutritional status and majority of them were in state of food insecurity.

B39 Knowledge and attitude on nutrition related to cancer prevention among undergraduate students in Faculty of Medicine and Health Sciences in Universiti Putra Malaysia

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Cancer was the third common cause of death in Malaysia. Lack of knowledge on cancer risk factors among the public especially in younger age where observed as it may be one of the factor lead to cancer. The objective of this study is to to determine the knowledge and attitude on nutrition related to cancer prevention among undergraduate students in Faculty of Medicine and Health Sciences in Universiti Putra Malaysia (UPM). Data were collected at UPM, where a total of 240 undergraduate students from Faculty of Medicine and Health Sciences participated. Stratified proportionate to size sampling method was used and consent was obtained before the questionnaire was distributed. The respondents were asked to answer a set of questionnaire which comprised of socio-demographic characteristic, physical activity level, dietary intake, and knowledge and attitude on nutrition related to cancer prevention. The dietary intake of the respondents was interviewed by the researcher to obtain their nutrient consumptions. The mean knowledge score on cancer risk factor between medical and non-medical students were 7.68±1.3 and 7.72±1.1 respectively. Nevertheless, medical students had significantly higher mean knowledge score on nutrition that increase or decrease the risk of getting cancer than non-medical students ($p=0.021$). For attitude, number of medical students are significantly higher that have time to exercise, practice doing physical activity for 30 minutes 5 times a week, and eat vegetable ($p=0.001$, $p=0.002$, $p=0.004$; respectively). As conclusion, medical students had more knowledge and attitude on nutrition related to cancer prevention. However, non-medical students had slightly higher knowledge on cancer risk factors.

B40 Fruits and vegetables intake among adolescents in Kelantan

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Low fruits and vegetables consumption is a persistent problem worldwide that has been linked with various chronic diseases. However, there is limited knowledge on factors that influence fruits and vegetables consumption in Malaysia, especially for the adolescent group. Hence, the objective of this study was to examine the relationship between socio-environmental factors, personal factors and adolescent's fruits and vegetables consumption in Kelantan, Malaysia. A total of 223 respondents were randomly selected from 5 secondary schools in Kelantan. Data were collected by self-report questionnaire and height and weight was measured to calculate body mass index (BMI) of respondents. The mean daily frequency of fruits consumed was 2.98 ± 1.486 and the mean daily frequency of vegetables consumed was 2.92 ± 1.500, which had the similar trend. Most of the respondents (68.2%) were in normal body weight status. The prevalence of overweight and obesity were 11.7% and 10.8%, respectively. In categorical analysis, no significant associations were observed between BMI and fruits consumption ($\chi^2 = 0.92$, $p>0.05$) and also BMI and

vegetables consumption (χ^2 = 0.27, p>0.05). In correlation analysis, socio-environmental factors including home availability of fruits and vegetables, parental modeling, parental support for healthy eating, peer support for healthy eating and family meal patterns as well as personal factors including health or nutrition attitudes and weight or body concerns showed significant relationship with fruits and vegetables consumption. However, taste preferences inconsistent with other studies, did not showed significant correlation with fruits and vegetables consumption (r=-0.03, p>0.05). In conclusion, nutrition interventions could incorporate socio-environmental factors as well as personal factors to improve fruits and vegetables consumption among adolescents in Malaysia.

B41 Parental influences on disordered eating among early adolescents in selected primary schools, Selangor

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This study aims to determine the parental influences on disordered eating among early adolescents. This cross-sectional study was conducted at 12 randomly selected primary schools in Selangor, involving 707 respondents aged 10-11 years old. Respondents completed a self-administered questionnaire on socio-demographic characteristics, disordered eating, perceived parenting style, and perceived pressure to gain weight and lose weight from parents. Parents self-reported their role in modeling and policies to support healthy eating at home. About one in three of the respondents had disordered eating (31.5%). More than half of the respondents' father (53.3%) and mother (56.7%) have attained a secondary education. The mean monthly household income was RM4578.21±3187.56. Nearly half (45.7%) of the respondents perceived their father as authoritarian, while 38.5% perceived their mother as authoritative. After adjusted for socio-demographic confounders (age, sex, and ethnicity), results of the multivariate logistic regression analysis showed that respondents who perceived their mother as authoritarian had 1.590 times (95%CI=1.048-2.413) higher odds of disordered eating compared to respondents who perceived their mother as authoritative. For every unit increase in perceived pressure to lose weight from father, the likelihood of disordered eating increased by 1.124 (95%CI=1.038-1.218). In contrast, the odds of disordered eating decreased by 0.649 (95%CI=0.482-0.875) for every unit increase in parental role modeling of healthy eating. No association was found between parental educational level, monthly household income, perceived parenting style of father, parental policies to support healthy eating, perceived pressure to gain weight from parents, and perceived pressure to lose weight from mother with disordered eating. This study highlights the importance of parenting style, parental pressure to lose weight, and parents being a healthy eating role model on disordered eating. There is a need for parental involvement in future intervention programmes on promoting healthy eating in order to prevent and manage disordered eating effectively in early adolescents.

B42 Glycaemic control and nutrition knowledge in diabetes individuals in Kota Kinabalu, Sabah

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The objective of this study was to determine the relationship between glycaemic control, nutrition knowledge and practices in individuals with diabetes. Their knowledge, practice and lifestyle were obtained using an interviewer-administered questionnaire. Food intake was estimated using a 24-hour diet recall. Respondents (n=236; m=116, f=120; age 18 to 70 years, mean age = 52.3 years) had fasting blood glucose of 7.3±4.5 and random blood glucose of 9.5±4.1 mmol/L indicating poor blood glucose control. Most respondents (n=110, 60.1%) exceeded the target for FBS. HbA1c was 7.7±2.1% (95%CI: 7.4 – 8.0); 116 respondents (60.4%) exceeded had HbA1c >6.5%. There were 99 (42.7%) overweight and 107 (46.1%) obese respondents, using the WHO (2004) BMI cut-offs. Respondents who were obese class III had significantly higher FBS ($p<0.001$); their mean FBS was 16.8±20.8mmol/L (95% CI: -5.1 – 38.6). Mean HbA1c was higher in patients who practised eating out compared to patients who only ate at home ($p=0.039$); however Type I error cannot be ruled out due to unequal group sizes. Most respondents (n=124, 52.8%) have had counseling from either a dietitian or nutritionist, but when tested about their comprehension of food servings or exchanges, only 55 respondents understood them. There was no significant difference in nutrition knowledge scores between respondents who had seen a dietitian or nutritionist, and those who did not ($p=0.621$). There was a significant relationship in nutrition knowledge scores and HbA1c ($r_s=0.147$, $p = 0.042$). Diet recalls showed that 43 respondents (19.9%) consumed more than 110% of their energy requirement. Under-reporting of energy intake cannot be ruled out, therefore the number of respondents who over-ate should be higher given their BMI values. There is a significant relationship between nutrition knowledge and glycaemic control. Dietitians and nutritionists should increase efforts or restrategise diet counseling for diabetic patients to increase their nutrition knowledge.

B43 Factors associated with intuitive eating among university students in Universiti Putra Malaysia

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Intuitive eating, which is defined as reliance on physiological hunger and satiety cues to guide eating has been proposed as a healthier alternative to current strategies of weight management. This cross-sectional study examined the associations between sociodemographic characteristics, body weight status, psychological well-being, and disordered eating behaviors with intuitive eating among university students. A total of 333 undergraduates (21.3% males and 78.7% females) from three randomly selected faculties in UPM participated in this study. Respondents completed a self-administered questionnaire on sociodemographic backgrounds, intuitive eating behavior, self-esteem, body appreciation, general unconditional acceptance, body acceptance by others, body function, body dissatisfaction and disordered eating behaviors. Body weight, height, body fat percentage and waist circumference were measured. Results revealed that there was no difference ($t=0.067$, $p=0.947$) in intuitive eating score between males (75.69±7.16) and females (75.62±7.90). Body acceptance by others ($r=0.267$, $p<0.001$), general unconditional acceptance by others ($r=0.219$, $p<0.001$), body appreciation ($r=0.409$, $p<0.001$), body function ($r=0.135$, $p=0.014$), self-esteem ($r=0.256$, $p<0.001$), and disordered eating behaviors ($r=-0.228$, $p<0.001$) were correlated significantly with intuitive eating. Multiple linear regression results showed that high body appreciation ($\beta=0.385$, $p<0.001$) and lower score of disordered eating ($\beta=-0.168$, $p=0.001$) were significant predictors of intuitive eating, which accounted for 19.6% of the variance in intuitive eating. Overall, this study found that intuitive eating behavior was inversely related with harmful outcomes and positively related with several positive psychological well-being indicators. Health promotion programs should highlight the importance of enhancing body appreciation and preventing disordered

eating in university students in order to promote intuitive eating as one of the healthy weight management approaches.

B44 Awareness and use of food labelling for food choices by consumers in Kuching, Sarawak

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Faculty of Medicine and Health Sciences UNIMAS

Food labelling in packaged food products provide information which could help consumers in healthier foods selection. The objective of the study is to determine the awareness and use of food labelling for food choices by consumers. A cross-sectional survey was conducted in a selected hypermarket in Kuching City using a self-administered questionnaire targeting adult consumers aged 18 years and above. 293 consumers participated representing 92% response rate. 280 respondents (95.6%) were aware of the use of the food labels as a way to differentiate healthier foods, while 78.2% actually read the food labels. The reasons for reading were health consciousness (35.8%), to assess specific nutrient content of different products (19.2%), to avoid certain nutrient (20.6%), having medical condition such as food allergies, high blood glucose, high blood pressure (12.6%), and preferences for some ingredients (7.1%). Nutritional information made up 43.5% of the information which the respondents looked for in food labels (ingredients, allergens, food additives and preservatives, nutritional information panel and nutritional claim), compared to the non-nutritional information (brand, price, expiry date and country of origin). The reasons for the nutritional labels was to choose food which is healthier (48.2%), to know the nutritional value (34.7%) and to compare the similar food products for their nutritional value (17.2%). The reasons for not reading the food label were lack of interest (34.1%), lack of time (16.5%), small printed words (16.5%), do not understand the term used (21.2%), already know the nutritional content (10.6%). The association between age-group, ethnicity, occupation and marital status and the practice of reading food labels is significant ($p < 0.05$). In this study, younger, educated and single adults tended to read food labels to decide on food purchasing.

Group C: Nutrition and Other Components in Foods/ Products

C01 Comparison between pomelo [C*itrus grandis*(L.)Osbeck] flavedo and albedo as source of potent antioxidant

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Pomelo peels contribute to 30% of fruit weight and the consumption of this fruit has resulted in huge production of peel as waste. This study aimed to compare the total antioxidant content and activity in two different parts of pomelo peel, namely flavedo and albedo as source of potent antioxidant. By using 80% ethanol extraction, total phenolic content (TPC) and total flavonoid content (TFC) were determined using Folin-Ciocalteu method and Aluminium Chloride Colorimetric method, respectively. The total antioxidant activity was determined by performing DPPH free radical scavenging assay and ferric ion reducing antioxidant power (FRAP) assay. The TPC in flavedo and albedo were 38.67 ± 4.27 and 63.11 ± 5.03 mg GAE/g FW while TFC were 28.05 ± 6.31 and 45.61 ± 5.01 mg QE/g FW, respectively. Albedo was found to possess about 1.5 times higher TPC as well as TFC

than flavedo and there were significant differences between these parts ($p<0.05$). The EC_{50} value obtained from DPPH assay was significantly lower in flavedo (166.30 ± 0.87 µg/ml) than albedo (168.00 ± 0.71 µg/ml), indicating its higher antioxidant activity ($p<0.05$). FRAP value was also significantly higher in flavedo with 307.59 ± 20.14 mM Fe^{2+}/g FW than albedo with 245.88 ± 32.17 mM Fe^{2+}/g FW ($p<0.05$). Pearson correlation tests revealed that there were no correlations between TPC and EC_{50} as well as FRAP value ($p>0.05$). There was also lack of relationship between TFC and EC_{50} ($p>0.05$). Nevertheless, a significant strong negative correlation was observed between TFC and FRAP value ($p<0.05$), showing that reducing ability of samples may not be attributed to flavonoids. In conclusion, the very thick albedo part which contributing to more than a kilogram of fruit weight is a good source of natural antioxidants and its reused help to alleviate the serious disposal problem in food and agricultural industries.

C02 Retention of EPA and DHA in selected fish using different cooking methods compared to salmon

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The beneficial health effects of fish consumption have been mainly ascribed to its *n*-3 long-chain polyunsaturated fatty acids (PUFA), especially eicosapentaenoic acid (EPA, 20:5n3) and docosahexaenoic acid (DHA, 22:6n3), which have beneficial effects on non-communicable diseases. However, PUFA are thermo-sensitive compounds and are often being affected by cooking. Hence, the effect of different cooking methods (steaming, frying, grilling and baking) on the retention of EPA and DHA in local fish, Yellowstripescad (*Selaroidesleptolepis*) and Japanese threadfin bream (*Nemipterusjaponicus*) as compared to salmon (*Salmosalar*) were determined. Generally, when compared to the raw samples, steaming and baking did not show significant changes but frying and grilling affected the EPA and DHA content of both local fish and salmon significantly ($p<0.05$). When comparing among the cooking methods, retention of EPA and DHA content was the highest in steaming and followed by baking. Both frying and grilling also showed significantly lower in retaining EPA and DHA contents in all fish samples as compared to steaming and baking ($p<0.05$).. In addition, the effect of cooking methods was found to be associated with the true retention value of EPA and DHA ($p<0.05$). Overall, steaming and baking had little effect whereas frying and grilling had considerable effect on the EPA and DHA content of local fish and salmon. Steaming and baking would be the best cooking methods in retaining EPA and DHA content in both local fish and salmon. Yellowstripescad remained to retain the highest EPA and DHA content for all of the cooking methods. Hence, it could be the best fish from local resources in getting the benefits of *n*-3 fatty acids in order to meet the suggested dietary intakes (0.3-1.2%) of the Malaysian and also serves as the potential new source of fish oil in the near future.

C03 Determination of *in vitro* bioaccessibility of β-carotene in pumpkin and butternut squash by different cooking methods

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β-carotene, a type of provitamin A is beneficial to our health. However, the compound needs to be released from its food matrix before being utilized by our body. Thus, understanding

the bioaccessibility of the food consumed is a crucial step. The objective of this study was to determine the effect of various cooking methods on bioaccessibility of β-carotene in pumpkin and butternut squash. *In vitro* digestion was carried out on raw and cooked (steamed, boiled, and deep fried) pumpkin and butternut squash. β-carotene was identified using RP-HPLC. Generally, butternut squash (4.99±0.02mg/100g) had higher β-carotene content than pumpkin (4.34±0.04mg/100g). Thermal processing resulted in lower βcarotene content in pumpkin samples; however, it increased the β-carotene content in butternut squash samples. The β-carotene content in steamed pumpkin was 3.82±0.04mg/100g, 3.57±0.05mg/100g in boiled pumpkin and 3.08±0.04 in deep fried pumpkin. β-carotene content in steamed, boiled and deep fried butternut squash were reported as 10.58±0.38mg/100g, 10.23±0.05mg/100g and 5.67±0.08mg/100g respectively. In term of bioaccessibility, thermal processes increased the percentage of bioaccessible β-carotene in both pumpkin and butternut squash samples. Raw pumpkin had 10.56±0.44% of bioaccessible β-carotene while raw butternut squash had only 1.65±0.04%. Bioaccessibility of β-carotene deep fried pumpkin and butternut squash were significantly higher than their raw sample with 68.86±0.86% ($p<0.001$) and 22.32±2.12% ($p<0.05$) of bioaccessible β-carotene respectively. Although boiled and steamed pumpkin and butternut squash had higher bioaccessibility of β-carotene than raw samples, the differences were not significant. Deep frying method was found to enhance the bioaccessibility of β–carotene significantly in both of these samples but not boiling and steaming method.

C04 Antioxidant contents and activity of polyphenol rich mixture (PRM)

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Polyphenol rich mixture (PRM) is a spices mixture with the combination of several phenolic rich ingredients included garlic, ginger, lemon, apple cider vinegar and honey. The natural antioxidants such as vitamins and polyphenols in PRM sample are believed to protect the body from chronic diseases. This study was undertaken to determine antioxidant content and activity of PRM samples. Three PRM samples (raw, cooked and commercial) were subjected to Folin-Ciocalteu Reagents for determination of total phenolic content (TPC) whereas aluminium chloride colorimetric assay for determination of total flavonoid content (TFC). The antioxidant activity was determined by using two methods which were DPPH free radical scavenging assay and Ferric ion reducing antioxidant power assay (FRAP). The TPC of samples were significantly different ($p<0.05$) and ranged from 4.21 mgGAE/gFW to 12.94 mgGAE/gFW with commercial PRM having the highest value. Similarly, TFC were also significantly different ($p<0.05$) ranged from 2.18 mgQE/gFW to 8.56 mgQE/gFW. The EC_{50} values obtained from DPPH free radical scavenging assay ranged from 19.12±4.1 to 49.30±3.9 with commercial PRM showing the lowest value indicating it possesses the highest antioxidant activity among the PRM samples. Furthermore, commercial PRM also showed the highest value in FRAP assay compared to raw and cooked PRM samples that ranged from 39.48 $mMFe^{2+}$/gFW to 103.50 $mMFe^{2+}$/gFW with significant differences among the PRM samples ($p<0.05$). For pearson correlation, the results demonstrated high negative correlation coefficients between DPPH with TPC and TFC (r=-0.855, r=-0.829, respectively) and high positive correlation coefficients between FRAP with TPC and TFC (r=0.995, r=0.988, respectively). Overall, the present study showed that commercial PRM possesses the highest antioxidant content and activity among the three PRM samples. PRM can be consider as a potential natural antioxidant beverage for nutraceutical and pharmaceutical purposes.

C05 Current status of iodized salt coverage in Sarawak

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After the National Iodine Deficiency Disorders (IDD) survey 2008 was conducted, a legislation on universal salt iodisation (USI) was introduced in Sarawak in July 2008, which requires all salt sold for human consumption in the state to contain iodine of not less than 20 mg/kg and not more than 40 mg/kg. This study aimed to determine the iodized salt coverage in Sarawak after 4 years of USI.Data from iodized salt surveillance in Sarawak in 2012 were analysed. Inspections of the iodine content of salt sold in retail shops in Sarawak were carried out by health inspectors according to sampling schedule from Sarawak State Health Department. The salt samples taken were sent to the Food Quality Laboratory in Kuching for determination of iodine content using standard iodometric titration method. A total of 23 salt samples were analysed and the mean iodine concentration level was 32.7±12.0 mg/kg. About 70% (n=16) of the samples contained adequate iodine, less than 20% (n=4) with inadequate iodine (<20 mg/kg) and the remaining samples (13.0%, n=3) had more than adequate iodine level (>40 mg/kg).Generally, the mandatory USI had been implemented successfully in Sarawak. However, the inadequate iodized salt still accounts for 17.4% which may impede the goal of IDD sustained elimination programme. Regular inspection of salt at port of entry, factory and retail outlets should be continued to ensure compliance with minimum and maximum iodization standards.

C06 Detection of fresh oil adulteration with recycled cooking oil using fatty acid composition analysis and FTIR spectral analysis

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There is a growing concern over the food safety issue related to increased incidence of cooking oil adulteration with recycled cooking oil (RCO). The objective of this study was to detect adulteration of fresh palm olein (FPO) with RCO using fatty acid composition (FAC) analysis and Fourier transform infrared (FTIR) spectral analysis combined with chemometrics. RCO that prepared in the laboratory was mixed with FPO in the proportion ranged from 1% to 50% (v/v) to obtain the adulterated samples (AO). FAC for FPO, RCO, and AO were determined as percentage of fatty acid methyl esters using gas chromatography equipped with flame-ionization detector. The results showed that FAC of RCO was quite similar to that of FPO and lied within the ranges of reference standards for palm olein, except for C18:2. Several fatty acids such as C8:0, C10:0, C11:0, trans-C18:1 and C20:5 not found in FPO appeared in RCO with minute amounts (<0.1%). However, these fatty acids were not consistently detected in the AO. This suggested that FAC analysis might be insensitive in detecting adulteration of FPO with RCO. For FTIR spectral analysis, the transmittance spectra of FPO, RCO and AO were measured. The spectral regions where variation between FPO and RCO was observed were used to develop partial least square (PLS) models and discriminant analysis. The optimized PLS model (combination of 3016-2642cm^{-1} and 1845-650cm^{-1}, 1st derivative) could well predict the adulteration level for samples with adulteration level down to 10%. On the other hand, the discriminant analysis able to classify the FPO and AO into two distinct groups with accuracy level of 100% and

detection level as low as 1% of adulteration level. Discriminant analysis unable to detect any adulteration in all the 5 selected packet oils. Although both are highly applicable for the objective, both techniques combined unable to resolve oil adulteration convincingly.

C07 Physicochemical and nutritional properties of peels, pulp and arils of gac*(Momordicacochinchinensis)* fruits grown in Malaysia

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The study was to examine the physicochemical and nutritional properties of peels, pulp and arils of gac*(Momordicacochinchinensis)* fruits as it is first grown in Malaysia. The physical measurements were determined prior to fruit fractions. The proximate composition of peels, pulp and arils were performed according to AOAC method. The skin colour (L*, a*, b*) of the gac fruit were 40.69±0.82, 43.93±0.59 and 37.38±1.67 respectively. The fruit weight was 245g to 762g with the length to circumference ratio was 0.39cm to 0.44cm. The pulp (39%±0.02) contributes to the highest percentage to the fruit weight compared to seeds (23%±0.02), peels (19%±0.02) and arils (19%±0.01). The pH for the edible parts (pulp and arils) of the gac fruit were 5.65±0.02 and 5.54±0.02 with 0.02g/L and 0.03 to 0.05g/L of titratable acidity (TA) respectively. In addition, the arils contained higher TSS compared to pulp with 11.57%±0.52 and 4.90%±0.33 °Brix. The colour index showing that pulp had lighter compared to arils, and arils colour had more red compared to the pulp. Pulp had significantly highest the moisture content (94.94%±0.26), compared to arils (90.67%±0.12) and peels (88.10%±0.25). Furthermore, gac fruit was found to have high ash content particularly in pulp at the range of 17.29 to 23.45 followed by peels (13.99 to 15.91) and arils (6.31 to 13.12). The gac fruit was also found to contain high available carbohydrate with 55.62%, 30.93% and 19.29% in arils, pulp and peels respectively. Meanwhile, the peels contained the highest protein content (6.16%±0.26) followed by arils (5.76%±0.32) and pulp (4.57%±0.22). Nevertheless, the gac arils found to contain significant amount of fat content at 14.55%±0.27 to 29.97%±6.86 and low percentage in peels (0.96% to 2.17%) and pulp (0.69% to 2.47%). The total dietary fibre found at the highest amount in peels (68.56%) compared to pulp (43.53%) and arils (20.55%). This preliminary study indicated that pulp and arils of gac fruit are important source of carbohydrate and minerals for human consumption, while arils have a good potential source of healthy edible oils.

C08 A comparative study on the antioxidant activity of leaf, flower, stem and root extracts of *Peperomiapellucida* (L.) HBK (Piperaceae)

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Peperomiapellucida is an underexploited annual herb abundantly available in Malaysia. It is widely used as ethnomedicines in treating various ailments throughout the tropical and subtropical regions of the world. Previous studies evidenced that *P. pellucida* possessed

antioxidant properties. However, there is no antioxidant study on different parts of the plant was reported. The aim of this study is to determine and compare the antioxidant properties of leaf, flower, stem and root of *P. pellucida*, hence providing additional scientific evidence of its potential. Each part of the plant collected was washed, freeze-dried, and ground into fine powder before extracted using 70% ethanol, 70% methanol and distilled water (1:10 w/v). DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging assay was used to determine the antioxidant capacity. Only moderate [half maximal inhibitory concentration (IC_{50}) >50 µg/ml] antioxidant activities were detected in all *P. pellucida* extracts with mean IC_{50} ranging from 2,138 µg/ml (ethanol flower extract) to 10,058 µg/ml (methanol stem extract). The mean IC_{50} of all *P. pellucida* extracts is significantly different from that of standard reference, gallic acid (30 µg/ml) ($p<0.05$). Generally, *P. pellucida* leaf extracts showed the highest antioxidant activity, followed by flower, root, and stem extracts. However, ethanolic flower extract (IC_{50} 2.14 mg/ml) showed significantly higher antioxidant activity than ethanolic leaf extract (IC_{50} 2.79 mg/ml) ($p<0.05$). In terms of extraction solvent, ethanolic extracts of *P. pellucida*generally showed higher antioxidant activity than that of methanolic and aqueous extracts. However, methanolic root extract (IC_{50} 4.35 mg/ml) showed significantly higher antioxidant activity than ethanolic root extract (IC_{50} 6.15 mg/ml) ($p<0.05$). The results revealed that ethanol is a better extraction solvent than methanol and distilled water for leaf, flower and stem of *P. pellucida* to show their highest antioxidant activity while methanol is a better extraction solvent for *P. pellucida* root to show its highest antioxidant activity on DPPH assay.

C09 Effect of selected cereal grains on *in vitro*bioaccessibility of isoflavones in soymilk

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Soymilk, which can be called as plant based “milk” is a favourite traditional beverage in Asian with various beneficial health protective effects due to the presence of phytoestrogen known as isoflavones. As consumers becoming more health conscious, mixing cereal grains into soymilk to make a wholesome beverage for breakfast becomes popular. However, dietary factors may affect the bioaccessibility of isoflavones. The aim of this current work was to evaluate changes in the bioaccessibility of isoflavones in soymilk after mixing with selected cereal grains following *in vitro* gastrointestinal digestion. The samples (soymilk, soymilk with oat, soymilk with corn cereal, soymilk with wheat cereal, soymilk with barley, soymilk with multigrain powder) were subjected to *in vitro* gastrointestinal digestion with its isoflavones content determined before and after simulated gastric digestion and intestinal digestion with dialysis membrane. Soymilk contained 1.80 ± 0.029mg daidzein and 2.12 ± 0.077mg genistein in 100ml, while for percentage of bioaccessibility of soymilk daidzein and genistein were 11.24 ± 0.460% and 5.09 ± 0.250% respectively. Additional of cereal grains except barley in soymilk have shown significant reduction in bioaccessibility of isoflavones. Soymilk beverage mixed with oat expressed the lowest isoflavonesbioaccessibility, while barley expressed the highest isoflavonesbioaccessibility. Dietary fiber content, especially the insoluble fiber of cereal grains was related to the reduction of bioaccessibility of isoflavones by its entrapping affinity of isoflavones and viscosity effect in the gut. The higher the dietary fiber added into the soymilk showed the lower the bioaccessibility of isoflavones in soymilk.

C10 Visceral fat weight, muscular fat content and fatty acid composition of organic and broiler chicken

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Chicken was a valuable source of protein and other important nutrient. But chicken can also be source of unhealthy fat. The primary objective of this study was to determine the visceral fat weight, muscular fat content and fatty acid composition of organic and broiler chicken. The broiler chicken weight between 1.00 to 2.00kg was purchased at Tesco IOI Putrajaya and the organic at Az-Zain store Bandar BaruBangi. A total 12 chickens sample (6 broiler and 6 organic) were used for the experiment. After cleaning, visceral fat from chicken was removed, collected and weighed. Chicken was cut and and categorised into breast with skin, skinless breast, leg with skin and skinless leg. Soxhlet method and gas chromatography were employed to determine the muscular fat content and fatty acid composition respectively. Broiler chicken contains 2.6% more visceral fat compared to organic chicken which only contained 3.6% fat ($p< 0.05$). Organic chicken had lower muscular fat content compared to broiler for all selected part measured, but significant difference only observed for breast with skin ($p=0.032$) and skinless breast ($p= 0.030$). Higher concentrations of C16:0 and C18:1n9c fatty acids were observed in the leg than in the breast for both chicken types. Organic skinless breast and leg had higher PUFA than broiler. Overall there were a few major differences in the fatty acid contents between organic and broiler. Further larger scale studies in Malaysia, covering a larger geographical area and more selection of chicken parts needed to extend the current work.

C11 A survey on acceptance of innovative product (TempeCal nugget) among urban community in Klang

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This study was aimed to determine the level of acceptance of innovative product named as TempeCal nugget) among urban community in Klang. This newly developed product was based on TempeCal (tempe fortified with calcium). The survey was carried out using a questionnaire that was adapted from previous study. The study was carried out in Klang since the major population was consisted of Malay-Javanese who normally consume tempe. A total of 70 subjects who lived in Taman Johan Setia 1 and Taman Johan Setia 2 were randomly selected. The subjects were given TempeCal nuggets samples to be tasted and were given questionnaires of 5-point Likert scale to assess the level of acceptance towards TempeCal nugget. Soy products and isoflavone consumptions among subjects were based on isoflavone food frequency questionnaire (FFQ).There were 60% of subjects who showed "High" level of acceptance, while 34.4% of them showed "Very High" level of acceptance to TempeCal nuggets. Based on FFQ, soy products which were usually consumed by the subjects were consisted of sweet tau foo fah, homemade soy milk, commercial soy milk, fried tempe and sambal tempe. However, soy products that contributed the most intakes of isoflavones were sweet tau foo fah (6.84 $\pm$ 14.32 mg / day) and fried tempe (6.71 $\pm$ 10.97 mg/day). The average intakes of soy products and isoflavones for all subjects were 131.8 $\pm$ 293.64 g/day and 62.0 $\pm$ 140.66 mg/day, respectively. There were positive correlation

between subjects' level knowledge on TempeCal nugget (r=0.044), intake of soy products (r=0.136) with subjects' acceptance on TempeCal nuggets.

C12 Determination of essential mineral and heavy metals in selected ready to eat canned seafood products commercially available in East Coast of Peninsular of Malaysia

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The objective of this study was to determine the composition of essential mineral and heavy metals in selected ready to eat (RTE) canned seafood products commercially available in East Coast of Peninsular Malaysia. The compositions of essential mineral in the products were compared with recommended intake for population in Malaysia and the levels of heavy metal in selected canned food were also determined.. Ten samples of selected canned seafood product were purchased form 5 supermarket around Kota Bharu, Kelantan. Microwave digestion was used for sample digestion and extraction and Inductively Coupled Plasma Mass Spectrometry (ICP-MS) was used to determine macro mineral (Na, Mg, K, Ca), trace mineral (Mn, Fe, Cu, Zn, Se) and heavy metal (Al, As, Cd, Sb, Pb) in selected canned seafood products. The range concentration of macro mineral: Na, Mg, K, Ca in selected canned foods were found within 0.575 – 3.510 mg/kg, 0.057 – 0.116 mg/kg, 0.415 – 1.002 mg/kg and 0.033 – 0.0787 mg/kg respectively.These concentrations of essential metals are in the range of human necessities. For trace mineral, the concentration of Mn, Fe, Cu, Zn and Se were ranged within 0.014 – 0.029 mg/kg, 0.003 – 0.041 mg/kg, 0.022 – 0.261 mg/kg, 0.107 – 0.450 mg/kg and 0.011 – 0.043 mg/kg. While the concentration of heavy metal: Al, As Cd, Sb and Pb were within the range of 0.116 – 4.707 mg/kg, 0.014 – 0.029 m/kg, 0.012 – 0.061 mg/kg, 0.001 – 0.094 mg/kg , ≤ 0.001 mg/kg and 0.003 – 0.009 mg/ kg respectively. In a conclusion, the concentrations of heavy metals being very negligible in most of the samples and was below the permissible limit according to Food Act 1983 and food regulation 1985. This indicate that these foodstuffs are reasonably safe from metal toxicity. However a few samples had slightly higher concentrations of these metals, although the concentration are still below the permissible limit,this kind of metals can be very harmful to human being even at low concentration. Thus regular examination of these items should be demanded before products distributed to the market.

C13 Antioxidant capacity, total phenolic content, total flavonoid content of *apium graveolens l.* (celery) *and coriandrum sativum l.* (coriander)

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The objective of this study was to determine antioxidant capacity, total phenolic content (TPC) and total flavonoid content (TFC) of celery and coriander leaves and stems in 70% ethanol and water extract. Folin- Ciocalteu reagent assay was used to determine total phenolic content while aluminium chloride calorimetric assay was performed to determine total flavonoid content. The determination of antioxidant capacity was done using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity, ferric reducing antioxidant power (FRAP) and β-carotene bleaching assays (BCB). Water extracts of coriander leaves showed the highest TPC (20.53 ± 0.16 μg GAE/100g of dry weight extract) and also TFC (15.62

± 2.54 µg GAE/100g of extraction weight) compared to other extracts. For antioxidant capacity, coriander leaves showed the lowest EC_{50} scavenging activity (34.17 ± 1.53, 72.27 ± 0.25), ferric reducing power (44.4 ± 12.37 µM $FeSO_4$/100g of extraction weight, 54.1 ± 6.32 µM $FeSO_4$/100g of extraction weight) and, antioxidant activity (43.94 ± 3.79%, 49.39 ± 9.16%) both in ethanol and water extract. There was no correlation found between TPC and TFC, EC_{50} scavenging activity. However, TPC and TFC demonstrated a strong positive correlation with FRAP (r = 0.894, p < 0.01, r = 0.864, p < 0.01). TPC and TFC also exhibited a strong positive correlation with BCB (r = 0.797, p < 0.01, r = 0.637, p < 0.01). Overall, this study showed that coriander leaves exhibited the highest TPC, TFC and antioxidant capacity.

C14 Determination of total phenolic content, total flavonoid content and antioxidant activity in *Lasiaspinosa*

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Lasiaspinosa or the local name is keladigegeli is a herbal plant that consumed in Southeast Asia including Malaysia which has been recognized to have several medical properties and health benefits. Therefore, the purpose of this study was to determine the total phenolic content (TPC), total flavonoid content (TFC) and antioxidant activity in aqueous and ethanolic extracts from various parts of *Lasiaspinosa*(stem, root and leaf). In this study, the TPC were ranged from 1.99 to 298.51 µg GAE/100 g dry weight sample. The TFC were ranged from 0.41 to 106.54 µg CE/100 g dry weight sample. Hot extract of leaf part had the highest TPC and TFC (298.51 ± 2.91 µg GAE/100 g dry weight sample; 106.54 ± 8.39 µg CE/100 g dry weight sample, respectively). The antioxidant activity using 1,1-diphenyl-2-picryl-hydrazyl (DPPH) assay expressed as percentage of scavenging activity were ranged from 31.12% to 79.67%. The highest percentage of scavenging activity was hot extract of leaf part (79.66 ± 0.26 %). The antioxidant activity by β-carotene bleaching assay expressed as percentage of antioxidant activity were ranged from 3.07% to 92.04%. Cold extract of leaf part had the highest percentage of antioxidant activity (92.04 ± 3.51 %) using β-carotene bleaching assay. The leaf part of *Lasiaspinosa* had the highest TPC, TFC and antioxidant activity followed by stem and root. The hot water extraction was the optimum extraction to determine TPC, TFC and antioxidant activity in *Lasiaspinosa* followed by cold water extraction and 70% ethanol extraction. In conclusion, *Lasiaspinosa* can be used as a potential natural plant sources of antioxidants.

C15 Screening for total phenolic content, total flavonoid content and antioxidant activity of *ElateriospermumTapos* in aqueous and ethanol extracts

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Elateriospermumtapos (E. tapos) had been recognized to have medicinal properties and beneficial effects towards health. This study was aim to determine the total phenolic content, total flavonoid content and antioxidant activities of *E. tapos*in different extracts and various parts. The samples were separated and prepared into two parts (shell and seed) and three types of extraction (cold water, hot water and 70% of ethanol extraction). Folin-Ciocalteu and aluminium chloride colorimetric method were used to determine total phenolic content (TPC) and total flavonoid content (TFC), respectively. DPPH radical scavenging (DPPH) and beta carotene bleaching (BC) methods were used to determine antioxidant activity. Hot water extraction for shell part exhibited the highest TPC (1298.600 ± 4.242 µg GAE/100g EW) followed by cold water extraction (537.190 ± 04.579 µg GAE/100g of EW) and the lowest was 70% of ethanol extraction (3.602 ± 0.071 µg GAE/100g of EW). Sample with the highest TFC was shell part in hot water extraction (16685 ± 487.771 µg CE/100g EW) followed by cold water (4462.264 ± 241.567 µg GAE/100g of EW) and the lowest was 70% of ethanol extraction (12.918 ± 0.617 µg CE/100g of EW). The highest percentage of antioxidant activity was shell part in 70% of ethanol extraction (86.015 ± 3.940 %) followed by hot water (79.83 ± 0.103 %) and the lowest was cold water extraction (75.860 ± 0.544 %) using DPPH radical scavenging effect. While, the highest percentage of antioxidant activity was shell part in hot water extraction (122.165 ± 0.000 %) followed by cold water (35.367 ± 0.000 %) and the lowest was 70% of ethanol extract (18.227 ± 5.911 %). Shell part and hot water extraction were found to have higher TPC, TFC and antioxidant activity compared to seed part. In conclusion, *E. tapos* by product, shell may have potential as natural and significant sources of antioxidant.

C16 Nutrient content in a new developed food products TempeCal nugget

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This study was aimed to identify the nutrient content in a new food product based on TempeCal (tempe fortified with calcium). The fortified tempe was developed into a new product such as nugget tempe. Proximate analysis was carried out using AOAC method. The total carbohydrates content was determined by using by difference method. Calcium content of the fortified tempe was determined using Atomic Absorption Spectrophotometer. Sensory analysis was carried out on 30 untrained panels assessed the acceptance of the nugget TempeCal (NTC). The results showed that NTC contained higher value in all proximate contents except for carbohydrate content when compared to control sample which was nugget tempe based on normal tempe. However, only the total ash content in NTC was significantly ($p<0.05$) higher compared to the control sample. The calcium content of NTC was almost double compared to control sample. As for the sensory analysis, the acceptance of NTC was not significantly difference ($p>0.05$) compared to control sample. This showed the panel subjects could not differentiate the taste of NTC compared to the control sample. However, NTC score was higher than or equal to the score of control sample in all five aspects of sensory (colour, smell, appearance, texture and taste) and overall acceptance. In short, innovated food such as nugget tempe produced from fortified tempe (TempeCal) contained higher amount of nutrient and calcium compared to the normal tempe. The taste of TempeCal used in the making the nugget tempe was acceptable compared to the one using normal tempe.

C17 Glycaemic index of coconut pudding and Nata De Coco

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There is a scarcity of glycaemic index (GI) data on local coconut based food products. We aimed to determine the GI of two popular local desserts, coconut pudding and Nata de Coco. Proximate analysis using AOAC procedures was conducted to verify the nutrient content of the food products. GI testing procedures were carried out in accordance with recommended methods. A total of 10 healthy subjects (mean age: 23.2±0.8 years, mean BMI: 20.1±0.8 kg/m^2) tested two test foods (coconut pudding and Nata de Coco) once in random order and the reference (glucose drink) three times, on separate days after fasting overnight. Capillary blood glucose was measured before food/reference consumption and postprandially at 15, 30, 45, 60, 90, 120 minutes using a glucometer. The incremental area under the curve (iAUC) for blood glucose was calculated by using the trapezoidal method and the GI was calculated as the iAUC for blood glucose after consumption of a test food divided by the iAUC of the reference (tests foods and the reference contained 25g of available carbohydrates). The GI value of coconut pudding and Nata De Coco was 51 ± 2.9 and 42 ± 2.6 respectively. Both foods are classified as low glycemic index foods possibly due to the nutrient content, acidity, and the processing method (fermentation, gelling) of these products. These desserts are suitable to be included in a low GI diet.

C18 Fat soluble vitamins and carotenoids analysis in cooking oils by ultra performance convergence chromatography

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In the current study a rapid ultra performance convergence chromatography (UPC^2) method for the determination of seven fat soluble vitamins: (vitamin A: retinol, retinyl acetate; vitamin D: ergocalciferol, cholecalciferol; vitamin E: α-tocopherol; vitamin K: phylloquinone, menaquinone) and three carotenoids: (lutein, lycopene, β-carotene) in various cooking oils was developed. Fat soluble vitamins could be separated within eight minutes on a UPC^2 system with a BEH column (3.0 x 100 mm, 1.7 µm) at 50°C, using a gradient elution with a mobile phase of carbon dioxide and 2-propanol (99.9:0.1/99.2:0.8/99.9:0.1), at a flow rate of 2 mL/min and the Automatic Back Pressure Regulator (ABPR) set to 1800 psi. Carotenoids were separated within three minutes on a similar UPC^2 system with an HSS C18 SB column (3.0 x 100 mm, 1.8 µm) at40°C under isocratic conditions with a mobile phase of carbon dioxideand ethanol (75:25; *v/v*). The flow rate was set to 1.5 mL/min and the ABPR to 1800 psi. The limits of detection (LOD) and quantification (LOQ) were ranging between 0.01 - 1.17 ppm and 0.05 - 3.59 ppm for fat soluble vitamins while carotenoids detection limits fell in the range of 0.03 - 0.11 ppm and 0.10 - 0.38 ppm, respectively. The results showed excellent linearity for both methods (R^2: 0.9993 - 0.9999). A recovery study with standard addition technique into a selected coconut oil sample resulted in more than 90% recovery for retinyl acetate, retinol, vitamin K_1 and K_2, whereas the recovery for vitamin D_2 and D_3 ranged between 70 - 80%. The lowest recovery of 68 - 70% was found for α-tocopherol whilst almost comparable recovery rates above 80% were observed for all three carotenoids.

C19 Minerals and heavy metals contents of coconut milk (*santan*) in Malaysia

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Coconut milk is the word used to describe the liquid obtained from the mechanical or manually press of the coconut's meat usually with or without added water. In Malay word the coconut milk is known as 'santan' which usually sold as a fresh liquid form in the local market. It is immensely rich in vitamins and minerals. It contains high levels of some of the crucial minerals like, iron, calcium, potassium, magnesium and zinc. Therefore, this study was carried out to evaluate the minerals and heavy metals contents of Malaysian coconut milk sold by local vendors and compared with local goat's and cow's milk. Samples were obtained from three locations in Hulu Langat in Malaysia and were measured by Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Results of the study showed that santan is rich in Ca content but it was a significantly lower ($P<0.05$) amount of Ca and Na than goat's and cow's milk with mean values of 189.52 and 142.73 ppm, respectively. However, it possess very high concentration of Fe element (36.348 ppm) compare to goat' milk (1.44 ppm) and cow's milk (1.23 ppm). In addition. It exhibited a higher content of Mg, K and P (415.67, 2256.47and 984.61 ppm, respectively) compare to cow's milk (147.82, 1752.20 and 982.00 ppm respectively) with lower amount of Cd and Hg (0.46 and 0.01 ppm, respectively). Therefore, this milk can provides a sufficient amount of iron element that recommended for health protection. Thus, it can be concluded that one cup of coconut milk can enhances the human health on certain aspects such as treating anemia, transporting the oxygen in the blood cells and providing the requirement iron to the pregnant health.

C20 Determination of total phenolic content, total flavonoid content and antioxidant capacity of various parts of *Manilkarazapota*(flesh, peels, leaves and seeds)

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This study aimed to determine the total phenolic contents (TPC), total flavonoid contents (TFC) and antioxidant capacity of different parts of *Manilkarazapota* (ciku) (flesh, peels, leaves and seeds) extracted by 70% ethanol and water. TPC was determined by using Folin-Ciocalteu reagent assay while the TFC was determined based on aluminium chloride-flavonoid assay. Antioxidant activity were assessed by β-carotene bleaching and 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity assays. The results showed that water extract showed significantly higher ($p<0.05$) TPC and TFC compared to ethanol extract. The leaves of ciku showed the highest TPC (31.35 ± 0.45 µg, 14.16 ± 0.48 µg GAE/100g dry weight extract), TFC (33.71 ± 8.02 µg, 12.10 ± 3.12 µg CE/100g dry weight extract), radical scavenging activity (93.61 ± 0.59%, 92.96 ± 0.06%) and antioxidant activity (49.94 ± 10.6%, 48.59 ± 9.52%) in water and ethanol extract, respectively than other parts of ciku. Data from Pearson correlation test showed that the antioxidant activity of ciku as measured by beta-carotene bleaching assay demonstrated high positive correlation coefficient with TPC and TFC ($r = 0.689$; $r = 0.604$) which were highly significant ($p< 0.01$)

respectively. This indicate that high antioxidant activity of ciku, partly due to the high content of TPC and TFC. However, there was negative and low correlation between TPC and radical scavenging activity EC_{50} (r = - 0.532, p < 0.05) which indicate that radical scavenging activity of ciku was not due to the TPC content. In conclusion, among four parts of *Manilkarazapota* studied, the leaves exhibits the highest TPC, TFC and antioxidant capacity.

C21 Price comparison between more and less nutritious food and drink products in three supermarket headquarters

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One of the barriers to healthy eating is the high price of nutritious foods compared to foods with less nutritional value. The objective of this study was to examine the price comparison between more and less nutritious food and drink products in supermarket headquarters. A cross-sectional study was performed to identify five categories of food and drink products (bread, cereal, chips, biscuit and juice) available from three supermarket headquarters in Malaysia. The market survey was conducted to determine the sub-categories under each category of food and drink products. In addition, 20 respondents in Kuala Lumpur and Selangor have answered a questionnaire consists of socio-demographic information, factors of purchases food and drinks products and frequency of purchases food and drink products in supermarket. The Nutritional Quality Index form was used to categorize the food and drink products into either more or less nutritious based on the nutrient content stated on nutrition labels. Item-to-item price comparison was made using stated prices and standardized per 100 g. Overall, the average price of the more nutritious food and drink products did not differ significantly from that of less nutritious products (RM 1.80 ± 1.4 versus RM 2.9 ± 2.6, p=0.054). More nutritious breads differ significantly and have higher price than less nutritious breads (RM 0.7 ± 0.06 versus RM 0.6 ± 0.03, p=0.036). Moreover, more nutritious cereals (RM 2.4 ± 1.2 versus 2.6 ± 1.2, p=0.4) and biscuits (RM 2.2 ±1.0 versus 2.9 ± 1.6, p=0.5) have lower price. More nutritious chips (RM 5.9 ± 0.0 versus 5.0 ± 3.1, p=0.7) and more nutritious fruit juice (RM 0.8 ± 0.6 versus 0.6 ± 0.4, p=0.6) have higher price than the less nutritious counterparts. The findings showed that it is possible to choose more nutritious food within common categories without spending more money.

C22 Nutritional Composition of *Citrus microcarpa*and *Citrus hystrix*

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Citrus is one of the most important commercial fruit crops grown in the world. *Citrus microcarpa* and *Citrus hystrix*are fruit tree in the family of Rutaceae and have been recognized as important spices in Asian cooking. The purpose of this study is to determine the proximate and mineral composition of different parts (mature leaf, young leaf, pulp and peel) of *Citrus microcarpa*and *Citrus hystrix.* The results show that pulps have the highest moisture content which is 89% in *Citrus microcarpa* and 86% in *Citrus hystrix*. Mature leaf has the highest content in protein, fat, ash, and total energy content in both citrus; *Citrus microcarpa* (6.65%, 0.51%, 4.49% and 151 kcal, respectively) and *Citrus hystrix* (7.08%, 0.54%, 4.49% and 139 kcal, respectively). However, for total carbohydrate content,

young leaf of *Citrus microcarpa*has the highest amount (31.45%) while mature leaf of *Citrus hystrix,* contained the highest carbohydrate (26.60%). In comparison of both citrus, *Citrus microcarpa*has the highest moisture content, carbohydrates and total energy in pulp and mature leaf. While *Citrus hystrix*has the highest protein, fat, and ash content in mature leaf. As for mineral, calcium was the highest mineral content in mature leaf of both *Citrus microcarpa*and *Citrus hystrix*followed by potassium in peel of both citrus. In conclusion, mature leaf is the most nutritious part for both citrus and contributes as rich sources of nutrients.

C23 Determination of total phenolic content, total flavonoid content and antioxidant capacities of different parts (flesh, seed, peel and leaf) of Pulasan (*Nepheliummutabile*Blume)

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Pulasan (*Nepheliummutabile*Blume), one of the underutilised fruits in Malaysia, is believed to possess good antioxidant potential. This study was aimed to determine the content of total phenolic (TPC), total flavonoid (TFC) as well as antioxidant capacities of flesh, seed, peel and leaf of Pulasan. Samples were extracted with 80% (v/v) methanol and 80% (v/v) ethanol. TPC and TFC were evaluated using Folin-Ciocalteu and aluminium chloride colorimetric method respectively, whereas antioxidant capacities were determined by DPPH radical scavenging and β-carotene bleaching assays. The yield of Pulasan extract was significantly higher ($p<0.05$) when 80% ethanol was used as a solvent as compared to 80% methanol. Among four different parts of Pulasan, the highest yield was obtained from flesh (59.4%). The highest TPC was found in peel extract, which were 129.27 mg and 118.9 mg GAE/g DW in methanol and ethanol extract, respectively. TFC was also found highest in peel which were 120.84 mg and 107.25 mg CE/g DW in methanol and ethanol extract, respectively. Similar with TPC and TFC, the peel also exhibited the highest radical scavenging capacity than other parts of Pulasan. Antioxidant capacity assessed by β-carotene bleaching assays however, showed that the highest capacity was found in leaf. Nevertheless, the antioxidant capacity of all extracts of Pulasan were significantly lower ($p<0.05$) than standard (BHT). A positive relationship was found between TPC, TFC and antioxidant capacity of Pulasan as shown by Pearson correlation test. This indicated that high antioxidant capacities of Pulasan were partly due to high TPC and TFC. Results from this study also showed that there was no significant different ($p>0.05$) on antioxidant capacity between methanol and ethanol extract, which suggest that ethanol could be used as a safer extraction solvent. In conclusion, Pulasan peel has the highest TPC, TFC and radical scavenging capacity than other parts of the fruit.

C24 Proximate and carotenoid compositions, and antioxidant capacity of pulp and aril of gac (*Momordicacochinchinensis*) fruits

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This study aimed to investigate the proximate and carotenoids compositions, and

antioxidant capacity in two fractions (pulp and aril) of gac fruit. All the proximate analysis were performed according to AOAC Official Methods except for available carbohydrate and total energy contents, in which calculated based on 'by-different' and 'summation' method. Antioxidant capacity of the samples was determined by DPPH free radical scavenging activity and ferric reducing antioxidant power (FRAP) assay. While the carotenoids composition (β-carotene and lycopene) of the gac fruit was analyzed by High Performance Liquid Chromatography. All the analysis were conducted in triplicate in an independent experiment. The pulp and aril of the gac fruits were found high in moisture (79.61g/ 100g and 80.11g/ 100g) but low in ash contents (0.8g/ 100g and 1.1g/ 100g), on wet weight basis, meanwhile, high in carbohydrates (9.2g/ 100g and 5.6g/ 100g), and protein (5.6g/ 100g and 6.5g/ 100g), on dry weight basis. In addition, the aril had high fat contents (5.2g/ 100g) but low in fiber content (1.6g/ 100g), whereas the pulp had high fiber (3.0g/ 100g) yet low in fat content (1.8g/ 100g), on dry weight basis. The pulp and aril of the gac fruits were categorized as low energy dense foods with the energy content 79.2 kcal/ 100g and 97.8 kcal/ 100g dry weight, respectively. The aril contained higher β-carotene (169.1 μg/g) and lycopene concentration (770.5 μg/g) compared to pulp, which was 12.03 μg/g and 16.45 μg/g, respectively. According to the independent-samples *t*-test, the proximate and carotenoids compositions, and FRAP assay showed significantly different between the pulp and aril of gac fruit ($p<0.05$), except for the DPPH free radical scavenging activity assay. Several factors, such as geographical and climate differences, environmental factors, stage of maturity, as well as storage conditions might influence the nutritional contents of the samples. Therefore, it is recommended that this tropical fruits should be considered as one of fruits rich in nutrients content especially carotenoids composition.

C25 Effects of different drying methods and extraction solvents on the total phenolic content, total flavonoid content and antioxidant capacity of Chinese yam (*Dioscoreaoppositifolia* L.) extracts

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Chinese yam (*Dioscoreaoppositifolia L.*) is a tuber vegetable that widely used in traditional Chinese medicine. In this study, total phenolic content (TPC), total flavonoid content (TFC) and antioxidant capacity of Chinese yam prepared by different treatments were determined. Sample was subjected to two drying methods (freeze dry/oven dry) followed by extraction using two different solvents (80% methanol/80% ethanol). TPC and TFC were determined by Folin-Ciocalteu and aluminium chloride colorimetric assay, respectively. The antioxidant capacity was determined by DPPH radical scavenging assay and β-carotene bleaching assay. Results showed that TPC of Chinese yam ranged between 12.02±0.75mg to 15.50±0.91mg GAE/100gFW where highest value was found in freeze dried sample extracted by 80% methanol. For TFC, the highest content was found in freeze dried sample extracted by 80% ethanol (4.88±0.40mg CAE/100gFW) while oven dried sample extracted by 80% methanol exhibited lowest TFC (1.22±0.13mg CAE/100gFW). Antioxidant capacity as measured by DPPH radical scavenging assay showed that freeze dried sample extracted by 80% methanol had lowest EC_{50} value (5.49±0.09mg/ml) indicating it possesses highest radical scavenging capacity. This sample also had highest antioxidant capacity (55.86±3.51%) in β-carotene bleaching assay. Freeze dried sample consistently showed greater antioxidant capacity than oven dried samples as it has significantly higher TPC, TFC, radical scavenging capacity and antioxidant capacity ($p<0.001$). For solvent, no significant different ($p>0.05$) of TPC were found between samples in two solvents. Sample in 80% ethanol however, possessed significantly higher TFC than 80% methanol ($p<0.001$), whereas the higher scavenging capacity and antioxidant capacity were found in 80% methanol. TPC showed significantly

strong correlation with radical scavenging capacity (r=-0.805,p<0.001) and antioxidant capacity (r=0.673,p=0.001). However, no significant correlation were found between TFC with DPPH assay (r=-0.353,p=0.127) and β-carotene bleaching assay (r=0.207,p=0.380). This indicates that antioxidant capacity of Chinese yam could partly due to the TPC but not TFC. In conclusion, 80% methanol was able to extract more antioxidant in Chinese yam, and to retain antioxidant properties, freeze dry is the better drying technique.

C26 Determination of elemental composition of selected infant and growing up formula in Malaysia

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The objective of this study was to determine the elemental compositions, including trace elements (copper, zinc, iron, manganese and selenium) and heavy metals (lead, cadmium and chromium) in infant and growing up formula among different brands locally available in Malaysia. Twelve different milk powder brands consisted each of six samples of infant formula and six samples of growing up formula were purchased and analyzed for elemental composition. Microwave digestion system was used for sample digestion and extraction. Flame Atomic Absorption Spectrometer (FAAS) was used to determine the elemental composition concentration. There was significant difference between trace elements in infant formula. Selenium was found to be the highest in concentration, followed by iron, copper, zinc and manganese in infant formula. Sample F (1.936 mg/L) was found to be the highest in Selenium concentration compared to other samples. In terms of heavy metals, Chromium was found to be the highest concentration in infant formula, with Sample C (0.080 mg/L) recorded the highest content of Chromium. There was also significant difference between trace elements in growing up formula. Iron and Selenium were found to be higher in growing up formula compared to copper, zinc and manganese. Between the samples, sample 3 (1.494 mg/L) recorded the highest in iron concentration, whereas Selenium was highest in sample 2 (1.991 mg/L) and sample 5 (1.991 mg/L). Lead was found to be the highest in concentration compared to other heavy metals in growing up formula, in which sample 5 (0.088 mg/L) had the highest amount compared to other samples. Although almost all of the trace elements and heavy metal shows significant amount in both growing up and infant formula, however there were still below the permissible limit for all of the elements, according to Food Act 1983 and Food Regulation 1985.

C27 Antioxidant and nitric oxide properties in human milk

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Exclusive human milk feeding for the first 6 months of life, with continued breastfeeding for 1 to 2 years of life or longer, is recognized as the normative standard for infant feeding. Human milk has antioxidant properties which consist of both enzymatic and non-enzymatic compound. This study aimed to investigate the total antioxidant capacity (TAC) and nitric oxide (NO) properties in human milk, according to the lactation days collected at three different time points within two weeks interval. Samples of breast milk from 20 full-term mothers were included in this study. The samples were collected at three different time points after delivery, corresponding to mature milk at two weeks interval from mothers of infant up to five months of age. The samples (n=60) were kept frozen at – 80 °C until analysis. TAC analyses were performed by spectrophotometric method using the ferric reducing antioxidant power (FRAP) assay, 1,1-Diphenyl-2-picryl hydrayl (DPPH) radical scavenging activity and 2,2– azinobis – (3 – ethyl –benzothiazoline – 6 – sulfonic acid) (ABTS) radical

cationdecolourisation assay. Nitric oxide analysis was performed by spectrophotometric method using Griess Reagent. The range of TAC of human milk determined by FRAP, DPPH and ABTS assay were 879.5 to 3583.1 µM/L, 1.7 to 16.58 mg TE (Trolox Equivalents) /100 ml, 7.98 to 28.71 mg TE/100 ml respectively. The range of NO scavenger level of human milk determined by Griess assay was 6.4 to 32.53 µM/L. This study found that there was a weak correlation between the TAC and NO levels in human milk samples. It revealed that human milk is able to provide better than infant formula. Thus, this may protect their infants against free radical related diseases.

Group E: Food Science and Technology

E01 PROP (6-*n*-propylthiouracil) taster status and their association with sweet and fatty taste acceptance among obese and non-obese subjects

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Tasters of 6-n-propylthiouracil (PROP) are more sensitive to sweet taste and fattiness in foods, hence often showed lower degree of acceptance toward foods that are high in these taste qualities. However, little is known about the relationship between group of tasters and food acceptability in lean and obese individuals. This study aimed to compare the taste acceptance and preference of sweet/fatty food between and within PROP taster groups among lean and obese individuals. A total of 30 obese and 58 lean subjects aged 20-45 were classified as PROP nontasters, medium tasters, or supertasters by using PROP filter paper screening procedure. Hedonic test was carried out on 4 types of food models (2 sweet foods – tea and agar; 2 fatty foods – dessert and pudding). Obese subjects showed higher acceptance towards fatty and sweet foods compared to lean subjects. There is no significant different ($P>0.05$) on sweetness intensity among PROP taster group in both lean and obese groups. However, fattiness rating was significantly different ($p<0.05$) among the 3 taster groups in obese and lean groups. The non-tasters preferred higher fat content compared to supertaster and medium taster in this food model in obese groups. These results suggested that PROP taster status could act as a useful indicator in nutrition intervention program which takes into account the different sensory experience among individuals when they consuming foods.

E02 Thyme leaves benefits on human health

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The potential source of natural antioxidants is plants, fruits and vegetables. Active ingredients of Thymus vulgaris (*T. vulgaris*)are useful in the treatment of convulsions,

respiratory diseases, smooth muscle spasm and bloating . Thyme contains many flavonoids, phenolic antioxidants like zeaxanthin, lutein, pigenin, naringenin, luteolin and thymonin. Fresh thyme herb has one of the highest antioxidant levels among herbs. Thyme is packed with minerals and vitamins that are essential for optimum health. Its leaves are one of the richest sources of potassium, iron, calcium, manganese, magnesium and selenium. Thyme has changed from a traditional herb to a serious drug rational phytotherapy. Thyme is a strong anti-microbial, which means it combats bacterial, viral, yeast and fungal infections. It is an effective treatment for athlete's foot. Thyme anti-bacterial, anti-vital properties make it an effective remedy for respiratory ailments. It fights infections, dries mucous membranes, and relaxes bronchial spasms that bring on heavy coughing. Because of its drying ability, thyme tea is helpful as a diuretic. It is useful in treating runny noses caused by colds, hay fever and other allergies. Thyme tea also alleviates watery eyes. It is beneficial in treating sore throats, bronchial ailments, swollen tonsils, laryngitis, sinus, and asthma. Thyme is especially effective in treating respiratory infections because it loosens and expels mucous. It is even used to treat whooping cough and emphysema. And gargling with thyme tea can reduce swelling and pus formation in tonsillitis. The highlight of this study is to evaluate the Thyme leaves benefits on human health.

E03 Chemical composition in commercially produced fish sauce ('budu')

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Understanding the authenticity of chemical composition in commercially produced fish sauce is important to enable the consumers to make wise decision for quality fish sauce in a situation whereby fish sauce; also known as 'budu' has become one of the condiments in daily Malaysian dish, various brands of 'budu' have been largely introduced into the market. However, little is known about the quality and reliability of the nutrition labelling of the 'budu'. Therefore, the present study was aimed to determine the authenticity of the samples in comparison of their chemical composition with nutrition labelling and the nutrition information of 'budu' from the book of Nutrient Composition of Malaysian Foods (1997). Different brands of 'budu' made from anchovies (n = 10) were obtained from various sundry shops in Kota Bharu, Kelantan for analysis of their chemical composition using standard AOAC methods (1984). One-Sample T-Test showed that there was significant difference between the results of the chemical composition studied in majority of the samples and the test value from the Nutrient Composition of Malaysian Foods especially ash content in which all the samples showed significant difference from the test value ($p < 0.05$). When compared with the nutrition labelling for the three samples which had labelling, the result showed significant difference in term of the mean fat content for every 100 g of 'budu' in all the 3 samples ($p < 0.05$). However, only one out of the 3 samples showed significant difference in the mean protein content for every 100 g of the 'budu' ($p < 0.001$). In conclusion, it was suggested that all the 'budu' used in this study were not authentic in term of their chemical composition. Further efforts should be done in enhancing the quality of the 'budu' and the proper nutrition labelling process especially for the 'budu' produced by the backyard 'budu' manufacturers in Malaysia.

E04 Comparison of physicochemical properties between tualang and kelulut honey

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This study was aimed to compare the differences of physicochemical properties between tualang and kelulut honey. Several physical and chemical parameters of honey such as pH, moisture content, total soluble solid, total ash content, total available carbohydrate, crude protein content, mineral content and antioxidant tests were measured. Samples of tualang honey were manufactured by Agromas products and kelulut honey was obtained from Kuantan, Pahang. Six replicates were analyzed for each type of sample. Tualang honey was more acidic (pH 3.22), whereas kelulut honey contained lower moisture content (67.27%), which indicate that both types of honey can resist microbial spoilage. Kelulut honey also had lower total soluble solid (68°B) and higher total ash content (4.17%). Tualang honey had the higher total available carbohydrate (97.58±6.22%) and crude protein content (0.74±0.06%), whereas kelulut honey had higher phenolic content (12.8±0.02 mg galic acid/100g). Kelulut honey contained highest mineral content of Mg, Fe, Na, K and Ca compared to tualang honey. Overall, tualang honey showed significantly higher ($p<0.05$) values in pH, moisture content, total soluble solid, total ash content, total available carbohydrate, mineral content (Mg, K, Ca) and fenolic compared to kelulut honey. However, there was no significant difference ($p>0.05$) in crude protein and mineral (Fe, Na) contents showed between tualang and kelulut honey. In conclusion, keluluthoney were found to show differences in physicochemical properties compared to tualang honey.

E05 Effect of cooking methods on phenolic acids in *Hericiumerinaceus*

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Hericiumerinaceus(HE) is a popular edible fungus in Asia known for its excellent antioxidant properties. Owing it to the lobster and shrimp-like flavour as well as meaty texture it imparts when cooked, HE is generally consumed in cooked state. Nevertheless, thermal treatments have been known to induce effects on texture, chemical composition and nutritional value of foods. Up to date, existing literature on the effect of cooking on HE and its phenolic acids profile is scarce. Hence, the objective of this study is to evaluate the effect of different cooking methods (microwaving, boiling, steaming and stir-frying) on phenolic acids and antioxidant activities of HE. The cooked and dried (control) mushrooms were analyzed for antioxidant activity and total phenolic content (TPC) using DPPH and Folin-Ciocalteu assays, respectively. The methanolic yields of cooked HE extracts ranged from 41.00 to 47.47%. The TPC of HE decreased after cooking treatments and was in the order of dried > stir fried > microwaved > steamed > boiled. Microwaving, boiling and steaming significantly lowered the TPC ($p < 0.05$) while no significant difference ($p > 0.05$) was observed after stir-frying as compared to the control. Increase in radical scavenging activity was found in all cooked samples albeit they were statistically insignificant ($p > 0.05$). The phenolic acid

profiles of HE were identified using HPLC. Gallic acid was reported to be the dominant phenolic acid found in HE extracts in the range of 3.03 to 49.41 μg/ g dry weight. Negative correlations were observed between DPPH and TPC as well as DPPH and gallic acid profile. This may be explained by the influence of Maillard reactionproducts on the enhanced DPPH capacity in this study. These results demonstrate that some domestic cooking procedures did not compromise the phenolic acids content, which highlight the positive role of cooking on the nutritional qualities of HE.

E06 The effects of inulin supplementation on the physical,chemical and functional properties of plain white bread

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In recent years, the demand for healthy foods has been on the rise. The incorporation of prebiotics into food to improve the food's functional properties has been of growing interest. Therefore, the aim of this study is to investigate the effects of inulin supplementation (IS) on the physical, chemical and functional properties of plain white bread. Inulin was supplemented into the white bread at 2.5% and 5.0% of the total dough weight while the non-inulin supplemented bread served as control. Based on the results obtained, no significant difference ($p>0.05$) was observed for color and texture across all samples, denoting that inulin supplementation into white bread might not give rise to a noticeable change in consumer's perception. In addition, the retrogradation behavior and moisture content of both breads were also not affected by inulin supplementation. However, supplementation with 5% inulin significantly lowered ($p<0.05$) the water activity of bread as compared to control. The supplementation of inulin at 2.5% and 5.0% substantially lowered the glycemic index (GI) of control by approximately 57.5% as compared to the control. This study suggested that supplementation with inulin, particularly at 5% could potentially produce white bread with acceptable quality attributes while increasing its functional properties.

E07 Development of beverage from cornsilk extracts by different thermal treatments and its effect on morphological characterization and mineral composition

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Cornsilk is the by-product of maize and always been discarded after harvesting. Numerous studies have shown the importance of cornsilk towards health since ancient time. Utilization of cornsilk into beverage product not only able to prevent huge wastage, but also can offer alternative remedy to the consumers. This study aims to investigate the effect of different thermal treatments of cornsilk on morphological characterization and mineral compositions. Cornsilk was introduced into two types of thermal treatments (steaming and blanching), and untreated. After the treatments, the cornsilk was dried overnight in an oven before viewed using scanning electron microscope (SEM) for morphological characterization. Later, the dried cornsilk was ground into powder form prior to beverage preparation. Both powder and beverage prepared from different treatments were analysed for mineral concentration determination using ICP-MS. There was no significant differences between fresh and dried cornsilk treated with different thermal treatments in morphological features and physical

characteristics. Differences were only observed in the diameter and width in all cornsilk samples. Shrinkage was obviously seen in dried cornsilk samples compared to fresh cornsilk samples. The result of ICP-MS showed significant amount of K and Ca compared to other macrominerals in both powder and cornsilk beverages. Similarly, the concentration of Mn and Zn were significant in both powder and cornsilk beverages. For heavy metals, cornsilk powder contain low amount of Cr whereas cornsilk beverage contain low amount of Ar but still under the limit set by Food Act 1983 and Food Regulations 1985. In conclusion, there was no significant difference between thermal treatments of cornsilk towards morphological characterization. For mineral concentration, both cornsilk powder and beverage contain significant amount of K, Ca, Mn and Zn. The only difference recorded was the low amount of heavy metals present in both form of cornsilk.

E08 Total microbial count in fermented fish sauce (budu)

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Budu is produced by mixing fish and salt at certain ratio followed by fermentation at least for six months in closed tanks. This study was conducted to assess the microbial load in anchovies based fish sauce made from anchovy, *Stolephorus sp*. With 3:2 fish to salt ratio at first day, 1st month, 2nd month, 3rd month, 4th month and 5th month of fermentation. The samples of the anchovies based fish sauce is taken directly from the *budu* factory in Tumpat, Kelantan. Fish mixture (25g) were transferred aseptically to stomacher bag containing 225mL peptone solution. The mixture was mixed vigorously for 1 minute using stomacher. The total plate count was determined using plate count agar (PCA) which was incubated for 48 hours at 37°C. Pour plate and spread plate method were used to determine the microbial load. Microbial load for the total plate count (TPC) using pour plate at first day was $4.8x10^3$ cfu/g. It then increase significantly from $4.8x10^3$ cfu/g to $1.0x10^4$ cfu/g after 5 months of fermentation. The increase in the TPC at the initial stage of fermentation could be due to bacterial and autolytic spoilage that occurred once the anchovies mixture was prepared. An increase of the microbial load was also due to most of the halophilic bacteria successfully adapted well to the high salt environment. Microbial load using spread plate at first day of fermentation was $6.9x10^4$ cfu/g. It then increased significantly from $6.9x10^4$ cfu/g to $1.27x10^5$ cfu/g. Based on microbiological safety of ready-to-eat foods, spoilage eventually occurred at a level around 10^9cfu/g due to the production of lactic acid. The results showed microbial load level low than spoilage. The anchovy based fish sauce from factory in Tumpat, Kelantan showed low level of microbial load thus safe for consumer consumption.

E09 Biochemical and nutritional analysis of biscuits supplemented with lemon peel powder

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Lemon peel is the waste by product of citrus juice industries and is reckoned valuable healthful and functional food. Lemon peel has rich antioxidant and nutritional potential and exhibits dense amount of dietary fiber. Antioxidants are very beneficial in several

metabolic disorders. The aim of present study was incorporation of different levels of lemon peel powder and their effect on chemical, physical, antioxidant and sensory characteristics of biscuits were analyzed.Different treatments(T_0, T_1, T_2, T_3) of biscuits were prepared by using different concentrations of lemon peel powder (0%, 1%, 2%, 3%) in wheat flour (100%, 95%, 90%, 85%). The results indicated that lemon peel powder had high amount of fiber and moisture but low ash, fat and protein content. The antioxidant activity and total phenols content (TPC) were observed 190.5 and 1.73g/GAE respectively. In case of antioxidant activity, the treatment T_3 showed that this treatment have highest antioxidant activity which is very useful for controlling oxidation process in stored food. On account of treatments, the highest phenols content was found in treatment T_3 followed by T_2, T_1 and T_0 in the same order. The concentration of total phenols at different storage duration was ranged 0.91-0.79 and highest concentration was observed at 0 days and it was followed in descending order by 21days, 14 days and 7 days. Thus, the results indicated that by incorporating lemon peel powder, it is possible to enhance the nutritional quality and improved antioxidant properties of biscuits.

E10 Investigation on nutritional compositions and textural properties of wheat bread partially substituted with sweet potato flour

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The development of wheat bread formulated with sweet potato flour can be a great platform to increase or enhance the nutritional compositions of the bread as well as improving the textural properties of the bread itself. The objective of this study is to investigate the nutritional compositions and textural properties of wheat bread partially substituted with sweet potato flour (SPF). The purpose of the study is to increase the nutrient content and the textural properties in wheat bread by partially substituted the wheat flour with SPF. This is because; the addition of sweet potato flour in bread may enhance its nutritional quality. 5 different formulation of wheat bread with partial substitution of SPF in the percentages of substitution were; 0%, 2%, 4%, 6% and 8% were investigated for its nutritional composition and textural properties. For nutritional composition, proximate analyses were done for moisture content, total ash content and fat content. For textural properties, by using the Texture Analyser TA.XTplus, the textural attributes were investigated on the firmness, springiness, cohesiveness and chewiness of the 5 different wheat bread formulations. In comparative assessment of the different bread formulation, the results showed that the fat and ash content of wheat bread were increased whereas moisture content was decreased in line with the SPF added. However, the result did not show significant increment ($p<0.05$) increment in term of ash and fat content. In textural analysis, there is an increment of firmness, gumminess and chewiness of wheat bread due to lower moisture content of wheat bread. SPF was effective in improving nutritional compositions and influenced the textural attributes in wheat bread. However, only addition of 2% SPF would be effectively contributes to the desirable textural properties in the wheat bread.

E11 Recovery of antioxidants from *Camellia sinensis*var. *assamica* leaves in an aqueous two-phase system using thermo-separating polymer

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Tea is receiving great interests due to the many beneficial health effects associated with its regular consumption. Black tea represents the majority of the tea traded internationally and occupies about 80% of the global tea market. Theaflavins and thearubigins present inblack tea possess high antioxidant capacity and biological activities. The objective of this study was to recover the antioxidants in black tea (*Camellia sinensisvar.assamica*) using an aqueous two-phase system (ATPS) consisting of thermo-separating random copolymer ethylene oxide–propylene oxide (EOPO) and salt. The effect of type of salts including potassium phosphate, ammonium sulphate and tri-sodium citrate on the partitioning behavior of black tea antioxidants was investigated. The partition coefficients of the antioxidants in the developed ATPS were determined. Besides, effects of tie-line length (TLL); volume ratio (V_R);sample loading; pH and centrifugation time for equilibration on the partitioning behavior of antioxidants in ATPS were studied to achieve the optimum recovery condition for antioxidants. The optimum condition for the recovery of antioxidants in black tea was obtained in EOPO 2500/sulphate ATPS comprising of TLL of 41.4% (w/w), V_R of 1, sample loading of 0.3% (w/w), pH of 7.0 and centrifugation time of 12.5 mins. At this optimal condition, 96.54 ± 0.09% of black tea antioxidants were recovered in the EOPO-rich top phase with a partition coefficient of 26.93 ± 0.76.The results reported herein demonstrate the potential application of ATPS, particularly EOPO 2500/sulphate ATPS, for the recovery of antioxidants from *Camellia sinensis var. assamica*.

Notes

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- ✓ 2 scoops (≈ 18 g) provide more than **3 g of oat beta-glucan** for cholesterol-lowering effect.
- ✓ Good solubility. Just mix one scoop into 250ml cold or warm water and drink.
- ✓ **Rich in total fiber and a balanced amount of soluble & insoluble fiber.**
- ✓ **HIGH IN PROTEIN, MAGNESIUM, IRON & ZINC.**

MS 1900:2009
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Oat Bran Powder Canister (480 g)

2 scoops (≈ 18 g) = more than 3 g beta-glucan

• Other *Biogrow® Oat BG22™* family members •

1 packet (30 g) = 3 g beta-glucan

Crispy Cereal
(30 g x 12 's + 2 's) &
(30 g x 28 's + 4 's)

2 sachets (≈ 18 g) = more than 3 g beta-glucan

Oat Bran Powder Travel Pack
(9 g x 30 's)

Message by **Yayasan Jantung Malaysia** (The Heart Foundation of Malaysia):

Take 3 g of beta-glucan (soluble fiber) from ***Biogrow Oat BG22™*** daily, as part of your low fat and low cholesterol diet to help **Reduce Cholesterol.**

Available at all leading pharmacies nationwide.

Legosan (Malaysia) Sdn. Bhd. (284196-H)
Lot 6, Jalan 19/1, 46300 Petaling Jaya.
Call Infoline: 03-7956 2220 (Mon-Fri 9am-5pm)
Website: www.biogrow.com.my

With the Compliments from

Mondelēz International