34th Scientific Conference

Theme

Healthy Nutrition:

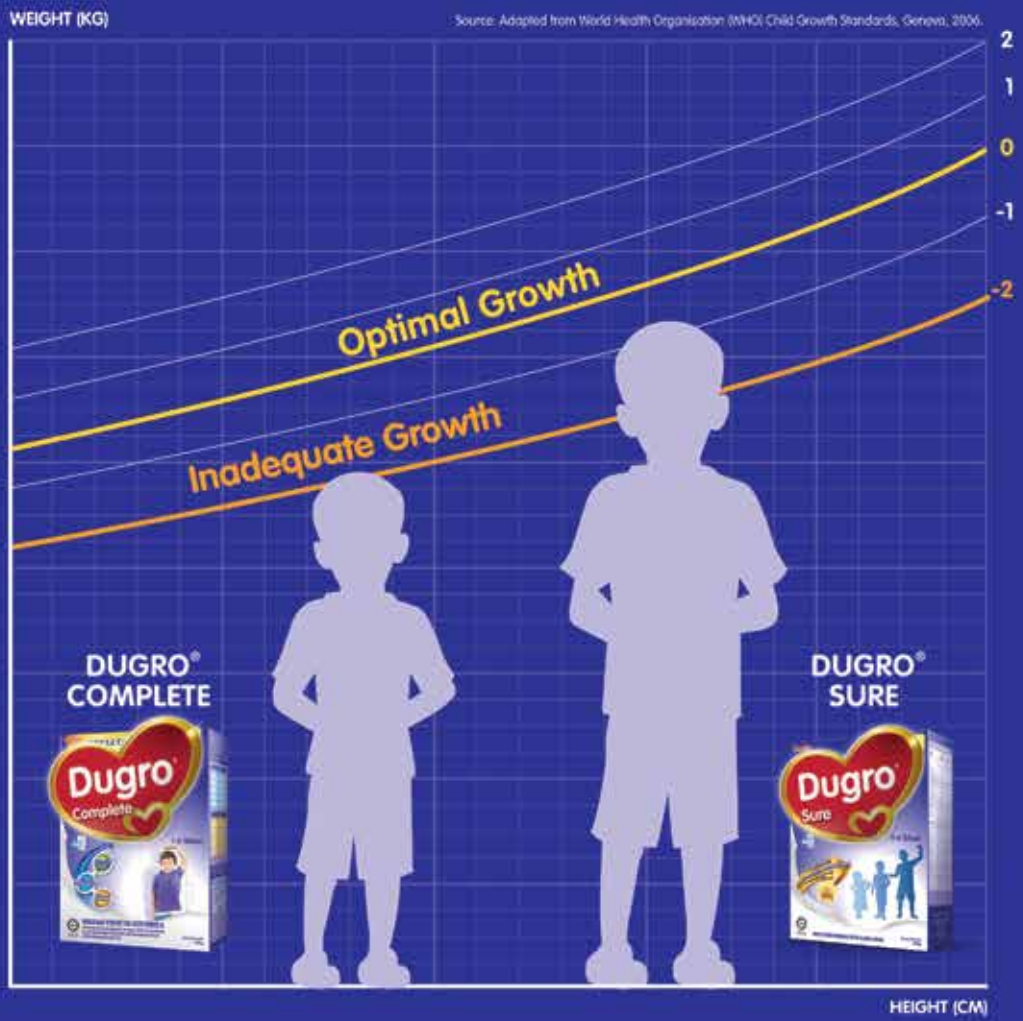
Key to Disease Prevention

Programme & Abstracts

3 – 4 July 2019

Hotel Istana, Kuala Lumpur

HOW MUCH HELP DOES YOUR CHILD NEED FOR OPTIMAL GROWTH?



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Dugro® Complete is a formula dietary food to support catch-up growth in children with undernutrition, stunting or wasting. Please consult a healthcare professional before using the product.

Dugro® Sure is formulated to support children to achieve appropriate growth milestones. This is not a solution to accelerate child's growth in short term. As part of daily diet, individual results may vary as growth is also determined by other factors.

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Contents

Conference Secretariat

VERSACOMM (263773-W)

12-A, Jalan PJS 8/4, Mentari Plaza, Bandar Sunway,
46150 Petaling Jaya, Selangor.
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Members of the 17th Council & Organising Committee of 34th Scientific Conference

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Dr Wong Jyh Eiin

President's Welcome Message

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

A warm welcome to the 34th Annual Scientific Conference of Nutrition Society of Malaysia (NSM)! We extend a special welcome to Yang Berbahagia Dato' Seri Dr Chen Chaw Min, Secretary-General Ministry of Health Malaysia for graciously consenting to declare open this Conference.

Recognising the severity and urgency of the nutrition situation in the country, disease prevention through promotion of healthy nutrition must be the way forward for Malaysia. It is thus amply clear why this year's conference theme is: "Healthy Nutrition: Key to Disease Prevention". We are of the belief that the identified national strategies and action plans such as in the NPANM III (2016-2025), and the National Strategic Plan for Non-Communicable Diseases (2016-2025) must be systematically implemented. A top-down approach would be the way to galvanise the concerted efforts of relevant government ministries for an effective whole-of-government approach. Getting all stakeholders, including the private sector, to join forces would be the logical way towards addressing the problems.

It is imperative that adequate financial resources be made available for the effective implementation of the identified programmes and activities. What is also crucial is the availability of critical mass of well-trained nutritionists for successful execution of NPANM. We need passionate nutritionists who are inspired to contribute towards improving the food and nutrition scene in the country.

In this regard I am pleased to update that the Allied Health Professionals Act 2016 will be enforced, hopefully at the later part of the year. Once enforced, only suitably qualified graduates are eligible to be registered as nutritionists. What is also important is that registered nutritionists must act ethically and professionally. NSM will play a crucial rule in the implementation of the Act. It will become even more important for members to support your Society!

I urge everyone to take full advantage of this opportunity provided in the conference to network. Do use the knowledge gained to bring the voice of nutrition to higher levels, to all stakeholders! Everyone can and should contribute towards preventing nutrition-related problems. We hope this conference is able to provide further impetus to all stakeholders to act more seriously to prevent nutrition-related disorders.

I take this opportunity to place a record sincere gratitude to all who have contributed in successfully organising this Conference. This includes all speakers and poster presenters, all participants and sponsors as well as Versacomm Sdn Bhd, the Secretariat of the Conference. I thank my colleagues in the 17th Council of the NSM for their cooperation in organising this conference.

Nutrition Society of Malaysia

IMPROVING LIVES *through* NUTRITION

As a professional organisation, we are guided by a simple belief – the more people understand food and nutrition, the better they can care for their health and well-being.

For that reason, we support the advancement of research, sharing practical insights and important discoveries for the benefits for all.

We also support the Government's efforts in promoting healthy nutrition in the society to combat nutrient deficiencies as well as diet-related chronic diseases in the country (e.g. obesity, diabetes, hypertension and coronary heart disease).

In caring for the community, we continuously disseminate practical nutrition information to the young and old alike, guiding them to discover the benefits of good nutrition and a healthy lifestyle.

We are committed to improve lives through nutrition. It's our way of serving Malaysians.

Established in 1985, the Nutrition Society of Malaysia (NSM) is a non-profit scientific organisation that facilitates networking among its 500 professional members and engages in the following scientific and community nutrition promotion activities to achieve its goal.

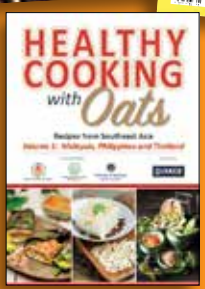
For more information, visit our website:
www.nutriweb.org.my

Our Activities

- Organise annual scientific conferences
- Conduct scientific update sessions
- Advice to government health & regulatory authorities & scientific bodies
- Research on specific community groups
- Lead the Southeast Asia Public Health Nutrition (SEA-PHN) Network
- Conduct nutrition promotion programmes in collaboration with other professional organisations and corporate companies
  - specific target groups especially women, infants and children (eg Healthy Kids, Mi-Care, MyNutriBaby, Positive Parenting)
  - community-based promotion programmes eg Nutrition Month Malaysia, Probiotics Education Programme
- Establish a comprehensive and authoritative website on nutrition for Malaysians

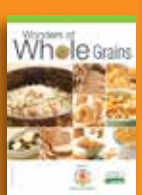
Our Major Publications

- Malaysian Journal of Nutrition
- Berita NSM (newsletter)
- Series of recipe books
  - Healthy Cooking with Oats. Recipes from SEA. Vol 1. Malaysia, Philippines, Thailand
  - Junior Chef Cookbook Vol 1. Let's Play Healthy Cooking.
  - Nutritionists' Choice Cookbook (Vol 1: Healthy Recipes for Your Little Ones. Vol 2: Resipi Untuk Seisi Keluarga)
  - Resipi Sihat, Pilihan Bijak (Vol 1 & 2)
- Various educational booklets and leaflets on dietary guidelines and specific foods
- Nutrition Month Malaysia booklets on healthy eating and active living (www.nutritionmonthmalaysia.org.my)



Junior Chef Cookbook Vol 1. Let's Play Healthy Cooking, Nutritionists' Choice Cookbook (Vol 1 & 2), Resipi Sihat, Pilihan Bijak (Vol 1 & 2), Healthy Cooking with Oats

Healthy Eating During Pregnancy & Lactation



Wonders of Whole Grains

Women@Heart *Wanita & Pemakanan* manual for professionals and leaflets for public

Malaysian Dietary Guidelines leaflets

Breastfeed with Confidence

Baby's First Bites

Healthy Spoonfuls for Toddlers

Acknowledgements

The Nutrition Society of Malaysia gratefully acknowledges contributions from the following to the 34th Scientific Conference:

Major Sponsors

- Danone Dumex (Malaysia) Sdn Bhd
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SEA PHN

Southeast Asia Public Health Nutrition Network

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.

Good Nutrition Key to Healthy Children

Multi-country initiative of

SEA-PHN
Southeast Asia Public Health Nutrition Network

Jointly implemented by

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

Recognising the importance of preventing the double-burden of malnutrition from a young age, the Southeast Asia Public Health Nutrition (SEA-PHN) Network has initiated a multi-country nutrition education initiative called Good Nutrition – Key to Healthy Children (GNKHC). It aims at empowering school children with appropriate nutrition knowledge to enable them to adopt healthier eating habits and be physically active. This will be implemented via a specially designed nutrition module developed by member societies/associations of the SEA-PHN Network in Indonesia, Malaysia, Philippines, Thailand and Vietnam. The module, comprising nine topics on the basics of healthy eating and active living, will be implemented by the school teachers in selected schools, trained to conduct the lessons and carry out various interactive activities.

This initiative is supported by unconditional educational grants from corporate partners of the Network, namely BENEO GmbH, Danone, DuPont Nutrition & Health, Mondelez International (from 2018), Nestle (until 2017), PepsiCo (Quaker), and Tate & Lyle (till 2017).

Teaching Materials of the GNKHC Nutrition Module

Teacher's Guidebook and Student's Workbook

Learning Slides

Materials for Interactive activities

Parent's leaflet

Early Nutrition eAcademy Southeast Asia

eLearning for Healthcare Professionals

The Early Nutrition eAcademy Southeast Asia (ENeA[SEA]) develops **innovative eLearning** for practicing **doctors** in the field of **early nutrition.**

EU, Thai and Malaysian partners are jointly developing science-based education, tailored to the needs of the Southeast Asian region. Our goal is to offer the latest recommendations for everyday practice and maximise outreach to the wider healthcare community. (HCPs e.g. obstetricians, gynaecologists, paediatricians).

ENeA[SEA] offers eLearning modules on:

- Nutrition and Lifestyle during Pregnancy
- Breastfeeding
- Breast Milk Substitutes
- Nutrition of the Preterm Infant
- Malnutrition

ENeA[SEA] is designed for professional sub-specialisation and integration in pre- and post-graduate study programmes.

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www.enea-sea.eu

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Official Opening

CONFERENCE DAY 1: WEDNESDAY, 3 JULY, 2019

0730 hrs Registration

OFFICIAL OPENING
Mahkota II Ballroom

0900 hrs **Welcome address by**
Tee E Siong
President, Nutrition Society of Malaysia (NSM)

0910 hrs **Speech and official opening by**
YBhg Dato' Seri Dr Chen Chaw Min
Secretary-General, Ministry of Health Malaysia

- Presentation of NSM Undergraduate and Postgraduate Prizes
- Presentation of NSM Publication Prizes

0945 hrs **Tour of Trade Exhibition/Scientific Posters by invited guests**

Refreshments

Poster Session: presenters in attendance for discussion

Scientific Programme

CONFERENCE DAY 1: WEDNESDAY 3 JULY, 2019

PLENARY LECTURE 1
Chairperson : Mohd Ismail Noor
Taylor's University

1030 hrs **Nutritional intervention for the management of faltering growth and its potential risks**
Tan Sue Yee
Consultant Nutritionist, Kuching

SYMPOSIUM 1 : Maternal, Infant and Young Child Nutrition
Chairperson : Khor Geok Lin
Universiti Putra Malaysia

1100 hrs **Promoting healthy maternal nutrition for the best start in life**
Mastura Ismail
Seremban 2 Health Clinic, Seremban

1120 hrs **Tackling maternal anaemia saves maternal and infant lives**
Faridah Abu Bakar
Family Health Development Division, Ministry of Health Malaysia, Putrajaya

1140 hrs **Low birth weight and stunting in Malaysia – tackling the persistent problems**
Zalma Abdul Razak
Nutrition Division, Ministry of Health Malaysia, Putrajaya

1200 hrs **Promoting confidence in breastfeeding practices**
Rokiah Don
Department of Nutrition & Dietetics, School of Health Sciences, International Medical University, Kuala Lumpur

LUNCH SYMPOSIUM 1
Chairperson : Tan Sue Yee
Consultant Nutritionist, Kuching

1230 hrs **Education modules on early nutrition and lifestyle during pregnancy and childhood by Early Nutrition eAcademy Southeast Asia (ENeA-SEA)**
Wong Jyh Eiin, Roseline Yap WK and Tee ES
On behalf of ENeA-SEA Consortium Partner, Nutrition Society of Malaysia

1315 hrs **Poster viewing/ Trade exhibition**

SYMPOSIUM 2 : Functional Ingredients and Health
Chairperson : Tee E Siong
Nutrition Society of Malaysia

1415 hrs **Clinical application of palm-tocotrienols: challenges and opportunities**
Ju Yen Fu, Puvaneswari Meganathan, Doryn Meam-Yee Tan and Zaida Zainal
Nutrition Unit, Malaysian Palm Oil Board, Kajang

1435 hrs **Human milk oligosaccharides – overview of nutritional significance**
Cyndy Au
DuPont Nutrition and Biosciences, Singapore

1455 hrs **Regulatory update on functional ingredients: permitted health claims in Malaysia**
Nurul Hidayati Mohd Nasir and Tee E Siong
Food Safety and Quality Division, Ministry of Health Malaysia, Putrajaya

NUTRITION UPDATE 1
Chairperson : Loh Su Peng
Universiti Putra Malaysia

1515 hrs **Relationship between overweight/obesity and anemia in vocational high school students (adolescent girls) in Bekasi, Indonesia**
Muhammad Nur Hasan Syah, Asna AF, Perdana SM and Amelia R
Nutrition Study Program, Health Sciences Faculty, University of Pembangunan Nasional Veteran Jakarta, Indonesia

1525 hrs **Nutritional factors associated with autism severity in children with Autism Spectrum Disorder at an autism intervention center in Kuala Lumpur**
Eow Shiang Yen, Gan WY, Lim PY, Hamidin A and Zalilah MS
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang

1535 hrs **Rate of gestational weight gain trajectory is associated with adverse pregnancy outcomes**
Yong Heng Yaw, Zalilah MS, Geeta A, Zulida R, Barakatun-Nisak MY, Jacques B, Yvonne Tee YS and Eline MVDB
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia

1545 hrs **Prevalence of eating disorder risk and its associated factors among high school adolescents Terengganu, Malaysia**
Nizatul Nurain Mazubir and Nurulhuda MH
Faculty of Medicine, Universiti Sultan Zainal Abidin, Kuala Terengganu

1555 hrs **Maternal body mass index, dietary intake and choice of infant feeding method: a cross sectional study in Petaling district, Selangor**
Kughaneshwary Silvermany and Vaidehi Ulaganathan
Department of Healthcare Professional, Faculty of Health and Life Sciences, Management and Science University, Shah Alam

1605 hrs **Omega-3 fatty acids and probiotics in improving immune response in highly active individuals: a pilot randomised controlled trial**
Chen Wei Mun, Shyam S, Chong HZ, Tan SS, Appukutty M, Seah SH and Meno AC
Department of Nutrition & Dietetics, International Medical University, Kuala Lumpur

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

1615 hrs **FTO gene variants (rs9930501, rs9930506 and rs9932754) and post-intervention differences in anthropometric and cardio-metabolic parameters after a 6-month Hipcref diet intervention in overweight and obese Malaysian adults**
Tan Pui Yee and Mitra SR
School of Biosciences, Faculty of Science and Engineering, University of Nottingham Malaysia, Semenyih

1630 hrs **Are Malaysian children with low calcium intakes having low bone mass?**
Kanimolli a/p Arasu, Chang CY, Wong SY, Ong SH, Yang WY, Chong MZH, Meenal M, Erwin Khoo EJ, Karuthan Chinna and Chee WSS
Division of Nutrition & Dietetics, School of Health Sciences, International Medical University, Bukit Jalil, Kuala Lumpur

1645 hrs **The KidChen Study: Effectiveness of a hands-on healthy meal preparation intervention among primary schoolchildren in Kuala Lumpur, Malaysia**
Ng Choon Ming, Satvinder K, Koo HC, Yap RWK, Firdaus M and Yim HS
Faculty of Applied Sciences, UCSI University, Kuala Lumpur

1700 hrs **The impact of F.E.A.T weight reduction programme on health-related quality of life among obese adult**
Wirdah Mohamed, Poh BK, Norhayati I, Nor Farah MF and Ruzita AT
Nutritional Sciences Programme and Centre for Community Health, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur

1715 hrs **Low daily energy intake, household smoke and sugar exposure increased the risk of dental caries in pre-schoolers**
Lee Zhi Ling, Gan WY, Ruhaya H, Lim PY
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang

1730 hrs **Effects of sunlight exposure and vitamin D supplementation on serum 25-hydroxyvitamin D concentrations, high molecular weight adiponectin and metabolic syndrome risk factors**
Norliyana Aris, Wan Mohd Izani WM, and Hamid Jan JM
Nutrition and Dietetics Programme, School of Health Sciences, Universiti Sains Malaysia, Kubang Kerian

1745 hrs **Refreshments / End of Day 1**

1800 hrs ***Meet the Experts Session***
Public Private Partnership in Food and Nutrition: The roles and challenges of a nutritionist
Function Rooms Nilam and Delima

CONFERENCE DAY 2: THURSDAY, 4 JULY, 2019

NUTRITION UPDATE 2
Chairperson : Wong Jyh Eiin
Universiti Kebangsaan Malaysia

0900 hrs **The influence of obstetrics characteristic on early initiation of breastfeeding among mothers in Petaling District, Selangor: My SHAPE Project 2019**
Kavithira P Kumaran and Vaidehi Ulaganathan
Department of Healthcare Professional, Faculty of Health and Life Science, Management and Science University, Shah Alam,

0910 hrs **Encapsulated fish oil results in higher absorption of DHA in toddlers**
Samaneh Ghasemi Fard, Loh SP, Sinclair AJ, Elliott G and Turchini GM
Nu-Mega Ingredients Pty Ltd, Brisbane, Australia

0920 hrs **Nutritional status and associated risk factors amongst older adults in Al Madinah Al Munawarah**
Ahlam Badreldin El Shikieri
Department of Clinical Nutrition, Faculty of Applied Medical Sciences, Taibah University, Al Madinah Al Munawarah, Kingdom of Saudi Arabia

0930 hrs **Prevalence of stunting among Malaysian school-aged children living in welfare homes and its contributed factors**
Nur Amalin Juhari, Chin YS, Nur Nabila AR
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang

0940 hrs **Association of intensity and type of physical activity with post-partum weight gain among mothers in Petaling District, Selangor**
Shameradevi Tamil Selvam and Vaidehi U
Department of Healthcare Professional, Faculty of Health and Life Sciences, Management and Science University, Shah Alam

0950 hrs **Prevalence of stunting among infants and its association with maternal characteristics in Petaling District, Selangor**
Siti Madihah Muhammad Royani and Vaidehi U
Department of Healthcare Professional, Faculty of Health and Life Science, Management and Science University, Shah Alam

1000 hrs **Refreshments / Poster viewing / Trade exhibition**

SYMPOSIUM 4 : School Child and Adolescent Nutrition
Chairperson : Rokiah Don
International Medical University

1030 hrs **School Nutrition Programmes for primary school children – experiences and learnings**
Teo Choon Huey, Chin YS, Lim PY, Shahril Azian HM and Zalilah MS
Department of Nutrition & Dietetics, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia, Serdang

1050 hrs **Understanding and prevention of disordered eating among Malaysian adolescents**
Chin Yit Siew, Tay CW, Sharifah Intan Zainun SI, Mohd Nasir MT and Zalilah Mohd Shariff
Department of Nutrition & Dietetics, Faculty of Medicine & Health Sciences, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang

1110 hrs **Good Nutrition Key to Healthy Children – a multi-country school nutrition intervention in SEA: Malaysia experience**
Norimah A Karim, Chin Yit Siew, Zawiah Hashim and Tee E Siong
On behalf of Malaysia Technical Committee for GNKHC

1130 hrs **Use of red palm oil fortified biscuits to reduce vitamin A deficiency among rural primary school children in Malaysia**
Radhika Loganathan, Tan Pei Yee, Syahirah Nadiah Mohd Johari, Kanga Rani Selvaduray, Yvonne Lim Ai Lian, Romano Ngui, Lee Soo Ching and Teng Kim Tiu
Nutrition Unit, Malaysian Palm Oil Board, Kajang

1150 hrs **Poster Viewing / Trade Exhibition**

LUNCH SYMPOSIUM 2
Chairperson : Zawiah Hashim
Nutrition Society of Malaysia

1300 hrs **Nutrition Month Malaysia – a multi-stakeholder collaborative community nutrition promotion programme**
Tee ES, Zaitun Y, Roseline Yap Wai Kuan, Ng KF, Lee ZY, Zawiah H, Chin YS, Muhaini MH and Chwee LYY
On behalf of Nutrition Month Malaysia 2019 National Steering Committee

PLENARY LECTURE 2
Chairperson : Tee E Siong
Nutrition Society of Malaysia

1400 hrs **Probiotics effects on gut microbiota and short-chain fatty acids of normal and overweight school children after probiotics administration**
Narcisse Joseph, Kalidasan Vasodavan, Nurul Ain Saipudin, Barakatun Nisak Mohd Yusof, Suresh Kumar and Syafinaz Amin Nordin
Department of Medical Microbiology and Parasitology, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Selangor

SYMPOSIUM 5 : Physical Activity and Sedentary Behaviour
Chairperson : Mahenderan Appukutty
Universiti Teknologi MARA

1430 hrs **Toybox Study Malaysia – improving healthy energy balance and obesity-related behaviours among pre-schoolers**
Poh Bee Koon, Cheah WL, Ruzita AT, Lee JAC, Koh D, Noor Hafizah Y, Farra AJ, Reeves S, Summerbell C, Essau C and Gibson EL
Department of Nutrition and Dietetics, Faculty of Allied Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur

1450 hrs **Active living for healthy ageing: An exercise recommondation for older adults**
Arimi Fitri Mat Ludin
Center for Healthy Ageing and Wellness, H-CARE, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur

1510 hrs **Malaysian preschoolers' physical activity, sedentary behaviour and sleep: compliance with the 24-hour movement guidelines**
Lee Shoo Thien, Wong JE and Poh BK
Nutritional Sciences Programme & Centre for Community Health, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur

NUTRITION UPDATE 3
Chairperson : Zaiton Daud
Ministry of Health Malaysia

1530 hrs **Nutrition during pregnancy and its association with birth weight: findings from the Maternal and Infant Cohort Study (MICOS)**
Muliana Edi, Chin YS, Woon FC, Siti Huzaifah MH, Tan ML, Farhan HS, Geeta A, Lim PY, Gan WY, Intan Hakimah I, Amir Hamzah AL and Chan YM
Department of Nutrition & Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang

1540 hrs **Vitamin D deficiency and its related factors in umbilical cord blood of neonates**
Lee Siew Siew, Loh SP, Raman S, Tusimin M, Ling KH and Rahim FK
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang

1550 hrs **Post diagnosis circulating micronutrients and survival of nasopharyngeal carcinoma patients: A prospective case control study**
Vaidehi Ulaganathan, Lye MS and Mirnalini K
Department of Healthcare Professional, Faculty of Health and Life Science, Management and Science University, Shah Alam

1600 hrs **Contribution of prenatal factors towards 6 months postpartum weight retention (PPWR): Evidence from a Maternal and Infants Cohort Study (MICOS)**
Siti Huzaifah Mohamed Hussien, Chin YS, Woon FC, Muliana E, Tan ML, Farhan HS, Gan WY, Intan Hakimah I, Amir Hamzah AL, Nurzalinda Z, Geeta A and Chan YM
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang

1610 hrs **Association between compliance status of dietary iron supplementation and anaemia status among pregnant women attending selected health clinics in Selangor and Kuala Lumpur**
Tan Meng Lee, Chin YS, Woon FC, Siti Huzaifah MH, Muliana E, Farhan HS, Lim PY, Salma Faeza AF, Gan WY, Intan Hakimah I, Amir Hamzah AL, Geeta A and Chan YM
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang

1620 hrs **Effect of multicomponent nutrition intervention (NuTeen) on adolescents' behaviour related to food choice, food safety and food hygiene**
Shashikala S, Mirnalini K, Vaidehi Ulaganathan, Gan WY and Zalilah MS
Department of Healthcare Professional, Faculty of Health and Life Science, Management and Science University, Shah Alam

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

1630 hrs **Young Researchers' Symposium and Best Undergraduate Poster Prizes**

1700 hrs **Refreshments / Conference ends**

Conference Information

REGISTRATION COUNTER

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

- 3 July 2019: 7.45 am – 4.00 pm
- 4 July 2019: 8.30 am – 12.00 pm

SCIENTIFIC SESSIONS

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

POSTER PRESENTATIONS

Scientific poster Presentations shall be held at **Function Room Safir II, Hotel Istana** and the opening hours are as follows:

- 3 July 2019: 8.30 am – 6.00 pm
- 4 July 2019: 8.30 am – 5.00 pm

TRADE EXHIBITION

Trade Exhibition is located at **Foyer, Ballroom Level, Hotel Istana**. Opening hours:

- 3 July 2019: 8.30 am – 6.00 pm
- 4 July 2019: 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 7 working days after the Conference via email (soft-copy). Special certificates will be given to those who participated in the Young Researchers' Symposium, Nutrition Update sessions and Poster Presentations. To request for 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 meals is based on name badges.

LUNCH

Lunch box will be served during the Lunch Symposium sessions on both days inside the Mahkota II Ballroom.

COFFEE BREAKS

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

FOR SPEAKERS:

Submission of slides and preview

Speakers for Symposium 1 and 2 are requested to submit their presentation materials to the Speaker Preview Room during registration in the morning of Day 1. Speaker of 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 **Secretariat Room – Zamrud Room, Ballroom Level, Hotel Istana** and the opening hours are as follows:

Wednesday, 3 July 2019 & Thursday, 4 July 2019: 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 ***15 minutes*** prior to the start of your session.

CELLULAR PHONE

As a courtesy to all delegates and speakers, cellular phones 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

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

PARKING

Parking in the hotel is charged at RM11.00 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 area. (Please approach the Conference Secretariat to obtain the access key to the room and further assistance)

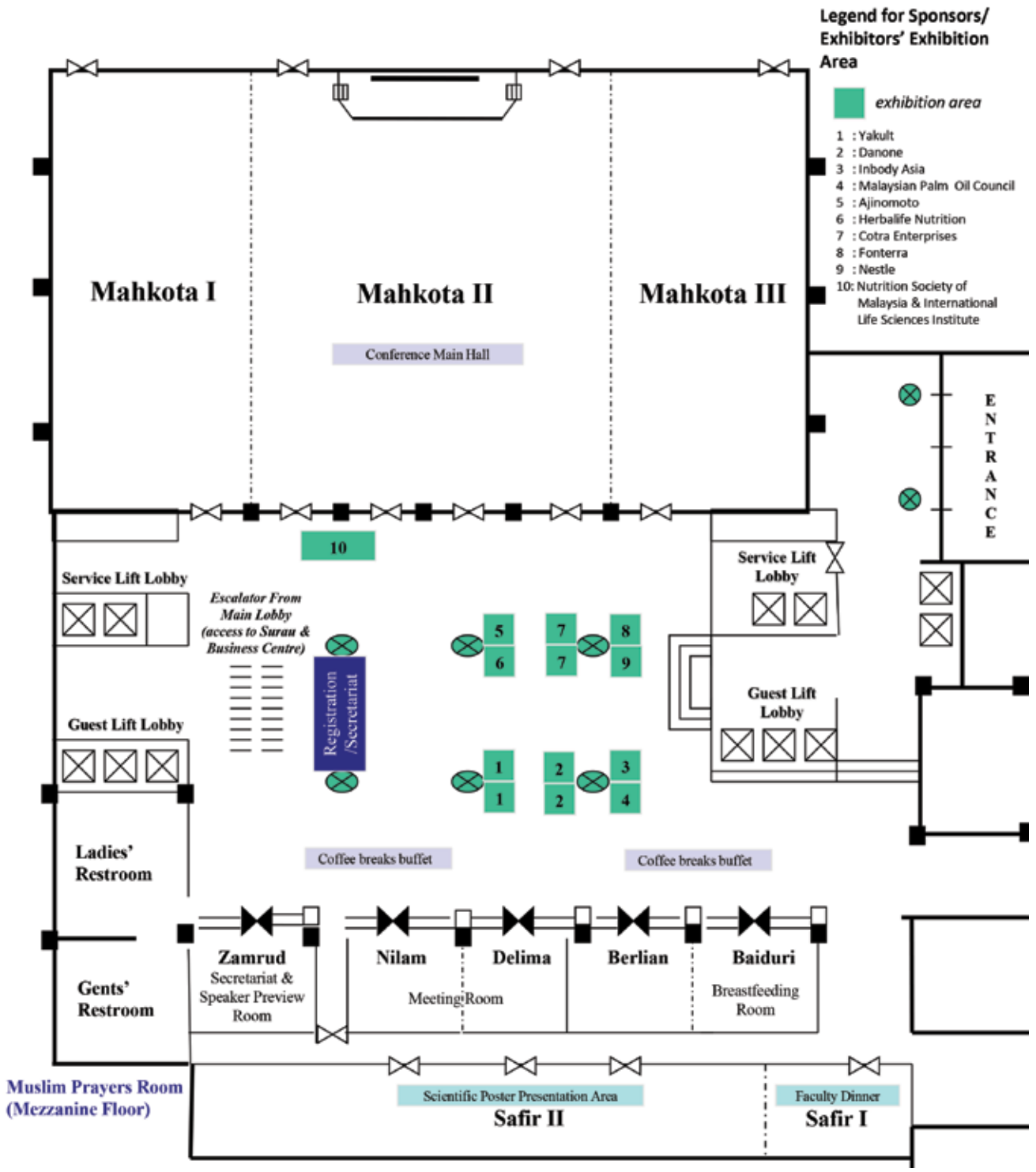
PRAYER ROOM

Surau is located at the **Mezzanine Floor of Hotel Istana**.

LIABILITY

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

Event Layout & Exhibitor Area Layout



NSM Prizes 2019

NSM Postgraduate and Undergraduate Prizes 2019

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: RM1,000 for a PhD thesis, RM750 for MSc thesis and RM500 for the undergraduate prize.

In 2019, NSM is awarding eight Postgraduate Prizes: three for PhD and five for MSc, with a total cash award of RM6,750. Six undergraduates receive Undergraduate Prizes with a total cash of RM3,000. The total cash award for this year is RM9,750. This amount is from NSM funds, as well as a contribution of RM1,750 from Ms Mary Easaw (L0027).

The recipients for the PhD thesis prizes are:

1. **Dr Lau Xiao Chuan**
   Development and effectiveness of C.E.R.G.A.S programme: a combined intervention (physical activity-nutrition) in combating overweight and obesity among Malaysian adolescents
   Supervisor: *Prof Dr Poh Bee Koon*
   Co-supervisors: *Prof Dr Ruzita Abd Talib, Prof Stanley Sai Chuen Hui, Assoc Prof Dr Hazizi Abu Saad, Assoc Prof Dr Alvin Ng Lai Oon*
   University: *Faculty of Health Sciences, Universiti Kebangsaan Malaysia*

2. **Dr Serene Tung En Hui**
   Comparison of mediating factors associated with cognitive function between normal weight and overweight/obese children in Kuala Lumpur, Malaysia
   Supervisor: *Assoc Prof Dr Mohd Nasir Mohd Taib*
   Co-supervisors: *Prof Dr Zalilah Mohd Shariff, Assoc Prof Dr Zubaidah Jamil Osman, Assoc Prof Dr Chin Yit Siew*
   University: *Faculty of Medicine and Health Sciences, Universiti Putra Malaysia*

3. **Dr Wan Putri Elena Binti Wan Dali**
   Impact of interactive multimedia-based nutrition education programme (IMNEP) on nutrition KAP and anthropometric parameters among overweight and obese primary school children in Kota Bharu
   Supervisor: *Dr Hafzan Yusoff*
   Co-supervisors: *Assoc Prof Dr Hamid Jan Bin Jan Mohamed & Dr Nik Siti Hanifah Nik Ahmad*
   University: *School of Health Sciences, Universiti Sains Malaysia*

The recipients for the MSc thesis prizes are:

1. **Bong Mee Wan**
   Infant and young child feeding amongst Penan children age below two years in rural Sarawak
   Supervisor: *Prof Dr Norimah A.Karim*
   Co-supervisor: *Emeritus Prof Dr Mohd Ismail Noor*
   University: *Faculty of Health Sciences, Universiti Kebangsaan Malaysia*

2. **Nur Izzatun Nasriah Nasruddin**
   Nutritional status and physical fitness among Royal Malaysia Police Personnel in Sepang district police headquarters, Selangor
   Supervisor: *Dr Razalee Sedek*
   Co-supervisor: *Dr Saiful Irwan Zubairi*
   University: *Faculty of Science and Technology, Universti Kebangsaan Malaysia*

3. **Siti Fatihah binti Murtaza**
   Factors associated with cognitive performance among Orang Asli children aged 2 to 6 in Negeri Sembilan, Malaysia
   Supervisor: *Dr Gan Wan Ying*
   Co-supervisors: *Prof Dr Zalilah Mohd Shariff, Assoc Prof Dr Norhasmah Sulaiman, Dr Siti Irma Fadhilah Ismail*
   University: *Faculty of Medicine and Health Sciences, Universiti Putra Malaysia*

4. **Nurulhuda Binti Abd Aziz**
   Food preferences and perceptions of healthy food among primary school children and barrier factors for food selling guideline compliance in Kelantan school canteens
   Supervisor: *Dr Soo Kah Leng*
   Co-supervisor: *Dr Sharifah Zahhura Syed Abdullah*
   University: *School of Health Sciences, Universiti Sains Malaysia*

5. **Melissa Leong En Ying**
   Vitamin D supplementation, parathyroid hormone (PTH) and plasma vitamin D response among Malaysian female adults: double blinded, randomised clinical trial of efficacy
   Supervisor: *Dr Megan Chong*
   Co-supervisor: *Emeritus Prof Dr Khor Geok Lin*
   University: *School of Health Sciences, International Medical University*

The recipients for the undergraduate thesis prizes are:

1. **Yong Tze Ying**
   Associations of nutritional and socio-cultural factors with self-esteem among upper primary school children in Kuala Lumpur
   Supervisor: *Assoc Prof Dr Chin Yit Siew*
   University: *Faculty of Medicine and Health Sciences, Universiti Putra Malaysia*

2. **Wong Lai Shan**
   Development of a photographic food atlas prototype as a portion size estimation aid for Malaysian
   Supervisor: *Dr Wong Jyh Eiin*
   University: *Faculty of Health Sciences, Universiti Kebangsaan Malaysia*

3. **Nik Nur Izyan Binti Nik Mustapa**
   Dietary diversity and nutritional status among primary school children aged between 7 to 10 years in Kota Bharu, Kelantan
   Supervisor: *Dr Soo Kah Leng*
   University: *School of Health Sciences, Universiti Sains Malaysia*

4. **Teo Chun Yi**
   The effect of using different spoon sizes on postprandial glycaemia, hunger and satiety of overweight and obese subjects consuming brown rice
   Supervisor: *Dr Sangeetha Shyam*
   Co-supervisor: *Rohana Abdul Ghani*
   University: *School of Health Sciences, International Medical University*

5. **Ooi Yong Xuan**
   The association between meal frequency with diet quality and micronutrients intake among young adults at northeast Penang
   Supervisor: *Tasneem Shaari*
   Co-supervisors: *Dr Lau Xiao Chuan, Ainor Farahin Aziz*
   University: *Faculty of Health and Life Science, Management and Science University*

6. **Loo Yen Chi**
   Lactic acid bacteria (LAB) as potential probiotics isolated from soy sauce
   Supervisor: *Assoc Prof Dr Yim Hip Seng*
   Co-supervisor: *Asst Prof Yap Wai Sum*
   University: *Faculty of Applied Sciences, UCSI University*

NSM Publication Prizes 2019

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 2019. These are for different fields of nutrition research, namely: Maternal Nutrition; Dairy Nutrition and Mobility and Musculoskeletal Health and Nutrition.

NSM Publication Prize: Maternal Nutrition

For the Publication Prize in the field of Maternal Nutrition, for the year 2019 - 2021, this prize is 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 2019, three applications were received for this category. The Selection Committee decided to award the prize to two applications, with the following details:

Name of recipient:	**Ms Ng Choon Ming** [O 2339] Faculty of Applied Sciences, UCSI University, Kuala Lumpur
Publication:	Associations of pre-pregnancy body mass index, middle-upper arm circumference, and gestational weight gain *Sexual & Reproductive Healthcare 2019 20: 60–65*
Name of recipient:	**Dr Yong Heng Yaw** [L 1742] Department of Nutrition and Dietetics Faculty of Medicine and Health Sciences Universiti Putra Malaysia
Publication:	Associations between the dietary patterns of pregnant Malaysian women and ethnicity, education, and early pregnancy waist circumference: A prospective cohort study *Nutrition Research and Practice 2019 13(3):230-239.*

NSM Publication Prize: Dairy Nutrition

For the Publication Prize in the field of Dairy Nutrition, for the year 2019 - 2021, this prize is 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 2019, no application for this Prize was received.

NSM Publication Prize: Mobility and Musculoskeletal Health and Nutrition

For the Publication Prize in the field of Mobility and Musculoskeletal Health and Nutrition, for the year 2019 - 2021, this prize is 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 2019, only one application has been received for this category. The Selection Committee decided to award the prize to the applicant, with details as follows:

Name of recipient: **Ms Lim Sook Yee** [L 2048]
Department of Nutrition and Dietetics,
Faculty of Medicine and Health Sciences,
Universiti Putra Malaysia (UPM).

Publication: Dietary Acid Load, IGF-1 Single Nucleotide Polymorphism and Bone Resorption among Postmenopausal Chinese Women
Nutrients 2018 10, 915; doi:10.3390/nu10070915

NSM Young Researchers' Symposium Prizes 2019

Winners of the Young Researchers' 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 2019, totaling RM1,100 are provided by International Life Sciences Institute Southeast Asia Region.

NSM Poster Competition Prizes 2019

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 2019, totaling RM750 are provided by International Life Sciences Institute Southeast Asia Region.

Announcements
NSM Publication Prizes 2020

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 2019-2021, 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 35th 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.

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. Deadline for receipt for applications for NSM Publication prize shall be announced in the NSM website**.**

4. Applicants must submit the following for consideration of the NSM selection committee:
    a. A copy of the published paper in pdf for the consideration of the selection committee
    b. A cover letter 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)
    c. The following personal particulars
        i. Name
        ii. NSM membership number
        iii. Address of work place
        iv. Email and contact number
    d. 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.
5. All documents stated in item 4 should be emailed to the President at: president@nutriweb.org.my and copy to the Hon. Secretary at: secretary@ nutriweb.org.my, to reach them before the stipulated deadline.

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 2017 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.

13 June 2019

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 2019-2021, 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 35th 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.

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. Deadline for receipt for applications for NSM Publication prize shall be announced in the NSM website**.**
4. Applicants must submit the following for consideration of the NSM selection committee:
    a. A copy of the published paper in pdf for the consideration of the selection committee
    b. A cover letter 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)

       The following personal particulars should be included:

       v. Name
       vi. NSM membership number
       vii. Address of work place
       viii. Email and contact number

       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.

5. All documents stated in item 4 should be emailed to the President at: president@nutriweb.org.my and copy to the Hon. Secretary at: secretary@ nutriweb.org.my, to reach them before the stipulated deadline.

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 2017 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.

13 June 2019

3. Mobility & Musculoskeletal Health & Nutrition

Members of the Nutrition Society of Malaysia (NSM) are invited to apply for the NSM Publication Prize: Mobility & Musculoskeletal Health & 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 2019-2021, 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 35th 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.

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. Deadline for receipt for applications for NSM Publication prize shall be announced in the NSM website**.**
4. Applicants must submit the following for consideration of the NSM selection committee:
    a. A copy of the published paper in pdf for the consideration of the selection committee
    b. A cover letter 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)
    The following personal particulars should be included:
    ix. Name
    x. NSM membership number
    xi. Address of work place
    xii. Email and contact number
    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.

5. All documents stated in item 4 should be emailed to the President at: president@nutriweb.org.my and copy to the Hon. Secretary at: secretary@ nutriweb.org.my, to reach them before the stipulated deadline.

Criteria for Selection:

1. Publication(s) submitted for consideration by the Selection Committee must be in the field of Mobility & Musculoskeletal Health & 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 2017 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.

13 June 2019

List of Scientific Posters

Scientific posters have been grouped into the following themes:

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

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

Poster Presentation

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

A01 Associations between socio-demographic characteristics, body weight status, dietary intake, physical activity and life satisfaction among adolescents in Melaka, Negeri Sembilan and Johor
Amira Azrein, Geeta Appannah and Aishah E

A02 Association between maternal factors with body weight status among children aged four to six years old in Bandar and Jugra Kuala Langat Selangor
Asrawati Awalina Aslan and Norhasmah Sulaiman

A03 Assessment of the level of food safety knowledge, attitude and food handling practices among Nutrition and Dietetics students in Universiti Sains Malaysia, Health Campus
Ayunis CD and Wan Faizah WY

A04 Association between body weight status and cardiorespiratory fitness among school-aged children in community setting in Selangor
Cheah JMH, Chin YS, Ngoi KKL, Lee KY, Low SDTY, Valentine MK and Tan M

A05 Food insecurity, weight status and dietary intake among adolescents in Kubang Kerian, Kelantan
Chek LP and Hamid JJM

A06 Validation of healthy eating self-efficacy scale for secondary school students in Kuala Lumpur, Malaysia
Choo ZY, Safiah MY, Chong SL and Shamala R

A07 Association between selected geriatric syndromes with frailty among elderly in Kuala Lumpur, Malaysia
Duaa A, Siti Nur Asyura and Camilla Wahida Norazman

A08 Association of socio-demographic factors, social support, physical activity and dietary intake with perceived stress among pregnant women in health clinics Wilayah Persekutuan
Farah Nurdiana B and Nurzalinda Z

A09 Stunting among 1-year old Malaysian infants and its associated risk factors
Farhan HS, Chin YS, Woon FC, Siti Huzaifah MH, Muliana E, Tan ML, Geeta A, Gan WY, Intan Hakimah I, Amir Hamzah AL and Chan YM

A10 Association of maternal feeding beliefs, attitude and practices with infant growth in Petaling District, Selangor
Hana AZ and Vaidehi U

A11 Associations of disordered eating and body size dissatisfaction with BMI-for-age among secondary school students in Labuan Federal Territory, Malaysia
Ho SF, Chin YS and Lim PY

A12 Associations of socio-demographic background and lifestyle behaviours with waist circumference among army veterans in the Department of Veterans Affairs (JHEV) Malacca/Negeri Sembilan
Isswariya Segar and Chin YS

A13 Archery intervention programme improves muscle strength and heart rate variability of sedentary youth
Juliana N, Zolkafi MAN, Azmani S, Hayati AR, Teng NIMF, Sarip NAM and Abu MIF

A14 Prevalence and nutritional status of eating disordered adolescent females in Al Madinah Al Munawarah: Time for action
Ahlam Badreldin El Shikieri

A15 Association between gross motor function classification system (GMFCS) and body fat in cerebral palsy (CP) children in Kelantan
Juliana S, Shariza AR, Marina AM and Sakinah H

A16 Associations between food environment and weight status among UCSI University students
Lee XY, Satvinder K and Tung SEH

A17 Associations of socio-demographic characteristics, psychological factors and lifestyle factors with academic performance among undergraduate students in Selangor
Lim HS and Chin YS

A18 Body weight perception and weight control behaviours among adults attending Outpatient Clinic at Hospital Universiti Sains Malaysia
Ling TH and Tengku Alina TI

A19 Methodology to identify associated factors for malnutrition among children under-5 years of age in Putrajaya - A case-control study
Mohamad Hasnan A, Nor Azian MZ, Fatimah O, Azli B, Ruhaya S, Cheong SM, Lalitha P, Rashidah A, Syafinaz S, Nurshahida AA, Azahadi O, Muhammad Fadhli MY, Noor Ani A, Zamir AM, Rusidah S, Sophia AM, Poh BK, Hazizi AM and Tahir A

A20 Prevalence of soil-transmitted helminth infections and vitamin A deficiency status of rural school children in five regions in Malaysia
Mohd Johari SN, Teng KT, Loganathan R, Tan PY, Selvaduray KR, Lim YAL and Ngui R

A21 Exploring the sustainability of childhood obesity intervention: a mixed methods study
Mok WKH, Devanthini DG, Wee LH, Poh BK and Ruzita AT

A22 Kindergarten readiness for healthy eating intervention module: Toybox Study Malaysia
Najwa WN, Noor Hafizah Y, Ruzita AT, Poh BK and Gibson EL

A23 Associations between demographic and socio-economic background, nutritional status and household food security with academic performance and social interaction among primary school children in North Kinta District, Perak
Nor Syaza Sofiah A and Norhasmah S

A24 Factors associated with muscle dysmorphia among athletes in Universiti Putra Malaysia
Nur Athirah MI and Gan WY

A25 Association between maternal factors with body weight status of children aged 2-6 years old attending Tabika & Taska KEMAS in Putrajaya
Nur Atiqah Hasbullah and Nurzalinda Zalbahar

A26 Associations between socio-demographic characteristics, body weight status, body image and life satisfaction among adolescents in Melaka, Negeri Sembilan and Johor
Nur Liyana Amran, Geeta Appannah and Aishah E

A27 Factors associated with body dysmorphic disorder among undergraduate students in Universiti Putra Malaysia
Nurafiqah A and Gan WY

A28 *Suku Suku Separuh & Cergas* (3SC) intervention on weight management among overweight and obese adults
Nurul Amira Nabilah K, Norimah AK and Ismail MN

A29 Associations between socio-demographic factors, lifestyle factors, body weight status and night eating syndrome among undergraduates in Selangor
Nurul Huda A and Chin YS

A30 Effects of a 6-week nutrition education and 10,000-steps-a-day intervention on overweight/obese female university students' caloric intake, daily step count and anthropometric parameters
Gan TL and Ramlah G

A31 The relation of milk feeding practice, milk appetite, and dietary intake with nutritional status among young children aged 2 to 4 in PERMATA Negara Zon Tengah: A study protocol
Rasyidah A, Nur Aina Afrina AR and Nurul Husna MS

A32 Associations of milk feeding practice and appetite with nutritional status among young children aged 2 to 4 in Pusat Anak Permata Negara (PERMATA Negara) Zon Tengah
Rasyidah A, Nur Aina Afrina AR and Nurul Husna MS

A33 Association of socio-demographics and home food environment on body weight status among primary school children
Rina SR, Nurzalinda Z and Norhasmah S

A34 Parental and caregiver nutritional knowledge and eating behaviours among children with disabilities in Kuala Lumpur
Nina Shahira AH, Sarina S and Nur Hana H

A35 Association between household food insecurity with fast food consumption and weight status among primary school children in Shah Alam
Ahmad Alibuni A and Tasneem S

A36 Relationship between maternal feeding practices, eating behaviour and weight status among kindergarten children aged 4-6 in Section 17, Shah Alam, Selangor
Eilsa N and Tasneem S

A37 Development, validity and reproducibility of the new food frequency questionnaire (FFQ): A pioneer project to assess dietary intake for the Mauritian population
Toorabally BZ, Hamid Jan JM, Rohana AJ, Subratty AH, Hosenally M and Ozeer MY

A38 Associations between self-reported and objectively measured physical activity and overweight/obesity among adults in Kota Bharu and Penang, Malaysia
Yi Yi Lee, Khairil Shazmin Kamarudin and Wan Abdul Manan Wan Muda

A39 Assessment of nutritional status, physical activity, sedentary behaviours, and perceptions against crime among adolescents in Kuala Lumpur
Yi Yi Lee, Rosilawati Zainol, Mohd Zaid Ghazali, Khairil Shazmin Kamarudin and Wan Abdul Manan Wan Muda

Group B: Dietary Intake, Consumption Pattern & Disease

B01 Associations between dietary intakes, nutritional status, medical status and bone mineral density among older adults in Selangor, Malaysia
Assyima Sabri and Geeta Appannah

B02 Sarcopenia among community dwelling elderly: comparison of AWGS and EWGSOP
Camilla Wahida N, Siti Nur 'Asyura A and Rosita J

B03 Factors in retrospective child feeding practices associated with obesity risk in young adults
Chew WL and Satvinder K

B04 Beneficial effect of zinc on intestinal barrier
Jesmine Khan, Wan Nor Izzah Wan Mohamad Zain and Mohammed Nasimul Islam

B05 Factors associated with binge eating behavior among university students in Universiti Putra Malaysia
Lailatul AS and Gan WY

B06 The nutritional status between users and non-users of dietary supplements in Kota Kinabalu, Sabah
Lim Beng Hooi, Norliyana Aris, Teoh Chin Tiong, Nurul Syahira Jali, Alcey Jaibi and Ramlah George @ Mohd Rosli.

B07 The prevalence of constipation and its associated factors among elderly at selected private care homes in Selangor
Malisa E, Nabil M and Noraida O

B08 Drinking pattern of preschool children in Klang Valley: ToyBox Study Malaysia
Noor Hafizah Y, Ruzita AT, Najwa WN, Farra AJ, Koh D, Ismail MN, Poh BK and Gibson EL

B09 Vitamin C dietary intake and its link to haemoglobin level: a cross- sectional study in pregnant women attending antenatal clinics in Seremban, Negeri Sembilan
Nurdiyana MN and Salma Faeza AF

B10 Motivators and barriers towards fruits and vegetables intake among Students of Universiti Kebangsaan Malaysia: a qualitative study
Nurul Azlyza AO, Sameeha MJ, LH Wee and Norimah AK

B11 Associated factors of sociodemographic, dietary intake and household food insecurity with anaemia status among pregnant women attending Obstetrics and Gynaecology (O&G) Clinic, Hospital Universiti Sains Malaysia (HUSM)
Nurul Hidayah AT and Rohana AJ

B12 Energy and dietary intake among public university students in Peninsular Malaysia
NurulHudha MJ, Norhasmah S, Siti Nur'Asyura A and Shamsul Azahari ZB

B13 Barriers to and facilitators of healthy meal preparation among children aged 9-10 in Kuala Lumpur, Malaysia
Ong HY and Satvinder K

B14 Associations between picky eating, infant feeding practices and nutritional status of preschool children in Klang Valley, Malaysia
Ong JM, Tung SHE and Wong YH

B15 The association between meal frequency with diet quality and micronutrients intake among young adults at Northeast Penang
Ooi YX, Tasneem S, Lau XC and AF Aziz

B16 A gap analysis between expectations and perceptions on service quality of online food purchasing and delivery services in Kota Bharu among undergraduates in Health Campus of Universiti Sains Malaysia
Raewadee BR and Vijayakumaran RK

B17 Associations between sociodemographic factors, influence of fruit presentation, self-efficacy, and body mass index with fruit intake among adolescents aged 16 years old in Beranang, Selangor
Nur Shafiqah Z and Rosita J

B18 Eating out behaviour and high sodium intake among adults in Malaysia: Findings from the Malaysian Community Salt Study (MyCoSS)
Ruhaya S, Mohamad Hasnan A, Cheong SM, Rashidah A, Fatimah O, Rusidah S, Azli B, Nur Shahida AA, Lalitha P, Syafinaz MS, Norazizah IW, Shubash Shander G and Tahir A

B19 Design and validation of web and computer-based food frequency questionnaire: a scoping review
Shahril MR and Laila Ruwaida MH

B20 Factors associated with nutritional supplementation intake among athletes in Universiti Putra Malaysia
Siti Maizura Mohd Daud and Hazizi Abu Saad

B21 Ethnicity differences in assessment of diet quality index among Malaysian elderly
Amin Faiz Bin Nohani, Siti Nur 'Asyura Adznam and Camilla Wahida Norazman

B22 Associations between screen time, snacking behaviour and sleep quality and nutritional status among adolescents aged 13 to 19 years in Kuala Lumpur, Malaysia
Tan Mun Yee, Rokiah Don and Safiah Md Yusof

B23 Evaluation of binge eating behaviour among university students
Farhia MA and Tan ST

B24 Sugar-sweetened beverages (SSB) intake knowledge, attitude and practices among university students in Malaysia
Teng NIMF, Norsham JN and Siti ZAL

B25 Maternal anthropometry, dietary intake and its association with gestational diabetes mellitus: a cross-sectional study
Teoh AN, Dhivyalosini M and Satvinder K

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Koit YS, Lee LS, Chai HR, Chang SK and Snigdha M

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Lee LS, Koit YS, Chai HR, Chang SK and Misra S

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Abstracts

Plenary Lecture 1

Nutritional intervention for the management of faltering growth and its potential risks

Tan Sue Yee

Consultant nutritionist

Children go through different stages of growth since young and the provision of necessary nutrition is essential for them to reach their optimal growth and be healthy. Today, Malaysia is still plagued with issues of malnutrition, both undernutrition and overnutrition. Whilst we focus much on the problems of managing overweight and obesity among our children, undernutrition such as wasting, stunting and underweight are still considered prevalent in our society. Undernutrition is caused by multiple factors and it can cause short- and long-term health consequences on growing infants and children.

Growth issues in children are commonly assessed and monitored using growth chart standards. We are well aware that undernutrition causes poor growth in children, and this often leads to the risk of growth faltering. Growth faltering happens when a pattern of slower weight gain than expected for age and sex is observed in a child. It is often due to inadequate nutritional intake. Globally, regardless of continents, children seem to experience growth faltering in a similar pattern, and most prominently within the age range of 6 to 20 months (before age 2 years old), also known as a critical period in early life.

Some of the nutritional interventions in place for managing growth faltering in growing infants and children include breastfeeding, complementary feeding, provision of energy and nutrient dense foods, micronutrient/ dietary fortification or supplementation, healthy eating and mealtime strategies. These nutritional interventions serve two main purposes: (i) to prevent further growth faltering; (ii) to promote 'catch-up growth' (recovery from period of poor growth). Whilst these interventions for the management of growth faltering are known to be beneficial, there is now compelling evidence showing that accelerated growth during the critical period of early life has detrimental effects on long-term health, particularly the risk of obesity and CVD. Therefore, as we health professionals try to rectify growth issues in children through provision of appropriate nutrients, we should also be aware that rapid 'catch-up growth' may pose undesirable adverse outcomes later in life for a child. Therefore, we need to look into the risk-balance benefits in our efforts to promote optimal growth in these children.

Symposium 1: Maternal, Infant and Young Child Nutrition

Promoting healthy maternal nutrition for the best start in life

Mastura Ismail

Klinik Kesihatan Seremban 2

Nutrition plays a major role in maternal and child health and it is widely acknowledged that optimum nutrition in early life is important for long term health. A healthy maternal dietary pattern, along with adequate maternal body composition, metabolism and placental nutrient supply, reduces the risk of maternal, fetal and long-term effects in the offspring. Both maternal overnutrition and obesity, as well as undernutrition have been known to adversely affect metabolic regulation in offspring and increase the risk for metabolic disease development. Preconceptional counseling of women of childbearing age should spread awareness of the importance of maternal nutrition before and during pregnancy and should promote a cultural lifestyle change, in favor of a healthy weight before conceiving and balanced healthy diet with high-quality foods consumption. Supplementation and/ or fortification can make a contribution when recommended micronutrient intakes are difficult to be met through food alone. Intervention strategies should include population targeted interventions for women of reproductive age, in addition to those targeting the 3 months before conception including addressing the barriers for optimum nutrition. This will allow adequate time to correct for nutritional deficiencies before pregnancy.

Tackling maternal anaemia saves maternal and infant lives

Faridah Abu Bakar

Family Health Development Division, Ministry of Health Malaysia

Anemia is a condition in which the number of red blood cells is insufficient, thus affecting their oxygen-carrying capacity and resulted in the inability to meet the body's physiological needs. Anemia in pregnancy not only will give negative impact to the women's health but also to the outcome of the pregnancy. It is made as one of the global targets under the Sustainable Development Goal (SDG) Target 2.2. – 'address the nutritional needs of adolescent girls, pregnant and lactating women'.

This paper will highlight the global and local anemia situation and share some of the initiatives taken to tackle anemia among women, in the reproductive age group.

Low birth weight and stunting in Malaysia – tackling the persistent problems

Zalma Abdul Razak

Nutrition Division, Ministry of Health Malaysia

We have yet to witness any improvement of trends in low birth weight since 2010, based on the report by the Department of Statistics Malaysia. In 2016, it was reported that 11.4

percent infants were born with low birth weight. The results of the National Health and Morbidity Survey (2016) also showed that 1 in 10 infants born with low birth weight, with the higher proportion amongst preterm infants. While for stunting, it is an increasing trend from 2011 to 2016. In 2016, the National Health and Morbidity Survey showed that 20.7 percent or 1 in 5 children below five years are stunted, which categorised stunting as a moderate prevalence in Malaysia. Many factors combine together to affect the low birth weight amongst infants and stunting amongst children less than 5 years. Thus, by understanding the interlink of these two nutrition issues, perspectives on nutrition interventions has to be broaden to ensure that investments aimed at addressing the condition.

Promoting confidence in breastfeeding practices

Don R

Department of Nutrition and Dietetics, School of Health Sciences, International Medical University, Kuala Lumpur

The promotion of breastfeeding in Malaysia has been an integral component of the maternal and child health services since the 1960s.The prevalence of ever breastfed has been consistently high with more than 95.0% of infants being breastfed currently. This consistently high prevalence is, however, not observed for exclusive breastfeeding. Based on the health clinic data from the Ministry of Health Malaysia, the rate of exclusive breastfeeding at 6 months was 14.4% in 2009 and increased to 65.9% in 2018. The rates are particularly low in the states of Sarawak (43.5%), Melaka (45.3%) and Federal Territory of Labuan (49.3%). The highest rate is in the Federal Territory of Putrajaya (92.2%). The Global Breastfeeding Scorecard, which evaluated 194 nations, found that only 40.0% of children younger than 6 months are breastfed exclusively (given nothing but breastmilk) and only 23 countries have exclusive breastfeeding rates above 60.0%. The duration of exclusive breastfeeding up to 6 months declines with age. The contributing factors to this decline and non-exclusive breastfeeding are multifactorial. Working mothers, lack of breastfeeding knowledge and skill, childcare, healthcare professional and family support, mother support groups, breastfeeding facilities in public and at work place and lack of confidence coupled with aggressive marketing of formulated milk are possible contributing factors. Several strategies and interventions have earlier been identified and, currently, are in the National Plan of Action for Nutrition of Malaysia III (2016-2025) to address these challenges. Long term education and training in providing knowledge and skill in breastfeeding plays a major role in influencing mothers to decide to want to breastfeed or not. Malaysia's Breastfeeding Policy recommends exclusive breastfeeding for the first six months of life and continued breastfeeding after six months, along with complementary foods, up to two years of age. The implementation of the Baby-friendly Hospital Initiative (BFHI) and the Code of Ethics for the Marketing of Infant Foods and Related Products are two strategies that had great impact on breastfeeding practices in the country. The Ten Steps To Successful Breastfeeding encompassed in the BFHI guides hospital healthcare professionals in providing the knowledge and skill as well as the critical support required for mothers to confidently breastfeed whilst in hospitals and to link mothers to mother-support groups once discharged from hospitals. The Code is developed to promote, support and protect breastfeeding through the guided conduct of health professionals and infant formula industry in the marketing of infant foods and related products. The formation of mother-support groups in the community to assist mothers with breastfeeding challenges to maintain breastfeeding lends great support to the increased confidence amongst mothers. The establishment of creche at workplace and childcare centres provides great support and extended care for infants and young children for continued breastfeeding until two years. The training of childcare providers on nutrition and breastfeeding must not be overlooked. Lactation Management Education Training for health professionals in the hospitals and health clinics further enhances these professionals to be more knowledgeable in lactation

management and confident in providing technical support to breastfeeding mothers. Alternatively, lactation management can be integrated into the medical curriculum to ensure the medical graduates are more work-prepared to manage breastfeeding mothers attending the primary healthcare facilities. Continued research on breastfeeding and the contributing factors to non-breastfeeding and non-exclusive breastfeeding to provide evidence for policy decision-making must be supported as a facilitating strategy. These collaborative strategies and interventions are designed and hoped to empower mothers, with knowledge and skill with a supportive environment, to initiate and maintain exclusive breastfeeding for six months with introduction of solids at this age, and to continue with breastfeeding for two years and beyond.

Lunch Symposium 1

Education modules on early nutrition and lifestyle during pregnancy and early childhood – by Early Nutrition eAcademy Southeast Asia (ENeA – SEA)

***Wong JE*[1,2], *Roseline Yap WK*[1,3] *and Tee ES*[1]**

On behalf of ENeA-SEA Consortium Partner, Nutrition Society of Malaysia; [1]Nutrition Society of Malaysia, Kuala Lumpur; [2]Nutritional Sciences Programme & Centre for Community Health, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, 50300 Kuala Lumpur; [3]School of Biosciences, Faculty of Health and Medical Sciences, Taylors University, 47500 Selangor

Nutrition during the early years of life from pregnancy through early childhood, have a profound lifelong impact on a child's health and risk of non-communicable diseases. Recognising the growing double burden of malnutrition, improving professional knowledge and practice of healthcare providers is a key to ensure appropriate early nutrition support are provided to mothers and children during this critical period. Early Nutrition eAcademy - South East Asia (ENeA SEA) is an Erasmus+ Capacity Building project which aims to reduce early nutrition and lifestyle-related health problems in Southeast Asia by offering an e-learning programme comprising modules on early life nutrition. The ENeA SEA platform is designed by international scientific experts from Germany, United Kingdom, Romania, Thailand and Malaysia. As one of the consortium partners, Nutrition Society of Malaysia contributes to the review of the education module content development and support the dissemination and networking activities of the ENeA SEA. Currently, ENeA SEA offers five free e-learning modules (https://www.enea-sea.eu/en/elearning), including "Nutrition and Lifestyle in Pregnancy", "Breastfeeding", "Breast Milk Substitutes", "Nutritional Care of Preterm Infants" and "Identification and Management of Malnutrition". Learners can either enroll into a standard curriculum or choose customized curriculum which covers topics relevant to the learner profile and receive certificates for CME/CPD. The e-learning modules provide up-to-date content paired with interactive learning activities and quizzes that are suitable for healthcare professionals in Southeast Asia, including nutritionists working in the field of early nutrition and lifestyle in Malaysia.

Symposium 2: Functional Ingredients and Health

Clinical application of palm-tocotrienols: challenges and opportunities

***Ju Yen Fu*[1], *Puvaneswari Meganathan*[1], *Doryn Meam-Yee Tan*[1, 2] *and Zaida Zainal*[1]**

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Nature has made palm vitamin E to contain up to 70% of total tocotrienols, among which alpha-, gamma- and delta-tocotrienols are the major constituents. Based on their structural differences compared to tocopherols, tocotrienols were reported to exert distinctive properties. Recent advancements have shown their biological properties in conferring protection against cancer, cardiovascular diseases, neurodegeneration, oxidative stress and immune regulation. Preclinical results of these physiological functions were translated into clinical trials gaining global attention. To date, more than 30 clinical trials had been conducted using palm-tocotrienols. This paper provides critical analysis of the functional applications of palm-tocotrienols in the context of efficacy, population, disease state and bioavailability. Adding depth, we identified the challenges and opportunities of palm-tocotrienols from various point of views. Challenges from food and drug regulations, analytical methods and scientific recognition will be discussed. While every challenge leads to an opportunity, this paper will serve as a platform to pave the future direction for tocotrienols in clinical settings.

Human milk oligosaccharides – overview of nutritional significance

Cyndy Au

Regional Director, Regulatory & Scientific Affairs (Asia Pacific), DuPont Nutrition & Biosciences, Singapore

Research on human milk oligosaccharides (HMOs) has received much attention in recent years. However, it started about a century ago with the observation that oligosaccharides were the prebiotic "bifidus factor" that promotes a healthy microbiota composition that is beneficial to breast-fed infants. Much data has been accumulated over the years to support the health benefits of HMOs.

HMOs are a family of structurally diverse soluble carbohydrates unique to human breast milk, made up of a lactose core bonded to other simple sugars. They are the third most abundant component in human milk, after lactose and lipids, contributing to approximately 10% of total solids. Over 200 structurally different HMOs have been identified, each may have a distinct functionality. The amount and composition of HMOs are highly variable among women, and over the period of lactation. The most abundant of these oligosaccharides, and to most studied to date, is 2' Fucosyllactose (2'FL). The reported average levels 2.4 g/L, high during the early stage of lactation, decreasing later. This presentation summarises the potential role of HMOs, particularly 2'FL, in improving the immune health of infants.

Much evidence has been accumulated to investigate how 2'FL influences microbiota composition and/or activity. More than 90% of the 2'FL reaches an infant's large intestine

undigested. It serves as a prebiotic, providing nutrients for beneficial bacteria —particularly Bifidobacteria. As such, 2'-FL, when added to infant formula, can help establish dominance of these beneficial bacteria over the pathogenic species, thereby promoting a healthy intestinal flora and immunity. Current evidence suggests establishment of Bifidobacteria early in life plays a role in programming future health.

The adhesion of pathogens to human epithelial cells is usually the first step towards successful colonization and subsequent systemic infection. HMOs have been shown to be able to mimic cell surface receptor structures, acting as soluble decoys, preventing adhesion colonization of epithelial surfaces. Studies have demonstrated the ability of 2'-FL to inhibit pathogen adhesion to intestinal mucosa. In addition, in-vitro studies suggest that HMOs directly modulate immune responses. HMOs may act either locally, on cells of the mucosa-associated lymphoid tissues, or at a systemic level, as 1% of HMOs are absorbed and reach the systemic circulation.

Regulatory update on functional ingredients: permitted health claims in Malaysia

***Nurul Hidayati Mohd Nasir*[1] *and Tee E Siong*[2]**

[1]*Food Safety and Quality Division, Ministry of Malaysia, Putrajaya;* [2]*Nutrition Society of Malaysia*

Beyond their nutritional effects, functional ingredients are known to provide health benefits and possibly reduce risk to some diseases. Nowadays, there is a huge and increasing interest among consumers and food industry on these ingredients. Generally recognized as functional ingredients, foods containing these components have been termed as functional foods. There has been a marked increase in research and development activities to establish the scientific basis of the health-enhancing properties, regulatory discussions as well as the trade and marketing of functional foods and ingredients.

To date, there is no unanimously accepted global definition of functional foods or ingredients. These terms are also currently not used in any of the relevant regulations. A generally accepted understanding is that functional foods or ingredients are able to serve physiological roles and provide health benefits beyond basic nutrition. The approach by regulatory agencies towards these ingredients is therefore focused on the health claims permitted and their scientific substantiation. These claims are along the lines of the Codex Alimentarius guidelines Several countries in Southeast Asia permit the use of health claims namely, other function claims and disease risk reduction claims.

Similarly, in Malaysia, the term "functional ingredients/foods" is not used in its regulatory system. However, the Ministry of Health (MOH) recognizes that other food components in foods (not nutrients) may possess physiological functions beyond basic nutrition. Regulation 26 was thus amended to permit the "other food components" to be added to Table 1 of the Twelfth Schedule so that they may be added to foods. The food industry may apply to the Food Safety & Quality Division (FSQD) of MOH for the addition to this Table, "other food components" which are bioactive components demonstrated scientifically to possess beneficial effects. In addition, a regulation has been enacted to permit "other food components" listed in this Table to apply to FSQD to make other function claims, supported by sound scientific evidence. Arising from petitions from the food industry, MOH has a positive list of 29 other function claims for bioactive ingredients with proven physiological functions. These include several dietary fibres and non-digestible oligosaccharides, plant sterol, soya protein, lutein, DHA/ARA. Disease risk reduction claims are not permitted in Malaysia

This presentation summaries the regulations in Malaysia related to the application for the addition of other food components to Table 1 of Twelfth Schedule and for other function claims as well as the review process carried out by FSQD.

Nutrition Update 1

Relationship between overweight/obesity and anemia in vocational high school students (adolescent girls) in Bekasi, Indonesia

Syah MNH, Asna AF, Perdana SM and Amelia R

Nutrition Study Program, Health Sciences Faculty, University of Pembangunan Nasional Veteran Jakarta, Indonesia

Anemia is a nutritional problem that occurs in adolescent girls like vocational students. Based on the results of the 2013 basic health research, anemia in Indonesia was 21.7%. For women, 23.9% and for ages 15-24 there are 18.4%. There are not many data for anemia in adolescent girls. This study aims to know the relationship of over nutritional status with anemia on adolescent girls in Vocational School in Bekasi City, Indonesia. This study used a cross sectional design. Samples are 327 adolescent girls in vocational schools in Bekasi, Indonesia. Anemia was determined based on blood hemoglobin levels (<12 gr / dl). Nutritional status measure with anthropometric and analysis with Z score BMI for age. The relationship analysis by using chi-square test. The result showed that 31.8% of anemia was found in adolescent girls of Vocational School in Bekasi City. 48.1% were mild anemia, 45.2% were moderate and 6.7% were severe. 80,1% has normal nutritional status, but there were 19,9% overweight and obesity. Chi-square test result shown significant relationship between over nutritional status and anemia (p=0,000). It was found 13,8% adolescent girls has anemia with overweight and obesity status. Anemia is still a high nutritional problem compared to the problem of obesity and thinness in adolescent girls in vocational schools in Bekasi. most adolescent girl cannot fulfill the recommended daily portion, especially in vegetables and fruit.

Nutritional factors associated with autism severity in children with Autism Spectrum Disorder at an autism intervention center in Kuala Lumpur

Eow SY[1], Gan WY[1], Lim PY[2], Hamidin A[3] and Zalilah MS[1]

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Children with Autism Spectrum Disorder (ASD) are at risks for nutritional deficiencies due to their selective eating and sensory selectivity. These deficiencies predispose the children with ASD to poor nutritional status. To date, there is limited information on the nutritional

status of children with ASD of different autism severity in Malaysia. Hence, this cross-sectional study aimed to determine the association between nutritional factors and autism severity in children with ASD at a selected autism intervention center in Kuala Lumpur. A total of 224 children (82.6% males and 17.4% females) with a mean age of 5.19 ± 0.87 years and their mothers were recruited. Mothers completed a self-administered questionnaire on sociodemographic factors, parental feeding practices, and child eating behaviors. A 3-day food diary was recorded by the mothers. Body weight and height of the children were measured by the researcher in the center. Majority of the children with ASD (78.1%) were in the high autism severity group, with no significant difference in sex (χ^2=0.392, p=0.531). The prevalence of underweight, stunted, and overweight/obese were 8.0%, 6.7%, and 10.8%, respectively. The multiple logistic regression analysis showed that mothers with tertiary education (AOR=2.98, 95% CI=1.21-7.37), high perceived child weight (AOR=4.32, 95% CI=1.74-10.71), Malay children (AOR=4.13, 95% CI=1.74-9.84), and children who did not achieve recommended intake for vitamin C (AOR=3.72, 95% CI=1.70-8.15) were more likely to have high autism severity. Dietary interventions on vitamin C and parenting programs on forming appropriate parental beliefs on child weight should be carried out to lower the risk of autism severity in children with ASD.

Rate of gestational weight gain trajectory is associated with adverse pregnancy outcomes

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Inappropriate rate of gestational weight gain (GWG) has been associated with adverse pregnancy outcomes, but it remains unclear whether change in rate of GWG during pregnancy will contribute to similar outcomes. This study aimed to examine the rate of gestational weight gain (GWG) trajectory and its associations with pregnancy outcomes. This is a retrospective cohort study of 1,951 pregnant women in Seremban district, Negeri Sembilan, Malaysia. Rate of GWG trajectories were identified using latent class growth model. Binary logistic regression was performed to examine the adverse pregnancy outcomes of these trajectories. Three rate of GWG trajectories were identified as "Group 1 – maintaining at an average rate of GWG of 0.38 kg/week" (80.7%), "Group 2 – increasing rate of GWG" (3.1%), and "Group 3 – maintaining at an average rate of GWG of 0.60 kg/week" (16.2%). In the adjusted model, women in group 2 had significantly higher risk of caesarean delivery (AOR= 2.35, 95% CI= 1.27 – 4.35) and having low birth weight infants (AOR= 3.43, 95% CI= 1.78 – 6.61) than those in group 1. Meanwhile, women in group 3 were at a higher risk of 6 weeks postpartum weight retention (AOR= 30.18, 95% CI= 15.74 – 57.84), preterm delivery (AOR= 2.66, 95% CI= 1.68 – 4.21), and caesarean delivery (AOR= 1.86, 95% CI= 1.29 – 2.69), but lower risk of having small-gestational age (SGA) infants (AOR= 0.71, 95% CI= 0.50 – 0.99) compared to those women in group 1. Most pregnant women in this study maintained the rate of GWG at an average of 0.38 kg/week for second and third trimester. Promoting rate of GWG within the recommended range should be emphasized in antenatal care to prevent risk of adverse pregnancy outcomes.

Prevalence of eating disorder risk and its associated factors among high school adolescents Terengganu, Malaysia

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Eating disorder is most commonly occur among adolescents due to weight concern and body dissatisfaction. Screening for eating disorders based on early identification of an eating disorder risk factor can lead to early treatment, thereby reducing serious complication and psychological complications. This study aimed to determine the prevalence of eating disorder risk and its associated factors among high school adolescents. A cross-sectional survey was conducted among 620 school-adolescents aged between 14 and 18 years from 11 secondary schools in Terengganu. Cluster sampling was applied and a self-administered questionnaire was used to assess 4 main components of the study: Eating Disorder Risk, Sociodemographic Factors, Substance Misuse Index and Psychological Factor. Eating Attitude Test (EAT-26) is used to assess risk of eating disorder as it has 3 subscales to assess an individual's behaviours, thoughts on dieting, bulimia and food preoccupation and oral control. Substance Misuse Index drug is divided into 2 main categories licit and illicit drugs. Psychological factors was measured using validated Malay version of strength and difficulties questionnaires (SDQ). Prevalence of eating disorder risk among school-going adolescents were 32.3%. The prevalence of eating disordered risk was higher among girls (18.4%) as compared to boys (13.9%). It was independently associated with emotional problem (p=0.028, Adjusted OR 1.15, CI 1.02, 1.30) and peer problem (p=0.004, Adjusted OR 1.23, CI 1.07, 1.42) identified using SDQ after adjusting other variables. Increasing age also increased the risk for eating disorder (p=0.014, Adjusted OR 1.20, CI 1.04, 1.38). It was not significantly associated with body mass index (BMI), or any history of any form of previous abuse. Adolescents with emotional and peer problems are at risk for eating disordered. It is crucial to screen adolescents identified with these problems for eating disorders in order to evade or reduce the potential harmful complications associated with it.

Maternal body mass index, dietary intake and choice of infant feeding method: a cross sectional study in Petaling district, Selangor

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Mothers with high body mass index (BMI) had reduced breastfeeding duration, and this was seemingly mediated by women's body discomfort. Moreover influence of maternal intake of specific nutrients on milk volume has not been investigated satisfactorily. This study aims to determine the association of maternal body mass index, dietary intake and choice of infant feeding method. An analytical cross sectional study was conducted among 247 mothers with infants ≤ 2 years old in five health clinics in Petaling district, Selangor. A validated questionnaire was administrated to assess the maternal diet and weight status. All data was analysed using SPSS 23 and Nutritionist Pro software. Prevalence of breastfeeding, formula feeding and both breast and formula feeding were 30.8%, 18% and 12.6% respectively. The mean dietary energy intake per day was 1012.7±427.8 kcal. While, the mean intake for

carbohydrate, protein and fat were 173.1±79.7g, 78.6±39.9g and 47.3±30.5g respectively. Breastfeeding is more prevalent among mothers with adequate amount of calorie (75%). All mothers with adequate protein intake tend to breastfeed their infants compare to those with inadequate and excess intake of protein. Breastfeeding was more prevalent in mothers with adequate fat intake (60.7%) as well as mothers with excessive carbohydrate intake (76.5%). A significant difference was found between the carbohydrate intake of the mothers and the feeding choices (X^2 =7.992, p= 0.018). Breastfeeding was highly prevalent among mothers with normal BMI (66.3%) but there is no significant differences found between the groups. In multivariate analysis mothers with excessive carbohydrate intake 6-times more likely to breastfeed (AOR = 6.30, 95% CI = 1.34, 29.6). Adequate nutrient intake may improve the preference of breastfeeding in response to breast milk production. However, it is not clear whether the maternal BMI can differently impact choice of infant feeding methods.

Omega-3 fatty acids and probiotics in improving immune response in highly active individuals: a pilot randomised controlled trial

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Individuals who practise highly intensive sports have a higher chance of reducing their immunoglobulin A (IgA) levels in their body. This will lead to a higher susceptibility of developing upper respiratory tract infection (URTI) symptoms. Previous studies have proven that consumption of probiotics aid in improving the health of the subjects by decreasing the incidence of URTI symptoms and increasing salivary IgA levels. However, there are no studies related to the consumption of probiotics with omega-3 fatty acids in modulating the immune response of highly active individuals. This study aimed to investigate the effectiveness of probiotics (*Lactobacillus casei* Shirota strain as drink containing 3.75 × 10^8 CFU daily) with and without omega-3 fatty acids (650 mg) for modulating immune response among highly active individuals in 4 weeks. In a randomised controlled trial, 29 highly active individuals consumed either probiotics only (n = 15) or probiotics with omega-3 fatty acids (n = 14). Saliva samples were collected at the beginning and end of the trial and were analysed for salivary IgA levels. Frequency of URTI incidence was recorded via a questionnaire. After the four-week supplementation, salivary IgA concentration within the probiotics group was significantly increased (4.8 ± 0.8 vs. 10.5 ± 7.7 mg/ml; p-value = 0.001) while no significant change was observed in the probiotics with omega-3 fatty acids group. Incidence of URTI within the probiotics and omega-3 fatty acids group significantly decreased (50% vs 0%; p-value = 0.008) but remained unchanged in the probiotics group (p-value = 1.000). A short 4-week consumption of probiotics with or without omega-3 fatty acids beneficially modulated immune response by significantly decreasing the incidence of URTI or increasing the salivary IgA levels respectively. Further studies to investigate effects of co-administration of probiotics with omega-3 fatty acids are warranted.

Symposium 3: Young Researchers' Symposium

FTO gene variants (rs9930501, rs9930506 and rs9932754) and post-intervention differences in anthropometric and cardio-metabolic parameters after a 6-month Hipcref diet intervention in overweight and obese Malaysian adults

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Studies have reported that gene variations not only contribute to the risk of developing obesity and its complications, but may also affect the outcome of dietary intervention programmes. This study aimed to investigate the effect of *FTO* gene variants (rs9930501, rs9930506 and rs9932754) on the post-intervention differences in anthropometric and cardio-metabolic parameters in response to a 6-month Hipcref (High-protein, calorie-restricted, high vitamin E and high fiber) diet, in overweight and obese Malaysians. Hipcref dietary intervention was a 6-month, parallel-arm, randomised controlled study on 128 participants, aged ≥18 years with a BMI≥23kg/m2. Participants were randomised to either the Hipcref diet (n=65) or the control diet (n=63). Hipcref diet was formulated and developed based on the data generated from the experiments (gene-diet interactions) at baseline. Based on the individual's baseline intake, the Hipcref diet introduced a) a reduction of 300-500kcal/day, b) 30% calories from protein, 30% calories from fat and 40% calories from carbohydrate, c) dietary fibre ≥25g/day and d) vitamin E ≥15mg/day. The control group received generalised dietary advice. All participants of the Hipcref diet group reduced on an average 0.6kg body weight and 0.4% body fat per month. A two-way mixed ANOVA revealed significant treatment group × time effect on anthropometric and cardio-metabolic parameters. Hipcref diet group had significant higher reduction in body weight (P<0·001), BMI (P<0·001), WC (P<0·001), fat mass (P<0·001), percent body fat (P<0·001), fasting insulin (P<0·001), HOMA-IR (P<0·001) and hsCRP levels (P=0·020) compared to the control diet group at month 6. Subsequently, in a subgroup analysis on the Hipcref diet group the post-intervention differences in obesity-related anthropometric and cardio-metabolic parameters were assessed by *FTO* genotypes. *FTO* (rs9930501, rs9930506 and rs9932754) gene variants were not associated with any post-intervention differences in body composition and cardio-metabolic parameters at the end of the dietary intervention, after adjusting for potential confounders (p>0.05). In conclusion, our results suggest that overweight and obese Malaysian adults carrying the risk alleles of *FTO* gene benefited equally from the Hipcref diet just as the non-risk allele carriers. Therefore, genetic predisposition to obesity associated with the risk alleles of *FTO* gene can be counteracted through Hipcref diet.

Are Malaysian children with low calcium intakes having low bone mass?

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Calcium intake is important for peak bone mass acquisition however little is known on the effect of habitual low calcium intake on the bone mineral density (BMD) of Malaysian children. This study aims to characterise the total body bone mineral density (TBBMD) of 243 children aged between 8-12 years old taking part in the PREBONE-Kids study in IMU. We measured TBBMD using dual-energy X-ray absorptiometry (DXA), calcium intake using 7 days' diet history, serum Vitamin D using the LC-MS/MS method and physical activity using Children Physical Activity Questionnaire (C-PAQ). Based on Asian reference population, 97.5% of the children had TBBMD z-scores above -1 SD, 2.5% were at risk for low BMD for chronologic age (-1.9 to -1.0 SD) and none had low BMD for age (<-2.0 SD). The overall mean TBBMD was 0.768 ± 0.075 g/cm^2 and boys had higher TBBMD than girls (0.780 ± 0.075 g/cm^2 vs 0.754 ± 0.072g/cm^2 respectively, p=0.008). The mean calcium intake was 348 ± 179 mg/day which achieved only 30% of RNI while 35% of children were having vitamin D deficiency (<30nmol/l). We conclude that Malaysian children have normal bone mass for age despite low calcium and vitamin D status and implies some adaptation mechanism may have contributed to this.

The KidChen Study: Effectiveness of a hands-on healthy meal preparation intervention among primary schoolchildren in Kuala Lumpur, Malaysia

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KidChen Study (Kids in Kitchen) emphasized on experiential learning and hands-on healthy meal preparation among primary schoolchildren. This randomized-controlled trial aimed to improve children's psychosocial factors (knowledge, attitude, practice and self-efficacy) towards healthy meal preparation, eating pattern (usual daily frequency of food groups consumption) and anthropometry measures (BMI-for-age, waist circumference and percent body fat). Two schools in Kuala Lumpur, Malaysia were randomly selected and assigned to either intervention or control group. Eligible children from intervention group (n=44) received five 60-minute interactive education modules over 12 weeks which consisted of hands-on healthy meal preparation activities. Children from control group (n=43) did not receive any intervention activities. After the programme, intervention group had better mean knowledge (Δ=1.36±0.42, p=0.002), attitude (Δ=4.59±0.69, p<0.001), practice (Δ=7.38±0.78, p<0.001) and self-efficacy (Δ=6.29±0.84, p<0.001) towards healthy meal preparation when compared with control group. In terms of eating pattern, intervention group demonstrated significant improvement in their usual daily frequency of food groups consumption (number of times/day) namely wholegrains (Δ=1.29±0.30, p<0.001), vegetables (Δ=2.32±0.26, p<0.001), fruits (Δ=1.60±0.32, p<0.001), legumes (Δ=1.29±0.15, p<0.001), fish (Δ=0.59±0.26, p=0.028) and decrease in consumption of refined grains (Δ=-1.70±0.26, p<0.001) in comparison with control group. No significant improvement was observed in BMI z-score nor percent body fat between groups. However, control group had a higher waist circumference as compared to intervention group after the programme [(70.65(12.36) vs 65.15(10.37)cm, p=0.027]. Findings revealed that KidChen Study made an impact in improving children's psychosocial factors and eating pattern, although the effect on body composition is minimal. A follow-up study will be conducted to determine the sustainability of these nutritional outcomes. In conclusion, KidChen Study is effective in empowering children as advocates of healthy nutrition-related behaviour.

The impact of F.E.A.T weight reduction programme on health-related quality of life among obese adult

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Numerous studies have indicated that obesity causes negative impacts to health-related quality of life (HRQOL). Reductions in body weight, albeit small, can lead to significant improvements in HRQOL. Thus, successful weight reduction interventions should also improve HRQOL. This study aimed to determine the effect of a community-based weight loss intervention programme on HRQOL among obese adults in Malacca. This quasi-experimental study was carried out among 53 individuals (mean age 47.4 ± 7.6 years, mean BMI 29.3 ± 3.5kg/m^2), who were assigned to intervention (n=28) and control (n=26) groups, respectively. The Fit, Eat, Active, Training (F.E.A.T) programme was a 3-month intervention, comprising aerobic and resistance exercises, and behavioural modification strategies to increase physical activity and promote healthy eating. HRQOL using the 36-Item Short-Form Health Survey (SF-36) and anthropometric indices were measured at baseline and post-intervention at week-12, -24 and -36. Data was analysed using two-way repeated measures ANOVA. Interaction effects were observed in changes in body weight (Wt), waist circumference (WC), body fat (%BF), and HRQOL dimensions, overall SF-36 score as well as the five domains of health. There were significant reductions after 36 weeks in Wt (-4.3%, p=0.001), WC (-10.5%, p=0.001), and %BF (-3.6%, p=0.002) in intervention group but not in control group. Results also showed that there were significant improvements for all HRQOL domains and overall SF-36 score in intervention group compared to control group. Positive correlations were found between weight loss and improvement in physical functioning (r=0.402, p=0.034), general health (r=0.390, p=0.040), and vitality (r=0.396, p=0.037). In conclusion, the F.E.A.T weight reduction programme increased HRQOL in obese adults experiencing modest weight loss. We opine that the F.E.A.T programme can be adopted by other similar communities for weight reduction and to improve healthy quality of life practices.

Low daily energy intake, household smoke and sugar exposure increased the risk of dental caries in pre-schoolers

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Dental caries in primary teeth among pre-schoolers is the most common communicable disease worldwide and it is highly prevalent in developing countries. Dental caries in primary teeth is expensive to treat and it brings negative impact on general health, as well as quality of life. A cross-sectional study was conducted at 26 Tabika Perpaduan in Negeri Sembilan to determine the factors associated with dental caries in primary teeth among

396 pre-schoolers aged 4 to 6 years old. Dental examination was conducted by a dentist to obtain number of decayed or filled primary teeth (dft) and the presence of visible plaque. A self-administered questionnaire was completed by the mothers on socio-demographic characteristics, second-hand smoke exposure, frequency of sugary food and drinks, dietary intake, oral health knowledge, attitude and behaviours. Results showed that 64.4% of the pre-schoolers had dental caries in primary teeth, in which higher proportion of boys (69.4%) had dental caries than girls (59.5%). More than half (52.0%) of the pre-schoolers had visible plaque on their teeth. More than one third of the pre-schoolers (37.1%) did not achieve daily recommended intake for energy. Multiple logistic regression analysis revealed that pre-schoolers who had visible plaque on their teeth (AOR=6.22, 95% CI=3.45-11.24), with family members who smoked at least one cigarette at home (AOR=2.47, 95% CI=1.24-4.91), exposed to sugar for more than 6 times daily (AOR=5.64, 95% CI=1.79-17.749), and did not achieve daily energy intake requirement (AOR=2.763, 95% CI=1.54-4.95) had higher risk of getting dental caries. Dental health education on the important of oral hygiene, disadvantages of smoking and healthy eating habits are needed to reduce the risk of dental caries among pre-schoolers.

Effects of sunlight exposure and vitamin D supplementation on serum 25-hydroxyvitamin D concentrations, high molecular weight adiponectin and metabolic syndrome risk factors

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Vitamin D (VD) deficiency is common and has been associated with several non-bone/ calcium related outcomes including chronic diseases. A quasi-experimental study design was carried out for 12 weeks to evaluate the effects of moderate sunlight exposure (n=19; 15 minutes sunlight exposure biweekly on face, arms, hands and feet), VD supplementation (n=15; 50 000 IU cholecalciferol weekly) and placebo (n=10) on serum 25-hydroxyvitamin D [25(OH)D] levels, high molecular weight (HMW) adiponectin and metabolic syndrome (MetS) risk factors in subjects with VD deficiency (serum 25(OH)D < 50 nmol/l). Anthropometric data and biochemical markers were assessed at the baseline and endpoint (after 12 weeks). The VD classification was based on the 2011 Endocrine Society Clinical Practice Guidelines while MetS risk factors was in accordance with the Harmonized International Diabetes Federation (IDF) for MetS 2009. Repeated measure ANCOVA within group analysis was applied with age as covariate. The baseline data did not differ significantly among study groups except for age (F=6.15, p=0.004) and waist circumference (F=7.13, p=0.002). After 12 weeks, serum 25(OH)D increased significantly in sunlight exposure (mean difference (MD)=14.27 nmol/l, p<0.001) and VD supplement group (MD=14.30 nmol/l, p<0.001) but not in placebo group (MD=1.63 nmol/l, p=0.067). Significant increase in HMW adiponectin was only observed in VD supplement group (MD=0.43 ng/ml, p=0.024). Among the MetS risk factors, glucose decreased significantly after 12 weeks of sunlight exposure (MD=-0.27 mmol/l, p<0.001) but no change was observed in other groups. No significant changes were found in waist circumference, blood pressure and triglycerides after 12 weeks of intervention. However, HDL-C was found to be increased significantly in all groups after the intervention (p<0.05). In conclusion, moderate sunlight exposure and vitamin D supplementation were equally effective in improving vitamin D status, but the effects on MetS risk factors warrants further investigations.

Nutrition Update 2

The influence of obstetrics characteristic on early initiation of breastfeeding among mothers in Petaling District, Selangor: My SHAPE Project 2019

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Malaysians are diverse in ethnic, culture and beliefs, some discard their first milk as they consider it as a "dirty milk" which may contribute to lower rates in early initiation of breastfeeding. The objective of this study was to examine the prevalence of early breastfeeding initiation among mothers in Petaling District, Selangor across the obstetric characteristics. Two hundred and fifteen mothers with infants below 2 years old were recruited in MY SHAPE Project. A descriptive cross sectional study was conducted in five Health Clinics in District of Petaling, Selangor. Data was collected using a pre-tested structured questionnaire on breastfeeding practices. All data were analysed using SPSS 23. Early initiation of breastfeeding was prevalent among 39.1% of infants below two years old. Early breastfeeding initiation was significantly more prevalent among mothers who have undergone vaginal delivery compared to C-Section delivery (89.4% vs. 54.7%; X^2 = 31.042, p < 0.001). Similarly, early breastfeeding initiation was significantly higher among mothers with more than one child compared to those mothers with first child (85.8% vs. 73.8%; X^2 = 4.554, p = 0.033). The proportion of early breastfeeding initiation was higher among female infants compared to male infants; however, the distribution was not significantly different (82.1% vs. 80.0%; X^2 = 0.152, p < 0.696). There is no significant difference in infant's birth weight with early breastfeeding initiation status (t= -0.572, p= 0.568). Multi-variable logistic regression showed that mothers with vaginal delivery were significantly more likely to initiate early breastfeeding more than 9 times compared to C-Section delivery. (AOR= 9.37, 95% CI= 4.12-21.3). Therefore, special support group should be formed to assist C-Section mothers and mothers with first child to initiate early breastfeeding.

Encapsulated fish oil results in higher absorption of DHA in toddlers

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The omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are well accepted as being essential components of a healthy, balanced diet, having beneficial effects on brain and visual acuity development and optimal health during fetal and early postnatal life. The ideal source of DHA for infants is human milk from a well-

nourished mother, but an appropriate substitute must be available when breastfeeding is not possible. European Food Safety Authority (EFSA) and the Commission Delegated Regulation (EU) 2016/127 have proposed DHA supplementation as mandatory for infant formulas. The challenge for infant formula is to provide DHA that most stable and closely resembles the growth and developmental results achieved with human milk. The aim of this study was to investigate the bioavailability of different Omega 3 fatty acid formulations in healthy toddlers (2-3 years old) compared with fish oil for a period of one month. Forty-eight toddlers were randomly allocated to four groups (n=12/group): 1. unfortified toddler formula, 2. unfortified toddler formula + high DHA tuna oil, 3. milk drink fortified with fish oil powder formulation 1, 4. milk drink fortified with fish oil powder formulation 2. The bioavailability was checked through analysis of the blood and faces fatty acid levels. The results showed that the DHA bioavailability was enhanced through microencapsulation. Encapsulated fish oil powder is a protective structure of fish oil typically incorporated into formulas together with other formula components.

Nutritional status and associated risk factors amongst older adults in Al Madinah Al Munawarah

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The percentage of older adults increased dramatically over the past years. The aging process is accompanied by many physiological, physical and psychological changes that could have adverse effect on the old person's nutritional status. The aim of this study was to assess the nutritional status of older adults and determine the factors that might affect their nutritional status. An epidemiological, cross sectional, community-based study was conducted in different places in Al Madinah Al Munawarah, Saudi Arabia. Nutritional screening was carried out using the Mini Nutritional Assessment-Short Form. Weight, height and the mid upper arm circumference were measured twice. Body composition of lean and fat mass percent was analyzed. The psychologic and physiological status, activities of daily living and quality of life were assessed. Two 24-hour recall records were collected for the estimation of energy and selected nutrients. Dietary data was analyzed by Diet Organizer version 3.1. Statistical analysis was conducted using SPSS version 20. A total of 114 older people aged between 65-100 years (Mean age: 69 ± 6.1 years) were included; of these 82 (72%) were women. Participants (28.9%) were at risk of malnutrition and 3.5% were malnourished. Overweight and obesity were common among the study group. Older people consumed lower energy, calcium, fibre and water compared to their recommended daily allowances. Age, educational level, psychological and physiological status and sleeping status affected their nutritional status. Nutritional education campaigns are needed for them and their families targeting their dietary intake, body weight and physical activity level.

Prevalence of stunting among Malaysian school-aged children living in welfare homes and its contributed factors

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There is a growing body of evidence of undernourished problem among children in welfare homes, but lack of study focusing on stunting issue. This cross-sectional study aimed to determine the prevalence of stunting among Malaysian school-aged children who lived in welfare homes and its contributed factors. A total of 307 school children aged between 7 and 17 years old from 15 selected welfare homes in Selangor area participated in the present study. Information on the socio-demographic background of the children was obtained from the head of each welfare homes. Children's height was measured to determine their height-for-age. Data on physical activity status, dietary factors and psychological factors of the children were assessed by using a set of a self-administered questionnaire. The results showed that approximately 13.6% of children were in severely stunted and stunted categories. Children who were in older age group ($r=-0.128, p<0.05$), less physically active ($r=0.021, p<0.05$), less preference for thinner body ($r=-0.117, p<0.05$), and more energy intake per body weight ($r=-0.213, p<0.05$) were significantly correlated with lower height-for-age (z-score). The multiple linear regression analysis reported that more energy intake per body weight ($\beta=-0.438$) and less physically active ($\beta=0.387$) were significantly contributed to lower height-for-age (z-score). In other words, children who consumed more energy and less physically active were more likely to have stunting problem. The present study suggested that the health intervention program should be focused on the adequate intake of energy and the physical activity level of the children as to overcome stunting problem.

Association of intensity and type of physical activity with post-partum weight gain among mothers in Petaling District, Selangor

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Pregnancy is a phase in the lives of women during childbearing age when they are at risk of becoming overweight or obese. For women, gradual fat deposition after childbirth, where notable weight changes occur that might lead to future obesity, a rising public health problem in Malaysia. This present study aims to determine the association between physical activity and post-partum weight gain among Malaysian mothers. A cross sectional study was conducted administrating a questionnaire consisting of socio-demographic profile, anthropometric measurements and pregnancy physical activity questionnaire (PPAQ). Subjects were comprised of 113 mothers from the healthcare clinics in Petaling District, Selangor. All data were analysed using SPSS 23. Average postpartum weight gain was 3.20 ± 5.40 kg. The study has observed that lower physical activity intensity were significantly associated with higher postpartum weight gain ($p < 0.05$). Total physical activity and light intensity activity have an inverse significant and moderate correlation with postpartum weight gain, ($r=-0.219$, $p<0.05$) and ($r=-0.338$, $p<0.05$) respectively. Household or caregiving activity also had a significant correlation of with postpartum weight gain inversely ($r=-0.320$, $p<0.05$).Although it has indicated a high level of physical activity, this study highlighted that mothers should be advised to control postpartum weight gain by being physically active during pregnancy. Healthcare providers should educate mothers in managing their increased risk of postpartum weight gain and subsequent development of obesity.

Prevalence of stunting among infants and its association with maternal characteristics in Petaling District, Selangor

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This study aimed at analysing, in a cross-sectional study, the prevalence of stunting in a group of 267 infants between 6 months and 24 months, was recruited between February 2019 and March 2019 and attended the health clinics in Petaling District Selangor. For all infants, maternal demographic, and anthropometric data were recorded. Mean Height-for-age z-scores (HAZ) was -1.41 ±2.27 indicating normal HAZ. In average the infants are in the 28th percentile. One-third of the infants, 32.2%, and (86/267) were exhibiting stunted growth (below -2SD). Of the stunted children, 43% showed a moderate delay in linear growth for their age group [height-for-age z-score (HAZ) between -2 -3 SD] while 57% presented severe delay (HAZ < -3). Stunting was most prevalent among Indian infants (39.3%). Mothers with lower educational background (43.9%), working mothers (42.2%) and having lower household income (47.8%) had higher proportion of stunted infants, however no statistical difference were found. Stunting was significant among infants without exclusive breastfeeding. Exclusive breastfeeding reduced the risk of stunting by 82% (OR = 0.18, 95% CI = 0.039-0.843). Therefore, promotion of exclusive breastfeeding can be conducted without sociodemographic disparities to prevent stunting.

Symposium 4: School Child & Adolescent Nutrition

School Nutrition Programmes for primary school children – experiences and learnings

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School Nutrition Programmes (SNP), that comprises two components, namely nutrition education and supportive healthy school food environment, is developed to provide primary school children with the knowledge and facilitate supportive environment to encourage children to practice healthy eating. The aim of this presentation is to share the experiences and learning points from the School Nutrition Programmes for primary school children in Batu Pahat District, Johor.

The SNP provided nutrition education through the trained teachers to the children in three School Nutrition Campaigns, and supportive healthy school food environment through the trained canteen food handlers to the children during school recess over a period of

three months in school canteens. The SNP is effective in improving knowledge on nutrition, eating behaviours, physical activity, cognitive performance and health-related quality of life and reducing BMI-for-age z score among Batu Pahat primary school children.

The involvement of school authorities and parents from Parent Teacher Association play major role in the success of the SNP. Throughout the SNP, varies experiences were gained from three different school types *(Sekolah Kebangsaan, SK; Sekolah Kebangsaan Jenis Cina, SJKC; Sekolah Kebangsaan Jenis Tamil, SJKT),* for teachers, primary school children, parents and canteen food handler, respectively. The lessons learned from the SNP should be actively considered in future programs. The SNP is highly recommended to roll-out to all Malaysia primary school.

Understanding and prevention of disordered eating among Malaysian adolescents

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Disordered eating is a range of unhealthy eating behaviors which occurs less frequently or severe than a specific eating disorder. In recent years, disordered eating become rampant in developing countries, including Malaysia. The most commonly used screening tool for disordered eating is the Eating Attitudes Test-26 (EAT-26). Previous studies showed that disordered eating predicted poorer nutritional and health outcomes among adolescents. In addition, several local studies showed that the prevalence of disordered eating among Malaysian adolescents had increased over the years, but the data were unable to generalize to Malaysian adolescents. The Malaysian Overweight and Disordered Eating Survey among Teens (MODEST) is a population-based study that involved 9,677 secondary school Malaysian adolescents. The study found that one-third (31.4%) of the Malaysian adolescents was disordered eating. While disordered eating among Malaysian adolescents pose a significant public health concern, there is no intervention focus on preventing disordered eating. In addition, findings from the MODEST showed that obesity and disordered eating have similar risk factors, including dietary practice, physical activity and body image perception. Hence, an intervention programme that focused on preventing overweight and disordered eating among Malaysian adolescents - 'Eat Right, Be Positive about Your Body and Live Actively' (EPaL), was developed. This programme applied peer-led approach and promoted three main components of healthy lifestyle, which were healthy eating, positive body image and active lifestyle. The evaluation of the effectiveness of the EPaL intervention programme was conducted. It compared the effects of the intervention on eating and physical activity behaviour variables, and health outcomes, between intervention and comparison groups, at three time points - before intervention (pre-intervention), after intervention (Post I) and 3 months after intervention (Post II). The intervention group received EPaL intervention programme while the comparison group received no intervention and had their standard Physical Education and Health classes. There were 76 adolescents (Intervention Group: 34; Comparison Group: 42) aged 13-14 years had completed the intervention activities. The EPaL intervention programme was effective in improving knowledge, perception of body weight status, eating behaviours. The present study added to the knowledge and evidence on the effectiveness of health interventions. Hence, it can be used as a model to develop future health and nutrition interventions for adolescents in Malaysia.

Good Nutrition – Key to Healthy Children – A multi-country school nutrition intervention in SEA: Malaysia experience

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Primary school children in our country are faced with significant double burden of malnutrition, in which overnutrition is much more prevalent. Dietary and physical activity patterns of these children are unsatisfactory. There is an urgent need to implement comprehensive intervention measures throughout the country to improve the nutritional status of these children and it is the only way to ensure healthier future generations of adult Malaysians. This presentation will discuss Good Nutrition - Key to Healthy Children (GNKHC), a unique multi-stakeholder, multi-country nutrition education initiative for school-going children initiated by the Southeast Asia Public Health Nutrition (SEA-PHN) Network. SEA-PHN Network is a network comprising of five nutrition societies in Southeast Asia (Indonesia, Malaysia, Philippines, Thailand and Vietnam). The network is dedicated to promoting public health nutrition among the population and alleviating nutrition problems in the region.

The goal of GNKHC is to empower school children with appropriate nutrition knowledge to enable them to adopt healthier eating habits and be physically active. The five member countries of the SEA-PHN Network participated in this initiative. Nutrition Society of Malaysia (NSM), a member of SEA-PHN Network, is the implementation partner of GNKHC in Malaysia.

The first part of the project commenced with development of a nutrition education package, which comprised nine topics in food and nutrition based on the dietary guidelines of the countries, teaching aids for interactive activities and games, student's workbook and educational leaflets for parents. All countries utilised the similar jointly developed nutrition package, monitoring tools and followed the similar implementation protocol. However, the contents were translated into the appropriate national languages and customised to meet local social and cultural practices. Technical working groups, overseen by national nutrition societies were established within each country to manage the implementation of the project in their respective selected schools.

The second part of the project involved implementing the nutrition module via a 2-step process. A training-of-trainer (TOT) workshop was first organised to train the teachers to familiarise them with the module and implementation process (including evaluation). In the second step, the trained teachers rolled out the nutrition education lessons in the selected schools.

In Malaysia, three classes of primary 3 students (9 years old) from two schools were selected to participate in the GNKHC nutrition intervention program. Five teachers from each school attended the TOT workshop in May 2018 and the nutrition education/lessons were rolled out from June till November 2018. Nutrition knowledge, attitude and practice (KAP) of the students were assessed at pre- and post-activity. A total of 131 students from both schools were involved in this programme. Nutrition knowledge (K) and attitude (A) scores of the students showed an improvement following the module implementation as indicated from the percentage of students who increase in their scores. However, the percentage of students who decreased in their practice (P) scores increased. It may be due to multiple factors influencing the practice of the students; for examples, foods were prepared by their parents, availability of foods in cafeteria, and influences by peers and media.

Teachers and students provided feedback that the lessons were interactive and educational. Most students (71%) felt that the nutrition lessons taught by the teachers were easy to understand. This showed that the module is appropriate for this age group. One of the key challenges of this programme is getting commitment from the teachers to complete the lessons within one year. It was also challenging for teachers to allocate time to conduct the lessons during school hours, as this programme is not part of the formal school syllabus. It is hoped that experience gained in the implementation of GNKHC can be used for implementing larger scale interventions in more schools to empower school children with knowledge on healthy eating and active living.

Use of red palm oil fortified biscuits to reduce vitamin A deficiency among rural primary school children in Malaysia

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Vitamin A deficiency and intestinal parasitic infection still coexists among children of aborigines "Orang Asli" and those from rural areas in Malaysia; however current data is inadequate. Current study is carried out to investigate the health status of these children, before and after Vitamin A intervention. Controlled trial with pre-post-test design is done in 5 regions in Malaysia (n=10 schools). A total of 651 students is recruited. Experimental arm receives biscuits baked with red palm oil while control arm receives biscuits baked with palm oil. Biochemical assessment includes serum retinols, retinol binding protein, beta and alpha carotene, vitamin E, haemoglobin, ferritin, high sensitivity C-reactive protein, fibrinogen and haematology tests. Eyes are examined for ocular signs. Fecal samples are collected for intestinal parasites and gut microbiota analyses. Questionnaires on the demographic, socioeconomic, environmental sanitation, living condition and food consumption are done. Upon screening, high prevalence of stunting, iron deficiency, anaemia, vitamin A deficiency and intestinal parasitic infection was found. Intervention period is currently on-going. Supplementation of red palm oil fortified biscuit is expected to improve the nutritional, ocular, intestinal parasitic infections and gut microbiota status of the vitamin A deficient primary school children. [Trial registration: ClinicalTrials.gov NCT03256123]

Lunch Symposium 2

Nutrition Month Malaysia – a multi-stakeholder collaborative community nutrition promotion programme

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On behalf of Nutrition Month Malaysia 2019 National Steering Committee
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Many Malaysians may know that the main causes of non-communicable diseases are unhealthy eating and sedentary lifestyle. However, they do not translate this knowledge

into healthier daily practices. Recognising a need for a nationwide community nutrition promotion programme, Nutrition Month Malaysia (NMM) was jointly initiated in 2002 by three leading professional bodies, namely the Nutrition Society of Malaysia (NSM), the Malaysian Dietitians' Association (MDA) and the Malaysian Association for the Study of Obesity (MASO), together with the support of the Ministry of Health (MOH). In line with the Government's healthy lifestyle programme, NMM strives to promote greater awareness on healthy eating and active living by disseminating unbiased and practical nutrition information, with the aim to reduce the prevalence of NCDs amongst the nation. This long-term community empowerment programme is spearheaded by a National Steering Committee with representatives from the three professional founding bodies.

Every year, NMM focuses on different themes but the goal remains the same – to create greater awareness of the importance of a healthy lifestyle. The main activities each year include family carnivals, publication of practical nutrition guidebooks and recipe books, educational materials for school children and pre-schoolers, articles in major newspapers, mass media activities such as website, social media, radio and television as well as community engagement sessions among targeted groups (primary school, kindergarten and workplace setting). All the educational materials are available to download for free at NMM website (www.nutritionmonthmalaysia.org.my).

For 2019, NMM was celebrated for the 18th time with the theme '*Make Time for Healthy Eating & Active Living (HE-AL)'*. The theme was chosen to emphasise to the public the urgency of making time to adopt a healthy diet and an active lifestyle. NMM annual family carnival was held in IOI City Mall, Putrajaya for five consecutive days which attracted over 5,000 visitors with its entertaining, educational yet engaging activities. The highlight of the carnival was nutrition screening, where visitors could do a free screening for body composition analysis, followed by free diet analysis and professional advice from nutritionist or dietitian. NMM signature publication for 2019 is a magazine-style guidebook entitled "HE-AL – Guide to Health Eating & Active Living Volume 1" which was distributed for free at the carnival. It can be used as a reference by the public to equip them with the necessary knowledge to kick-start their journey to healthy living.

NMM recognises the need for collaboration with multi-stakeholders for more effective community promotion programmes. This strategic alliance of the 3 professional bodies, with the support of MOH and the collaboration of several food & beverage and health industry companies has enabled the required resources to be pooled together to conduct educational activities and deliver nutrition messages to a much wider audience. It is hoped that various stakeholders will continue to support NMM, thus allowing NMM to be a more effective nationwide community nutrition empowerment programme.

Plenary Lecture 2

Probiotics effects on gut microbiota and short-chain fatty acids of normal and overweight school children after probiotics administration

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A study was conducted to investigate the effects of *Lactobacillus casei* Shirota (LcS)-fermented probiotic drinks ingestion on the intestinal microbiota in school children. The children who participated in this study were grouped into normal weight and overweight and further divided into intervention and control groups. Faecal samples were obtained from the children, followed by qPCR analysis of the gut microbiota and high-performance liquid chromatography analysis of short-chain fatty acids (SCFAs). Consumption of probiotic drinks is associated with significant alterations in the gut microbiota composition of *Lactobacillus spp.* and *Bifidobacterium spp.* In addition, total SCFA and propionic acid contents increased significantly from baseline in normal weight children. Significant differences were also observed for total SCFAs and propionic acid among overweight children. Results from this study suggest that consumption of LcS-fermented probiotic drinks potentially altered the gut microbiota composition of *Lactobacillus spp.* and *Bifidobacterium spp.* in children, consistent with changes in SCFAs.

Symposium 5: Physical Activity and Sedentary Behaviour

Toybox Study Malaysia – improving healthy energy balance and obesity-related behaviours among preschoolers

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As overweight and obesity rates continue to rise in Malaysia, early life intervention could be the key strategy to prevent later life health complications. However, intervention programmes that focus on prevention of obesity among Malaysian preschoolers are scarce. This study, funded by Medical Research Council (UK) under the Newton Ungku Omar Fund, aimed to assess the feasibility of adapting a kindergarten-based family-involved intervention programme from Europe to Malaysia. The ToyBox-Study programme aims to improve four key energy-balance related behaviours: drinking water, eating healthy snacks, reducing sedentary behaviour and increasing physical activity. The project was conducted

in three phases: (i) Preparation Phase – needs assessment and adaptation of European ToyBox-Study components into Malaysian context, (ii) Implementation Phase – conducted in selected urban and rural kindergartens in Kuala Lumpur, Selangor and Sarawak, and (iii) Evaluation Phase – assessment of feasibility and effectiveness in comparison to control kindergartens. The ToyBox Study Malaysia intervention was delivered and compared to usual practice by assessing behaviour, physical activity, dietary intake and health-related outcomes as measured by questionnaires, accelerometry and anthropometry. Adaptation process of Toybox intervention and assessment questionnaires was completed in year 2017, and included focus group discussions and Theory of Change workshop with kindergarten teachers and parents. Materials were translated for language and Malaysia specific content (e.g. foods) and context. The modules prepared are Teachers' Guide, *Jom Minum!*, *Jom Aktif!*, *Makanan dan Snek Sihat*, and *Tingkahlaku Sedentari*. The feasibility study was conducted at 48 kindergartens (22 intervention; 26 control) under the Department of Community Development (KEMAS) over the entire 2018 school-year. Preliminary qualitative analysis suggests that stakeholders, such as parents and teachers, found the activities for fostering the four energy-balance related behaviours were useful and easy to apply. There was impact in the practices from school to home; the children played active roles in applying what they had learned in school to their home environments. In conclusion, the ToyBox-Study programme was successfully adapted into a Malaysian version. It is hoped that the programme will help the preschoolers and their families to build and maintain healthier behaviours in the long-term and provide lifelong benefits to health. We are also optimistic that the programme will be sustainable and be adopted by other kindergartens in Malaysia when proven to be feasible and effective.

Active living for healthy ageing: An exercise recommendation for older adults

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Aging is an inevitable process and every human being will experience it in due time. Advancing age itself leads to structural and functional decline. Coupled with sedentary lifestyle, this physiological decline is worsen. Declining in physical function can be slowed down or reverse with physical exercise. However, data from NHMS 2015 showed the prevalence of physical activity among older adults in decreases with advancement in age. The goals of an exercise are to improve oxygen delivery and metabolic process, build strength and endurance, decrease body fat and improve movement in joints and muscles. Ideally, exercise prescription for older adults should include aerobic exercise, muscle strengthening exercises, and flexibility exercises. The success of promoting active lifestyle especially among older adults relies on the holistic approaches and every players in healthcare setting shall play their roles. This talk will discuss the physical exercise recommendation for older adults.

Malaysian preschoolers' physical activity, sedentary behaviour and sleep: compliance with the 24-hour movement guidelines

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Increased physical activity, reduced sedentary behaviour and adequate sleep are important for early childhood development and well-being. These behaviours have not been extensively investigated among preschoolers in Malaysia. Thus, this study aims to determine preschoolers' physical activity, sedentary behaviour and sleep, and their compliance with the latest 24-hour movement guidelines. This study was conducted among 230 preschoolers aged 4-6 years, who are of Malay, Chinese and Indian ethnicities, and attending kindergartens in Kuala Lumpur. Physical activity and sedentary behaviour were assessed using hip-worn Actical accelerometers. Screen time and sleep pattern of children were proxy-reported by their parents. Mean time spent on moderate-vigorous physical activity (MVPA), screen activities and sleep were 61±23 minutes, 177±94 minutes and 9.47±1.28 hours daily. A total of 48.7% preschoolers had at least 60 minutes of MVPA per day and higher compliance was found in boys than girls (52.3% vs. 45.4%). Only 25.2% of preschoolers met screen time recommendations (children aged 4 years, ≤1 hour; children aged 5-6 years, ≤2 hours). Screen time compliance on weekdays was two-fold higher than weekend days (43.5% vs. 22.6%). More than half of preschoolers (55.2%) met the recommended sleep duration (children aged 4 years, 10-13 hours; children aged 5-6 years, 9-11 hours). Only 6.5% preschoolers met all three MVPA, screen and sleep guidelines. Child's (β = -5.7; 95%CI: -10.3, -1.0) and parent's constraints (β = -5.5; 95%CI: -9.8, -1.2) towards physical activity were negatively associated with MVPA. Children's preference for screen activities was found to be positively associated with screen time (β = 20.5; 95%CI: 3.9, 37.2). Overall, very few preschoolers met the 24-hour movement guidelines, especially for screen activities. Further intervention studies aiming to improve 24-hour movement behaviours of young children should consider different familial and social environmental factors.

Nutrition Update 3

Nutrition during pregnancy and its association with birth weight: findings from the Maternal and Infant Cohort Study (MICOS)

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There was a growing interest in the interaction between the amount and type of nutrients consumed by mothers during pregnancy and fetal growth and development. The present study aimed to determine the contribution of mothers' nutrient intake on the birth weight of their infants in selected health clinics in Malaysia. A face-to-face interview was conducted among 472 mothers about their socio-demographic background, obstetrical history and dietary intake in their third trimester and was prospectively followed up until childbirth. Birth weight of the infants were obtained from the medical record book and pregnancy outcomes record book. The current study reported 9.1% of infants delivered had less than 2.5kg, with a mean birth weight of 3.02±0.43kg. Mothers who were younger, had lower pre-

pregnancy BMI, gained less gestational weight, consumed less daily intakes of total energy, carbohydrates, protein, fat, thiamine, vitamin C, folate and iron during pregnancy were associated with having infants less than 2.5kg ($p<0.05$). Multiple linear regression analysis showed that mothers' pre-pregnancy BMI, daily intake of carbohydrates, protein, fat, thiamine and calcium contributed towards the birth weight of the infants ($R^2=0.437$, $F(6, 235)=29.674$; $p<0.05$). In short, there was about one in ten of Malaysian infants born with low birth weight. Mothers with lower pre-pregnancy BMI, lower intake of carbohydrates, protein, fat, thiamine and calcium were more likely to deliver infants with lower birth weight. Hence, women need to have an optimal BMI before pregnancy, consume variety and adequate intake of macro- and micro-nutrients throughout pregnancy to improve infants' birth weight.

Vitamin D deficiency and its related factors in umbilical cord blood of neonates

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After birth, infants depend on their vitamin D stores at birth, and dietary intake for the supply of vitamin D. Due to the low content of vitamin D in breastmilk, exclusively breastfed infants have a minimal intake. Breastfed infants of vitamin D replete mothers will have sufficient vitamin D stores for their first 3-4 months of life. Given the widespread of maternal vitamin D deficiency, infants may be born with low vitamin D stores and are at increased risk of vitamin D deficiency. Up to date, data on the vitamin D status of neonates in Malaysia are scarce. Here, we examined the prevalence of vitamin D deficiency in and its associated factors in umbilical cord blood of neonates at birth. A total of 217 pregnant women were recruited at the labour suite of Hospital Serdang, Selangor, Malaysia. Plasma total 25-hydroxyvitamin D (25OHD) levels were measured using a validated Ultra-High-Performance Chromatography (UHPLC) assay. Results showed the median cord total 25OHD was 24.4 nmol/L (IQR 15.5-31.0); 60.4%, of cord had 25OHD <25 nmol/L, 71.4% were <30 nmol/L and 95.4% were <50 nmol/L. Consistent with previous studies, maternal status was the best predictor of neonatal vitamin D deficiency. After accounting for the maternal vitamin D status, factors that associated with the increased risk of neonatal vitamin D deficiency (25OHD <30 nmol/L) were low maternal vitamin D binding protein (VDBP) level and maternal VDR SNP (rs2228570). In contrast, maternal vitamin D supplement intake and nulliparous were protective factors. The high prevalence of neonatal vitamin D deficiency reported in this study indicates the need for urgent development and implementation of strategies to improve neonatal vitamin D status. The strong association between maternal and cord vitamin D status suggests that the vitamin D status of neonates might be improved through maternal supplementation.

Post diagnosis circulating micronutrients and survival of nasopharyngeal carcinoma patients: A prospective case control study

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Micronutrients deficiency seems to be carcinogenesis, and in case of solid tumours, selected micronutrients played a pivotal role in the inflammatory mechanism and prognosis of cancer. The objective of this study was to investigate the relationship between circulating micronutrients and overall 5-year survival in nasopharyngeal carcinoma (NPC) patients. A hospital-based matched case-control study was undertaken from 17th July 2012 until 31st January 2016 in Hospital Kuala Lumpur and Hospital Pulau Pinang. The subjects of this study included 300 patients who were histologically diagnosed with NPC (cases) while 300 controls were matched to cases by age, sex and ethnicity. Adjusted hazard-ratios were estimated by Cox proportional hazards regression. Mean Vitamin D concentration was significantly lower among cases compared to controls (63.17 ± 19.15 nmol/L and 67.34 ± 23.06 nmol/L) (t = -2.41, p = 0.016). Mean serum calcium concentration was significantly higher among cases compared to controls (1.95 ± 0.68 mmol/L vs. 1.82 ± 0.90 mmol/L, t = 2.15, p =0.032). Median serum magnesium level was also found to be significantly higher among cases compared controls (0.64 mmol/L vs. 0.42 mmol/L, Z = 8.88, p < 0.001). Median calcium/magnesium ratio was found to be significantly lower among cases compared to controls (2.54 vs. 3.85; Z-score = 6.36, p <0.001). Median serum zinc level was found to be significantly lower among cases compared to controls (13.90 µmol/L vs. 14.90 µmol/L, Z = 5.02, p <0.001). Independently in multivariable analysis, calcium/magnesium ratio was significantly associated with increased risk of mortality among NPC cases by 82% in second tertile (AHR = 1.82, 95% CI = 1.18, 2.80). Further large studies are needed to confirm this findings and to better understanding the potential modifying effects of the circulating Ca:Mg ratio on associations between Mg and Ca intake and NPC survival.

Contribution of prenatal factors towards 6 months postpartum weight retention (PPWR): Evidence from a Maternal and Infants Cohort Study (MICOS)

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This study aimed to examine the contribution of prenatal factors towards postpartum weight retention (PPWR) in selected government health clinics in Selangor and Kuala Lumpur. Of the 535 eligible pregnant mothers who were recruited in the MICOS, 394 of them completed the study until 6 months of their postpartum. At the third trimester of

pregnancy, the mothers were interviewed about their socio-demographic information, dietary intake, depression, while information on maternal obstetrical factors such as maternal pre-pregnancy weight, gestational weight gain (GWG), parity, gravidity, interval of pregnancy were obtained from their health records. A majority (91.4%) of the mothers were Malays, with a mean age of 29.95 ± 4.21 years. About one-third (36.3%) of the pregnant women were overweight and obese before pregnancy, with a mean pre-pregnancy body mass index (BMI) of 23.99±4.66kgm^{-2}. There were more pregnant women who had gained insufficient weight than those who had gained excessive weight during pregnancy (32.5% vs. 28.4%), with a mean GWG of 12.13±5.08kg. At 6 months of postpartum, one in five (20.1%) retaining ≥5kg, with a mean PPWR of 1.58±4.68kg. Specifically, 19.4% of the mothers who had normal pre-pregnancy BMI has become overweight, 73.1% of overweight mothers remained overweight and 8.7% has become obese, whereas 84.6% obese mothers remained obese at 6 months postpartum. Bivariate analyses showed that age (r=-0.169, p=0.001), gravidity (t=2.376, p=0.018), GWG (F=17.162, p=0.001) and pre-pregnancy BMI (F=12.092, p=0.001) were significantly associated with PPWR at 6 months postpartum. Based on the multiple linear regression analysis, low maternal pre-pregnancy BMI (β=-0.182) and high GWG (β=0.426) contributed towards PPWR at 6 month postpartum (R^2=0.284, F=51.560, p<0.05). Our findings indicate that the key to reducing PPWR is women need to have an optimal BMI before pregnancy and gain optimal weight during pregnancy.

Association between compliance status of dietary iron supplementation and anaemia status among pregnant women attending selected health clinics in Selangor and Kuala Lumpur

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Anaemia during pregnancy remains as a significant health problem in Malaysia, despite free provision of dietary iron supplements to all pregnant women attending government health clinics. Thus, the present study aimed to determine the prevalence of anaemia among pregnant women, and its association with the compliance status of the supplements. The present study is part of Maternal and Infant Cohort Study (MICOS). Data from 435 third trimester pregnant women aged 18 to 40 years old, attending selected health clinics in Selangor and Kuala Lumpur were collected through face-to-face interviews and their medical records in the health clinics. Compliance to dietary iron supplementation was defined as taking the supplements for at least 70% of the actual prescription in a week. Anaemia is defined as having haemoglobin level (Hb) of less than 11 g/dL. In overall, more than one-third of the subjects (39.3%) were anaemic, with a mean Hb of 11.1 g/dL. A majority of the subjects (81.8%) were compliant to dietary iron supplementation during their pregnancy. Significant association was found between poor compliance status of dietary iron supplementation and anaemic status (χ^2=5.187, p=0.023), whereby the prevalence of anaemia was significantly lower for those who were compliant to the supplements (36.8%)

when compared to those who were non-compliant (50.6%). To prevent anaemia during pregnancy, efforts on improving the compliance status of dietary iron supplementation among pregnant women are crucial. Meanwhile, further study is needed to determine the leading factors associated with anaemia status besides compliance status.

Effect of multicomponent nutrition intervention (NuTeen) on adolescents' behaviour related to food choice, food safety and food hygiene

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Schools have important roles to play in shaping students' food choice behaviours and developing healthy dietary habits. This study aimed to examine the impact of a nutrition education intervention on adolescents' behaviour related to food choice, food safety and food hygiene. A cluster-randomised intervention trial was conducted in four secondary schools in Kuala Lumpur (2 intervention: 2 control). Two hundred fifty students were recruited from each schools and nutrition-related behaviours related to food choice, food safety and food hygiene behaviours were measured at pre- and post-intervention surveys with the same instrument. The nutrition education was conducted over eight weekly lessons that lasted an average of 45 minutes each. There was a significant increase in the percentage of adherence to healthy food choice among intervention group after the education session (pre-intervention = 62.1 ± 10.6% vs. post-intervention = 64.4 ± 10.6%; t = - 3.096, $p < 0.001$) compared to control group (pre-intervention = 62.2 ± 10.6% vs. post-intervention = 63.4 ± 9.0%; t = - 1.866, p = 0.062). There was an increase in the overall adherence to food safety practices (pre-intervention = 42.7±20.9% vs. post-intervention = 45.6±24.1%) but not statistically different (t = -1.822, p = 0.069). However, the adherence to food safety practices significantly increased among male adolescents, but not among female adolescents (pre-intervention = 39.9 ± 22.1% vs. post-intervention = 46.1 ± 25.3%; t = - 2.611, p = 0.009). The percentage of adherence to food hygiene practices among intervention group significantly increased after the educational session (pre-intervention = 55.1 ± 16.9% vs. post-intervention = 58.6 ± 15.9%; t = - 3.121, p = 0.002). It is feasible and effective to improve behaviour in healthy food choices and food hygiene among adolescents through school-based nutrition programs.

Poster Presentations

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

A01 Associations between socio-demographic characteristics, body weight status, dietary intake, physical activity and life satisfaction among adolescents in Melaka, Negeri Sembilan and Johor

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While high life satisfaction is an overall judgement of a good life, limited studies were conducted on the predictors of life satisfaction among adolescents in Malaysia. Therefore, this cross-sectional study aimed to determine associations between socio-demographic characteristics, body weight status, dietary intake, physical activity and life satisfaction among adolescents in Melaka, Negeri Sembilan and Johor. A self-administered questionnaire was used to collect data on socio-demographic characteristics. Anthropometry measurements including weight and height were measured and classified according to body mass index (BMI-for-age) based on WHO Growth Reference. My UM Food Frequency Questionnaire (FFQ) was used to measure dietary intake, PAQ-C questionnaire was used to measure physical activity level and lastly Multidimensional Students' Life Satisfaction Scale (MSLSS) was used to estimate adolescents' life satisfaction. A total of 933 adolescents (300 males and 633 female) participated in this study. A majority of adolescents had higher energy and sugar intake (79.7%). There were no significant differences between low (33.3%), moderate (33.4%) and high (33.3%) physical activity levels. More than half of the adolescents had higher life satisfaction (61.2%). Female adolescents had higher odds to have higher life satisfaction (Adjusted OR = 1.363 [95% CI, 0.885, 2.098], p= 0.160). No association between energy intake and sugar intake was found after adjusting for confounding variables (Adjusted OR= 1.460 [95% CI, 0.935,2.280], p= 0.096). No association was found between physical activity level and life satisfaction after being adjusted with confounding variables but adolescents with higher physical activity level had higher odds to have higher life satisfaction (Adjusted OR = 1.564 [95% CI, 0.966, 2.533], p= 0.069). Other variables found to have no association with adolescents' life satisfaction. These findings provide insights for future intervention to improve adolescent's life satisfaction.

A02 Association between maternal factors with body weight status among children aged four to six years old in Bandar and Jugra Kuala Langat Selangor

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Body weight status is one of the main element that contributed to the physical development of young children. Globally, childhood overweight and obesity become one of the major public

concern and despite the declining rate in wasting and stunting among younger children, both of these still become a great challenge. This study was conducted to investigate the associations between maternal factors with body weight status of children aged four to six years old. A cross-sectional study was conducted in Bandar and Jugra, Kuala Langat, Selangor involving 208 pair mothers and children. A set of self-administered questionnaire was filled by the mothers and anthropometric measurements were taken for both mother and child. Maternal socio-demographic which are employment status (c^2=7.983, p=0.018), education level (c^2=12.499, p=0.002, household monthly income (c^2=6.075, p=0.048) and child's birth weight (c^2=10.320, p=0.006) were associated with child's body weight status (BMI-for-age, weight-for-age and height-for-age). Women's empowerment (r=0.148, p=0.037), food restriction (r=0.219, p=0.001) and maternal misperception on child's weight status (r=0.177, p=0.010) were significantly associated with child's BMI-for-age while maternal BMI were significantly associated with child's BMI-for-age (r=0.223, p=0.001), weight-for-age (r=0.364, p=0.001) and height-for-age (r=0.237, p<0.00). After conducted a multiple linear regression, food restriction and maternal BMI were found to be a predictor of a child's BMI-for-age. Child's BMI-for-age will decrease when mother increase the food restriction while increasing in maternal BMI will increase child's BMI-for-age. In conclusion, the mother plays an important role in improving a child's weight status. Attention should be given in empowering the mother as it will give benefits in reducing malnutrition and obesity among young children.

A03 Assessment of the level of food safety knowledge, attitude and food handling practices among Nutrition and Dietetics students in Universiti Sains Malaysia, Health Campus

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Food safety is the condition and practices that take place during the production until consumption.

Nutrition and dietetics students are expected to have better food safety knowledge, attitude and food handling practices as they have been exposed to this knowledge before. This study is conducted to assess the level of food safety knowledge, attitude and food handling practices among Nutrition and Dietetics students in USM Health Campus. This is a cross sectional study whereby 131 students from 1st to 4th year nutrition and dietetics students were selected using convenience sampling technique. Data were collected using a questionnaire and analyzed using Statistical Package for Social Sciences (SPSS) version 24. Most of the respondents were females (87.8%, n= 115), first year students (30.5%, n= 40) and nutrition students (53.4%, n= 70). Nutrition and dietetics students reported high level of knowledge (0.79 ± 0.189) and attitude (0.82 ± 0.198) but medium level in food handling practices (3.46 ± 0.384). For food safety knowledge, nutrition students scored higher median (8 ± 2) compared to dietetics students (7 ± 1) although the differences were no significant. For food safety attitude, both scored the same median (4 ± 2, 4 ± 1) and no significant difference was observed. For food handling practices, nutrition students scored more (36 ± 3) compared to dietetics students (35 ± 6) and there was a significant different observed (p= 0.041). There was a significant, weak and positive correlation observed between food safety knowledge and attitude (r= 0.179, p= 0.041) as well as food safety knowledge and food handling practices (r= 0.268, p= 0.002). Continuous education should be given to strengthen and improve students' food safety knowledge, attitude and food handling practices.

A04 Association between body weight status and cardiorespiratory fitness among school-aged children in community setting in Selangor

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Malaysia has one of the highest prevalence of childhood obesity in South East Asia. Previous studies found that childhood obesity and poor cardiorespiratory fitness could lead to morbidity such as coronary heart disease during adulthood. Therefore, this cross-sectional study was conducted to investigate the association between body weight status and cardiorespiratory fitness among school-aged children. A total of 1198 school-aged children (1006 males, 192 females) from eight communities in Selangor, had completed a 3-min Kasch Pulse Recovery Test. Their body height and weight were measured by the researchers. The mean BMI-for-age (BAZ) among primary school children was 0.065±1.70 whereby 12.2% and 13.8% of the primary school children were classified in overweight and obesity category. The mean heart rate of the children after the step test was 108.13±19.38bpm whereby a majority of the primary school children had sufficient to excellent level of cardiorespiratory fitness. On the other hand, 13.7% of the respondents were having either poor or very poor level of cardiorespiratory fitness. The chi-squared test found that a significant association between body weight status and cardiorespiratory fitness level among the primary school children (χ^2=99.89; p<0.001) whereby most of the obese children (31.4%) has either poor or very poor cardiorespiratory fitness. In conclusion, about one in four of the children were either overweight or obese, while about one in seven of the children were insufficient in cardiorespiratory fitness. Future study should formulate an effective intervention to improve the nutritional status and cardiorespiratory fitness of the children; thus, reduce the prevalence of childhood obesity in Malaysia.

A05 Food insecurity, weight status and dietary intake among adolescents in Kubang Kerian, Kelantan

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Adolescents are facing the issues of food insecurity which might exert undesirable heath effect and lead to adverse outcomes such as malnutrition. This study was conducted to determine the food security status of adolescents and its association between dietary intake and weight status. A total of 215 secondary school students who aged 13 to 17 years old were recruited in this cross-sectional study by using convenient sampling. The food security status was determined by using a validated food security survey namely Household Food Security Survey Module (FSSM) which could be modified into individual level. Dietary intake was assessed by using 24-hour dietary recall and was analysed by using Nutritionist Pro to obtain the energy intake and macronutrient intake. The weight status was assessed by obtaining BMI-for-age that calculated by using measurements of weight and height from adolescents. The prevalence of food insecurity among secondary school students was 86% which was considered respectively high. The food security status of adolescents was significantly associated with weight status (p<0.001) but there was no association between food security status and dietary intake except for protein intake. Interestingly, there was a significant association between food security status and protein intake (p<0.05) in which the adolescents who reported of food insecurity or severe food insecurity were more likely to consume less protein that those who experienced food security. In conclusion, the food

insecurity was prevalent among secondary school students and it was associated with weight status and protein intake. Hence, the food insecurity issues among adolescents who are stepping into adulthood shall draw attention of every stakeholders especially parents to ensure the adoption of healthy behavior for a healthy life in adulthood.

A06 Validation of healthy eating self-efficacy scale for secondary school students in Kuala Lumpur, Malaysia

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Adolescents should be empowered to have high level of healthy eating self-efficacy through education because developing good eating habits will endure into best practices in eating in adulthood phase. However, the appropriate healthy eating self-efficacy scale, the knowledge and the understanding of healthy eating self-efficacy related to adolescents in this region is limited. Thus, it is essential to validate an evaluation tool to assess the healthy eating self-efficacy of adolescents in the Malaysian population. The objective of this study is to validate a healthy eating self-efficacy scale for secondary school students in Kuala Lumpur, Malaysia. The adapted Healthy Eating Self-Efficacy Scale (HESS) with total number of 31 items was validated against the BMI-age status and diet quality among adolescents aged 13 to 19 years in selected secondary schools in Kuala Lumpur, Malaysia. Confirmatory Factor Analysis, descriptive statistical analysis, Bivariate, Regression Test, and Bland Altman were conducted to analyse the data (N=400). In the preliminary stage, thirty-one items were adapted. Thirteen items were finally extracted through the confirmatory factor analysis (internal consistency .72, $p<0.05$, CMIN/df = 0.000, RMSEA = <0.04, CFI = 0.935 and TLI = 0.918). The internal consistency of HESS as measured by Cronbach's was 0.91. Bivariate correlation showed there was a significant relationship between HESS score and BMI-age category ($r^2=0.04$, $p<0.05$), but showed there was no significant relationship between HESS score and diet quality ($r^2=0.028$, $p>0.58$). Bland Altman analysis showed no agreement between HESS score and diet quality. The content and construct validity and reliability of HESS were established but the effectiveness in accuracy needs to be further validated. Adolescent can attain better weight management by utilising the self-efficacy scale developed by Wilson (2014). Thus, the HESS is an acceptable measure to serve as a potential instrument to pre-test the level of healthy eating self-efficacy among the targeted population.

A07 Association between selected geriatric syndromes with frailty among elderly in Kuala Lumpur, Malaysia

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Frailty syndrome is defined as a clinically recognizable condition of older adults with greater vulnerability. Geriatric syndrome presence has been hypothesized that may play important role in the development of frailty in older adults. The purpose of this study is to determine the relationship between selected geriatric syndromes and frailty syndrome among the Malaysian elderly in PPR flats Kuala Lumpur. A cross-sectional study was conducted among 160 elderlies (aged ≥60) which were randomly recruited in this study. Demographic and socioeconomic variables, health related variables, selected geriatric

syndromes (depressive symptoms, functional status, cognitive impairment, polypharmacy, malnutrition, falls and urinary incontinence), and frailty status were analysed. Chi-square analysis was used to determine the factors associated with frailty. The prevalence of frailty and pre-frail was 18.1% and 77.5% with the frail score increasing with age. There are no significant differences was observed between gender (x^2 =8.34, P=0.147). However, female showed a higher proportion of having frail 21.1% compared to male 13.8%. Health related variables that was only associated with frailty syndrome was arthritis/gout (F=0.044, p<0.05) Among all tested geriatric syndrome only depressive symptoms showed significant association with the frailty syndrome (x^2 = 4.494, p<0.05). This study shows that there is a significant association between depressive symptoms and arthritis/gout with frailty status among older adult. The findings of this study highlight that depressive symptoms and arthritis/gout could have influence on frailty status. Understanding the relationship between geriatric syndrome and frailty status help to reduce the risk of the frailty syndrome among elderly.

A08 Association of socio-demographic factors, social support, physical activity and dietary intake with perceived stress among pregnant women in health clinics Wilayah Persekutuan

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This cross sectional study examined the association of socio-demographic factors, social support, physical activity and dietary intake with stress among pregnant women at health clinics in Wilayah Persekutuan. A total of 189 pregnant women (29.95 ± 4.81) attending maternal and child health clinics Wilayah Persekutuan were enrolled in this study between March and April 2019. The participants completed self-administered questionnaires consists of socio-demographic information, perceived stress scale (PSS-10), Multidimensional Perceived Social Support (MPSS-12), Pregnancy Physical Activity Questionnaires (PPAQ) and Food Frequency Questionnaires (FFQ). Out of 189 pregnant women, near half of the women (44.4%) were at their second trimester, followed by 41.8% and 13.8% were at their first trimester, and third trimester respectively. The total average gestational weeks was 25.46 ± 9.35. Most of the women (74.7%) had moderate and high level stress. The total mean activity and energy intake of the pregnant women were 249.39 ± 146.58 MET-hour/week and 2283.77 ± 979.48 kcal/day respectively. Perceived social support (r= -0.241, p<0.001), fat intake (r=0.145, p<0.05) and total energy intake (r= 0.150, p<0.05) were associated with perceived stress score. Women who are having less social support, eating a lot of sugary and high fat food, were prone to have high level of stress which these factors may underlies the importance of targeting these women for intervention program to manage the stress better.

A09 Stunting among 1-year old Malaysian infants and its associated risk factors

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Childhood stunting can be the best point of reference to achieve optimum health and growth yet being recognized as universal form of undernutrition. Stunted children suffered irreversible physical and neurocognitive damage which poses a great danger to human capital. Thus, this study aimed to determine the prevalence of stunting among 1-year old Malaysian infants and its associated risk factors. This study is part of the Mother and Infant Cohort Study (MICOS) which was conducted at six selected government Maternal and Child Health (MCH) clinics in Selangor and Kuala Lumpur. A total of 296 mother-infant pairs completed questionnaires on socio-demographic, obstetrical and birth-outcome related information through face-to-face interview. Anthropometric data were extracted from their health records. Length-for-age (z-score) (LAZ) of the infants were calculated and classified based on the WHO Growth Standard (2006). This study reveals that the prevalence of stunting among 1-year old Malaysian infants was 19.9%, with a mean LAZ of -0.86 ± 1.19. Bivariate analyses show that low household income ($t=-2.100$, $p<0.05$), low mother's height ($r=0.295$, $p<0.05$), male infants ($r_s=0.164$, $p<0.05$), low birth weight ($r=0.267$, $p<0.05$) and low birth length ($r=0.342$, $p<0.05$) were significantly correlated with low LAZ. Based on the multiple linear regression analysis, male infants ($\beta=0.322$), low birth length ($\beta=0.137$) and low mother's height ($\beta=0.049$) were significantly contributed to low LAZ. In conclusion, one in five of the infants were stunted. Further study is needed to understand the possible genetic and lifestyle influences in promoting good maternal and infant nutrition for a better birth outcome and linear growth.

A10 Association of maternal feeding beliefs, attitude and practices with infant growth in Petaling District, Selangor

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Maternal decision making related to infant feeding is multifactorial. Objective: The main aim is to examine the status of maternal feeding beliefs, attitudes and practices in relation to the growth of infants below two years old in Petaling District, Selangor across, infants' age, gender and ethnicity. This is a cross-sectional study and 220 data on infant feeding practices were obtained from mothers with infant below two years old who had attended five health clinics in Petaling District of Selangor. Data was collected using a validated Children Feeding Matter Questionnaire. All the data was analyzed using SPSS 23. Most of the infant are underweight 59% while prevalence of infant obesity was 9.4%. The mean age of male infant was higher than the female (7.32 vs 6.8) month. Majority of the mothers are Malay 81% with the age of 30-39 years old. Majority had tertiary education 56% with household income more than RM3000.majority of the mother presented with good maternal feeding practices (35%), while maternal feeding beliefs and attitude had reported at moderate level (59% and 62%). There is a significant week and positive correlation between maternal feeding attitude and beliefs ($r=0.172$, $p=0.030$). There is no significant correlation between socio demographic and infant growth ($p < 0.05$). Prevalence of good infant feeding practices was higher; therefore, a nutritional intervention is able to be implemented without any disparity across the gender, ethnicity or age of the infants.

A11 Associations of disordered eating and body size dissatisfaction with BMI-for-age among secondary school students in Labuan Federal Territory, Malaysia

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Previous studies reported body image dissatisfaction and unhealthy eating behaviours were more common in overweight and obese females than their counterparts. The present cross-sectional study was conducted to determine the associations of disordered eating and body size dissatisfaction with BMI-for-age among secondary school students in Labuan Federal Territory. Height and weight of the students were measured by researchers. BMI-for-age (z–score; BAZ) of the students was classified using WHO Growth Reference (2007). Self-reported socio-demographic characteristic of the students was obtained. Disordered eating and body size dissatisfaction were assessed using the Eating Attitudes Test (EAT)-26 and Contour Drawing Rating Scale, respectively. A total of 420 secondary school students in five selected schools (Male: 32.6%; Female: 67.4%) had participated in the study. The prevalence of overweight and obesity among secondary school students was 31.1% (Males: 30.7%; Females: 34.3%); with a mean BAZ of 0.36±1.46 (Male: 0.22±1.61; Female: 0.42±1.38). A majority of the students were Malays (55.0%), had low household monthly income (71.5%) and dissatisfied with their body size (73.3%). About one third of the students with disordered eating (28.3%). There were significant correlations between household monthly income (r_s = 0.121, p=0.015), disordered eating (r=0.182, p<0.001) and body size dissatisfaction (r=0.726, p<0.001) with BMI-for-age of the students. Further, results from the multiple linear regression analysis showed that dissatisfied body size (β=-0.226, p<0.001) and disordered eating (β=0.170, p<0.001) contributed towards high BMI-for-age. Therefore, understanding eating behaviours and body image perception among secondary school students is needed in obesity intervention programme.

A12 Associations of socio-demographic background and lifestyle behaviours with waist circumference among army veterans in the Department of Veterans Affairs (JHEV) Malacca/Negeri Sembilan

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When there is no longer a need to maintain a standard body composition as a requirement in military service, there is a burst of weight gain noticed upon retirement among army veterans. However, there was limited information about obesity among army veterans in Malaysia. While Body Mass Index (BMI) may underestimate the obesity status, waist circumference is indicated as a better measure of abdominal obesity and useful to predict metabolic risks. Thus, this study aimed to determine the associations of socio-demographic background and lifestyle behaviours with waist circumference among 160 army veterans in JHEV Malacca/Negeri Sembilan. A set of self-administered questionnaire was used to determine the socio-demographic background, physical activity level, sleeping quality, smoking status and alcohol consumption and eating behaviours of the army veterans. A majority of the respondents were classified as abdominal obese (75.7%), with a mean waist circumference of 103.52cm (SD: 9.05). Results show that lower level physical activity

(r=-0.236; p<0.05), frequent binge eating (r=0.193; p<0.05), less healthful dietary practice (r=0.230; p<0.05) engaging frequently in emotional eating due to feeling bored (r=-0.205, p<0.05) and guilt (r=0.191; p<0.05) were significantly correlated with having bigger/larger waist circumference. No correlations were found between night eating, meal skipping, snacking and fast food consumption with waist circumference. Multiple linear regression analysis showed that low physical activity (β=-0.001; p<0.05), less healthful dietary practice (β =1.028; p<0.05), emotional eating due to feeling bored (β=-2.636; p<0.05) and guilt (β =2.791; p<0.05) were significantly contributed toward larger waist circumference (R^2=0.185, p<0.05). In conclusion, there was a high prevalence of abdominal obesity among army veterans where they were engaged in unhealthy eating behaviours and low levels of physical activity. Hence, proper nutrition education is needed before the end of their military service in promoting a healthy post-retirement life.

A13 Archery intervention programme improves muscle strength and heart rate variability of sedentary youth

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Archery is one of the oldest sports that have evolved with human civilisation. The sport has now gained popularity among Malaysians. Therefore, serious attention should be focused on the health effects exerts by training of the sport. This study aims to explore the effects of archery training on physical fitness and heart rate variability (HRV) among sedentary youths. A randomised controlled study was conducted on male youths aged 18 to 30 years old that were physically inactive. Participants were assigned into two groups; control and intervention group who undergo archery training for 3 days a week. Assessments were ascertained at four time points; baseline, week 4, week 8 and week 12. Outcome measurements include muscle strength (upper and lower body), body coordination (reaction time) and short-term heart rate variability (LF/HF ratio). Analyses were computed using Split-plot ANOVA. Archery training in the intervention group improved their muscle strength parameters for both upper and lower body ranging from 15% to 45%, HRV for approximately 90%, and body coordination for approximately 32%. A significant intervention effect was found in muscle strength (hand grip, elbow flexor and extensor, shoulder abductor, knee flexor and hip abductor) and body coordination (p<0.05). This study is the first of its kind which provided evidence that archery training improved physical fitness and cardio-autonomic function in healthy male youths. Hence, the training of archery should be promoted as one of the options for activities to combat sedentary lifestyle among Malaysians.

A14 Prevalence and nutritional status of eating disordered adolescent females in Al Madinah Al Munawarah: Time for action

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Eating disorders (EDs) are psychiatric illnesses characterized by habitual disturbance of eating and weight control attitude with diagnostic criteria based on psychological, behavioral, and physiological characteristics. The aim of this study was to determine the number of female adolescents aged (10-18 years) suffering from eating disorder in Al Madinah Al Munawarah and to assess their nutritional status. An epidemiological, descriptive, cross sectional study including 381 female adolescents aged 10-18 years old, was conducted. Eating disorder was diagnosed using EAT-26 and the type of ED was determined by using DSM V. Height and weight were measured twice and fat analyzer was used to obtain the body composition. Anthropometrics were compared with the Saudi Growth Charts. Dietary intake was estimated by repeated 24-hr recall records. Intakes were compared with the recommended dietary allowances for this age group. Data was analyzed using SPSS version 21 with significance level being set at <0.05. Results indicated that the prevalence of ED was 10.2%. The mean age was 13 ±2.7 years. The most common type of ED was eating disorder not otherwise specified with a prevalence of 7.6% (Atypical anorexia nervosa). Eating disordered girls had normal anthropometric measurements. Body fat mass was also in the normal range. However, they had lower intake of energy, macronutrients and micronutrients (vitamins D, E, C, folate, calcium, iron, potassium, magnesium, copper, phosphorus) whereas higher intakes of vitamins B_1, B_2, B_3, B_6, B_{12} and A. Overall eating disordered females had unbalanced diet with poor nutritional values. Education and counseling should target this age group, families and school teachers focusing on the impact of ED on health and importance of healthy diet.

A15 Association between gross motor function classification system (GMFCS) and body fat in cerebral palsy (CP) children in Kelantan

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The objective of this study is to determine the association between gross motor function classification system (GMFCS) and body fat in children with cerebral palsy (CP) residing in Kelantan, Malaysia. A cross-sectional study was used to enrol 106 children (ages 4-12 years, mean age was 8.7 ± 2.4 years, 59.4% male and 40.6% female) with CP at Kelantan, Malaysia. Triceps and subscapular skinfold thickness (SFT) was measured and by using both measurements, body fat percentage was calculated using standard ('Slaughter') and CP-modified ('Gurka') equations. The association between the gross motor function classification system (GMFCS) and body fat was evaluated. Results showed that 7.5%, 6.6%, 8.5%, 10.4% and 67.0% CP children classified in levels I to V respectively. The mean body fat percentages by Slaughter and Gurka equation was 13.13 ± 6.63 and 26.74 ± 7.56 % respectively. Body fat percentages of CP children using standard were lower compared to the modified version. Based on the standard equation, CP Children with less motor impairment (GMFCS I) have a higher body fat percentage compared to the severe motor impairment (GMFCS V). CP children with GMFCS III also have a high body fat percentage. Meanwhile, based on Gurka equation, CP children in group GMFCS III have a high body fat percentage compared to the other group. Results showed that there was an association between GMFCS and body fat percentage using standard ('Slaughter') and CP-modified ('Gurka') equations. The high-fat percentage observed in the group with the lowest GMFCS with the exception of GMFCS III because children with CP are likely to gain fat and become overweight or obese in later life. Body fat assessment is important in assessing the nutritional status of CP children other than relying on BMI alone.

A16 Associations between food environment and weight status among UCSI University students

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Food environment plays an important role in determining a person's food choices and preferences which will influence university students to eat what is available in their surroundings. The objective of this study was to determine the associations between food environment and weight status of first-year undergraduates of UCSI University. A total of 176 first-year undergraduate students with the mean age of 19.60 ± 0.98 years participated in this cross-sectional study. Perceived Nutrition Environment Measures Survey (NEMS-P) was used to determine the food environment of the university students. Body weight, height, waist circumference (WC) and body fat percentage (BF%) were measured and body mass index (BMI) was calculated. The prevalence of overweight and obesity (22.7%) was higher than underweight (14.6%). Quality (34.6%) and prices (38.6%) of foods were perceived to be more important than the variety (26.8%) of foods during food purchasing in the grocery store. Among different types of snacks, biscuits (34.7%) were always available compared to ice cream (5.1%) and potato chips (4.0%). Availability and accessibility of fruits/ vegetables were significantly higher in females than males ($p<0.05$). Accessibility of fruits and vegetables was found to be negatively correlated with BMI ($r=-0.175$, $p<0.05$), WC ($r=-0.241$, $p<0.05$) and BF% ($r=-0.152$, $p<0.05$). While grocery store access was found to have a positive relationship with BF% ($r=0.155$, $p<0.05$). Additionally, prices of fruits and vegetables were positively correlated with BMI ($r=0.156$, $p<0.05$). No significant association was found between restaurant access and weight status. The results suggest that food environment is correlated with first-year students' weight status. Further studies are required to explore the factors underlying the association between food environment and weight status among university students.

A17 Associations of socio-demographic characteristics, psychological factors and lifestyle factors with academic performance among undergraduate students in Selangor

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Academic performance can be defined as the extent to which a student has achieved certain goals in their studies. Undergraduate students experienced various challenges especially educational, social, lifestyle changes that will affect their academic performance and future career success. However, there are limited studies on academic performance among undergraduate students in Malaysia. Therefore, this cross-sectional study aimed to examine the associations of socio-demographic characteristics, psychological factors and lifestyle factors with academic performance among undergraduate students in selected universities in Selangor. A total of 265 undergraduate students (66.4% females and 33.6% males) completed a set of questionnaire while anthropometric measurements were measured by the researcher. The present study found that 50.6% of the undergraduate students were classified as second upper class honour for their academic performance. Year of study ($\chi^2=18.599$, $p=0.029$), severity of depression ($\chi^2=111.197$, $p<0.001$), anxiety ($\chi^2=109.672$,

p<0.001) and stress (χ^2=97.490, p<0.001) and breakfast skipping (χ^2=9.046, p=0.029) were associated with poorer academic performance. High self-esteem (χ^2=48.542, p<0.001), better sleep quality (χ^2=68.086, p<0.001), and high physical activity level (χ^2=14.260, p=0.027) were associated with better academic outcome. No associations were found between sex, accommodation, monthly household income, parental education, fast food consumption, body mass index and academic performance. Logistic regression analysis showed that students with severe anxiety (AOR:5.46, 95%CI:1.08-27.56), poor sleep quality (AOR:9.53, 95%CI:2.50-36.28) and low physical activity level (AOR:14.06, 95%CI:1.49-132.74) have higher odds of having poorer academic performance. In conclusion, psychological distress and unhealthy lifestyles (high anxiety level, poor sleep quality and low physical activity level) were associated with poor academic performance. Further prospective cohort study is needed to understand how these factors influence one's academic performance.

A18 Body weight perception and weight control behaviours among adults attending Outpatient Clinic at Hospital Universiti Sains Malaysia

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Body weight perception is the way an individual perceives his or her own body in relation to the weight status. Studies on body weight perception mostly conducted among adolescents, college and university students in Malaysia, while scarce studies conducted among adults. This study aimed to determine the body weight perception and its association with current weight control behaviours among adults attending Outpatient Clinic at Hospital Universiti Sains Malaysia. It was a cross-sectional study involving a total of 210 adults who attended Outpatient Clinic at Hospital USM. A proforma and a validated questionnaire was used to assess socio-demographic characteristics, body weight perception and weight control behaviours. Weight and height were measured, and body mass index (BMI) was calculated. Descriptive analysis, pearson chi-square and independent t-test were used to answer all the objectives. The prevalence of overweight and obesity of participants was 55.7% while there were 63.8% of them perceived themselves as being overweight/obese. Majority (73.8%) had accurately perceived their body weight. In terms of weight control behaviours, exercise and dieting were the most frequent methods used to lose weight. There was significant association found between body weight perception and current weight control behaviours (p<0.001). BMI category was also found significantly associated with accurate body weight perception (p<0.001). Other factor such as socio-demographic factors was not associated with accurate body weight perception. Effective health-related interventions could be developed for adult population in order to increase self-awareness of their weight status. It is also a need to take body weight perception into consideration when promoting obesity prevention and weight reduction.

A19 Methodology to identify associated factors for malnutrition among children under-5 years of age in Putrajaya – A case-control study

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Malnutrition can be categorised as undernutrition (stunted, wasted, underweight) or overnutrition (overweight) according to the World Health Organization (WHO) standard growth chart 2006. The National Health and Morbidity Survey 2016 (NHMS 2016) showed that Putrajaya, despite being the administrative capital of Malaysia, had a high prevalence of malnourished children. Therefore, this case-control study aimed to identify factors associated with malnourishment among children under-5 years of age in Putrajaya. Appropriate sample sizes were calculated for each malnutrition category using the formula comparing 2-proportions accordingly to identify risk factors from NHMS 2016 and other studies with α:0.05 and β:0.80. About 380 stunted, 335 wasted, 318 underweight and 308 overweight children were needed as case respondents. The same number of control respondents (appropriately-nourished children) were recruited and matched by gender and age groups with the cases. The screening phase to identify case and control respondents took one month and the data collection phase involving interviews with their parents and/or caregivers took four months. The interview comprised 7 modules namely Sociodemographic characteristics, Health and pregnancy history, Knowledge, attitude and practice on child feeding, Breastfeeding and infant/young child feeding history, Food security, Screen time and physical activity and 3 days food diary. Two modules involving measurements were Anthropometry and Finger prick for haemoglobin level. Survey Creating System in tablets was used for data collection in the field. All data except for 3 days food diary was submitted through server located in the Institute for Public Health. The 3 days food diary was translated into nutrient intake using nutritionistPro software. Data was compiled and treated for missing values and outliers before analysis to identify the potential risks for malnutrition among children under-5 years of age in Putrajaya. Findings from this study will provide comprehensive evidence for stakeholders and policy makers to design effective interventions to combat the pressing issue of childhood malnutrition.

A20 Prevalence of soil-transmitted helminth infections and vitamin A deficiency status of rural school children in five regions in Malaysia

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Healthcare sectors remain as one of the main priorities of Malaysia. There are plenty initiatives undertaken by the government in order to improve the wellbeing and health

of the people. Nevertheless, Malaysia still faces uneven development across the country whereby some areas are still exposed to infection, malnutrition and micronutrient deficiency related problems. Listed among the ten most common infections in the world, intestinal parasitic infections (IPIs) are having significant impact on public health. Children living in low-income areas are one of the most affected especially with soil-transmitted helminth (STH) infections. STH infections often associated with severe illnesses like malabsorption, diarrhoea, blood loss and micronutrient deficiency such as iron deficiency and vitamin A deficiency (VAD). VAD will affect especially children and women of reproductive age leading to childhood mortality, impaired growth, risk of infection and nutritional blindness. To date, there are numbers of studies on the association of STH infections with nutritional status. However, these studies often are focused on certain localities and community. There are still limited nationwide data that is available, and this study is conducted to update the nationwide data on these associations; especially the association between STH infections and nutritional status of rural school children within five regions of Malaysia.

A21 Exploring the sustainability of childhood obesity intervention: a mixed methods study

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Childhood obesity is a global problem and is increasing affecting Malaysia. School-based obesity intervention is important to promote healthy eating (HE) and behavioural change; however, studies on impact of obesity interventions on children's health status has been neglected. This mixed methods study aimed to explore the sustained impact of Juara Sihat intervention. Juara Sihat programme was implemented over 12 weeks and focused on four key components, namely, nutrition education, physical activity education, family involvement, and empowerment of Parents and Teachers Association. A total of 55 participants of Juara Sihat were followed-up at 18 months after completion of intervention for anthropometric measurement, and 26 participants were followed-up at 30 months for face-to-face in-depth interview to explore barriers and motivators that influence sustainability of behavioural changes. Body mass index (BMI), body fat percentage (%BF) and waist circumference (WC) were measured and physical activity (PA) level was evaluated. Assessments were done at baseline (P0), immediately upon completion of intervention (P1), at 3 months post-intervention (P2), and 18 months post-intervention (P3). Repeated measures ANOVA with intention-to-treat principle were applied. Interviews were audio-recorded, transcribed verbatim and analysed thematically. Sustained effects were found in BMI-for-age z-score, which showed reduction (P0 2.41±0.84 vs P3 2.27±0.81), and PA level, which showed positive improvements (P0 2.46±0.62 vs P3 2.87±0.76) at 18 months after intervention. %BF and WC had increased over the same time period. The main themes identified as motivators are: (1) support from family, facilitators, school teachers, and friends; (2) PA and HE; (3) self-awareness; (4) knowledge on food pyramid and healthy eating; and (5) home environment. Barriers are: (1) knowledge inconsistency; (2) own safety; (3) peers influence; (4) self-attitude; and (5) boredom towards programme. Our findings showed that the main promoting factor for sustainability of Juara Sihat is continued practice of PA and HE, while main barrier is knowledge inconsistency. Also, Juara Sihat was sustained at 18 months follow-up in terms of BMI and PA level. Future interventions should consider these factors during programme planning as they could improve the sustainability of the programmes.

A22 Kindergarten readiness for healthy eating intervention module: Toybox Study Malaysia

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The high prevalence of obesity emphasises the importance of feasible strategies to curb the problem. School-based intervention programmes have been reported to be useful for increasing awareness and improving healthy eating habits, especially among preschoolers. The Healthy Eating Module in ToyBox Study Malaysia aimed to encourage intake of fruits and vegetables as part of good eating habits. This study explored readiness of kindergartens prior to the implementation of ToyBox Study Malaysia's Healthy Eating Module. A total of 33 kindergartens under the Department of Community Development (KEMAS) participated in this study. Data were collected through observation of kindergartens and interviewer-administered questionnaires with teachers. Fruits and vegetables served during mealtime at each kindergarten were identified using mealtime observation form. Twelve kindergarten kitchens were observed for a whole school-day each. Data on fruits and vegetables served were compared to the menu provided by KEMAS. All kindergartens were equipped with good kitchen facilities and had applied rules regarding food preparation. Majority of kindergarten teachers consistently encouraged children to eat healthily. Most kindergartens served breakfast and morning snacks daily. When comparing fruits and vegetables served to items listed in the menu, 17 of 21 fruits and vegetables matched. Five items were matched more than 3 times, with carrot and watermelon matching the menu most often. In conclusion, all kindergartens were considered ready to implement the ToyBox Study Malaysia's Healthy Eating Module. Even so, additional materials, such as #*SukuSukuSeparuh* 'healthy' plates need to be provided, and proper monitoring observations should be conducted throughout the module implementation timeframe to ensure that optimum results are achieved.

A23 Associations between demographic and socio-economic background, nutritional status and household food security with academic performance and social interaction among primary school children in North Kinta District, Perak

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Academic performance and social interaction are becoming a new standard acquired for school children. This study aim to determine the associations between demographic and socio-economic background, nutritional status and food security status with academic performance and social interaction among primary school children in North Kinta, Perak. Simple random sampling was used to select two schools. All Standard 5 and 6 students were invited to participate in this study. The parents were asked to answer self-administered questionnaires regarding socio-demographic background and food security status; while respondents and teachers answered the questions regarding social interactions. Weight and height of the children were measured to calculate BMI-for-age. The previous final year examination results were obtained from the school administrator to assess their academic performance. Among 140 respondents who participated in this study, 51.4% is male. Overall, 76.8% of the household were food insecure and 29.3% of respondents reported overweight and obese. The mean total score for academic performance were highest in

Malay Language and lowest in Mathematics. There were associations between monthly household income with academic performance ($p<0.05$) and aggressive behavior ($p<0.05$). Furthermore, age was associated with Mathematics score ($p<0.05$) and social competence ($p<0.01$). Meanwhile, there were significant differences between food security status with English language and Mathematics score ($p<0.05$). Logistic regression analysis found that the students from poor household are more likely to fail in Mathematics (OR 3.73, $p<0.05$) and English Language (OR 4.76, $p<0.05$). Our study found that income have great significant influences toward student's academic performance. Hence, future intervention program and financial assistance will help the poor household to combat food insecurity and thus enhance children academic performance in school.

A24 Factors associated with muscle dysmorphia among athletes in Universiti Putra Malaysia

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Muscle dysmorphia is characterized by a misconstrued body image in which individuals who interpret their body size as either small or weak even though they may look normal or highly muscular. Athletes are particularly vulnerable to develop muscle dysmorphia because of the pressures surrounding sport performance and societal trends of promoting muscularity and leanness. The objective of this cross-sectional study was to determine the factors associated with muscle dysmorphia among athletes in Universiti Putra Malaysia. A total of 132 athletes (69.7% males and 30.0% females) completed a self-administered questionnaire on socio-demographic background, muscle dysmorphia, drive for muscularity, supplement intake, exercise dependence, self-esteem, media influence, peer and family pressure. Their body fat percentage and waist circumference were measured. Results showed that the mean score of muscle dysmorphia was 34.56 ± 8.03, ranging from 13 to 61. Approximately one in four (23.5%) of the athletes were abdominally obese and 84.1% had a high body fat percentage. Multiple linear regression result showed that exercise dependence ($\beta=0.363$, $p<0.001$), self-esteem ($\beta=-0.186$, $p=0.014$), media influence ($\beta=0.291$, $p<0.001$), and body fat percentage ($\beta=-0.160$, $p=0.032$) were significantly associated with muscle dysmorphia. In conclusion, muscle dysmorphia is a problem among athletes. Psychoeducational programs should promote positive body image in order to assist athletes with muscle dysmorphia.

A25 Association between maternal factors with body weight status of children aged 2-6 years old attending Tabika & Taska KEMAS in Putrajaya

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The prevalence of childhood obesity has been increasing, it is necessary to identify the impact a mother has on the body weight status of their children. This study was done to determine the association between maternal factors (i.e. sociodemographic, depressive symptoms and child feeding practices) with body weight status of children age 2-6 years

old attending Tabika & Taska KEMAS in Putrajaya. A set of questionnaire was distributed to the mothers that have children attending Tabika or Taska KEMAS that consist of four parts: sociodemography, depressive symptoms for the past two weeks, child feeding practices and measurement of height and weight that were measured by the researcher. Chi-square test and Pearson correlation test were used to examine the association. From 259 questionnaires returned, only 247 were able to be used for analysis. The mean age of mothers were reported to be 34.74 ± 3.56 with at least secondary level of education (%). Monthly income (RM) was 2409.33 ± 1188.87 while the mean household income was 4986.98 ± 1708.79. As for kids, 49.0% are male and 51.0% are female with the mean age of 5.01 ± 0.95 years old. Their mean BMI was 15.05 ± 1.70 kg/m^2 and 7.3% of them were underweight and 10.9% were overweight and obese. There is 9.7% of mothers reported to have moderate to severe depressive symptoms. The mean score for restriction, pressure and monitoring feeding practices were 29.94 ± 4.41, 15.90 ± 2.70 and 11.57 ± 2.53 respectively. No significant association found from this study as $p > 0.05$ for all the variables tested. Further study is needed to confirm this finding yet it proves the dual-burden of malnutrition in an urban area.

A26 Associations between socio-demographic characteristics, body weight status, body image and life satisfaction among adolescents in Melaka, Negeri Sembilan and Johor

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Life satisfaction is an indicator of societal well-being and aids in facilitating adaptive development. Previous studies found inconsistent findings associated with life satisfaction in Malaysia. Therefore, this cross-sectional study aimed to determine associations between socio-demographic characteristics, body weight status, body image and life satisfaction among adolescents in Melaka, Negeri Sembilan and Johor. A self-administered questionnaire was used to collect data on socio-demographic characteristics. Anthropometry measurements including weight and height were measured and classified according to body mass index (BMI-for-age) based on WHO Growth Reference. The Contour Drawing Rating Scale was used to measure body image perception while Multidimensional Students' Life Satisfaction Scale (MSLSS) was used to estimate adolescents' life satisfaction. Data was analysed using chi-square and logistic regression. A total of 933 adolescents (300 males and 633 female) participated in this study. A majority of adolescents lived in family intact (91%), had higher household income (66.4%), normal weight (61.0%) and negative body image (79.0%). Most parents received secondary educational level (73.0%). More than half of the adolescents had higher life satisfaction (61.2%). No association between gender and life satisfaction after being adjusted with confounding variables (Adjusted OR = 1.211 [95% CI, 0.858 - 1.740], p= 0.266). Father who received tertiary educational level had higher odds of having children with higher life satisfaction (Adjusted OR= 14.347 [95% CI, 1.643 – 125.288], p= 0.016). Other variables found to be no association with adolescents' life satisfaction. These findings provide insights for future intervention to improve adolescent's life satisfaction.

A27 Factors associated with body dysmorphic disorder among undergraduate students in Universiti Putra Malaysia

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Body Dysmorphic Disorder (BDD) is defined as a psychiatric condition characterized by physical appearance concern towards one or more perceived defects such as acne or acne scars, excessive facial or body hair and nose shape which are unnoticeable or only slightly appear to others. BDD may lead to social impairment, poor quality of life and unhealthy behaviors in order to maintain body image, although research to date is still limited. This cross sectional study aimed to determine the associations between socio-demographic characteristics, body weight status, psychological and socio-cultural factors with BDD among undergraduate students in Universiti Putra Malaysia. A total of 336 undergraduate students (28.6% males and 71.4% females) with a mean age of 21.98 ± 1.61 years were recruited using multistage sampling method. A set of self-administered questionnaire on sociodemographic background, BDD, depression, social anxiety, self-esteem, appearance based rejection sensitivity, social media influence and peer pressure were completed by the respondents. Body weight, height, waist circumference and body fat percentage were measured by the researcher. Results showed that 5.1% of the respondents had BDD and 6.8% were excluded from BDD due to weight concern. On in ten of the respondents were underweight (9.2%), 25.4% were overweight and obese, 19.0% had abdominal obesity, and 15.8% had very high percentage of body fat. Multiple linear regression analysis showed that BDD was significantly predicted by year of study (β=-0.116, p=0.028), self-esteem (β=-0.110, p=0.037) and appearance-based rejection sensitivity (β=0.258, p=<0.001). Intervention programs to promote positive body image are recommended among undergraduate students to avoid BDD. More research is needed to gain a greater understanding on the etiology of BDD.

A28 *Suku Suku Separuh & Cergas* (3SC) intervention on weight management among overweight and obese adults

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Increasing obesity rates and other health issues related to dietary practices are not unique in Malaysia. The objective of this study is to determine the changes in body weight and food intake after 3 months of 3SC intervention program. The 3SC intervention program was conducted in Tanjung Karang and Ulu Yam Bharu, in Selangor. 32 overweight and obese participants were recruited into the 3SC intervention program and followed-up for 3 months. Participants attended a workshop in which they were taught modules on determination of weight status, healthy eating using the "*suku suku separuh*" concepts (Myhealthy plate) and diet modification as well as behavioral modifications. Participants were also involved in physical activity (once a week), nutrition counselling and motivation from the expert (once a month) during the 3 months intervention. Anthropometry measurements such weight, height, body mass index and waist circumference as well as healthy eating practices and

24-hour dietary recall were taken at baseline (P0) and 3 month (P3) intervention. At 3 months post intervention, significant reduction were found in BMI (P0:33.03 ± 5.43 kg/m^2 vs P3:31.75 ± 5.06 kg/m^2), WC (P0:98.12 ± 12.14 cm vs P3:95.04 ± 12.25 cm) and energy intake (P0:2150 ± 569 kcal/day vs P3:1852 ± 192 kcal/day) while significant increase was shown in the score for the practice of healthy plate (P0:46.88 ± 33.72% vs P3:91.67 ± 23.95). The proportions of calories derived from carbohydrates and proteins were within the recommendations for a healthy diet. This study demonstrated that the *Suku Suku Separuh & Cergas* (3SC) intervention program was successful in reducing BMI, WC and energy intake and improved the healthier eating practice using Myhealthy plate. This 3SC intervention study will act as a pilot study for weight management through promoting a healthier lifestyle among Malaysian adults as well as potentially to be implemented at other communities to combat obesity.

A29 Associations between socio-demographic factors, lifestyle factors, body weight status and night eating syndrome among undergraduates in Selangor

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Night eating syndrome (NES) is a disorder characterized by morning anorexia, evening hyperphagia, and insomnia with awakenings followed by nocturnal food ingestion. With the challenges to adapt with new environment and to cope with hectic schedule, stressful events faced in university could alter eating behaviors among undergraduate students. Hence, this study was conducted to determine the associations between socio-demographic factors, lifestyle factors, body weight status and night eating syndrome among undergraduates in Selangor. This cross-sectional study involved 263 undergraduates (mean age: 21.6±1.28 years), who were recruited from both public and private universities in Selangor, Malaysia. The questionnaire that assessed socio-demographic background, smoking, alcohol consumption, psychological distress, physical activity, sleep quality and eating behaviors were completed by the undergraduates. Anthropometric measurements of the undergraduates were also measured by the researchers. The results showed that the prevalence of NES was 11.2% with a mean NES score of 16.11 ± 6.03. Male undergraduates have higher mean NES score than their female counterparts (t=2.585, p=0.010). Further, severity of depression (r =0.331, p=<0.001), anxiety (r =0.280, p=<0.001), stress (r =0.265, p=<0.001), poorer sleep quality (r =0.460, p=<0.001), higher risk of emotional and restrained eating (r =0.249, p=<0.001; r =0.139, p=0.029), as well as frequent snacking in supper (r =0.376, p=<0.001) were correlated with higher severity of NES. Results from multiple linear regression analysis showed that NES was significantly predicted by depression (β = 0.198, p<0.001), sleep quality (β = 0.279, p<0.001) and snacking in supper (β = 0.279, p<0.001). In conclusion, about one in ten of the undergraduates were facing NES. It is suggested that future health promotion intervention program among university students should consider psychological well-being, proper meal and snack time as well as sleeping pattern.

A30 Effects of a 6-week nutrition education and 10,000-steps-a-day intervention on overweight/obese female university students' caloric intake, daily step count and anthropometric parameters

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Overweightness and obesity is prevalent in Malaysia including among young female adults studying at university due to unhealthy eating habits and lack of regular physical activity. The objective of the study was to determine the effectiveness of an intervention program to promote healthy eating and physical activity among female university students. This 6-week study comprised a quasi-experimental design. The intervention used nutrition education approach including provision of information in the Malaysian Dietary Guidelines as well as specific dietary advice and calorie calculation practicals for weight loss. Study participants were also advised and actively encouraged to achieve 10,000 steps per day which was measured using a pedometer. Overweight/obese female student volunteers at Universiti Malaysia Sabah (n=23; aged 20-25 years old; body mass index (BMI) ranged from 25.1 to 38.8 kg/m^2) were recruited for this study. Study variables measured at baseline and post intervention included mean daily caloric intake, daily step count and anthropometric parameters. After the 6-week intervention, participants' mean daily caloric intake decreased by 20.7% from baseline, physical activity significantly increased ($p<0.001$) by 212.1±180.3 MET-minutes/week and 47.8% of participants reported that they achieved the advised goal of 10,000 steps per day. Significant body weight reduction from baseline ($p=0.001$; 1.8%) and body fat percentage ($p=0.002$; 1.6%) were observed after the intervention. In conclusion, this 6-week intervention that used nutrition education approach and actively encouraged participants to reach 10,000 steps per day was found to reduce caloric intake, body weight and percent of body fat as well as increase physical activity of overweight/ obese female university students who participated in this study.

A31 The relation of milk feeding practice, milk appetite, and dietary intake with nutritional status among young children aged 2 to 4 in PERMATA Negara Zon Tengah: A study protocol

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Prolonged formula milk feeding and overnutrition in young children is known to be a risk factor for rapid weight gain in children and increased risk of overweight in adulthood. Over consuming formula milk could potentially lead to contain high energy load, which possibly could alter the diet preferences in young age. Therefore, an ongoing cross-sectional study has been conducted in Pusat Anak Permata Negara (PERMATA Negara) Zon Tengah to determine the associations of milk feeding practice, milk appetite and dietary intake with nutritional status among children aged 2 to 4. A self-administered questionnaire comprised socio-demographic characteristics, milk feeding practices, milk appetite, and dietary intake is to be completed by the child's mother or caretaker. Milk feeding practices include retrospective and concurrent data on feeding, such as exclusivity and duration

of breastfeeding, past and current formula milk intake, and other milk feeding practices. Volume, frequency, type, and brand of milk intake have also been obtained. Meanwhile, milk appetite has been measured using Baby-Eating-Behaviour-Questionnaire (BEBQ), based on a Likert scale of 1 (low score) to 5 (highest score) for appetite traits (Enjoyment of Food, Food Responsiveness, Satiety Responsiveness, Slowness in Eating, and General Appetite). Dietary intake has been assessed using the Semi-quantitative Food Frequency Questionnaire (S-FFQ). Weight and height of the children have been measured to calculate for weight-for-age (WAZ), height-for-age (HAZ), and BMI-for-age (BAZ). The outcome of this study could be baseline data for dietary factors and milk feeding practices that could be associated with child body weight status. This is important as the growth of the young children is rapid and this age group has a higher risk of malnutrition.

A32 Associations of milk feeding practice and appetite with nutritional status among young children aged 2 to 4 in Pusat Anak Permata Negara (PERMATA Negara) Zon Tengah

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Double burden of malnutrition shows a dramatic trend and persists to become a critical issue among children under five. Potential contributing factors include early milk feeding practices and appetite behaviour. However, studies among children after two years of life are scarce despite many of them are transitioning to a family diet. Therefore, this study aims to investigate the associations of milk feeding practice and appetite with child nutritional status. A cross-sectional study involving 197 children aged 2 to 4 was conducted in Pusat Anak Permata Negara (PERMATA Negara) Zon Tengah. A self-administered questionnaire consisting of sociodemographic characteristics, milk feeding practice and milk appetite was completed by child's mother. Milk feeding practice comprised questions on breastfeeding, formula milk, and other milk feeding. Meanwhile, milk appetite was assessed using Baby Eating Behaviour Questionnaire (BEBQ) that comprised scales of 1 (low) to 5 (highest) for appetite traits (Food Responsiveness, Enjoyment of Food, Satiety Responsiveness, Slowness in Eating, and General Appetite). Weight and height of the children were measured using standardized instruments to calculate for weight-for-age (WAZ), height-for-age (HAZ), and BMI-for-age (BAZ) as nutritional status indicators. Majority of the study population were Malay (97.5%), males (56.9%), with a mean population age of 3.3 ± 0.7 years. Approximately 9.5% of children experienced underweight and stunting, meanwhile 6.3% faced possible risk to be overweight. Age of introducing complementary feeding was negatively associated with WAZ (r=-0.152, p=0.038), while breastfeeding duration was negatively associated with WAZ (r=-0.201, p=0.007) and HAZ (r=-0.214, p=0.004). Slowness in Eating (mean score=2.3 ± 0.8) showed negative associations with WAZ (r=-0.188, p=0.01) and HAZ (r=-0.161, p=0.027). No association was found between sociodemographic characteristics, formula milk, other milk feeding practices and other appetite traits with nutritional status. Milk feeding factors and appetite place an important role in improving nutritional status among children. Interventions should focus on parenting education for early child feeding practices and healthy growth.

A33 Association of socio-demographics and home food environment on body weight status among primary school children

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Childhood obesity is increasing globally at an alarming rate and is the most common nutritional problem among children. It is associated with both physical and psychological problem and this unhealthy trend will progress to adulthood. Most of the children spend half of their time in home setting, and this makes the home food environment of an important setting that may influence the children's weight status. This study aimed to examine the association between socio-demographics and home food environment on body weight status of primary school children in Bangi, Selangor. This is a cross-sectional study conducted in seven primary schools. Parents of the children completed the Comprehensive Practice Feeding Questionnaire (CFPQ) and Determinants of Adolescents' Social Well-being and Health (DASH) questionnaire, while children completed the Parental Authority Questionnaire (PAQ). A total of 303 children (41.3% males and 58.7% females) aged 7-11 years old (mean age of 9.48±1.26 years) and their parents (65.0% mothers and 35.0% fathers) completed the study. The prevalence of overweight and obese was 17.8% and 14.9% respectively. Parental pressure to eat ($r=-0.229$, $p<0.01$) and restriction for weight control ($r=0.280$, $p<0.01$) were associated with children's body weight status. There were no association for food availability with children's weight status. Authoritative parenting style (mean=37.71, SD=4.92) was the leading style of the parents where it shows that parents manage their role with equal degree of control and warmth towards their children. The present study provided an insight to the roles of parenting in promoting healthy eating and active lifestyle among children. In particular, this study adds to evidence suggesting that parents can facilitate healthy eating at home by encouraging a positive home food environment to prevent the risk of childhood obesity. This understanding provides important direction for obesity prevention strategies and future research.

A34 Parental and caregiver nutritional knowledge and eating behaviours among children with disabilities in Kuala Lumpur

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Disabilities is an impairment faced by an individual who are unable to function normally in daily life. Children with disabilities (CWD) are vulnerable group to experience major health threat and failure to thrive in which parents and caregivers are responsible to provide care and supports in each aspect. Therefore, this study aimed to determine the nutritional knowledge of parents and caregivers towards eating behaviour of children with disabilities. A cross-sectional study was conducted among 112 respondents (parents and caregivers) from Community-Based Rehabilitation (CBR) centres in Kuala Lumpur, recruited through purposive sampling method. The self-administered questionnaire consisted of socio-demographic characteristics, the Behavioural Pediatrics Feeding Assessment Scale (BPFAS) and the Nutrition Knowledge, Attitude and Practice Questionnaire on Persons with Disabilities (KAP-nOKU). Most of the respondents were Malay (85.7%), of low income category (43.8%) and had upper secondary school level of education (48.2%), had never

attended nutrition course (75.9%). BPFAS scores indicated that parents and caregivers have good knowledge on managing eating behaviour of CWD (scores<9). Most of the respondents had moderate knowledge of nutrition (low score of KAP-nOKU). There was no significant association between nutritional knowledge of parents and caregivers with eating behaviour of CWD (p>0.05). Future intervention could be conducted to improve overall nutrition knowledge of parents and caregivers, specifically on topics related to children with disabilities.

A35 Association between household food insecurity with fast food consumption and weight status among primary school children in Shah Alam

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Availability, access, utilization and stability of the food are the cores for food security. Household food insecurity is related to both undernutrition and overnutrition due to starvation and calorie-dense food respectively. The aim of this study is to evaluate household food insecurity of school children aged 7-11 years old and its association with fast food consumption and their weight status. A cross-sectional survey was carried out on 177 subjects at four different primary schools in middle zone of Shah Alam. A set of parent-administered questionnaire; socio-demographic and socio-economic profile, fast food consumption questionnaire and Radimer/Cornell food insecurity scale was used. Secondary data of the schoolchildren's height and weight were taken to obtain the BMI-for-age using WHO AnthroPlus software. Data was analysed using SPSS version 25. There were 70 (39.5%) male and 107 (60.5%) female subjects recruited with mean age of 9.02 ± 1.31 years old. Finding showed that 85 (48%) of them were food secured while 92 (52%) were at least household insecure. Finding also showed that 142 (80.2%) subjects were replacing at least 1-2 times of their meals with fast food in a week. The mean score of BMI-for-age was 0.36 ± 1.74 with 18 (10.2%) subjects reported were at least underweight and 29 (16.4%) were overweight and obese. Fast food consumption and weight status of primary school children in Shah Alam are not associated to household food insecurity (p>0.05) respectively. Other factors such as physical activity may affect on weight status.

A36 Relationship between maternal feeding practices, eating behaviour and weight status among kindergarten children aged 4-6 in Section 17, Shah Alam, Selangor

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The most important stage in human growth is during early childhood as it is the period for creating and influencing the way of how feeding and lifestyle behaviours of the children. Children are exposed to various diseases. Hence, feeding practices and eating behaviours may act as predominant factors. Aim of this study is to determine the relationship between maternal feeding practices, eating behaviour and weight status among kindergarten children subjects aged 4-6 years old in Section 17, Shah Alam. This is a cross-sectional study involving 150 children and their mother from kindergarten at Section 17, Shah Alam. A bilingual questionnaire was used; feeding style was measured with Comprehensive

Feeding Practice Questionnaire while eating behaviour was measured with Children Eating Behaviour Questionnaire. Height and weight of children were measured using SECA stadiometer and TANITA weighing scale. BMI-for-Age was determined using AnthroPlus. Data was analysed using SPSS Version 23. Finding shows that 73.3% (n=110) of total subjects were having normal weight status, with 9.3% (n=14) and 17.3% (n=26) were underweight and overweight respectively. For maternal feeding practices, emotion regulation shows lowest mean score (7.22 ± 2.92), while emotional overeating of children eating behavior shows lowest mean score (8.85 ± 4.90). There was a significant relationship between weight status and maternal feeding practices ($p<0.05$). For food approach eating behaviour, weight status and food responsiveness shows a moderate and positive correlation ($r_s=0.389$). Food avoidance eating behavior shows a moderate and negative correlation between weight status and food fussiness ($r_s=-0.365$). Low emotion regulation off feeding practices shows that feeding practices does not depends on the children's emotion, while low emotional overeating of eating behavior shows that the emotion of the children did not affect their eating habit.

A37 Development, validity and reproducibility of the new food frequency questionnaire (FFQ): A pioneer project to assess dietary intake for the Mauritian population

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There is an urgent need to develop a food frequency questionnaire (FFQ) to assess habitual food intake of the Mauritian population. The study aimed at developing and assessing the validity and reproducibility of a food frequency questionnaire among Mauritians. Subjects were recruited through voluntary participation and a total of 66 participants completed a 3-day dietary recall to generate the most available and frequently consumed of food list among Mauritians, which subsequently led to the development of the FFQ. Another different group of subjects participated in the validation study (n=100), where the validation process comprised of the comparison between the developed FFQ against two 24-hour dietary recalls (DR1 and DR2). In the reproducibility study (n=30), the FFQ procedure was repeated and the same developed FFQ (FFQ1 and FFQ2) was administered 20 to 30 days apart. Energy, macronutrients (protein, carbohydrate and fat), vitamins (vitamin A and vitamin C), minerals (sodium and calcium), and dietary fiber were included in the analysis. The results demonstrated that the newly developed FFQ has moderately over-estimated the energy and nutrient intake as compared to the dietary recall. Spearman correlation coefficient for energy, protein, carbohydrate and fat were 0.75, 0.57, 0.39 and 0.53 respectively, showing moderate to good correlations. The Bland Altman plot demonstrated a good agreement (between ± 2SD) between the developed FFQ and the 24-hour dietary recalls. The intra-class correlation (ICC) used to assess the reproducibility of the FFQ was 0.69 for energy and ranged between 0.51 to 0.61 for macronutrients and 0.28 to 0.69 for micronutrients, therefore demonstrating a moderate to good reliability. The newly developed FFQ, which revealed an acceptable reproducibility, comprised of 112 food items and can be considered as valid tool to assess dietary pattern for the Mauritian population.

A38 Associations between self-reported and objectively measured physical activity and overweight/obesity among adults in Kota Bharu and Penang, Malaysia

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For the past decades, Malaysia has seen an increased prevalence of overweight and obesity which leads to significant health threats. Physical activity is beneficial in maintaining healthy body weight. The objective of this study was to measure physical activity of adults in Malaysia using objective measurement (accelerometer) and self-reported methods, as well as to determine their associations with (body mass index (BMI) and waist circumference (WC) measurements. Four-hundred and ninety Malaysian adults (n=490) aged 20 to 65 years old participated in this cross-sectional study. Their body weight, height, and WC measurements were measured according to standard procedures. Physical activity was assessed objectively with accelerometers for five to seven consecutive days. The International Physical Activity Questionnaire (IPAQ) was used to estimate the amount of time spent on various domains of physical activity. Mixed models were used to determine the associations between physical activity variables and both BMI and WC. The mean value of objectively measured moderate-to-vigorous physical activity (MVPA) was 13.5 minutes per day, in which male participants recorded a significantly higher amount of time compared to females. On the other hand, the mean self-reported total physical activity was 380 minutes per week; male participants reported a significantly higher amount of time on physical activity in the occupation/work and leisure/recreation domains while female participants spent significantly more time in the domestic/household chores domain. The mean values of objectively measured total MVPA, self-reported time spent on walking for leisure/recreation, and total time amount of time spent on MVPA for leisure/recreation were significantly higher among participants with BMI of less than 25 kg/m^2. Objectively measured MVPA was inversely associated with BMI, but not WC measurement. No significant association was observed between self-reported total physical activity and physical activity time measures across domains with both BMI and WC measurement.

A39 Assessment of nutritional status, physical activity, sedentary behaviours, and perceptions against crime among adolescents in Kuala Lumpur

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The increasing trend of obesity and physical inactivity among children and adolescents is a worrying public health problem. The main aim of this study was to assess total moderate-to-vigorous physical activity (MVPA) using objective measurements methods and self-reported

sedentary activity pattern among a sample of Malaysian adolescents residing in Kuala Lumpur, Malaysia. This study also explored the possibility of crime as a barrier to physical activity in adolescents. Two-hundred and seventy-one adolescents between 13 to 16 years old in Kuala Lumpur participated in this study. Physical activity (number of steps and amount of time spent on total MVPA daily) was measured objectively with accelerometers for seven days. Body weight and height were measured according to standard anthropometric procedures. Sedentary behaviours and perception of safety against crime were self-reported by the adolescents using a questionnaire. About 27.8% of the adolescents had body mass index (BMI) greater than 23 kg/m^2. In terms of accelerometer-measured physical activity, the adolescents achieved a mean of 11,883 (5,017) steps per day and 135 (54) minutes of MVPA per day. A large percentage of them agreed that fear of crime in their living quarters hinders physical activity participation. Adolescents who were thin or had BMI of less than 23 kg/m^2 according to the International Obesity Task Force (IOTF) cut-off points for adolescents and Asian adolescents achieved a lower number of steps and total MVPA minutes compared to adolescents with higher BMI. More than 50% of them spent more than 2 hours daily on sedentary activities such as screen-time and school homework. Findings of this study indicate satisfactory levels of total MVPA, but also substantially high levels of sedentary behaviours and screen-time among adolescents in urban Kuala Lumpur. The results on the perception of safety against crime showed the importance of crime safety for physical activity participation.

Group B: Dietary Intake, Consumption Pattern & Disease

B01 Associations between dietary intakes, nutritional status, medical status and bone mineral density among older adults in Selangor, Malaysia

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The objective of this study was to examine the associations between dietary intakes, nutritional status, medical status and bone mineral density (BMD) among older adults in Selangor. Subjects in this study received a self-administered questionnaire regarding socio-demographic (age and gender) and the history of their medical status. The anthropometry measurements were done by assessing height and subsequently body mass index (BMI) of the respondents was estimated. The assessment of dietary intakes was conducted by using Food Frequency Questionnaire which adapted from the Malaysia Adults Nutrition Survey 2014 and the subjects' dietary intakes were evaluated against Recommended Nutrient Intake 2017 (RNI). Bone mineral density were estimated by using dual-energy X-ray absorptiometry (DXA). The result of BMD of each respondents were identified by using T-score of -1.0 and above that indicated a normal BMD, T-score of less than -1.0 is indicated as low BMD. The associations between socio-demographic, nutritional status, dietary intake and medical status and BMD among older adults were assessed by using adjusted logistic linear regression. A total of 140 respondents completed this test. Female was the predominant sex (64.30%) and the age of (50-59 years old) was the lead group in this study of (45.90). Majority of respondents were overweight (37.10%) and obese (13.60%) while (85.70%) of the respondents had diabetes mellitus. There was an association between socio-demographic (age group of 60-69 years old) with bone mineral density is two times more likely to have reduced BMD (OR= 2.873, CI= 1.141, 7.233, P>0.05) while (age group of 70-79 years old) is three time more likely to have reduce BMD (OR= 3.408, CI= 1.154, 10.067, P>0.05). This study showed that BMD is significantly decreased with age which require a fully understand and more effort should be taken to ensure the improvement of independent function among older adults in future.

B02 Sarcopenia among community dwelling elderly: comparison of AWGS and EWGSOP

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This study aimed to assessed the prevalence of sarcopenia among Malaysian elderly using two distinct methods namely Asian Working Group of Sarcopenia (AWGS) and European Working Group for Sarcopenia (EWGS). A cross sectional study was conducted to compare the identification of sarcopenia among Malaysian elderly (n=400) using AGWS and EWGSOP algorithm. Skeletal muscle mass was assessed using Bioelectrical Impedance analysis (BIA), hand grip strength was assessed using Jamar Hydraulic Dynamometer and assessment gait speed of walking 4 meters. Covariates of anthropometric assessment (body fat, BMI, waist circumference, mid upper arm circumference and calf circumference) were analysed. Prevalence of sarcopenia was (5.3%) in AGWS and doubled (11.0%) when EGWSOP was used as diagnostic criteria of sarcopenia. Men elderly appeared to be 2.5 times likely of having sarcopenia compared to women. Significant association was found between sex, and all anthropometric assessment ($p<0.05$) for Visceral fat, WC, CC, BMI except for MUAC with sarcopenia. Binary logistic model (R^2=46.4%) revealed that sex, calf circumference and visceral fat were significant predictors of sarcopenia. AGWS is more suitable to be used in identifying Malaysian elderly with sarcopenia. The prevalence of sarcopenia was lower when AWGS was used. The discrepancy of cut-off point used may jeopardized the interpretation of result when used in different population setting.

B03 Factors in retrospective child feeding practices associated with obesity risk in young adults

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During childhood, the dietary preferences and habits are developed by parental feeding practice. Dietary preference and habits formed in childhood are likely to persist into adulthood which further determine their body weights status in later life. This study aims to determine the factors in retrospective child feeding practices associated with obesity risk in young adults. This was a retrospective cross-sectional study with 176 private university first year degree students in Kuala Lumpur. Retrospective data of maternal age, gestational age and child feeding practices using Child Feeding Questionnaire (CFQ) were collected. Current subject's socio-demographic data was collected, and anthropometric measurements were done using standard protocol. This study showed that 22% of subjects were overweight/ obese. There was no significant association found between maternal age with child feeding practices used such as restriction, pressure to eat and monitoring. A significant association ($p<0.05$) was observed between pressure to eat with gestational age. Parent with preterm (<37 weeks gestation) and full-term subjects tended to pressure their child to eat as compared to subjects born post-term (>42 weeks gestation). Obesity risk in young adults was higher among their parents who viewed themselves as overweight (OR:2.28, CI:1.45-3.58) and who viewed their child as overweight from birth to primary school (OR:1.69, CI:1.21-2.35). Parents that displayed low pressure to eat in their young child protected their child of obesity in young adulthood (OR:0.78, CI:0.63-0.97). The findings concluded that parental influences in child feeding practices were linked to the subject's obesity risk in young adulthood. Thus, appropriate child feeding practices education for parents is needed to maintain healthy weight status of their child in later life.

B04 Beneficial effect of zinc on intestinal barrier

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Zinc is an essential trace mineral which plays important role in cell division and proliferation to maintain the structure and function of various components of the body including intestinal barrier (IB). A healthy IB functions efficiently to prevent the access of different antigenic materials from the intestinal lumen into the systemic circulation. Compromised structure and function of IB leads to higher intestinal permeability(IP). Higher IP causes excessive passage of antigenic materials across the IB and eventually, various inflammatory reactions in the intestinal and extra intestinal tissues of the body. Objective of this research was to review the articles related to the effects of zinc in modulation of IB in different physiological and pathological conditions. We searched pubmed, google scholar and scopus using the key words zinc paired with mucus, goblet cells, villi, crypt, tight junction proteins (TJPs), claudins, occludin, cell signaling, intestinal permeability and intestinal barrier. A total of 496 articles were found. Most of them were animal studies. After exclusion of the duplicate and non-relevant studies, we extracted 30 studies for this review. Most of the studies found beneficial effects of zinc on different components of the IB such as goblet cells, mucus secretion, villi height, crypt depth, TJPs and cell signaling for cell proliferation and reduced IP. Deficiency of zinc compromised several components of the IB such as villi height, crypt depth, TJPs and caused higher IP. From the available findings, we conclude that zinc has the potential to be used as a therapeutic agent for strengthening compromised IB in different pathophysiological conditions of the body.

B05 Factors associated with binge eating behavior among university students in Universiti Putra Malaysia

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Binge eating behavior is an abnormal eating behavior due to losing control on the type and amount of food intake. There is limited study on binge eating behavior among university students in the local context. Therefore, this cross-sectional study aimed to determine the factors associated with binge eating behavior among university students. This study included 338 university students (31.4% males and 68.6% females) with a mean age of 20.98 ± 1.40 years from three randomly selected faculties in Universiti Putra Malaysia. Respondents completed a set of self-administered questionnaires on socio-demographic background, body image perception, depression, self-esteem, social physique anxiety, physical activity, food preoccupation and dietary restraint. Their weight, height, waist circumference and body fat percentage were measured. It was found that 26.9% of the respondents engaged in binge eating behavior, with no sex difference was observed (c^2=2.48, p=0.115). One in ten of the respondents (12.1%) were underweight, 13.9% were overweight and 11.9% were obese. Some 15.4% of the respondents were having abdominal obesity and one third of the respondents (34.0%) were having high body fat percentage. Multiple linear regression model showed that BMI (β=0.165, p=0.002), body image perception (β=0.181, p=0.001), depression (β=0.111, p=0.031), self-esteem (β=-0.105, p=0.040), frequent thoughts about food (β=0.181, p<0.001), negative emotion (β=0.158, p=0.003) and dietary restraint (β=0.172, p=0.002) were found to be the significant predictors for binge eating behavior. The findings indicated that binge eating behavior was prevalent among university students in this study. Nutrition intervention programs should promote healthy eating

behaviors and positive body image as well as healthy weight management among university students in order to prevent binge eating behavior.

B06 The nutritional status between users and non-users of dietary supplements in Kota Kinabalu, Sabah

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In Malaysia, the national prevalence of dietary supplement (DS) usage has increased and women category was even higher. Despite the high amount of DS use, there are limited studies about DS usage among Malaysian women particularly in Sabah. This study aims to determine the nutritional status between DS users and non-users. A cross-sectional study on DS usage was conducted among 123 voluntary female workers based in Kota Kinabalu, Sabah. Nutritional status was indicated by anthropometric measures (weight, body mass index, waist circumference and body fat percentage) and dietary intake (calorie, macro- and micronutrients). The dietary intake was assessed using 3 days 24 hours diet recall. Frequency and details of DS usage were obtained by structured questionnaire. Among 123 respondents only 32.5% (n=40) were DS users. This study found that vitamin C (52.2%) was most widely used, followed by honey (35.0%), multivitamin (20.0%), calcium (20.0%) and fish oil (20.0%). The anthropometric measures were similar in both users and non-users ($p>0.05$). Regarding dietary status, calorie intake between users (mean±SD, 1570±460 kcal) and non-users (1480±430 kcal) showed no significant difference ($p=0.244$). Among macronutrients, protein intake was significantly higher ($p=0.09$) in users [median(Q1,Q3), 69.7 (49.2, 85.3)] as compared to non-users [56.2 (45.8,69.5)]. In terms of micronutrients, comparison between users and non-users showed that vitamin C [136.7 (49.7,1039.9) *vs.* 39.1(24.5,69.2), $p=0.001$] and calcium [413.1(272.9,824.2) *vs.* 288.1(221.6,403.4), $p=0.002$] were significantly higher in users than non-users. In conclusion, despite similar anthropometric status in both groups, the DS users has better dietary intake than non-users.

B07 The prevalence of constipation and its associated factors among elderly at selected private care homes in Selangor

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Constipation problem was the most common health issues among the elderly. This cross-sectional study aimed to determine the prevalence of constipation and its associated factors among the elderly at selected private care homes in Selangor. A total of 114 subjects were participated from 10 private care homes in Selangor after purposively selected. Subject's anthropometric measurement which is height and weight were measured to calculate their Body Mass Index (BMI). Subjects were then asked to complete the questionnaire consisting five components which are socio-demographic characteristics (age, sex, ethnicity, education level, marital status, previous occupation and current monthly expenses), risk of malnutrition, dietary intake, physical activity, depression and stress level and constipation severity assessment by interview face-to-face. Majority of the subjects were male (64.0%), Malay (58.8%), had a secondary education level (50.9%) with current monthly expenses below than RM100 (66.7%). Their mean age was 70 ± 8 years. The mean BMI of the subjects was 23.62 ± 5.78 kg/m2. This study found that the prevalence of constipation among

these subjects was 7.0%. The variables that had significantly associated with constipation were sex (p=0.025), depression (p=0.001) and stress (p=0.001). No association was found between socio-demographic characteristics (age, ethnicity, education level, marital status, previous occupation and current monthly expenses), risk of malnutrition, dietary intake, physical activity and constipation. In conclusion, being a female, having depression and stress were associated with constipation in private care homes, Selangor. Future study needs to be done to investigate more details about the factors and the prevention of constipation problem among the elderly.

B08 Drinking pattern of preschool children in Klang Valley: ToyBox Study Malaysia

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Food and beverage consumption is a contributing factor to increasing prevalence of obesity. Improving drinking habits in early childhood will help to establish healthy drinking behaviour in later years. This study was conducted to assess the drinking pattern of preschool children in Kuala Lumpur and Selangor as a needs assessment prior to adapting the European ToyBox Study for implementation among Malaysian children. A total of 257 children aged 4-6 years from selected KEMAS kindergartens took part in this study. Weight and height were measured, and body mass index (BMI) calculated. BMI-for-age *z*-score (BAZ) was calculated using AnthroPlus software. Drinking pattern was assessed using parent-proxy report questionnaire. Mean age, weight, height and BAZ were 5.0±0.6 years, 17.5±4.2 kg, 106.7±6.1 cm and -0.15±1.42, respectively. Although plain water topped the list of beverages (99.5%), less than 50% of preschoolers consumed more than 5 glasses of plain water per day. We found that more than 80% of children consumed sugary drinks and more than 60% consumed carbonated drinks. The findings showed that drinking patterns among Malaysian preschool children do not meet dietary guidelines and need to be further improved. Thus, there is a need to increase awareness of drinking sufficient quantities of water and fewer sugar sweetened beverages among preschoolers and their caregivers. This in turn suggests that parents and kindergarten teachers need to be empowered to encourage healthy drinking behaviour. In conclusion, adaptation of the European ToyBox Study is useful in disseminating the message on healthy drinking behaviour to preschool children in Malaysia.

B09 Vitamin C dietary intake and its link to haemoglobin level: a cross-sectional study in pregnant women attending antenatal clinics in Seremban, Negeri Sembilan

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Anaemia in pregnancy has been shown to lead to various health implications for mothers and children. A report by World Health Organisation (WHO) showed that between 38.9-48.7% of Malaysian pregnant women were anaemic, and the highest prevalence of 29.7% was reported in Negeri Sembilan. Vitamin C has been shown to be one of the iron absorption enhancers in the existing literature. Therefore, the objective of this study was to determine the association between vitamin C dietary intakes and haemoglobin level. A total of 162 pregnant women aged between 19 to 45 years old with the mean±S.D of 29.07 ± 4.94 years participated in this study. All participants were recruited from 4 purposively selected health clinics in Seremban, Negeri Sembilan through convenient sampling. The participants were required to complete a set of questionnaire that consists of questions related to socio-demographic background, pregnancy history, anaemia and fatigue symptoms and vitamin C selective food frequency questionnaire. Height and body weight were measured whilst haemoglobin levels were retrieved from the antenatal record. It was found in this study that 22% of the women were anaemic (mean±S.D: 10.14±0.68 g/dl). A total of 54.3% women found to have not achieved the vitamin C dietary intake recommendation which equates to more than half of the participants (n=88), with the mean±S.D of 45.42±22.09 mg/day. There was no significant association found between total vitamin C dietary intake with haemoglobin level in this study population (r=-0.13, p=0.10). However, in a separate analysis by food groups, it was found that there was a significant weak positive association between the vitamin C dietary intake in meat and meat products with haemoglobin level (r=0.23, p= 0.00). These findings highlighted the importance of health education programs at health care community levels on adequate intake of vitamin C to lower the risk of anaemia in pregnancy and also on iron status improvement in general.

B10 Motivators and barriers towards fruits and vegetables intake among Students of Universiti Kebangsaan Malaysia: a qualitative study

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Fruits and vegetables intake among young adults in Malaysia do not meet the recommendation of the Malaysian Dietary Guideline. This study aimed to explore the motivators and barriers to the consumption of fruits and vegetables among Universiti Kebangsaan Malaysia (UKM) students in terms of individual, physical environment, social environment and cultural factors. 25 subjects were selected from UKM Bangi and UKM Kuala Lumpur campus by using convenient sampling techniques. This qualitative study used in-depth interview which lasted for 15 minutes, were audiotaped, transcribed and coded. Themes and subthemes were categorized through consensus with three experienced qualitative study researchers. Results from the interview were coded through thematic analysis using Nvivo version 10 software. The data explored 9 main themes and 11 subthemes. The themes for this study were socio-demography, food habits and self-esteem, sensory and physical values of fruits and vegetables, health status, availability and accessibility, characteristics of fruits and vegetables, influences of media and social as well as ethnicity and external influences. The individual motivators and barriers of fruits and vegetable intake were education, health status, sensory and physical values as well as food habits and self-esteem. In the physical environment factor, availability and accessibility were the motivators and barriers of students' fruits and vegetables intake, where price was seen as the biggest barrier on fruits consumption. Meanwhile, social environment factors that affected students' intake were social influences from family and peers. Culturally, the most influencing factor of vegetables intake was ethnicity, whereas, there was no cultural influence on fruits intake. In conclusion, the main motivators and barriers of fruits and vegetables intake were availability and accessibility, sensory and physical values of fruits and vegetables and

health status. This study can be used to develop and carry out more effective intervention programmes to promote fruits and vegetables consumption among Malaysian.

B11 Associated factors of sociodemographic, dietary intake and household food insecurity with anaemia status among pregnant women attending Obstetrics and Gynaecology (O&G) Clinic, Hospital Universiti Sains Malaysia (HUSM)

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Anaemia as a global public health concern and has affected and it is prevalent among women of reproductive age and pregnant women. Iron deficiency anaemia during pregnancy can exert a negative impact on the well-being of the mother, overall development of the foetus and also the infant at their later life. Food insecurity is closely related to poor nutrition intake that can lead to lower haemoglobin level and eventually anaemia. The objective of this study was to evaluate the dietary intake and household food insecurity, thus to determine the association between sociodemographic factors, dietary intake, household food insecurity with anaemia status among pregnant women attending obstetrics and gynaecology clinic of Hospital Universiti Sains Malaysia (HUSM). This cross sectional study used the Radimer/Cornell Hunger and Food Insecurity Instrument as an assessment tool for household food security level. A total of 138 pregnant women had participated in this study. This study found that the daily intake of macronutrient and micronutrients among majority of pregnant women were did not meet the recommendation based on Recommended Nutrient Intake (RNI) 2017. The prevalence of anaemia among pregnant women in this study was 32.6% with mean haemoglobin level of 11.18 g/dL (SD 1.00). Meanwhile, the prevalence of household food insecurity among pregnant women in this study was 56.5%, which accounted of 38.4% experienced household food insecure, 5.1% (individual food insecure) and 13.0% (child hunger). The Multiple Logistic Regression, with pregnancy anaemia as outcome, showed pregnant women who had food insecurity were 1.2 times (adjOR 1.23, 95% CI: 0.18, 8.39; p=0.832) more likely to have anaemia compared to the food secured pregnant women. Pregnant women who lived with poverty level of monthly income per capita was 5.42 times (adjOR 5.42, 95% CI: 1.30, 22.72; p=0.021) more likely to have anaemia compared to pregnant women who lived with poverty-free of monthly income per capita. The study found that there were significant association between monthly income per capita (RM) and number of household occupant with anaemia status among pregnant women attending O&G Clinic of HUSM, Kota Bharu. Therefore, there is a need to have a proper nutrition program or intervention specifically for anaemic pregnant women to ensure their adequacy of food and nutrients among pregnant women.

B12 Energy and dietary intake among public university students in Peninsular Malaysia

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Habitual food intake studies are carried out usually to identify the population at risks to inadequate intakes. The objective of this study was to determine energy and nutrient intake among public university students in Peninsular Malaysia. Peninsular Malaysia was divided into four zones and one public university was randomly selected to represent each zones. The selected universities are Universiti Utara Malaysia (UUM) in Northern, Universiti Malaysia Pahang (UMP) in Eastern, Universiti Kebangsaan Malaysia (UKM) in Central and Universiti Teknologi Malaysia (UTM) in Southern. All 427 students were randomly selected completed a questionnaire with two days 24 hour diet recall on weekday and weekend. This study showed an average energy intakes of 6.38 MJ/day (1524 kcal/day) and 5.53 MJ/ day (1321 kcal/day) among male and female students respectively, corresponding to 68% and 72% of the Malaysian Recommended Nutrient Intake (RNI). For males, distribution of energy intakes for breakfast, lunch, dinner and snacks were about 16%, 39%, 41% and 4% of total daily energy, respectively. However, for females about 19%, 36%, 41% and 4% of total daily energy were obtained for breakfast, lunch, dinner and snacks, respectively. The distribution of nutrients to the total energy intake amongst the students were 16% for protein in both males and females, 51% for carbohydrate in males and 53% in females and 33% for fat in males and 35% for females. Both male and female have high energy intake during dinner followed by lunch and breakfast. The proportions of calories derived from macronutrients (proteins and carbohydrates) were within the recommendations for a healthy diet. However, this population consumed a diet with too much fat as compared to the Malaysian RNI. This will act as a baseline for an improvement on the energy and nutrient intake among the students by developing a healthy meal plan for the students.

B13 Barriers to and facilitators of healthy meal preparation among children aged 9-10 in Kuala Lumpur, Malaysia

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Involvement of children in meal preparation was found to confer numerous positive effects to them including greater intake and preference for fruit and vegetables, healthier food choices and better dietary quality. This is important as the eating behaviour and practices established during childhood would be carried on into adulthood. However, it was found that only a small number of children frequently involved in meal preparation, indicating that the idea of preparing healthy meal has not been put into practice. Therefore, the objective of this study was to explore their views and opinions on the barriers and facilitators of healthy meal preparation. A qualitative approach via focus group discussion was conducted in two different primary schools in Kuala Lumpur, with eight children aged 9-10 years (mean age of 9.5 years old) in each school. The discussion was audio-taped, transcribed and analysed into different themes. Apart from parents' refusal for help from their children, most children were afraid of getting injured and the possible kitchen accidents. Their short stature also limited their participation in healthy meal preparation. Other barriers reported were their negative attitudes towards healthy meal preparation and taste preference. On the other hand, they viewed their own health as influential and their desire to eat for health and well-being emerged as facilitator. They were also driven by intrinsic and extrinsic motivations like enjoyment, enthusiastic task involvement, goal direction and rewards. Besides parents being role model, providing instrumental support and enough resources also facilitated children's involvement in healthy meal preparation. The findings obtained may provide additional information about the barriers and facilitators of healthy meal preparation among Malaysian children. This information might be useful in developing intervention programmes specifically targeted to children to promote healthy meal preparation among them, and subsequently improve their eating habits and practices.

B14 Associations between picky eating, infant feeding practices and nutritional status of preschool children in Klang Valley, Malaysia

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Picky eating in early childhood can be linked to nutritional problems due to limited dietary variety but the information on the picky eating behaviours during early childhood in Malaysia is limited. This study was conducted to determine the association between picky eating, infant feeding practices with nutritional status of pre-schoolers aged 4–6 years in Klang Valley, Malaysia. A total of 163 aged 4-6 pre-schoolers participated in this cross-sectional study. Socio-demographics, infant feeding practices, anthropometry measurement such as weight-for-age, height/length-for-age, BMI-for-age, child eating behaviours questionnaire (CEBQ) and dietary pattern were assessed. A total of 49.1% of pre-schoolers were picky eaters. Picky eaters were found to be more likely to be at risk of overweight (6.7%), overweight (1.8%), stunted (11.7%) and severely stunted (3.7%) than non-picky eaters ($p<0.05$). Picky eating was found to be associated with infants feeding practices such as exclusive breastfeeding ($\chi^2=6.64$, $p=0.01$), duration of breastfeeding ($\chi^2=6.47$, $p=0.04$) and the introduction of complementary foods ($\chi^2=7.47$, $p=0.01$). Higher prevalence of picky eating was found among pre-schoolers who were exclusively breastfeed for less than 3 months (28.2%), continued breastfeed for less than 12 months (38.0%) and introduced to complementary foods before 6 months of age (27.0%). Picky eaters tend to skip breakfast (14.1%) and lunch (7.4%) compared to non-picky eaters. Picky eaters were found to consume less fruits ($\chi^2=5.97$, $p=0.04$); vegetables ($\chi^2=8.68$, $p=0.01$); beans and legumes ($\chi^2=8.95$, $p=0.01$); meats and poultry ($\chi^2=6.74$, $p=0.03$) and fish ($\chi^2=6.53$, $p=0.04$) compared to non-picky eaters. Picky eaters consumed more snacks ($\chi^2=8.41$, $p=0.02$) and sweets ($\chi^2=7.76$, $p=0.02$) compared to non-picky eaters. In conclusion, picky eaters have poorer nutritional status and diet quality compared to non-picky eaters.

B15 The association between meal frequency with diet quality and micronutrients intake among young adults at Northeast Penang

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This study aimed to determine the association between meal frequency with diet quality and micronutrients intake among young adults in Northeast Penang. This cross-sectional study was conducted among 383 young adults aged from 20-29 years old in Northeast Penang. Meal frequency of the subjects was assessed by using the Meal Pattern Questionnaire. MANS Food Frequency Questionnaire (MANS-FFQ) was used to determine the dietary intake and micronutrient intake including sodium, potassium, calcium, iron, vitamin A and vitamin C. Diet quality for Malaysians was assessed by Healthy Eating Index (HEI). Average meal frequency of breakfast among the population was 4.57 ± 2.3, lunch was 4.43± 2.4, and dinner was 5.81 ± 1.8. The majority of the respondents (n = 337, 88%) were at risk of poor diet quality. Females (n = 198, 51.7%) had poorer diet quality than males (n = 139, 36.3%). The intake of sodium was high (2522.59 mg ± 1473.48), low in potassium (2781.79 mg ± 1522), and low intake of vitamin A (132.40 µg ± 121.29) among both gender. The intake of iron was low (12.45 mg ± 10.36) among the female population. The study

showed a significant association between frequency of breakfast and diet quality (p = 0.020) but no association between lunch and dinner with diet quality. There was a significant correlation between meal frequency of breakfast and vitamin C intake (r = -0.112, p = 0.029), also between meal frequency of lunch and calcium intake (rho = -0.109, p = 0.033). The high intake of energy-dense food in breakfast contributed to the negative correlation between breakfast and vitamin C. The number of meal frequency affected the diet quality and micronutrients intake among young adult. Health practitioners should concern the frequency of meal to improve diet quality while not only the serving size to serve.

B16 A gap analysis between expectations and perceptions on service quality of online food purchasing and delivery services in Kota Bharu among undergraduates in Health Campus of Universiti Sains Malaysia

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The food and beverage (F&B) industry in Malaysia is up with the recent trend of online food purchasing and delivery (OFPD) services. Service quality and customer satisfaction are very important concepts that the F&B industry should understand to know how to construct their business to attend to the needs of their customers. The main purpose of this study was to determine the gap between consumer expectations and perceptions of service quality of OFPD services in Kota Bharu, Kelantan among undergraduates in Health Campus of Universiti Sains Malaysia. A self-administered questionnaire that consisted of 20 items was adapted from the SERVQUAL instrument, which measured service quality based on five dimensions: Tangibility, Reliability, Responsiveness, Assurance and Empathy using a 7-point Likert Scale. Only undergraduates who used OFPD before were recruited using purposive sampling technique. Out of the 114 respondents, there were more females (N=82, 71.9%) compared to males (N=32, 28.1%). In regards to ethnicity, Malay (N=49, 43%) was the majority, followed by Chinese (N=37, 32.5%), Indian (N=19, 16.7%) and other races (N=9, 7.9%). A total of 42.1% of the respondents (N=48) spent below RM10 on OFPD services. Results showed that there were significant differences between expectations and perceptions of service quality of OFPD services in all dimensions of the SERVQUAL dimensions ($p<0.001$). The Tangibles dimension had the smallest gap score (-0.42) while the Empathy dimension had the largest gap score (-0.72). Overall, there was a significant gap between consumer expectations and perceptions of service quality of OFPD services in Kota Bharu, in which service quality was perceived low as expectations were higher than perceptions at a gap of -0.63. This calls for an improvement in the OFPD sector in Kota Bharu to increase their service quality and gain customer satisfaction.

B17 Associations between sociodemographic factors, influence of fruit presentation, self-efficacy, and body mass index with fruit intake among adolescents aged 16 years old in Beranang, Selangor

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Based on the Recommended Nutrient Intake Malaysia 2017, adolescents require ample amount of fruits to be consumed, at least 2 servings per day. Adequate intake of fruits is highly recommended as it can help to prevent or minimize the complication of disease in later life. Marketing among children and adolescents can affect their perception, preference and behavior. Various techniques can be used to influence the mind of the consumers. Besides, adolescents with high self-efficacy of fruit consumption will tend to have high self-efficacy in healthy eating later in their lives. This cross-sectional study aimed to determine the associations between sociodemographic factors, influence of fruit presentation, fruit intake based on semi-quantitative food frequency questionnaire (SFFQ), self-efficacy for fruit intake and body mass index. Subjects were also presented with two fruits packs with different presentations; fruit packs X contained big cut of fruits while fruit pack Y contained small cut of fruits. Majority of the participants chose fruit pack Y which had smaller cut of fruits (53.4%) compared to fruit lack X (46.6%). Their reasons for choosing fruit pack Y was due to convenience (41.8%), while pack X was chosen because of their preference for bigger cuts. There was a positive significant difference between father's monthly income with fruit intake ($p<0.05$). Self-efficacy score for fruit intake was significantly higher for female than male ($p<0.05$). BMI-for-age of participants were positively but weakly correlated with fruit intake ($p<0.05$). The findings from this study showed that father's monthly income was associated with higher fruit intake. Self-efficacy was also associated with gender and body mass index ($p<0.05$). Presentation of fruits may be used as one of the methods in increasing fruit intake among adolescents.

B18 Eating out behaviour and high sodium intake among adults in Malaysia: Findings from the Malaysian Community Salt Study (MyCoSS)

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Eating out is becoming more common recently due to changing lifestyle behaviours among Malaysian adults, which may contribute to the increasing prevalence of overweight and obesity. The objective of this study was to determine the prevalence of high sodium intake and its associated factors. Data were obtained from the Malaysian Community Salt Survey (MyCoSS) which is a nationally representative survey with stratified cluster sampling design. Dietary sodium intake was determined using food frequency questionnaire (FFQ) and high sodium intake was defined as intake of ≥ 2,000 mg sodium. Sources of three main meals (breakfast, lunch, and dinner) were assessed by multiple-choice questions: either at home or away from home (restaurant, stall, fast food outlet, kiosk, office, cafeteria or canteen, and others). Descriptive analysis and multiple logistic regression were conducted for the statistical analysis. A total of 52.1% respondents consumed excessive sodium in their diet. The prevalence of having breakfast, lunch and dinner away from home were 55.0%, 35.6% and 34.4%, respectively. Multiple logistic regression analysis revealed that those aged less than 30 years old (AOR=4.23, 95%CI: 2.46, 7.28), 30 to 39 years old (AOR=3.13, 95%CI: 1.92, 5.11), 40 to 49 years old (AOR=1.88, 95%CI: 1.20, 2.94), were more likely to have a high sodium intake compared to the oldest age group. Those of Indian ethnicity (AOR = 0.47, 95% CI: 0.26, 0.83) significantly less likely to consumed high sodium compared to those of Malay ethnicity. In conclusion, more than half of Malaysian have a high daily sodium intake. However, having meals away from home was not associated with high

sodium intake. Therefore, intervention to reduce daily dietary sodium in the population should not only be targeted towards population groups who eat out often, but also to those who prepare their meals at home.

B19 Design and validation of web and computer-based food frequency questionnaire: a scoping review

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Web and computer-based food frequency questionnaire (FFQ) provide a lot of advantages including saving cost, reducing participants burden and improving response quality. However, designing and validating a web or computer-based FFQ for a study can be a challenge. Therefore, this study aims to conduct a scoping review on the design and validation of web and computer-based FFQ among adult subjects. An electronic search was conducted on the PubMed database to identify studies published from 2009 to 2018 that included a web or computer-based FFQ for assessment of dietary intake among adult population. A pool of 27 articles were examined in-depth to assess the development, comparison or validation of a web or computer-based FFQ. Most of the studies (55%) were done in European countries. The number of food/drink items listed in the FFQ ranges from 12 to 270 items and portion size of food was estimated using images, ranging from three to seven images per food item or a standard portion size using household measurement. The reference period was usually over a period of one month up to one year. Majority of the study (78%) focus on intake of all food groups except for several studies that focuses on specific nutrient or food group namely sodium, fatty acids, vitamin D, calcium, fruits and vegetables, and beverage intake. There were only three studies that recorded supplement intake during web or computer-based dietary assessment. Out of 27 studies, a total of 22 carried out validation studies using a variety of reference method such as 24hours diet recall (24%), food diary/ records (27%), weighed food record (27%), paper version of FFQ (22%) and biomarker (1%). As a conclusion, a variety of web and computer-based FFQ were used in research worldwide. Strategies to improve the application of current evidence on best practices in designing and validating a web or computer-based FFQ have the potential to improve nutritional epidemiology studies.

B20 Factors associated with nutritional supplementation intake among athletes in Universiti Putra Malaysia

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The aim of this study was to determine factors associated with nutritional supplementation intake among athletes in Universiti Putra Malaysia. A cross-sectional study was carried out among athletes in UPM. A validated self-administered questionnaire was used to determine socio-demographic characteristics, sports characteristics, nutritional supplementation intake, sports nutritional knowledge and physical activity level of the athletes. Weight, height and body fat percentage were measured, then BMI and fat-free mass were calculated. A 24-hour dietary recall was used in interview session to determine athletes' dietary intake. A total of 165 of athletes in UPM (73.9% male and 26.1% female), with a mean age 22.48±1.95 years old participated in this study. Majority of the participants were Malay (84.9%), with the mean monthly allowance of RM590.61±421.65 and mean household

income of RM4123.70±1903.38. Most of the participants had a moderate sports nutritional knowledge (81.8%) and high physical activity level (55.2%). The prevalence of nutritional supplement intake among athletes in UPM was 43% with energy supplement (80.3%) being the most popular supplement followed by protein supplement (45.1%) and vitamin/mineral supplement (39.4%). The most common reasons for using nutritional supplements were to increase energy level (64.8%), for health (52.1%) and for weight/muscle gain (45.1%). The participants were most likely to get information about nutritional supplement from their coach (54.9%), fellow students athletes (50.7%) and from the internet (45.1%). Result showed monthly allowance (r=0.328; p<0.001), household income (r=0.243; p=0.002), types of sport (c^2=15.64; p=0.008), category of event (c^2=18.25; p<0.001), number of years of participation (c^2=4.90; p=0.027), sports nutritional knowledge (r=0.232; p=0.003), physical activity level (r=0.210; p=0.007) and fat-free mass for male (r=0.201; p=0.026) and female (r=0.359; p=0.018) were significantly associated with nutritional supplementation intake. In conclusion, the prevalence of supplementation intake among athletes in UPM was considered high. Therefore, intervention program to educate on sports nutritional supplement is needed to ensure healthy nutritional intake among the athletes.

B21 Ethnicity differences in assessment of diet quality index among Malaysian elderly

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This study aimed to determine the prevalence and discrepancy of Diet Quality Index (DQI) across ethnicity among elderly in Malaysia. This is a cross-sectional study with n=138 were randomly recruited in this study. Diet Quality Index was used to identify diet quality of elderly. ANOVA test was used to determine the mean differences of DQI between ethnicity. The Chi-square Test of Independence was used to determine the association between associated factors and diet quality. The prevalence of diet quality among elderly was 74.6% with Malay showed the highest proportion of poor diet quality (62%), followed by Indian (25.2%) and Chinese (12.6%). Analysis of variance showed a significance mean differences of diet quality index score across ethnicity (F (2, 135) =6.675, $P < 0.005$, η^2= 0.08. Post-hoc analysis with Tukey's HSD test ($P < 0.001$) revealed that, Indian showed a significantly higher diet quality score (M = 37.8, SD = 5.47) compared to Malay (M = 33.23, SD = 6.06). No significance differences of diet quality score between Malay and Chinese nor between Indian and Chinese. There is a significance association between ethnicity and diet quality (X^2= 10.587, p = 0.005). Other covariates of level of education (X^2 = 8.051, p= 0.005) and smoking (X^2 = 8.851, p=0.012) showed significant association with DQI. Chinese elderly showed the highest proportion of good diet quality index compared to Malay and Indian. The diversity of diet across ethnicity may play a significance role in determining the diet quality. Future research is needed to address the dietary pattern by ethnicity that may affect the diet quality index among elderly.

B22 Associations between screen time, snacking behaviour and sleep quality and nutritional status among adolescents aged 13 to 19 years in Kuala Lumpur, Malaysia

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The objective of this study is to determine the associations between screen time with snacking behaviour, sleep quality and nutritional status (Body Mass Index, Body Fat Percentage, Waist Circumference) among adolescents aged 13 to 19 years in Kuala Lumpur. This was a cross-sectional study and a total of 233 subjects were recruited using multistage stratified cluster sampling from three secondary schools located in Kuala Lumpur, Malaysia. Information on screen time, energy intake, snacking frequency and sleep quality were collected through self-administered questionnaires. Anthropometry and body composition data were measured. Number of subjects recruited in this study were slightly higher in males (53.2%) than females (46.8%), aged between 13 to 18 years. They were mainly Malays (42.1%) and Chinese (42.5%). Adolescent boys tend to spend longer time on the screen than girls. Overall, students spent longer screen time on weekends. Television viewing and use of internet for non-study reasons were the main screen recreation activities. These take up most of the total screen time (40%). Significant associations were found between screen time and higher BMI ($r=0.154$, $p=0.018$), unhealthy body fat percentage ($p=0.015$), higher waist circumference ($r=0.185$, $p=0.005$) and poor sleep quality ($r=0.131$, $p=0.047$). Energy-dense foods and higher snacking frequency were found to be more likely present amongst students with higher exposure of screen time. Consuming energy-dense foods during screen time and having poor sleep quality were significantly associated with unhealthy waist circumference. There is a high prevalence of excessive screen time, unhealthy snacking behaviour and poor sleep quality among adolescents in the selected schools in Kuala Lumpur. High screen time subjects tend to have high energy-dense foods and higher frequency in snacking. Health promotion strategies or interventions to reduce screen time to a recommended limit of 2 hours per day should be advocated to adolescents towards better health.

B23 Evaluation of binge eating behaviour among university students

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Binge eating behaviour refers to the consumption of large amounts of food that normal people would not have eaten in a certain duration of time. Early detection of binge eating behaviour helps to prevent the onset of eating disorders including Bulimia Nervosa and Binge Eating Disorder. Literature claimed that eating disorders usually begin in the late teens or early 20s and therefore this study aims to assess the Binge Eating Behaviour among university students in Management and Science University (MSU). A total number of 122 respondents was recruited into the present study using random sampling method. The Self-Regulation of Eating Behaviour Questionnaire (SREBQ) was used to assess the binge eating behaviour in the respondents. Findings indicated that the total mean score for SREBQ was 3.11 ± 0.51, which reflects that the respondents had a medium risk for binge eating behaviour. Among the 122 respondents, 17.2 % of the respondents had a low risk for binge eating behaviour, while 68.9% and 13.9% had medium and high risks for binge eating behaviour, respectively. There is a need to call for eating disorder-related

prevention program in MSU since majority of the respondents had medium risk for binge eating behaviour.

B24 Sugar-sweetened beverages (SSB) intake knowledge, attitude and practices among university students in Malaysia

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The trend of sugar-sweetened beverages (SSB) intake among university students is worrying. Increase intake of SSB in the young population will lead to serious consequences in adulthood. Thus, it was imperative to assess the knowledge, attitude and practices (KAP) of this population before implementing any possible intervention. This cross-sectional study aimed to evaluate the knowledge, attitude, and practices of SSB among university students in Malaysia. Data was collected using a validated questionnaire on 235 undergraduate students, selected from a few universities in Malaysia. Data on weight and height were self-reported by the students. Approximately half of the students have poor knowledge and attitude whilst 63.8% of them had poor practices of SSB. There were no significant differences between BMI and faculties in terms of knowledge level, but significant differences were observed between the gender ($p<0.001$). Female students (31.9%) showed a high level of knowledge regarding SSB as compared to male (17.9%). In terms of attitude, there were significant differences observed between BMI ($p<0.001$) and faculty ($p<0.01$). It was found that more normal weight students (43.0%) and non-health sciences (HS) students (34.5%) have a low attitude towards SSB as compared to overweight (10.2%) and HS students (18.7%). In the practices domain, both HS (31.9%) and non HS (31.9%) showed low practice of SSB. As conclusion, the level of KAP among the students was unsatisfactory. Therefore, education and awareness programs are essential for the young population in order to improve their practices towards SSB intake.

B25 Maternal anthropometry, dietary intake and its association with gestational diabetes mellitus: a cross-sectional study

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Gestational diabetes mellitus (GDM) is one of the most common complications of pregnancy. This study aims to determine the prevalence of GDM and study its association with maternal anthropometry and dietary intake. A cross-sectional study was conducted among 451 eligible pregnant women who attended government antenatal clinics in rural and urban areas of Selangor, Malaysia. GDM was self-reported and validated by clinic record review. Sociodemographic characteristics of pregnant women were collected using questionnaire while 2-day dietary recall was to assess dietary intake. Pre-pregnancy weight and height were obtained from medical reports. Body composition and mid upper arm circumference (MUAC) were measured using Tanita body impedance analyser SC-330 and non-stretchable measuring tape respectively. Overall prevalence of GDM was 13%, with no significant different among pregnant women in rural areas (14%) and urban areas (13%). Age of pregnant women with GDM (32 ± 5) was significantly higher than those without GDM (29 ± 5). Women with GDM had significantly higher pre-pregnancy body mass index

(BMI), MUAC, body fat percentage and visceral fat (26.8 ± 5.8, 28.0 ± 3.2, 40.0 ± 8.5 and 8.2 ± 2.8 respectively). No significant association was found between dietary intake and GDM. However, pregnant women with GDM had higher fat intake (60.4 ± 23.7g). In logistic regression model, maternal age (OR: 0.9, 95% CI: 0.8-1.0; P = 0.046), pre-pregnancy BMI (OR: 0.8, 95% CI: 0.7-0.9; P <0.001) and fat mass (OR: 1.3, 95% CI: 1.1-1.5; P = 0.006) were the main factors associated with GDM. Higher BMI, MUAC, body fat percentage and visceral fat may be associated with increased insulin resistance. Pregnant women with common risk factors especially among those of older age, with higher BMI as well as fat mass should receive more attention from physicians as high-risk individual for GDM.

B26 Pattern of plain water consumption among overweight and obese children: findings from MyBFF@School

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Plain water is recognised as the best energy-free alternative to replace sugar-sweetened beverages in the diet of overweight and obese children. Many countries, including Malaysia listed plain water as the preferred beverage to fulfill children's daily fluid requirements according to dietary recommendations and guidelines. This study aimed to determine the frequency of plain water intake and its dietary practice among overweight and obese school children. A total of 1045 primary and 1041 secondary school children from randomly selected schools in three states mainly Kuala Lumpur, Selangor and Negeri Sembilan had participated in this study. A pre-tested questionnaire was used to determine the frequency of plain water and its dietary practice among the primary and secondary school children. Findings revealed that, both primary and secondary school children consumed plain water for 4.07 ± 1.63 (days/week) and 3.58 ± 1.96 (days/week), respectively. Majority of the overweight and obese school children brought plain water to school every day (5 days/ week) at about 68.0% for primary and 61.5% for secondary school children. Meanwhile, the frequency of plain water bought at school canteen among overweight and obese school children were 40.3% (primary) and 44.8% (secondary), respectively. A high consumption of plain water was reported among the overweight and obese school children whom participated in this study.

B27 Associations between socio-demographic factors, nutritional status, dietary intake and atherogenic lipid profile among adults

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Atherogenic dyslipidemia (AD) is an important risk factor of cardiovascular disease (CVD) which consists of low high density lipoprotein (HDL-C), high triglyceride (TG) and small dense LDL (sdLDL) particles. Individuals with abundance of sdLDL particles are

classified as LDL pattern B. There are no published data on pattern B lipoprotein in multi-ethnic Malaysian population and this study aims to determine the associated factors of atherogenic lipid profile such as socio-demographic factors, nutritional status, and dietary intake. Questionnaires were given to a total of 150 respondents aged more than 30 years old who attended a Health Screening conducted in Faculty Medicine and Health Sciences, UPM. Information on socio-demographic background was collected via self-administered questionnaire, while their nutritional status including height and weight was measured and Body Mass Index (BMI) was subsequently estimated. A validated Food Frequency Questionnaire (FFQ) that consists of 126 food items was used to determine dietary intakes of the respondents. A total of 10 ml of blood were taken from the respondents and transported to Chemical Laboratory in FHMS, UPM. The separation of LDL-C particles was performed using The LipoPrint® Quantimetrix LDL. Individuals with large, buoyant LDL-C (lbLDL) particles (LDL-1 and LDL-2 subfractions) were classified as pattern A and individuals with sdLDL particles (LDL-3 through LDL-7) were classified as pattern B. Sixty-seven percent of subjects were presented with pattern B lipoprotein. After adjusting for age, sex, race, BMI and saturated fat intake, being a Malay (OR= 2.933; 95% CI: 1.191, 7.222) was associated with higher risk of getting AD compared to Indian and Chinese. Moreover, being a male (OR= 0.264; 95% CI: 0.117, 0.597) and overweight or obese (OR= 0.332; 95% CI: 0.143, 0.768) had a lower odds of having pattern B lipoprotein. The findings provide insights for target population that would benefit from intervention to reduce CVD.

B28 Development of a photographic food atlas prototype as a portion size estimation kit for Malaysian

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Photographic food atlas consists a set of photograph series showing different quantity of a particular food and serve as a portion size estimation aid (PSEA). In Malaysia, the existing food atlas are focusing on displaying food in exchanges and standard portion sizes but do not display range of food portion sizes. Thus, this paper aimed to discribe the development of a food atlas namely 'MY Food Album' and assess its usability as a PSEA. Thirty four subjects (31.6 ± 20.9 years) self-served 23 amorphus food items to represent their typical, small, medium and large portion sizes in a standard laboratory setting. Mean weight and standard deviation of portion sizes self-served by subjects were obtained to determine the food portion sizes to be displayed in MY Food Album. Using standard lighting and camera settings, pictures of various local foods were photographed at 45° angled view. The usability of MY Food Album as a PSEA was evaluated by six nutritionists and dietitians through an adapted questionnaire and discussion. A total of 393 food items categorized into 14 food groups were presented as serial (n=101), guide (n=213) and range (n=79) photographs. Nutritionists and dietitians shown positive feedback towards the newly developed food atlas as a PSEA and some suggestions were obtained to improve the MY Food Album. MY Food Album was accepted by nutritionists and dietitians as a PSEA while its effectiveness to aid in portion size estimation need to be evaluated through a validation proses in the future.

B29 Dietary diversity and body mass index of adults in Kampung Muara Tuang, Kota Samarahan, Sarawak, Malaysia

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A cross-sectional study on dietary diversity and body mass index was conducted among adults in a semi-urban Malay village of Kampong Muara Tuang in Samarahan district. A random sample of 110 adults was obtained and data elicited using an interviewed-administered questionnaire consisting of socioeconomic and demographic profile, 24-hour dietary recall and body mass index (BMI) measurement. Dietary diversity assessment was based on a 24-hour recall with FAO guidelines using 12 food grouping and levels of dietary diversity classification. The family monthly income was below RM3000 (69.1%) while 59.1 % were gainfully and self-employed. Most of the respondents (73.6%) were classified as having high dietary diversity. The food groups highly consumed were cereals (100%), vegetables (93.6%) and spices, condiments and beverages (92.7%), sweets (70.9%), oils and fats, meat and fish were consumed moderately (60%).The food groups lowly consumed were fruits (33.6%), eggs (30.9%),milk and milk products (24.5%), white roots and tubers (7.3%) and legumes, nuts and seeds (7.3%). The majority is in the overweight and obese BMI category (72.9%), while normal, 25.5% and underweight, 1.8%. There is no significant association between the socioeconomic and sociodemographic profile with dietary diversity and BMI ($p > 0.05$). Although it is found that respondents with low dietary diversity have high BMI, the association is not significant ($p>0.05$). In conclusion, high dietary diversity among the adults may not necessarily be associated with better nutritional status. The high prevalence of overweight and obese in the study population indicate an imbalanced diet with higher consumption of foods rich in carbohydrate and fat. More comprehensive study on dietary intake and level of physical activity is recommended.

Group C: Nutrients & Other Components in Foods/Products

C01 Determination of mineral and vitamin contents in traditional salad dishes of *centella asiatica* (pegaga), *cosmos caudatus* (ulam raja) and *piper sarmentosum* (kaduk)

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Throughout the world, there are many species of herbs found with tremendous beneficial effects for mankind. In Malaysia, the medicinal plants are still used in their traditional systems in treating diseases such as flatulence, gastric, constipation, and diarrhoea. Thus, this study had purposed to determine the mineral and vitamin contents in three traditional salad dishes of *Centella asiatica* (Pegaga), *Cosmos caudatus* (Ulam Raja) and *Piper sarmentosum* (Kaduk). In this experimental study, the traditional salad dishes were prepared using a slightly modified "*Kerabu Pucuk Mengkudu 1Malaysia"* recipe. The mineral contents of the traditional salad dishes was determined through atomic absorption spectrometry (AAS), while for vitamin, it was carried out with high performance liquid chromatography (HPLC). The *Cosmos caudatus* (Ulam Raja) had the highest concentration of potassium, calcium, sodium and copper (9.063 ±± 0.014 mg/g, 4.750 ±± 0.652 mg/g, 2.601 ±± 0.042 mg/g and 0.006 ±± 0.000 mg/g), whereas *Centella asiatica* (Pegaga) possessed the highest zinc content (0.008 ±± 0.001 mg/g). As for *Piper sarmentosum* (Kaduk), it had the highest iron content (0.024 ±± 0.001 mg/g) among the three traditional salad dishes. The contents of vitamin C and vitamin B_2 were found highest in traditional salad dishes of *Cosmos caudatus* (Ulam Raja) with 2.168 ±± 0.621 mg/100 g and 14.772 ±± 0.126 mg/100 g, respectively. Thus, the study had discovered that the *Cosmos caudatus* (Ulam Raja) traditional salad dishes had the highest mineral and vitamin contents within the three traditional salad dishes.

C02 Comparison of nutritional composition, antioxidant activity, and antibacterial activity between *Emblica officinalis* leaves and brown seaweed *Padina pavonica* harvested from Cape Rachado, Port Dickson, Negeri Sembilan, Malaysia

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The objective of this study was to determine the differences of nutritional composition, antioxidant activity, and antibacterial activity between *Emblica officinalis* leaves and brown seaweed *Padina pavonica*. Both samples were local samples harvested from Cape Rachado, Port Dickson, Negeri Sembilan. The nutritional composition was divided into two components, proximate composition and mineral contents. The results were presented as mean(standard deviation) except for antibacterial activity. For proximate composition, the determination of moisture, ash, protein, fat, carbohydrate, crude fibre and calorific value were done by using standard procedures. The mineral contents of the samples were determined with Atomic Absorption Spectrophotometry (AAS) method. Folin-Ciocalteu assay method was used to measure the antioxidant activity of the samples. Lastly, the antibacterial activity of the samples was determined by using the disk diffusion method. The result of the proximate composition showed a huge difference in terms of ash, carbohydrate, and crude fibre contents between *E.officinalis* and *P.pavonica*, which were 4.15(0.54) and 63.81 (0.26) for ash, 71.97(0.10) and 23.16(0.44) for carbohydrate, and 13.20(0.90) and 3.41(0.15) for crude fibre, respectively. For mineral analysis, both samples were low in iron, zinc and copper but were good sources for calcium and potassium. *P.pavonica* In the antioxidant analysis, total phenolic content (mg GAE/g) of *E.officinalis* was high, 150.33(27.47) but for *P.pavonica* showed no results. *E.officinalis* showed antibacterial activity towards the strains used in the analysis while *P.pavonica* showed no reactions at all. Their nutritional composition, antioxidant and antibacterial capacities made both samples as the potential candidates for nutritional and pharmaceutical industries. This study can be considered as part of continual efforts in exploring the potentials of these local samples.

C03 Proximate composition, total phenolic content and total flavonoid content of pasta made from wheat flour and composite soy flour

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Pasta is one of the most consumed cereal-based food products worldwide. It is made from refined wheat which most of refined grain foods contain high energy and low in nutritive value. Overconsumption of refined wheat can lead to several non-communicable disease. Hence, there is consumer demand on improving pasta and noodles nutritional properties, texture and appearance by using natural food additive. Many researches have been conducted show the components in soybean can prevent and treat chronic disease like cardiovascular disease, obesity, diabetes mellitus and cancer. Therefore, the purpose of this study is to determine the nutrient composition, total phenolic content and total flavonoid content in pasta made from wheat flour and composite soy flour. Sensory evaluations were also determined for the appearance, aroma, colour, firmness, taste and overall acceptability of the pasta samples. The proximate analysis was conducted by using

AOAC International methods while total phenolic content and total flavonoid content were conducted using Folin-Ciocalteu method and Aluminium Chloride Colorimetric method, respectively. Sensory evaluation involved 30 untrained panellists. The results showed that soy pasta contain high moisture, ash, protein and fat content ($p<0.05$). Meanwhile, wheat pasta contains high total carbohydrate content ($p<0.05$). Soy pasta presented higher total phenolic content and total phenolic content compared to wheat pasta ($p<0.05$). For the sensory evaluation, it revealed that commercialize pasta have higher overall acceptability followed by soy pasta and wheat pasta, respectively. Overall, this study showed that soy pasta has better nutritional value and preference compared to wheat pasta. Therefore, soy pasta could be one of the pasta variants that could potentially give health benefit to the consumer. This soy pasta can be used as a nutritious food for low income group in developing countries and as natural supplement to those who intended to take high protein food.

C04 Antioxidants and antimicrobial activity of rosemary leaves and stem extract

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Medicinal plants are a source for a wide variety of natural antibacterial and antioxidants. The objective of this study was to determine the antioxidant and antibacterial activity of rosemary leaves and stem. Methanol extracts of rosemary leaf and stem were evaluated for its antibacterial activity. The antibacterial activity was determined using paper disc method against two bacteria namely *Staphylococcus aureus* and *Bacillus cereus*. The sensitivity in terms of zones of inhibition of both extract was determined. The antioxidant activity was determined by measuring total phenolic content (TPC) and 2,2-diphenyl-1-picrylhydrazyl (DPPH). The result showed that the methanol extracts of rosemary leaf and stem were effective against both the bacteria tested. The leaf extract of rosemary exhibited a higher antibacterial activity than the stem extract of rosemary. The acetone extract of rosemary leaf showed the largest antioxidant TPC and DPPH compared with stem extract. The plants can be used to control infectious diseases and prevent oxidative damage.

C05 Antioxidant, physicochemical properties and acceptance of selected commercial tropical fruit juice (mango)

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This study aims to determine the antioxidant activity, vitamin C content, sensory acceptance and physicochemical properties such as pH, titratable acidity (%) and total soluble solids (° Brix) of commercial mango juice. The antioxidant activity (radical scavenging activity) was determined by using the UV-visible light spectrophotometer while vitamin C was determined by using potassium iodate titration method. The pH was determined by using pH meter and the total soluble solids was determined by using the refractometer. Titratable acidity was determined by using the potentiometric method. The brand of commercial mango juice that contained the highest antioxidant activity was sample D (746.94 ± 0.11 mg/100ml). Meanwhile, the highest vitamin C content was recorded in sample D (592.86 ± 55.79 mg/100ml). The highest titratable acidity was recorded in sample D (1.56 ± 0.05). Apart from that, the brand of commercial mango juice that contained the highest pH value was found in sample A (3.95 ± 0.02). Sample C (11.7 ± 0.10) had the highest total soluble solids among the commercial mango juice. For the sensory attributes, the highest appearance,

sweetness, sourness and overall acceptance was found in sample D. On the other hand, the highest sensory attribute for aroma and viscosity was found in sample A. In conclusion, brand or sample D of commercial mango juice recorded the highest antioxidant activity, vitamin C content, titratable acidity and sensory attributes for appearance, sweetness, sourness and overall acceptance. However, the highest pH and sensory attributes for aroma and viscosity was found in sample A while total soluble solids were found the highest in sample C of commercial mango juice. Hence, the brand sample of commercial mango juice that most accepted by the majority of the respondents was sample D.

C06 Determination of antioxidant activity, total phenolic and total flavanoid content of banana (*Musa SP.*) peels using aqueous and ethanolic extractions

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Banana (*Musa SP.*) peels have been categorized as one of the largest agricultural wastes produced from the food processing industry. It is important to manage and utilize these wastes as they pose health promoting properties, potentially as a natural antioxidant. The aim of this study was to determine and compare the antioxidant activity, total phenolic (TPC) and total flavonoid (TFC) contents in *Pisang Tanduk (PT)* and *Pisang Abu (PA)* peels. The banana peels were obtained from the chips production factories at Banting and Petaling Jaya, Selangor. They were washed, cut into smaller pieces, freeze-dried, and homogenized into powder for analysis of DPPH assay, β-carotene bleaching assay, Folin-Ciocalteu method and Aluminum Chloride Colorimetric method. The ethanolic extract of the samples (*PT*=0.09 mg/ml, *PA*=0.22 mg/ml) had significantly lower IC_{50} value than the aqueous extract. Besides, the antioxidant activity was significantly higher in the ethanolic extract (*PT*= 53.92 %, *PA*=50.02 %) than in the aqueous extract. Regardless of the types of banana peels, the ethanolic extract produced significantly higher TPC (*PT*=125.00 GAE/g, *PA*=89.00 GAE/g) and TFC (*PT*=14.567 mg QE/g, *PA*= 10.867 mg QE/g) than the aqueous extract. Of these two types of banana peels, *PT* had the higher antioxidant activity, total phenolic and total flavonoid content. This study found that banana peels can be considered as a potent and alternative natural antioxidant source from the agriculture wastes. Future work should is warranted to investigate the impact of different extraction conditions as well as to identify specific phenolic compounds in banana peels.

C07 Determination of total phenolic content and antioxidant activity of selected traditional salad dishes of *Cosmos caudatus* (Ulam raja), *Centella asiatica* (Pegaga) and *Piper sarmentosum* (Kaduk)

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Chronic disease is the largest cause of death in the world. The prevalence of chronic disease is expected to increase and elevate in the future with changes of population, industrialization and urbanisation of the country. The previous study has reported that

there is a high demand for fruits and vegetables in Malaysia but the consumption of fruits and vegetables are still not achieving the recommendation. Therefore, this study aims to determine the total phenolic content (TPC) and antioxidant activity of selected traditional salad dishes and the relationship between TPC and antioxidant activity. Three selected traditional salad were used in this study which is *Cosmos caudatus* (Ulam raja), *Centella asiatica* (Pegaga) and *Piper sarmentosum* (Kaduk). TPC was quantitatively determined using standard procedure and antioxidant activities were determined using two different methods which is 2,2-diphenyl-1-picryl-hydrazyl (DPPH) and ferric reducing/antioxidant power (FRAP) assays. Results were found that TPC of all sample extracts showed a significant difference for the raw traditional salad with *Cosmos caudatus* having the highest total phenolic content which is 17.10 mg GAE/g. For traditional salad dishes, *Centella asiatica* has the highest total phenolic content which is 47.72 mg GAE/g. For antioxidant activity using DPPH assay, sample extracts of *Cosmos caudatus* showed the highest antioxidant activity in both raw traditional salad and traditional salad dishes which is 78646.537 mg AA/g and 34692.805 mg AA/g respectively. For FRAP assay, all sample extracts showed the ability to reduce Fe^{3+} to Fe^{2+} but there is no significant different among them. In conclusion, *Cosmos caudatus* were found to possess significant antioxidant activity compared to *Centella asiatica* and *Piper sarmentosum.*

C08 A review on the phytochemicals of *Parkia Speciosa, stinky beans* as potential phytomedicine

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Parkia speciose (PS), or stink bean, is a Malaysian favourite culinary ingredient. The seed of *PS* contains important chemical and medicinal properties including its pods that always been discarded as a waste. This present review contained the relevant literature to congregate the phytochemicals secondary metabolites and pharmacological information on PS. PS seeds and its pods are rich in biologically active compounds such as phenolic acids, flavonoids, alkaloids, saponins, terpenoids, cyclic polysulfides and tannins. Phenolic constituents specifically, the gallic acid is the most abundant phytochemicals identified in PS pods. This is followed by the catechin, ellagic acid and quercetin. The terpenoids, β-sterol, squalene, campesterol and stigmasterol were identified in PS seeds. Cyclic polysulfides, compounds that responsible for a strong pungent smell and taste in PS were also identified in PS seeds, with 1,2,4-trithiolane being the most abundant compound identified. Alkaloids, saponins and tannins were only reported in qualitative phytochemical screening of PS in all articles reviewed. The alkaloids and saponins were reported to be abundant in the methanolic extracts but tannins were in ethanol extracts. These phytochemicals are beneficial in terms of antioxidant activity, hypoglycemic activity, antitumor/antimutagenicity, antimicrobial activity and current research showed some evidence of their effects on the cardiovascular system. The studies also revealed that plants with high antioxidant activity contained high total phenolic and flavonoid compounds while for hypoglycemic effect is from the synergistic effect of terpenoid compounds; the β-sterol and stigmasterol. The antimicrobial properties are possessing from both the seed and pod of PS; however, the spectrum of the activity depends on the type of the extract. This present review will be useful for future studies through current information on the phytochemical constituents and medicinal properties to a possible extent with relevant data as these plants have potential to be developed as phyto-/herbal-/botanical medicine.

C09 Total phenolic content, total flavonoid content and antioxidant activities of *dialium indum* in different extractions

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The fruit of *Dialium indum* or also known as *'keranji'* is part of the tropical fruits that are less popular and underutilized in Malaysia. Underutilized fruits are consumed by local people especially rural communities can be considered as one of important source of antioxidant in their diet. This study aimed to evaluate the antioxidant contents and antioxidant activities of *Dialium indum* fruit in three different extractions (50% ethanol, hot and cold aqueous extracts). This study was conducted by using four assays, which are Folin ciocalteu reagent to measure the total phenolic content, Aluminium chloride colorimetric assay to measure total flavonoid content, Ferric reducing antioxidant power (FRAP) assay and Beta carotene bleaching (BCB) assays to measure the antioxidant capabilities. The significant differences ($p < 0.05$) were observed among the different extractions upon comparison of antioxidant contents and antioxidant activities. The results showed that the fruit sample in 50% ethanol extract exhibited the highest antioxidant content and the strongest antioxidant activity with significantly higher total phenolic content (11.137 mg GAE/g), total flavonoid (1.350 mg CE/g), reducing power (10.743 mmol ferrous/g) and bleaching activity (40.79%) than the other extracts. High phenolic content and flavonoid content of *Dialium indum* fruit were found to be significantly and positively correlated with high antioxidant capacity. The various antioxidant properties indicate that this fruit can be used in dietary applications for an alternative in managing various degenerative and chronic diseases development as its have clearly demonstrated in the protection against deleterious effects of oxidative stress.

C10 Fat content and fatty acids profile of coconut milk (*santan*) in Malaysia

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Coconut milk is the white, oil-in-water emulsion extracted from fresh coconut flesh with or without added water. In Malay word the coconut milk is commonly known as santan which usually sold as a fresh liquid form in the local market. The composition of coconut milk depends on the amount of water used for the extraction, affecting significantly physicochemical properties. Therefore, the aim of this study was to determine the fat content with fatty acids profile of Malaysian coconut milk sold by local vendors. Samples were obtained from three locations in Hulu Langat (Banadar Baru Bangi, Hentian Kajang and Kajang) in Malaysia. Fat content was measured by Mojonnier method and fatty acids profile peaks were separated by gas chromatography (GC) model Shimadzu GC 2010 with Flame Ionization Detector (FID) at 230 °C injection temperature. Results of the study showed that Malaysian coconut milk contained significantly lower ($P<0.05$) fat content (15.4%) than the other tropical coconut milk samples from Philippine, Thailand and Sri Lanka. The coconut milk had the higher amount of buyric acid (C4), caproic acid (C6) and lauric acid (C12) with mean values of 247.08, 152.77 and 245.66 mg/ 100g, respectively. Furthermore, it had the higher amount of all long chain fatty acids (LCFAs) except linolelaidic-tans (C18:2n6t), eicosenoic-cis (C20:3n3) and erucic acid (C22:1n9). Lauric acid is known to be an antiviral and antibacterial that destroys a wide variety of disease causing organisms. Thus, it can be conducted that santan is a source of fat that may help protect the body from infections

and viruses. However, because of coconut milk's high content of saturated fatty acids, it is still seen as a food that should be consumed in moderation.

C11 Effect of growing location on phytochemicals screening and antioxidants activities of medicinal plants

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Extracts of medicinal plants *Eucalyptus* leaves, *Olea* leaves and *Zizphus* leaves were investigated for their antioxidant activity. The presences of phytochemicals and antioxidant activities were investigated. Parts of medicinal plants were extracted with acetone 50%. The extracts were evaluated for antioxidant activity using (TPC) and 2,2-diphenyl-1-picrylhydrazyl (DPPH) and phytochemical screening was performed using a standard method. The results indicated that for all plants and growing location urban and remote area had influence on phytochemicals and antioxidant activity phytochemical analysis revealed that alkaloids, flavonoids, triterpenoids, tannin, saponin and steroids were present in the extracts of *Eucalyptu, Olea* and *Zizphus.* Significant differences ($p<0.05$) in antioxidant activity in leaves of *Eucalyptus, Olea, Zizphus* were found among the different growing location. The results showed that the highest concentration of antioxidant activity in *Zizphus* leaves and *Eucalyptus* leaves were found from the remote areas. The results showed the important role of the growing location in increasing the antioxidant content of medicinal plants.

C12 Nutritional composition and cost between gluten-free food products and gluten-containing food products in Federal Territory of Kuala Lumpur, Malaysia

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Recently, the accessibility of gluten-free food products has been expanded broadly by food manufacturers because they can be purchased easily from the stores. However, to date, there is no information available in Malaysia on nutritional composition of gluten free products versus gluten-containing food products. Therefore, the objective of this study was to investigate the nutritional composition (energy, carbohydrate, protein, fat, and dietary fibre) based on Nutrition Information Panel and cost per 100g between gluten-free and gluten-containing food products in Federal Territory of Kuala Lumpur, Malaysia. The range of foods include bread, pasta, biscuit and flour. The nutritional composition and cost of the 106 food products were determined and compared: gluten-free food products ($n = 41$) with gluten-containing food products ($n = 65$) available from 4 grocery stores in Federal Territory of Kuala Lumpur, Malaysia. An independent samples t-test was used to determine the differences in nutritional composition and cost between both food products. The findings showed that the energy content was significantly higher especially in the gluten-free brownie mix and spaghetti ($p < 0.05$), and carbohydrate content was higher in gluten-free all-purpose flour and spaghetti ($p < 0.05$) than gluten-containing food products. Low protein content was found in gluten-free bread mix, chocolate cake mix, all-purpose flour, spaghetti and biscuits ($p < 0.05$). Across all gluten-free food products, only lasagne sheet was determined as having a low content of dietary fibre ($p < 0.05$). The cost for the

majority of GF food products was significantly higher as compared to gluten-containing food products ($p < 0.05$). In conclusion, this study showed that the gluten-free food products had overall similar nutritional composition with gluten-containing food products except for protein content and the cost. Over consumption of gluten-free food products does not give any beneficial effects toward health but rather show critical health condition.

C13 Proximate composition, functional properties, and prebiotic potential of banana (*Musa sp.*) peel

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Banana *(Musa sp.)* is a classic example of such abundantly available natural material which provides a wide range of benefits. However, it is one of the largest underutilized agricultural waste. This study was conducted to determine and compare chemical composition, functional properties and prebiotic potential of *Pisang Tanduk (PT)* and *Pisang Abu (PA)* peels. The fresh samples were obtained from Banting and Petaling Jaya, Selangor, and they were cleaned, freeze-dried and homogenized into powder. Proximate composition was analysed using the AOAC methods and total dietary fibre was determined using Prosky and Lee method (AACC Method 32-07.01) Four functional properties were analysed, i.e bulk density, water and oil absorption capacity and gelling property. Lastly, the prebiotic potential of these powders was assessed based on the growth of probiotic *Lactobacillus* and prebiotic activity score. The proximate composition was significantly ($p<0.05$) different between *PT* and *PA*, except for the ash content. Moisture, protein and carbohydrate were superior in *PT,* whereas *PA* had higher fat, total dietary fibre and reducing sugar. Regarding the functional properties, *PT* had significantly ($p<0.05$) high bulk density and water absorption capacity than *PA*. In contrast, *PA* had significantly ($p<0.05$) high oil absorption capacity and formed gel at a low concentration, compared to *PT*. There was also a significant difference in the mean growth rate and the mean duplication time ($p<0.001$) of probiotic *Lactobacillus*, indicated that the probiotic growth was affected by the source of glucose in the media supplemented by *PT* and *PA*. Both *PT* and *PA* had comparable prebiotic score, in comparison to other agricultural waste products. Overall, banana peel has enormous commercial potential that can add a higher value to this locally essential crop. This agricultural waste also serves its important as functional ingredient for food industry due to its potential prebiotic and fermentable properties.

C14 Analysis of nutritional composition, mineral content and antibacterial activity of farm and wild *sargassum wightii* from Cape Rachado, Negeri Sembilan

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Seaweeds are known as marine macroalgae which are high in nutritive value and minerals that are important to health. It is commonly found in places such as sea, lake and river. In this study, farm *Sargassum wightii* and wild *Sargassum wightii* which were harvested from Cape Rachado, Negeri Sembilan were determined to compare for its nutritional value, mineral content and antibacterial activity. Proximate analysis was conducted to determine

the moisture, ash, protein, lipid, carbohydrate and crude fibre by using the standard method. Next, the mineral content (sodium, potassium, iron, calcium, zinc, lead and cadmium) was determined by using atomic absorption spectroscopy (AAS). Next, the antibacterial activity of the seaweeds was determined by using a method called susceptibility screening to screen for the bioactivity of the bacteria. The results were expressed as mean ± standard deviation except for anti-bacterial activity. The different extracts of *S. wightii* showed differences in nutritive value and mineral content. Moreover, farm and wild *S. wightii* were high in its nutritional composition especially ash content of 32.50 ± 0.91 g/100g DW and 29.17 ± 0.62 g/100g DW while carbohydrate of 43.53 ± 1.23 g/100g DW and 53.15 ± 0.60 g/100g DW respectively. Both seaweeds showed low lipid content ranged from 0.26 – 0.31 g/100g DW. The determination of minerals showed that both seaweeds possess a high content of sodium, potassium and calcium but low content of zinc, lead and cadmium. Next, there is no zone of inhibition for susceptibility screening of antibacterial activity for both extracts. The results suggested that both farm and wild *S.wightii* has the potential to be a functional ingredient to provide extra health benefits to the consumer beyond the basic nutrition and disease preventing benefits.

C15 Minerals and trace element contents in breast milk of Malaysian mothers

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Breast milk provides the necessary nutrients for the growth and development of infants and young children. Breast milk composition differs from mother to mother due to the differences in dietary intake. This study determined the nutrient composition of breast milk collected from a sample of 20 Malay mothers with infants aged between 2 to 5 months. Breast milk samples were obtained by using a Philips Avent single electric breast pump to express the milk. Each mother provided three samples of breast milk of 25 mls at fortnightly intervals. The breast milk samples were collected in sterile tubes, placed on ice and stored in -80°C freezer until analysed using the ICP-MS. This presentation reports on the contents of sodium, chloride, calcium, phosphorus, magnesium, zinc, potassium, selenium, iodine and iron. The results revealed a relatively high concentrations of sodium, zinc and iodine and relatively low potassium, magnesium and iron contents, compared to published results elsewhere. Further studies with a bigger sample size and different ethnicities would be required.

C16 Evaluation of total phenolic content and antioxidant activities of coloured plants (blue butterfly pea, roselle, yellow bell pepper and purple sweet potato)

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Blue Butterfly Pea Flower (BBP), Roselle Calyx (RC), Yellow Bell Pepper (YBP) and Purple Sweet Potato (PSP) are rich in dietary antioxidants such as carotenoids, flavonoids and phenolic compounds. Antioxidant compounds exist in coloured plants are believed to be

able to eliminate free radicals that cause non-communicable diseases such as obesity, type II diabetes mellitus and cardiovascular diseases. Therefore, this study aims to evaluate the total phenolic content and antioxidant activities in coloured plants. Total Phenolic Content (TPC) was evaluated using Folin-Ciocalteu method while antioxidant activities of coloured plants were evaluated using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging, Ferric Reducing Antioxidant Power (FRAP) and Trolox Equivalent Antioxidant Capacity (TEAC) assays. Data was analysed using one-way ANOVA and Pearson's correlation coefficient test with SPSS Version 21. Total phenolic content of four coloured plants were reported from 273.15 ± 19.57 to 363.10 ± 7.94 µg GAE/g DW and in the order of RC > YBP > PSP > BBP. Antioxidant activities as determined by DPPH assay ranged from 17.26 ± 0.06% to 83.38 ± 1.04% and in the order of YBP > RC > BBP > PSP; while for FRAP assay was 4.92 ± 0.18 to 128.33 ± 11.59 mg Fe(II)/g DW and in the order of RC > BBP > YBP > PSP. On the other hand, TEAC values were in the range of 15.26 ± 2.83 to 364.27 ± 7.14 µg Trolox/g DW with the order of BBP > PSP > YBP > RC. In addition, findings from Pearson's correlation coefficient showed that there was moderate and positive correlation between TPC and DPPH (r = 0.562) as well as TPC and FRAP (r = 0.686). Results in the present study indicated that coloured plants contain significant amount of phenolic compounds and these coloured plants could serve as an alternative source in the formulation of food colourants.

C17 Characterization of lactic acid bacteria with probiotic potential isolated from Malaysian pickled shrimp products, *cincalok* and *belacan*

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Diverse lactic acid bacteria (LAB) with probiotic potential are found in many fermented foods. *Cincalok* and *belacan* are common Malaysian pickled shrimp products. The present study aims to characterize LAB from *cincalok* and *belacan*. In this study, enrichment and isolation were carried out using peptone water and MRS broth, whereby 20 isolates of each sample were selected randomly. Out of 20 isolates from each sample, 5 isolates from *cincalok* (CA2, CB6, CC3, CC4, and CC6) and 5 isolates from *belacan* (BA7, BC2, BC3, BC4, and BC6) survived in pH 2, pH 8, and pH 6.5 were selected for subsequent LAB characterization including (i) gram staining; (ii) bile salt tolerance; and (iii) resistance to antibiotics. All 5 isolates from each sample were identified to be gram-positive bacteria, capable to survive at 0.3% bile salt content. All selected strains were investigated for their resistance against 12 antibiotics, namely, amoxicillin, ampicillin, cephalexin, penicillin, vancomycin, chloramphenicol, erythromycin, gentamicin, tetracycline, ciprofloxacin, metronidazole, and ofloxacin. All 5 isolates from *cincalok* were resistant towards erythromycin, metronidazole, and gentamicin; whereas all 5 isolates from *belacan* were resistant towards erythromycin and metronidazole. All five strains from each sample fulfilled the selection criteria for probiotic potential and further studies on investigating their potential probiotic properties and identification of the lactic acid bacteria are therefore recommended.

Group D: Clinical Nutrition/Intervention Trials

D01 Association between energy/protein adequacy and quality of life among ICU survivors

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Medical advancements decrease mortality rate of critically ill patients over time. However, there are increasing number of patients discharged to nursing home and rehabilitation centers. Energy and protein deficit along with hypercatabolism during the period of critical illness may lead to malnutrition and poorer clinical outcomes. This study aims to investigate the association between energy and protein adequacy with and quality of life of Intensive Care Unit (ICU) survivors. Prospective observational study was conducted to follow ICU survivors from ICU admission day to a year post-admission. Convenience sampling was employed for study's enrollment. Energy and protein adequacy during critical illness were obtained from nutritional intake in ICU ward from admission day until patients were discharged of ICU or maximum of 14 days. Quality of life was measured using SF12 and EuroQoL-5D-3L questionnaires through a phone interview. Of 189 patients followed, 105 patients were alive at 1-year post ICU admission. Only 26 ICU survivors with a median age of 52.3 (18-83) years old were able to be reached. Most of the critically patient received an adequate intake of energy (93%), protein (86.7%), and energy and protein (n=20, 76.9%). 85% of ICU survivors reported good quality of life. There was no association between energy adequacy (p=0.158), protein adequacy (p=0.921), energy and protein adequacy (p=0.921) and the quality of life. This study showed that most critically ill patients were adequately nourished during the ICU stay and there was no association between energy and protein adequacy and quality of life of 1-year ICU survivors.

D02 Association of salivary insulin with family history of type 2 diabetes mellitus and oral status in a normoglycemic Malaysian population

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Plasma insulin is a surrogate marker for insulin resistance and current research shows significant correlation between plasma and salivary insulin (sINS) levels. Current evidence indicates the potential use of salivary biomarkers to identify individuals with metabolic disorders such as Type 2 Diabetes Mellitus (T2DM). There is a greater probability to acquire T2DM among subjects with positive family history (FHx) of T2DM and high level of plasma insulin has been found in these subjects. Periodontitis (inflammation of the dental supporting tissues) is an early sign of DM and is a valuable risk indicator of the disease. In this research we aim to investigate the association of sINS with FHx of T2DM and oral status in a normoglycemic Malaysian population. 54 subjects with mean age of 35.8 years old having HbA1c levels <5.6%, Random blood glucose level <5.6mmol/L, BMI <27.5kg/ m^2 and devoid of systemic diseases are recruited. Information on FHx of T2DM and 4ml whole saliva samples was collected from subjects. Oral status was determined using periodontal status assessment. This assessment was done with Community Periodontal Index of Treatment Needs (CPITN).Total concentration of sINS was measured by enzyme-

linked immunosorbent assay (ELISA). Data was analysed using Mann Whitney U test and Kruskal Wallis test. We found that 32 subjects had FHx of T2DM and 22 subjects did not have FHx (p=0.25). The mean sINS concentration was significantly higher in subjects with FHx of T2DM (n= 39.51μIU/ml) compared to those without FHx (n=20.15μIU/ml) (p=0.01). Periodontal status is not significantly correlated with sINS concentration (p=0.33) and FHx of T2DM (p=0.42).In conclusion, sINs was associated with FHx of T2DM but not periodontal disease. Thus sINS can be further investigated as a non-invasive marker for T2DM risk,that is independent of the oral status.

D03 Health properties of tocotrienols: evidence in human studies

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Vitamin E has been recognized as an essential vitamin since their discovery in 1922. Although the functions of tocopherols are well established, tocotrienols have been the unsung heroes of vitamin E. Due to their structural differences, tocotrienols were reported to exert distinctive properties compared to tocopherols. While most vegetable oils contain higher amount of tocopherols, tocotrienols were found abundantly in palm oil. Nature has made palm vitamin E to contain up to 70% of total tocotrienols, among which alpha-, gamma- and delta-tocotrienols are the major constituents. Recent advancements have shown their biological properties in conferring protection against cancer, cardiovascular diseases, neurodegeneration, oxidative stress and immune regulation. Preclinical results of these physiological functions were translated into clinical trials gaining global attention. The biological activities exerted by tocotrienols will be reviewed in detail from the perspective of evidence reported in human studies to date in terms of efficacy, population, disease state and bioavailability. This will serve as a platform to pave the future direction for tocotrienols in clinical settings.

D04 Red palm oil intervention program in addressing vitamin A deficiency: a study design for randomized controlled trial

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Vitamin A deficiency (VAD) has been recognized as a significant public health issue in developing countries. Based on WHO in year 2011, an estimated 190 million preschool-aged children in Africa and South-East Asia were reported to have VAD. In Malaysia, the existing data on Vitamin A status of school children are scarce and believed to be under reported. Therefore, this controlled randomised trial aims to investigate the effects of red palm oil-fortified biscuits on the nutritional status, ocular status, intestinal parasites and gut microbiota among rural primary school children with VAD in Malaysia. In a screening conducted on 848 students from 10 schools located in 5 regions of Malaysia: Pahang, Perak, Johor, Sabah and Sarawak, 175 students (20.6 %) and 476 students (56.1 %) were shown to have confirmed VAD (serum retinol < 0.7 μmol/L) and suspected VAD

(serum retinol 0.7-1.05 μmol/L) respectively. A total of 651 students were recruited and randomly allocated into 2 groups: red palm shortening-biscuit group (experimental) and palm shortening-biscuit group (control). The students were supplemented with biscuits four days a week for duration of 6 months with close monitoring by the assigned school teachers. The primary outcome is retinol concentration while the other outcomes are anthropometric status, dietary intake pattern, biochemical profile, ocular status, intestinal parasitic infections and gut microbiome profile. Outcome measures will be assessed at four time-points: pre-intervention, 3rd month of intervention, 6th month after intervention and 6th month after completion of intervention. This paper will present the study design and baseline characteristics of the subjects recruited.

Group E: Food Science & Technology

E01 Recovery of potent antioxidants from *Garcinia mangostana* pericarp using aqueous two-phase system

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Garcinia mangostana (mangosteen) is well-known for its delicate taste, its pericarp is characterized by several functional properties with good sources of antioxidants such as xanthones, α-mangostin, γ-mangostin, anthocyanins and tannins. The conventional approaches for the extraction of antioxidants from mangosteen pericarp require long processing time and high temperature, which may cause degeneration of the antioxidants, and often result in low recovery efficiency. In this study, recovery of antioxidants from mangosteen pericarp was investigated using polyethylene glycol (PEG)/citrate aqueous two-phase system (ATPS). The mangosteen pericarp powder was added into the biphasic system for extraction process and the 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical assay was carried out to evaluate the scavenging ability of the extracted antioxidants in the top and bottom phases. The optimum condition for the recovery of antioxidants were achieved in PEG1000/citrate ATPS using tie-line length (TLL) of 48.3% (w/w), volume ratio (V_R) of 1.6, 0.2% (w/w) crude load and addition of 1.0% (w/w) of Tween-85 surfactant at pH 8. The antioxidants were recovered in the PEG-rich top phase with high partition coefficient (K) of 18.23 ± 0.33 and DPPH radical scavenging activity of 83.88 ± 0.98%, respectively. The findings suggested that the single-step operation of ATPS could be a simple and effective separation tool for the recovery of antioxidants from mangosteen pericarp while preserving its antioxidative properties for future functional food applications.

E02 Development of a vegetable-based soup and its acceptance among primary school children in Klang Valley

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Taste preference is an important determinant for children's food intake. Vegetables consumption of children in Malaysia has been reported to be low and does not meet recommendations of Malaysian Dietary Guidelines. To increase vegetable consumption, serving vegetables in the form of blended soup may increase children's acceptance.

Therefore, the aim of this study is to develop a vegetable-based soup and to evaluate the acceptance among Malaysian children. Three soup recipes were formulated using potatoes as the base and blended with vegetables, including carrot, celery and leek. Soup A was made from 25 g of each of the three vegetables; soup B was made by doubling the amount of vegetables from A; and soup C was similar to B but with 50% extra carrot. A total of 43 children aged 9 – 11 years were recruited from primary schools in Kuala Lumpur and Selangor. Sensory evaluation was carried out to assess color, aroma, saltiness, sweetness, creaminess, and overall acceptance by using seven-point facial hedonic scale that express feelings from: 1=dislike strongly (most frowning) to 7=like strongly (most smiley). Results showed that children's acceptance was better when amount of carrot was increased, as explained by higher taste attribute score for soup C (5.4±1.8) than soup A (4.4±1.9) and soup B (4.9±1.8). Mean score for creaminess in soup C (5.4 ± 1.3) was significantly higher (p<0.05) than both soups A (4.6 ± 1.8) and B (4.6 ± 1.6). On the other hand, mean score for color, saltiness, sweetness and overall acceptance were highest in soup C although no significant differences were observed among the soups. In conclusion, the vegetable-based soup we developed was well-accepted by children. Future studies could consider using vegetable-based soup as a dietary strategy to increase vegetable and fiber intakes among Malaysian children.

E03 Utilization of *Saccharum Officinarum* L. by-products as a potential source of prebiotic

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Saccharum Officinarum L. by-products; rind (SR) and pith (SP) pose health promoting properties, potentially as a natural ingredient for functional and health food industry. The objectives of the study were to evaluate functional properties of SR and SP through estimation of their chemical composition, antioxidant capacities, phytochemical compound and prebiotic properties. The chemical compositions of SR and SP showed their applicability as fermentable ingredients due to their richness of fiber and available carbohydrate. DPPH and FRAP assays showed that SR exhibited significantly higher antioxidant activities and phytochemical compounds than SP. From the HPLC analysis, the amount of xylooligosaccharides (XOS) resulting from the enzymatic hydrolysis of SP was 2.99 mg/mL (58% xylobiose, 6.7% xylotriose and 34% xylotetroase), while XOS obtained from SR was 3.39 mg/mL (52.4% xylobiose and 47.6% xylotriose) with a complete absence of xylose in both XOSs. Based on the non- digestibility test, around 84 - 88.24 % of XOS extracted from SR and SP would reach the colon and be utilized by the residential microbiota, as part of the saccharides were hydrolyzed by α-amylase (8.28 - 12.86%) and by acid in stomach (3.74 - 4.07%). The fermentation test demonstrated that XOS derived from both SR and SP is a potential prebiotic food due to the evidence that probiotic bacteria significantly increased while *E. coli* was suppressed during the *in vitro* fermentation. Besides, the probiotic bacteria supplemented with XOS produced a considerable amount of SCFA during their fermentation, indicating the ability of tested bacteria to utilize XOS. Acetic acid was the predominant end-product, followed by propionic acid and lactic acid. XOS derived from SR and SP can be a novel prebiotic that might be incorporated into different food products.

E04 Optimization of extraction condition on yield and water holding capacity of mucilage from rose cactus (*Pereskia bleo*) leaves

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Rose cactus (*Perekia bleo*) is one of the medicinal plants from the Cactaceae family that have mucilaginous leaves. Rose cactus mucilage (RCM), a dietary fiber-rich hydrocolloid exhibits functionality suitable to be used as a functional ingredient in healthy emulsion-based food products. However, the extraction method currently used needs to be optimized to overcome the low yield and lack in the functionality of the extracted mucilage. The objective of the present study was to optimize extraction conditions i.e. temperature (45°C-85°C), pH (4-10) and water to leaves ratio (1:1-12:1) (independent variables) on yield and water holding capacity (responses) of RCM using a response surface methodology (RSM) involving 20 runs. The ranges of mucilage yield and water holding capacity were 1.59-3.58% and 547.24-1603.24%, respectively. The data was adequately fitted to a second-order polynomial model which could explain the relationship between independent variables and responses studied (R^2 >80, no lack-of-fit). Applying the desirability function method of RSM, optimum extraction conditions were temperature of 45°C, pH of 9.4 and water to leaves ratio of 8.05:1. At this optimum condition, extraction yield, water holding capacity, protein content, emulsion capacity (1% w/v) and emulsion stability (1% w/v) were found to be 3.22%, 912.83%, 45.43%, 34.17% and 32.68% respectively. This findings gives a better prospect of RCM as a functional ingredient for food/ nutraceutical industry and thus its promising medicinal applications shall be further explored.

E05 Development of food product from brewers' rice *(temukut)*

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Brewers' rice, locally known as *temukut* is a mixture of broken rice, rice bran, and rice germ. It is usually used as animal feed and for brewing. Brewers' rice has been shown to have potential in combating diseases such as liver and kidney disease, cancer and diabetes. High bioactive compounds were found present in brewers' rice for example phytic acid, polyphenols and tocotrienols. Phytic acid has been scientifically proven to act as antioxidant and help in the prevention of these diseases. This study was conducted with the aim of developing food product (cookies) from brewers' rice. The effect of different percentage of brewers' rice supplemented (0%, 5%, 10%, 15% and 20%) on color, texture, crispness and overall acceptance of cookies was determined. In addition, the content of phytic acid in these cookies was also analysed using spectrophotometric method. Results

showed that the control and all of the supplemented cookies received acceptable sensory scores 6 and above for all the parameters evaluated. The phytic acid content for 0%, 5%, 10%, 15% and 20% supplemented *temukut* cookies were 0.21, 0.45, 0.55, 0.65 and 0.72 mg/g, respectively. Cookies supplemented with 15% *temukut* received the highest score (7.75) of hedonic scale by the panellists compared to other percentage of supplementation. Similar finding was also shown for rice bran cookies where 15% of rice bran has received the highest acceptance as compared to other percentage of supplementation. In order to launch a product in market, the sensory score of at least 7 is usually needed. So, this indicates that the 15% *temukut* supplemented cookies was suitable to be commercialized.

E06 Physicochemical properties and sensory acceptability of bread incorporated with banana (*musa spp*) peel flour

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Unripe banana peel flour is fruit by-product and contribute to the major waste in many countries. The production of banana chips, usage as raw materials such as flour and production of wine or beer contribute to the increment of banana peel waste. It is inexpensive raw materials, which has shown good to be used as functional food ingredient in food products. The aims of this study were to determine the physicochemical properties and sensory acceptability of bread incorporated with different varieties of banana peel flour (BPF). Substitution of 10% BPF (Berangan and Nangka variety) was incorporated into bread formulation to replace commercial wheat flour. The result showed that substitution of Berangan and Nangka BPF into bread formulation had significantly ($p<0.05$) lower the loaf volume compared to control bread. The hardness of bread incorporated with Nangka BPF was significantly lower than Berangan BPF and control. Bread incorporated with all varieties of BPF resulted in darker colour in crumb and crust. Less yellow appeared in all samples. Higher moisture content and crude protein were observed in Berangan BPF bread. Meanwhile, Nangka BPF bread exhibited significantly highest ash and fat content. It was revealed that both Berangan and Nangka BPF bread had significantly lower in total carbohydrate content and higher in total dietary fibre content than control bread. Sensory analysis indicated that bread incorporated with Berangan BPF had better scores than Nangka BPF in term of texture and taste which led to the significantly higher ($p<0.05$) of overall acceptance attribute.

E07 *In Vitro* starch digestibility, α-amylase and α-glucosidase inhibitory capacities and glycaemic response of brown rice cooked using different methods

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This study aimed to compare brown rice cooked using a conventional rice cooker and draining method on the *in vitro* digestibility, α-amylase and α-glucosidase inhibitory capacities using the D-Glucose Assay Kit by Megazyme. Laboratory analyses for the *in vitro* digestibility and enzyme inhibitory capacities were carried out using freeze-dried brown rice samples. The estimated glycaemic index of the brown rice was then calculated based on the hydrolysis

index. Results showed that the *in vitro* starch digestibility of brown rice prompted a lower starch hydrolysis rate for the draining method in comparison to the rice cooker method. Draining method was able to yield a lower estimated glycaemic index when compared to the rice cooker method. Enzyme inhibition activities for α-amylase and α-glucosidase were higher in the draining method in comparison with the rice cooker method. Brown rice from both cooking methods showed stronger α-amylase inhibitory activities. It can be concluded that it might be useful to recommend cooking brown rice using the draining method to result in a lower glycaemic index, which leads to having a better control of postprandial blood glucose level especially for the diabetic population.

E08 Quantification of putative compounds causes gastric release in instant 3-in-1 coffee

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Coffee is a famously consumed beverage around the world and epidemiological studies shows many health benefits. Nevertheless, some have reported of gastric irritation and coffee prohibition are common. Previously, compounds causes gastric discomfort are caffeine and chlorogenic acid (CGA) whilst N-methylpyridinium downgrade the gastric-release. However, these stipulated compounds are unknown in commonly consumed coffee in Malaysia. In this research, caffeine, chlorogenic acid (5-CQA, 3-CQA and 4-CQA) and N-methylpyridinium (N-MP) in black coffee (BC) and instant 3-in-1: white coffee (WC), white coffee low acid (WCA), low sugar coffee (LS), low fat coffee (LF) and decaffeinated coffee (DC)] are quantified using liquid chromatography. Chlorogenic acid and caffeine quantification use Phenomenex Luna (C18) column at 30 °C and 1.0 mL/min. Mobile phase A 0.5% acetic acid (v/v) and B 100% MeOH with gradient elution profile was: 0–20 min, linear gradient from 0% to 90% B; 20–25 min, 90% B isocratic; 25–30 min, linear gradient from 90% to 0% B. Wavelengths used were 270nm (caffeine) and 320 nm (CGA). For N-MP compound, Phenomenex Kinetex PFP column with isocratic elution of two solvents: 95% A and 5 % B, total elution time = 30 min. The flow rate was 0.5 mL/min at temperature of 30°C and wavelength of 260 nm. The total CGA (mg/ml) is the highest in black coffee (BC) (36 ± 3.0, $p<0.05$) while no significant difference found between other instant 3-in-1 coffee samples. For caffeine, black coffee (BC) shows the highest 60 ± 0.2 (mg/ml) and the lowest is white coffee (WC) 2.5 ± 0.001 (mg/ml), $p<0.05$. The N-MP shows highest in black coffee (BC) 565 ± 7.59 µg/ml and lowest in white coffee (WC) 52 ± 0.88 µg/ml, $p<0.05$. Different technological process and added ingredients can affect the analytical recovery of compounds in coffee that causes gastric-release.

E09 Response of wheat Triticum aestivum L. to (ABA) acid under the influence of saline stress

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Field Experiment was conducted into season 2018 at the al Thi Qar governorate. The study included two factors: The first factor is the cultivation of wheat in five different types of soils in terms of salt concentration (3.24, 4.23, 6.73, 7.21 and 9.32) milimos. cm^{-1}. These

plants were sprinkled with six levels of abscisic acid ABA (0, 20, 40, 60, 80, 100 and 120) micromole. L^{-1} to determine the effect of these factors and their interactions on the different growth characteristics such as leaf area, plant height, total chlorophyll and other characteristics such as proline content in the root and in the root, glutathione reductase (GR), malondialdehyde (MDA), sucrose, glucose, starch, soluble sugar, and non-structural carbohydrates (NSC). The results of the experiment showed significant differences in all traits except for MDA in the root and leaves, the third saline concentration 6.73 milimose. cm^{-1} and the level of the fourth ABA 60 micromole L-1 were given the highest range of leaves area. $Plant^{-1}$, plant height, total chlorophyll rate, Proline content in the root and leaves, sucrose content, glucose content, starch content, soluble sugar in the leaves and NSC in the root of the wheat plant, plants those planted at the fifth saline concentration 9.23 milimose. cm^{-1} and the level of the (0) ABA were superior to the highest rates of the antioxidant enzyme (GR) and proline in the root and leaves of the wheat plant, while the lowest of these enzymes and proline were at the first of saline stress 3.24 milimose. cm^{-1}.

E10 Comparison of chemical composition and antibacterial properties between seaweed (*Caulerpa racemosa*) and terrestrial plant (*Emblica officinalis*) harvested from Cape Rachado, Port Dickson, Negeri Sembilan, Malaysia

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This study aims to compare the chemical composition and antibacterial properties between seaweed (*Caulerpa racemosa*) and terrestrial plant (*Emblica officinalis*) harvested from Cape Rachado, Port Dickson, Negeri Sembilan, Malaysia. Proximate composition (moisture, ash, lipid, protein, crude fibre, calorie and carbohydrate) were analysed using standard AOAC methods (2003) while the mineral analysis was done using Atomic Absorption Spectrophotometry. The amount of total phenolic content of the sample extracts was determined using Folin-Ciocalteau method whereas the preliminary identification of antibacterial activity was tested by filter paper disc diffusion method. The results were expressed in dry weight basis and all measurements were performed in triplicate. Majority of the proximate composition and mineral content were statistically different ($p \leq 0.05$) between *C.racemos*a and *E.officinalis*. The carbohydrate content of both species were equally high with only 0.39% DW difference. It was discovered that *C.racemosa* was significantly higher in crude fibre content (27.73% DW) than that of *E.officinalis* (13.2% DW), indicating that seaweed may be a valuable fiber source as food ingredient. Besides, it was worth noting that the ash content of *C.racemosa* was 8.17% DW higher than that of *E.officinalis* which indicates the presence of appreciable amounts of diverse minerals in seaweeds. This was justified when *C.racemosa* was found to be rich in Na, Fe, Zn, and Cu. Moreover, *C.racemosa* exhibited low lipid content (1.54% DW) and calorie value (3574 cal/g DW). On the other hand, *E.officinalis* contains high total phenolic content (140 mg GAE/g) and exhibited anti-bacterial activity whereas *C.racemosa* did not. *E.officinalis* was also higher in protein level (10.32% DW) which was comparable with high protein food such as egg whites. This study suggests that both C.*racemosa* and *E.officinalis* can be potentially used as ingredients to improve nutritive value of functional foods for human consumption as well as pharmaceuticals and other commercial functions.

Group F: Experimental Nutrition

F01 Determination of *in vitro* starch digestibility, α-amylase and α-glucosidase inhibitory capacities and estimated glycaemic response of papaya at different ripening stages

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Diabetes is a major public health concern in Malaysia. Ways to control blood glucose are necessary especially when consuming high starchy foods such as tropical fruits. However, limited studies had been done to determine the starch digestibility and enzyme inhibition of fruits such as papaya and its glycaemic index at different ripening stages. The objective of the study was to determine the *in vitro* starch digestibility, enzyme inhibitory capacities and estimated glycemic index of papaya at different ripening stages. An experimental study was conducted on *Carica papaya* at unripe, semi ripe and fully ripe stages. UV-spectrophotometer was used to analyze the starch digestibility and enzyme inhibition. The glucose released was measured using glucose assay kit. The estimated glycemic index was calculated using established formula. Three replicates were taken for each analysis. All data were analyzed using Microsoft Excel and Statistical Package for Social Sciences (SPSS) version 25. One-way ANOVA and Tukey test were used to analyze the data. The *in vitro* starch digestibility increased upon ripening and significant difference was found between all stages ($p<0.05$). Fully ripe *Carica papaya* has the highest percentage of rapidly digestibility starch (6.57 ± 0.12 %). There was a significant difference in α-amylase and α-glucosidase inhibition of papaya at all three ripening stages ($p<0.05$). The estimated glycaemic index (EGI) showed a significant difference between all three ripening stages with fully ripe *Carica papaya* having the highest EGI (57.97 ± 0.06). The *in vitro* starch digestibility and estimated glycemic index were highest in fully ripe papaya. Unripe papaya showed highest enzyme inhibition capacities. Thus, unripe papaya can be used as an alternative for populations who want to control blood sugar especially diabetes patients.

F02 Preliminary research on weight, food intake and fecal water holding capacity for different dietary fibre in rat

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Constipation is a health problem that negatively affecting the quality of life and increase the risk of colon cancer. Adequate dietary fiber is important to improve the regularity of bowel movement. Current study investigated the functionality of oat fiber (OF), psyllium husk (PH), oil palm trunk fiber (OPF) and Betox (B) (mixture of OF, PH and OPF). Twenty four Sprague-Dawley males rats, with an average weight of 220g were assigned to each of the treatment group i.e PH 250mg/kg (n=3), OF 250mg/kg (n=3), OPF 250mg/kg (n=3), B 250mg/kg (n=3), PH 500mg/kg (n=3), OF 500mg/kg (n=3), OPF 500mg/kg (n=3), B500mg/kg (n=3). The animal was fed with standard rat pellet for 7 days without oral administration of the fibers. Then, the rats were fed with rat standard pellet with administration of 250mg/kg and 500mg/kg of the fibers for 7days with water. The faecal bulk was collected every day measured and dried. Food intake, weight of the rat and fecal water holding capacity were assessed after 7 days feeding. PH 250mg/kg, OF 250mg/kg, OPF 250mg/kg, OPF 500mg/

kg groups were shown to decrease in weight for -1.89%, -1.37%, -5.12% and -13.3%, respectively. PH 250mg/kg, OF 250mg/kg, OPF 250mg/kg, OPF 500mg/kg groups were reduced in food intake for -8.87%, -3.18%, -17.63% and -30.19%, respectively. For the fecal water holding capacity, OF (250mg/kg = +14.4%; 500mg/kg = +83%), OPF (250mg/kg = +26.0%; 500mg/kg = +75.8%) and Betox (250mg/kg = +208.6%%; 500mg/kg = +49%) at both dosage were shown increase in fecal water holding capacity. In conclusion, PH, OF and OPF at the dosage of 250mg/kg shown to reduce food intake and weight while all of the fibers showed good fecal bulking effect especially Betox 250mg/kg. Nevertheless, this is a preliminary study, a more comprehensive study and toxicology study is needed before any definite conclusion can be made.

F03 Determination of starch digestibility, α-amylase and α-glucosidase inhibitory capacities, and estimated glycemic response (EGI) of banana at different ripening stages

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Diabetes mellitus, which commonly known as diabetes, is a vital and major public health concern in Malaysia. For diabetic patient, it is crucial for them to always manage and control their blood glucose level. Their fruit intake has to be taken in moderate amount because of the sugar content which will affect their blood glucose level. Various studies were conducted on the changes in phenolic compounds of fruits during different ripening stages but limited studies were conducted on the changes in their starch digestibility, α-amylase and α-glucosidase inhibitory capacities and glycaemic response. Hence, this study aims to determine the starch digestibility, α-amylase and α-glucosidase inhibitory capacities and estimated glycaemic index of banana at 3 different ripening stages. Glucose oxidase-peroxidase reagent assay kit was used to measure the glucose concentration of an *in vitro* starch digestion method. Inhibition capacities of α-amylase and α-glucosidase were measured at 540 and 405 nm, respectively using UV spectrophotometer. One-way ANOVA was used to determine the difference between the *in-vitro* starch digestibility, α-amylase and α-glucosidase inhibitory capacities, and the estimated glycaemic of banana at different ripening stages. There was significant difference in the *in-vitro* starch digestibility, α-amylase and α-glucosidase inhibitory capacities, and the estimated glycaemic response of banana at different ripening stages (p-value <0.05). Fully ripe banana has higher rate of starch hydrolysis and estimated glycaemic index, but lowest in inhibitory capacities of α-amylase and α- glucosidase. Results demonstrated that fully ripe banana could have better control on the blood glucose level which is crucial for diabetic individuals.

F04 Starch digestibility, α-amylase and α-glucosidase inhibitory capacities, and glycaemic response of guava at different ripening stages

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Type II Diabetes (T2DM) is a fast growing disease in Malaysia and fruits with high sugar content due to rapid starch digestibility can induce a sudden rise of postprandial blood glucose level. Guava, a tropical fruit that exhibit respiration and ethylene production

patterns during the maturation of fruit causes physical and chemical changes [3]. Though many studies have been conducted to study the changes of chemical compounds of guava at different ripening stages, limited study was done on starch digestibility and enzymes inhibitory capacities. The objective of this study was to determine the *in vitro* starch digestibility, α-amylase and α-glucosidase inhibitory capacities, and glycaemic response of guava at three main ripening stages, which are unripe, semi-ripe and fully ripe. The rate of starch digestion and glycaemic response of guava at different ripening stages were determined using the *in vitro* starch digestibility method. Meanwhile, the enzymes inhibitory capacities were determined using UV spectrophotometer. The differences of *in vitro* digestibility of starch, inhibitory capacities of α-amylase and α-glucosidase and glycaemic response of guava at different ripening stages were tested using one-way ANOVA. The rate of starch digestion was significantly lower for unripe guava, followed by semi-ripe and fully ripe guava ($p<0.05$). There was a significant difference in α-amylase and α-glucosidase inhibition and glycaemic response of guava at different ripening stages ($p<0.05$) with unripe guava having the highest enzymes inhibition capacities. The estimated glycaemic index (EGI) was significant lowest for unripe guava (48.06 ± 0.56, $p<0.05$). In conclusion, unripe guava with the slowest rate of starch digestion, lowest EGI and highest percentage of inhibition of α-amylase and α-glucosidase had the lowest glycaemic response. Therefore, consumption of unripe guava may be the most effective in controlling postprandial glycaemic response.

F05 Effect of brewers' rice in streptozotocin-induced hyperglycemic rats

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Increasing prevalence of diabetes can be linked to lifestyle changes, especially our dietary habits. Brewers' rice, or locally recognized as *temukut*, is a by-product of rice milling. Usually, it is utilized as animal feed and brewing material, whereas it is still uncommon for human consumption. This combination of broken rice, rice bran, and rice germ is not only a source of carbohydrate, but also contains rich sources of antioxidants like vitamin E, phytic acid and γ-oryzanol. Also, it has been shown to inhibit α-amylase and α-glucosidase activity by *in vitro* method, thus enhancing blood glucose control. The present *in vivo* study aimed to examine the effect of brewers' rice in streptozotocin-induced hyperglycemic rats. A total of 24 Sprague-Dawley male rats were used and divided into four groups. Treatment groups were defined as follows: healthy rats fed with normal diet (G1), diabetic rats fed with normal diet (G2), diabetic rats fed with 10% brewers' rice (G3) and diabetic rats fed with 40% brewers' rice (G4). Rats in G2, G3 and G4 were injected once with STZ (55 mg/kg body weight) intraperitoneally. Brewers' rice was administered in the diet for three weeks. Food and water intake, body weight and blood glucose level were recorded. At the end of the experiment, change in fasting blood glucose (FBG) level was observed. Statistical analysis was performed using a one-way analysis of variance (ANOVA) with p-value < 0.05 considered significant. The results demonstrated that consumption of brewers' rice at concentration 40% could reduce the blood glucose level of the diabetic rats after three weeks although the difference between baseline and final FBG level was insignificant ($p > 0.05$), considering that the treatment duration was too short. Taken together, our study suggests that daily consumption of brewers' rice could assist in the management of diabetes.

F06 Effects of *morinda citrifolia* leaves on streptozotocin induced rats in prevention of diabetic retinopathy

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Diabetic retinopathy is the diabetic complication that caused damage to the blood vessels at the light sensitive tissue at the back of the eyes. *Morinda citrifolia,* the folklore medicine has been known for its biological activities for treating various diseases. Recent study has showed that the juice from the fruit of *Morinda citrifolia* able to preserve physiological function of chick lens epithelial cells during oxidative stress. It is believed that the leaves possess similar physiological function as its fruit counterparts in prevention of diabetic retinopathy and cataract. The objective of this study was to determine possible prophylactic characteristic of *Morinda citrifolia* leaves extract (MLE) on diabetic retinopathy by employing rats as a model. In this study, the STZ-induced rats were fed with MLE for 8 weeks. Then the rats were sacrificed and the blood was withdrawn from the aorta part of the rats for further biochemical analysis. During the 8-weeks period, the body weight and glucose level were measured on weekly basis. The development of retinopathy and cataract were observed with slit lamp and ophthalmoscope. The score of lens opacity was determined on a scale of from 0 (normal lens) to 3 (advanced cataract). The supplementation of MLE showed little improvement of blood glucose level after 8 weeks for both low dose (LD - 200 mg/kg b.w) and high dose (HD - 400 mg/kg b.w) extract treated groups. MLE prevented sudden weigh loss in LD group while the HD group had slight increment in weight by 14.44% compared with the baseline. Significant lower level of vascular endothelial growth factor (VEGF) was observed in LD and HD groups compared with diabetic control ($p < 0.05$). LD and HD groups showed better scoring compared with gliclazide drug treated group for the cataract classification. No obvious sign of retinopathy in all groups. This study suggests that the leaves of *Morinda citrifolia* possess anti-cataract activity which might be helpful in preventing or slowing down the progress of cataract formation.

Notes

Notes

Nutrition Society of Malaysia

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  - community-based promotion programmes eg Nutrition Month Malaysia, Probiotics Education Programme
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- Berita NSM (newsletter)
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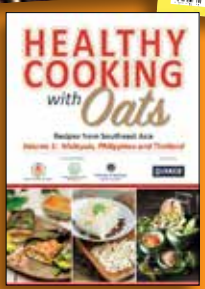
  - Junior Chef Cookbook Vol 1. Let's Play Healthy Cooking.
  - Nutritionists' Choice Cookbook (Vol 1: Healthy Recipes for Your Little Ones. Vol 2: Resipi Untuk Seisi Keluarga)
  - Resipi Sihat, Pilihan Bijak (Vol 1 & 2)
- Various educational booklets and leaflets on dietary guidelines and specific foods
- Nutrition Month Malaysia booklets on healthy eating and active living (www.nutritionmonthmalaysia.org.my)



Junior Chef Cookbook Vol 1. Let's Play Healthy Cooking, Nutritionists' Choice Cookbook (Vol 1 & 2), Resipi Sihat, Pilihan Bijak (Vol 1 & 2), Healthy Cooking with Oats

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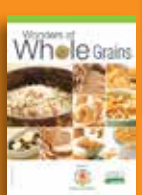

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