Diet Link

OFFICIAL NEWSLETTER OF THE MALAYSIAN DIETITIANS' ASSOCIATION

ISSUE 4 / 2019

Content

FROM THE EDITORIAL DESK

Finally we are at the last issue of the Diet Link 2019! A lot of time and effort has been invested into this publication throughout the year. This issue has relatively less content compared to other issues as all of us are (really) busy and we are so in need of more manpower. In fact, we decided to only publish 2 issues of Diet Link next year. In this issue, we presented the result summary of an RCT that look at the effect of 2 years of 25% calorie restriction versus ad libitum intake on cardiometabolic outcomes. This is one of the nutrition trials with the longest duration of intervention. Next, a modified recipe for Baked Muruku is also presented. If you still miss the delicious Muruku that you have just eaten in the past Deepavali, you may try this recipe at your home. We are also featuring a dietitian who founded a confinement centre. This is an innovative business that our current or future dietitian can venture into, providing a healthy and balanced diet for mothers after delivery. The research methodology corner will present a series of topics on observational studies in the next few issues, starting with cohort study. The research summary of the two best of oral presenters in the past MDA conference is also featured. We have also an article from a master student that write about a special topic on the potential link of the 'master clock' in our brain with body weight. Lastly, the Diet Link will not be complete without the Diet Joke! We hope that you will enjoy the content and we welcome more contribution from the members!

Lee Zheng Yii
BSc (Dietetic),
MSc (Clinical Nutrition)

WHAT'S NEW IN THE FIELD?

International Study

Summarized by:
Lee Zheng Yii

2 years of calorie restriction and cardiometabolic risk (CALERIE): exploratory outcomes of a multicentre, phase 2, randomised controlled trial

Objective:
Compared with ad libitum intake, what is the short-term and long-term effects of 25% calorie restriction with adequate nutrition on cardiometabolic risk factors in healthy, normal weight, and slightly overweight (BMI 22·0–27·9 kg/m²) men (aged 21–50 years) and women who were premenopausal (aged 21–47 years).

Design:
multicentre, phase 2, randomised controlled trial done at three clinical centres in the USA

Blinding:
All outcome assessors were masked to treatment assignment

Study procedures

After baseline testing, participants were randomly assigned at a ratio of 2:1 to a calorie restriction behavioural intervention designed to achieve a predicted longitudinal weight loss trajectory estimated from previous data for 25% calorie restriction in a phase 1 pilot study, or to an ad libitum control group; randomisation was stratified by site, sex, and BMI.

Participants in the calorie restriction group were prescribed a 25% restriction in calorie intake based on energy requirements estimated from doubly labelled water (individuals ingest $^{2}H_2{}^{18}O$ then energy expenditure is calculated as the difference in urinary excretion of ^{2}H and ^{18}O) measurements over a 4-week period at baseline. Participants were fed three meals per day each day inhouse, at the three clinical centres for 1 month, during which they were instructed on the essentials of calorie restriction. They chose from one or more of six eating plans modified to suit various cultural preferences.

One in-house meal was provided with intensive group and individual behavioural counselling sessions once a week. There were 24 group and individual counselling sessions over the first 24 weeks of the intervention; a detailed algorithmic strategy was applied to monitor and respond to changes in adherence (Clinical Tracking System) done by a behavioural interventionist.

Adherence to the calorie restriction intervention was determined in real time by the degree to which individual weight change adhered to an individualised weight loss trajectory (15.5% weight loss at 1 year followed by weight loss maintenance). Additionally, the precise level of calorie restriction was retrospectively quantified by calculating the total daily energy expenditure by doubly labelled water and adjusting total daily energy expenditure for changes in body composition.

Participants assigned to the control group continued on their regular diets; they received no specific dietary intervention or counselling. They had quarterly contact with study investigators.

Measurement of study outcomes

Pre-specified exploratory cardiometabolic outcomes were systolic, diastolic, and mean blood pressure; plasma lipids; high-sensitivity C-reactive protein; metabolic syndrome score; and glucose homoeostasis measures of fasting insulin, glucose, insulin resistance, and 2-h glucose, area-under-the curve for glucose, and insulin from an oral glucose tolerance test.

Bodyweight was measured in duplicate in the morning following a 12-hour fast. Fat mass and fat-free mass was measured by dual-energy x-ray absorptiometry. Dietary intakes were established using 6-day food diaries analysed with Nutrition Data System for Research. Venous blood was sampled for lipid and hormone concentrations after an overnight fast. Blood pressure was measured with an oscillometric blood pressure monitor in the morning after a 12-h fast in a seated position. Three sequential measurements were obtained at each sitting. If one differed by the other two by 15 mm Hg or more, it was discarded. Otherwise the three measures were averaged. 2-h, 0·075-kg oral glucose tolerance tests were done at baseline and at 12 and 24 months with blood samples collected at baseline, and 30, 60, 90, and 120 min after glucose consumption. Insulin resistance was calculated using homoeostasis model assessment (fasting glucose [mmol/L] × fasting insulin [mIU/L]/22·5). Insulin response was calculated as the ratio of change in plasma insulin from baseline to 30 min to the change in plasma glucose over the same period.

Results

10856 volunteered, 10618 were excluded: 4798 (44.2%) for age and BMI, 1479 (13.6%) for medical reasons, 4311 (40.0%) refused to participate due to concerns about their ability to adhere to the protocol, personal or other study-related issues.

Of the 238 participants who began baseline assessments, 220 were randomly assigned and 218 started the assigned intervention: 143 (66%) to the 25% calorie restriction diet and 75 (34%) to the ad libitum control diet. 117 (82%) of 143 of the calorie restriction group and 71 (95%) of 75 of the ad libitum group completed the study. Baseline characteristics were balanced between group. There was a mean difference of 77 kcal per day in average energy intake at baseline—assessed as total daily energy expenditure during a period of weight stability before the intervention—between the calorie restriction (2467 kcal per day [SE 34]) and ad libitum (2390 kcal per day [45]) groups.

Selected results are presented in table 1 below:

Variables	Compare to Baseline:			Between-group p-value
	Time	Calorie restriction	Ad Libitum	
Average Daily Energy intake, kcal/d	1 Year 2 Year	-279 (29) ↓ -216 (33) ↓	-83 (38) = -121 (43) =	<0.0001 <0.0001
Weight, kg	1 Year 2 Year	-8.4 (0.3, 11.5%) ↓ -7.5 (0.3, 10.4%) ↓	-0.7 (0.4) ↓ 0.1 (0.5) =	<0.0001 <0.0001
Fat mass, kg*	1 Year 2 Year	-6.1 (0.2) ↓ -5.3 (0.3) ↓	-0.34 (0.3) = 0.38 (0.4) =	<0.0001 <0.0001
Fat-free mass, kg	1 Year 2 Year	-2.2 (0.1) ↓ -2.2 (0.1) ↓	-0.3 (0.2) = -0.2 (0.2)	<0.0001 <0.0001
Total cholesterol, mmol/L	1 Year 2 Year	-0.32 (0.04) ↓ -0.24 (0.05) =	-0.04 (0.06) = 0.03 (0.07) =	0.0001 0.0010
LDL cholesterol, mmol/L	1 Year 2 Year	-0.25 (0.04) ↓ -0.23 (0.04) ↓	-0.05 (0.05) = 0.03 (0.05) =	0.0015 0.0001
HDL cholesterol, mmol/L	1 Year 2 Year	0.07 (0.02) ↓ 0.11 (0.02) ↑	0.03 (0.02) = 0.03 (0.03) =	0.11 0.0065
Triglyceride, mmol/L	1 Year 2 Year	-0.29 (0.04) ↓ -0.27 (0.04) ↓	-0.03 (0.05) = -0.03 (0.05) =	<0.0001 0.0002
Systolic BP, mmHg	1 Year 2 Year	-1.87 (0.77) ↓ -2.20 (0.82) ↓	0.60 (0.95) = 2.15 (1.06) ↑	0.0011 0.0011
Diastolic BP, mmHg	1 Year 2 Year	-3.38 (0.55) ↓ -3.40 (0.62) ↓	-0.58 (0.79) = 1.55 (0.80) ↑	<0.0001 <0.0001
Fasting glucose, mg/dL	1 Year 2 Year	-0.07 (0.02) ↓ -0.05 (0.02) ↓	0.02 (0.03) = -0.01 (0.03) =	0.0096 0.26
Fasting insulin, ulU/mL)	1 Year 2 Year	-1.59 (0.18) ↓ -1.71 (0.16) ↓	-0.14 (0.24) = 0.14 (0.21) =	<0.0001 <0.0001
Insulin resistance	1 Year 2 Year	-0.347 (0.038) ↓ -0.364 (0.035) ↓	-0.031 (0.050) = -0.027 (0.045) =	<0.0001 <0.0001
Insulin response	1 Year 2 Year	-0.055 (0.111) = -0.143 (0.045) ↓	-0.037 (0.149) = 0.096 (0.055) =	1.0 0.0014
Hs-CRP, nmol/L	1 Year 2 Year	-0.045 (0.028) = -0.068 (0.018) ↓	0.030 (0.037) = 0.002 (0.023) =	0.105 0.012

Table 1: Selected results of the CALARIE trial

Results are presented as mean (standard error), unless other stated

=: non-significant change from baseline

↓: significant reduction from baseline, ↑ significant increment from baseline

*Fat loss at 2 years accounted for 71% of the weight loss in the calorie restriction group

The results remained similar in a sensitivity analysis controlling for relative weight loss changes.

Strength

- Large sample intervention for a long duration (2 years)
- Intention-to-treat randomized controlled trial
- Measured their energy intake and energy expenditure using both nutrition assessment software and direct analysis through doubly-labelled water
- High retention rate of enrolled participants
- Good adherence to the study intervention, as shown by successful weight reduction over 2 years

Limitation

- Lack of hard clinical outcomes. (As stated that this is a phase 2 trial).
- No correction for multiple testing (multiplicity). Therefore, the result of this study is exploratory and not definitive, as stated clearly in the study title.

Conclusion

A moderate calorie restriction-induced negative energy balance improves multiple cardiometabolic risk factors, including plasma lipids, blood pressure, C-reactive protein and glucose homeostatic measures in healthy, young and middle-aged, and not obese adults.

Reference

Kraus W, Bhapkar M, Huffman K, Pieper C, Krupa Das S, Redman L et al. 2 years of calorie restriction and cardiometabolic risk (CALERIE): exploratory outcomes of a multicentre, phase 2, randomised controlled trial. *Lancet Diabetes Endocrinol*. 2019;7(9):673-683.

Dietitian's Recipe

Baked Muruku

No. of serving:
About 12 muruku (3 servings)

Total time (min):
- Preparation time (min): 15 mins
- Cooking time (min): 20 mins

Ingredients	Measurement
Storebought Muruku Flour Mix (Contains rice flour, urid dhal, salt)	40g
Butter	1 tbsp (room temperature)
Cumin	¼ tsp
Water	4 tbsp (Room temperature)

Unique Selling Point
Muruku is a must during this festive season, but the usual deep-fried version is higher in calories and fat. Try this for a change!
It's a great activity for you and your kids too.

Preparation steps:

1. Preheat the oven to 180°C. Line parchment paper onto the baking tray and set aside.
2. Add flour and butter in a large mixing bowl. Using a spatula, cut butter into flour to form little lumps of the raw butter in the flour mixture.
3. Gradually add 4 tbsp of water and mix until a thick batter is formed.
4. Transfer the batter into a piping bag. You may use a nozzle. We recommend piping nozzle no. 17
5. Pipe spirals outwards to form Muruku. Repeat until batter is finished. You should get about 12 pieces. *Tip: You can pipe into any shapes and sizes!
6. Bake in the oven for 20 minutes in the middle rack. *Note: Keep close attention to your Murukus at 10 minutes onwards, baking time may differ depending on oven size and Muruku shapes. Enjoy!

Nutrient Analysis (Per serving)
***about 4 pieces**

Calorie (kcal)	84
Protein (g)	1.5
Fat (g)	3.9
Carbohydrate (g)	10.7
Dietary fiber (g)	0.1
Sodium (mg)	29

With hereditary Baba Nyonya cooking skills and a penchant for flavourful food, Jowynna Yeo puts both to great use, modifying recipes to make them healthier and more nutritious.

Her passion for Food & Nutrition education for the community has seen her take on many hats: from teaching culinary classes for kids, consulting children & parents in the clinic, to conducting health talks & cooking demos for corporate clients, and schools.

Find out more about Vease Nutrition!
www.veasenutrition.com
Facebook / Instagram: @veasenutrition

Jowynna Yeo
BSc. (Hons) Dietetics with Nutrition
Founder, Vease Nutrition Sdn Bhd
Consultant Dietitian, ABC Children Specialist Clinic

Featured Dietitian

Jhen Ng Siew Lan

Ms. Jhen Ng Siew Lan, MS, RDN,
Founder of Starlight Confinement Centre

- Registered Dietitian Nutritionist, Commission on Dietetic Registration, USA
- Master of Science in Food Systems Administration, Texas Woman's University
- Bachelor of Science in Nutrition, National University of Malaysia
- Lactation Counselor, National Lactation Centre, Malaysia
- Director at Starlight Confinement Care Centre

1. Could you please briefly tell us about yourself?
I graduated from UKM as a nutritionist and later became a Registered Dietitian after continuing my study in the United States. I spent a few years in the clinical and community settings and given me the background of maternal and children nutrition services. In 2014, I moved back to Malaysia and started my own business 2 years later.

2. What inspires you to become a dietitian?
I wanted to help the sick so I explore into clinical nutrition by becoming a dietitian. Being a dietitian has given me a lot of opportunities. Not only clinical nutrition, I was able to learn and practice in each area a dietitian could contribute, that includes institution foodservice, business and community nutrition.

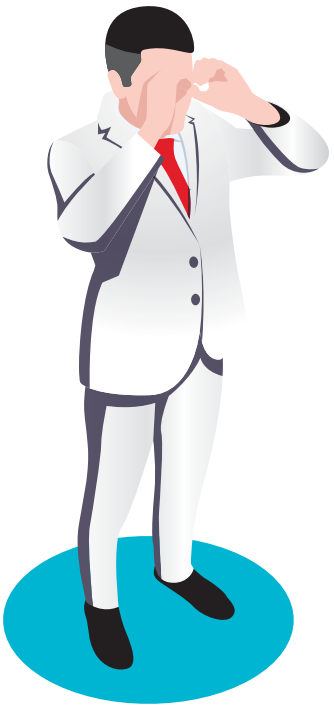
3. What makes you who you are today?
After a few years working as a dietitian, I wanted to have my own career. With my background, I started to take some additional courses in confinement practice and lactation management after moving back to Malaysia.

4. What is your typical day at work like?
- Check updates from the baby nursery making sure their conditions are good in terms of input and output.
- Provide breastfeeding counselling to clients who are having issues.
- Handling requests from Nurse Supervisor and Chef Manager.
- Delegate tasks to my administrative assistant.
- Create Facebook posts for marketing purposes.

5. What part of your work that you enjoy the most?
I enjoy seeing the meal we prepare for our clients. Another fun thing is sharing my experience and knowledge in nutrition and breastfeeding with clients in small group discussion.

6. What are some challenges that you have to face in your daily work?
Helping clients who are facing emotional feelings during the confinement period. Some postpartum mothers have fragile mind due to tiredness and hormonal changes. Giving support to these clients actually gives me an opportunity to serve and to help them heal emotionally.

7. What is your advice to dietitians who are interested to venture into the field like yours?
Be resilient and persevere. Caring for postpartum mothers needs empathy. Sometimes you have to be a mother to know a mother's feeling.



Observational Study: Cohort Study

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Introduction

As the name suggest, observational study only observe a usual clinical practice without assigning an exposure of interest (i.e. an intervention) to the study population.

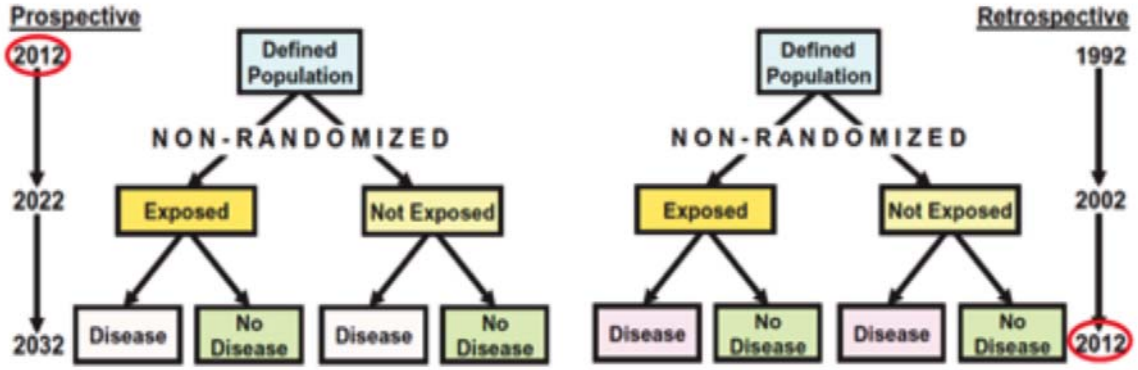
An observational study with a comparison or control group is termed analytical, if not, it is descriptive. With analytical observational study, the temporal (time) direction of the exposure (risk factor) and the outcome of interest (usually a disease) needs to be identified.[1]

Cross-sectional study determines both exposure and outcomes at one time-point. (Example: 10.1093/ajcn/83.6.1420). Cohort study begins with exposure and follow subjects for outcome (Example: 10.1161/STROKEAHA.111.633404). Case-control study begins with outcome and look back in time for exposure (Example: 10.1023/A:1024887411846). In this issue, we will look at cohort study.

Cohort studies

A cohort study begins with an exposure in study population without the outcome of interest and follow them either prospectively or retrospectively to measure the development of the outcome of interest.[1] As a cohort study start with all subject without the outcome of interest (free of the disease), the number of subject who developed the disease of interest during the follow up period will be the 'disease incidence'. Cohort studies can be prospective or retrospective as shown in Figure [1,2]

Figure 1: Time frame for prospective and retrospective cohort studies[2]



Prospective Cohort Studies[3]

In prospective cohort studies the investigators conceive and design the study, recruit subjects, and collect baseline exposure data on all subjects, before any of the subjects have developed any of the outcomes of interest. The subjects are then followed "longitudinally" (i.e. over a period of time, usually for years) into the future in order to record the development of any of the outcomes of interest. Typically, the investigators have a primary focus, for example, to learn more about cardiovascular disease or cancer, but the data collected from the cohort over time can be used to answer many questions and test many possible determinants, even factors that they hadn't considered when the study was originally conceived.

Table 1 shows a hypothetical group of 12 subjects followed over a number of years for disease X. They were enrolled into the study at different times. The follow up was stopped at year 1995.

Subject	Initial follow up year	Disease developed?	Time at risk (Disease-free time)*
A	1981	No	8.3
B	1981	Yes	11.0
C	1982	No	14.0
D	1982	No	14.0
E	1983	No	10.2
F	1983	Yes	3.0
G	1984	No	12.0
H	1984	No	7.0
I	1985	No	10.0
J	1985	No	3.0
K	1986	No	9.0
L	1986	Yes	6.2

Table 1: Hypothetical data for a prospective cohort study of 12 subjects.
*From initial follow-up until the development of the disease or until end of follow-up.

From Table 1,
Disease incidence = 3
Total time at risk = 107.7 person-years
Incidence rate (IR) for disease X = 3/107.7
= 0.028/person-year = 28/1000 person-years

Since the investigators asked about many exposures during baseline data collection, they can eventually use the data to study many associations between different exposures and disease outcomes. For example, one could identify smokers and non-smokers at baseline and compare their subsequent incidence of developing heart disease, as shown in Table 2.

Smoking Status	# of non-fatal heart attacks	Person-years of observation	Heart attack rate per 100,000 person years
No	41	177,356	23.1
Yes	85	99,573	85.4

Table 2: Hypothetical data for a prospective cohort study with smoking status

One of the measures of association in cohort studies between exposure and outcome is 'relative risk', which is the incidence rate of a disease among the exposed group versus the unexposed group. From Table 2, the relative risk of heart attack among smoker as compared to non-smokers is 85.4/23.1=3.7

Retrospective Cohort Studies[3]

Retrospective cohort studies also group subjects based on their exposure status and compare their incidence of disease. However, in this case both exposure status and outcome are ascertained retrospectively. In essence, the investigators jump back in time to identify a useful cohort which was initially free of disease and 'at risk.' They then use whatever records are available to determine each subject's exposure status at the begin of the observation period, and they then ascertain what subsequently happened to the subjects in the two (or more) exposure groups. Retrospective cohort studies are also 'longitudinal,' because they examine health outcomes over a span of time. The distinction is that in retrospective cohort studies all of the cases of disease have already occurred before the investigators initiate the study.

Retrospective cohort studies are particularly useful for unusual exposures or occupational exposures. Retrospective cohort studies are also less costly and time consuming than prospective cohort studies, but this advantage also creates potential problems. Sometimes exposure status is not clear when it is necessary to go back in time and use whatever data was available, because the data being used was not designed to be used in a study. Even the exposure status is clear, it would also be important to take into account (or adjust for) other differences that could have influenced (confounding factors) the outcome of interest.

Advantages of Cohort studies[3]

1) Clarity of temporal sequence.
2) Allow calculation of incidence
3) Facilitate study of rare exposures
4) Allow examination of multiple effects of a single exposure

Disadvantages of Cohort Studies3

1) May have to follow large number of subjects for a long time
2) Can be very expensive and time consuming
3) Not good for rare diseases or diseases with long latency
4) Differential loss of follow up can introduce bias
5) For retrospective cohort studies
   a. Recall bias due to reliance on memory of the subjects
   b. Records that are not designed for the study are usually of poor quality. Data on potential confounding factors is frequently unavailable.

References:

1. Grimes & Schulz. An overview of clinical research: the lay of the land. *Lancet* 2002;359:57-61
2. Gordis, L. (2014). *Epidemiology*. 5th ed. Philadelphia: Elsevier Saunders, p.182.
3. Wayne, L. (2016). *Cohort Studies.* [online] MPH Online Learning Modules. Available at: http://sphweb.bumc.bu.edu/otlt/MPH-Modules/EP/EP713_CohortStudies/ [Accessed 10 Oct. 2019]. **[Note: A large part of the information in this article is taken from this MPH online learning module. I will encourage you to read the whole module if you are interested]**

MDA 25th Conference Award Recipients

Dietitian Research Oral Presentation (Online Web-based Dietetics): Perception on the Benefits, Challenges, Support and Commitment to the Role of Dietetics Clinical Instructors in Malaysia

Jamilah Abd Jamil
International Medical University

Aim
Clinical instructors' roles are critical in shaping dietetics interns to be clinically competent upon completion of the dietetics course. This study aimed to determine clinical instructors' perceptions on benefits, challenges, support and their association with commitment level to the roles of dietetics clinical instructors.

Methods
This was a cross sectional study conducted among dietetics clinical instructors of the seven universities with dietetics course in Malaysia. The study was carried out from February to March 2019. By using total sampling method, 53 clinical instructors were invited to participate in the study. The questionnaire consisted of five sections; demographic details, perceptions on benefits, challenges, support and commitment. Participants were required to rate their level of agreement to given statements on a 5-point Likert scale, from strongly disagree to strongly agree. Questions were adapted from Mowday et al.,[1] Dibert & Goldenberg[2] and AbuSabha et al.[3] Data was gathered using Survey Monkey platform.

Results
A total of 45 clinical instructors participated in the study (85% response rate). Majority (78%) of the participants were females at an average age of 31 years old, obtained bachelor's degree as the highest education level (89%) and had an average of 5 years' experience as clinical instructors. Score for benefit ranged from 9 to 45 while score for support ranged between 8 to 40. Challenges and commitment score ranged from 7 to 35 respectively.

Participants perceived that they benefitted from their role as a clinical instructor (median of 38.0, IQR 6.0), faced minimal challenges (19.00±4.30), received good support (28.00±3.36) and were committed to their roles (28.50±3.58). Results suggested that the dietetics clinical instructors were more likely to be committed if they have good perception on the benefits obtained and if sufficient support is provided. Similar results were reported by Hyrkäs and Shoemaker4 and Usher et al.,[5] revealing that commitment to the role of preceptor is associated with the perceived benefit and support received.

Conclusion
Providing continuous support should be the priorities in ensuring that the clinical instructors are committed in executing their roles. Attention should be given in the development of the clinical instructors by providing training and creating opportunities for them to grow professionally. With improved quality of trainers, it would lead to quality dietetics force for the country.

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2. Dibert C, Goldenberg D. Preceptors' perceptions of benefits, rewards, supports and commitment to the preceptor role. *J. Adv. Nurs.* 1995;21(6):1144-51.
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5. Usher K, Nolan C, Reser P, Owens J, Tollefson J. An exploration of the preceptor role: preceptors' perceptions of benefits, rewards, supports and commitment to the preceptor role. *J. Adv. Nurs.*1999;29(2):506–14.

Featured Dietitian

Dietitian Research Oral Presentation (Technology-based Dietetics): Translating Nutrition Focused Physical Examination (NFPE) Knowledge and Skills Acquired through Virtual Learning into Practice

Dr. Chen Seong Ting
International Medical University

Introduction

This study is an international collaboration between Malaysia IMU N&D and the United States Rutgers University SHP. Nutrition Focused Physical Examination (NFPE) is one of the components of nutrition assessment in the nutrition care process. It refers to the physical examination for malnutrition identification from top to toe beginning with where food enters the body which is the mouth. NFPE includes the examination of orofacial and cranial nerve for eating difficulty, dysphagia screening, dermatologic, fat, muscle and edema assessment. Dietitians can perform these physical examinations to determine physical indicators impacting patients' food intake and to diagnose nutrition problems. In line with the Malaysian Education Blueprint 2015-2025, one of the key initiatives is to make online learning an integral component of higher education and lifelong learning1. Virtual learning can certainly support the growing demand of borderless education and continuing professional development. Traditionally, health professions education especially those involving hands-on such as physical examination was taught face-to-face. Can nutrition focused physical examination skills be acquired through virtual learning in Malaysian dietetics students?

Objective

The objective of this study was to explore the feasibility to acquire NFPE skills through virtual learning amongst IMU final year dietetics students who were in clinical internship.

Methodology

This study was conducted from October 2017 to January 2018. Fifteen IMU dietetics students who were in their clinical internship volunteered to join an 8-week online course on NFPE and to learn the skills through computer-assisted instruction (CAI)- an innovative web-based technology uses interactive software programmes and audio or visuals to augment instructions2. This online course was delivered by the Rutgers SHP faculty using Zoom and Moodle, the virtual learning platforms. The NFPE online course activities comprised of the online pre- knowledge test and a virtual tour to introduce the Moodle in Week 1; followed by synchronous live lectures and skills demonstration, asynchronous lectures and skills videos for 5 weeks; student live case study discussions at week 7; student live demonstration of skills on peer and first post- knowledge test at week 8; and ended by student self-recording of skills for evaluation and a second post-test after 6 weeks of completion (week 14). As for the course content, it was a structured stepwise approach to conduct NFPE- started with step 1 interviewing the patients on eating patterns; step 2 fat, muscle and functional status assessments; step 3 extra-oral screen to assess facial profiles, joint and muscles of mastication; step 4 screening on cranial nerves related to food intake; step 5 skills to assess swallowing difficulty; step 6 intra-oral screen to examine the color, texture of oral cavity and dentition; step 7 examination on signs and symptoms of micronutrient deficiency. These physical examinations were used collectively to identify and diagnose malnutrition. Students were required to take the online pre- and post- knowledge tests, present live case study discussions, demonstrate skills on peers online and assessment by instructor, record NFPE skills video for instructor- and self-evaluation and complete a course evaluation survey at the end of the course.

Results

The feasibility of learning NFPE skills online were presented in terms of students' knowledge, translation into practice and their experience on virtual learning. All students showed significant improvements in knowledge scores at post-tests as compared to pre-test. Repeated measure ANOVA showed significant differences between pretest and both post-tests scores ($p<0.001$) with no significant difference between post-test 1 and 2 (Table 1). This showed the knowledge retained even after 6 weeks without any refresher. As for the translation into practice, 7 out of 15 students had applied the NFPE skills learned on patients during their internship. They had examined 14 patients with cerebrovascular accident (CVA) (n=8), cancer (n=5), and chronic kidney disease (n=1). The NFPE skills most frequently performed were the fat and muscle examination, followed by the extra- and intra-oral, swallowing difficulty and cranial nerves examination. The students identified 6 patients with severe fat and muscle loss, 4 patients had chewing difficulty and 2 patients had swallowing difficulty. A patient with CVA failed to detect sensation on the right facial region during cranial nerve screening. Students recorded these findings in their case notes, formulated the nutrition diagnosis and recommended the tailored care plans. As for the experience on virtual learning, more than 80% of them agreed that this online course had benefitted them as dietitians, more confident to perform the physical examinations on patients and the experience inspired them to take more online course.

Discussion

The positive outcomes noted above were attributable to the course designs which used moderately interactive CAI. It allowed the repeated viewing of recorded virtual sessions and the skills videos[3]. This online course also provided opportunities for students to perform, record, re-watch and self-evaluate to self realise the gaps for further improvement. Nevertheless, students also provided feedback on the barriers. They were anxious to examine real patients due to the lack of exposure as they only practiced on peers or simulated patients. Second barrier was the time constraint to juggle daily clinical training and additional self-study. It was also reflected by a small number of students who disagreed that this experience was beneficial. Virtual learning requires learners to be independent, highly responsible, highly motivated to self-learn and have good time management[3].

Conclusion

Virtual learning using CAI to teach NFPE in Malaysia had significantly increased students' knowledge, enhanced skills acquisition and ultimately translated into their practice. Virtual learning is flexible, convenient and cost-effective that student in Malaysia can attend lectures from faculty in USA. This collaboration has extended to training the clinical dietitians and educators in Malaysia aimed to change practice and to elevate the dietetics practice in Malaysia.

References:

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Timeline Comparison	Mean difference (95% CI)	p-value
Pre – Post 1	-26.0 (-30.7, -21.3)	<0.001*
Pre – Post 2	-26.4 (-31.3, -21.4)	<0.001*
Post 1 – Post 2	-0.3 (-3.6, 2.9)	1.000

Table 1. Pre- and Post- NFPE Knowledge Test Scores of Participants (N=15)

Note:

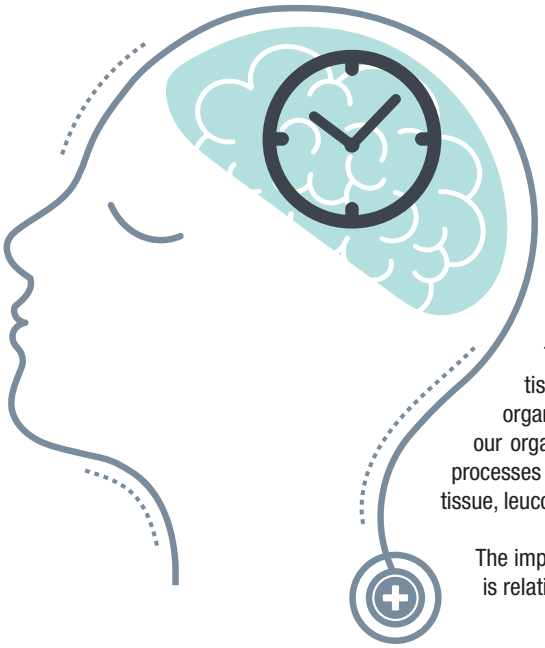
Pre- Pre-knowledge test score

Post 1- 1st post-knowledge test score (within 1 week after the online course)

Post 2- 2nd post-knowledge test score (6 weeks after the online course)

Repeated measures ANOVA within group analysis was applied followed by pairwise comparison with Bonferroni correction

*Level of significance was set at 0.05 (two-tailed)



Food for Thought

Master Clock in Your Brain Controls Your Weight!

Have you ever heard about the "MASTER CLOCK" in your brain?

Research has identified a region in the brain known as the suprachiasmatic nucleus (SCN), they called it "The Master Clock" because it can synchronise with the cells of most organs and tissues, influencing several physiological processes[1].

The "Master Clock", which is primarily regulated by light/dark cycles, plays a major role in peripheral tissues synchronising the body to the light cycle, thus we have a so called "peripheral clocks" in each organ that contains a clock gene[2,3]. Clock genes, on the other hand, are now recognised in many of our organs, they are known for their indisputable role in coordinating nearly all biological and physiological processes of the body[3]. Surprisingly, clock genes have now successfully been observed in human white adipose tissue, leucocytes, fibroblasts, liver, pancreas, adrenal cortex, and heart[3].

The impact of Master Clock on these clock genes influence nutrition leading to metabolic changes and obesity is relatively new and is an area of evolving interest called "Chrono-nutrition".

There are several factors affecting the Master Clock pattern[4]:

- Seasons, ecosystem, high attitudes and light.
- Heredity mutation in clock genes.
- MOST IMPORTANTLY: Life style changes; shift in working hours, sleep/wake cycle and food habits.

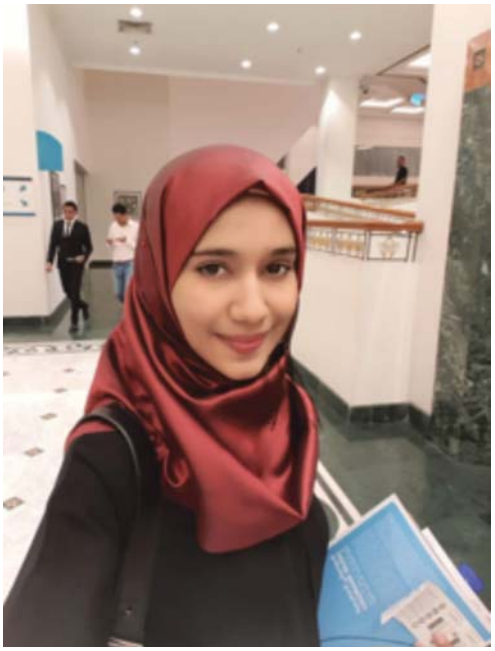
For example, it is speculated that shift in working hours lead to disturbances in the Master Clock pattern leading to physiological function disorders such as blood pressure, heart rate, and the secretion and excretion of hormones, all of which increases the risk metabolic syndrome onset.

The TIME-OF-DAY you eat affects THE WEIGHT YOU GAIN!

Recent evidence from chrono-nutrition studies verifies the importance of meal timing in energy balance and cardio-metabolic health and disease (Figure 1). The big breakfast study explores that morning-loaded energy distribution is a beneficial strategy for weight control and prevention of obesity. Increased risk of obesity and related health conditions has been associated with[5]:

- Breakfast skipping
- Late night feeding
- Misalignment between normal feed/fast cycles

This misalignment, late feeding and breakfast skipping may desynchronise central and peripheral regulations of metabolic processes and contribute to obesity and metabolic disorders. The mechanism of how clock genes, controlled by the Master clock in brain, affect obesity is stated simply as a deficient of a clock gene, induces dyslipidemia and ectopic fat formation[6]. The following chart explains the process in steps.



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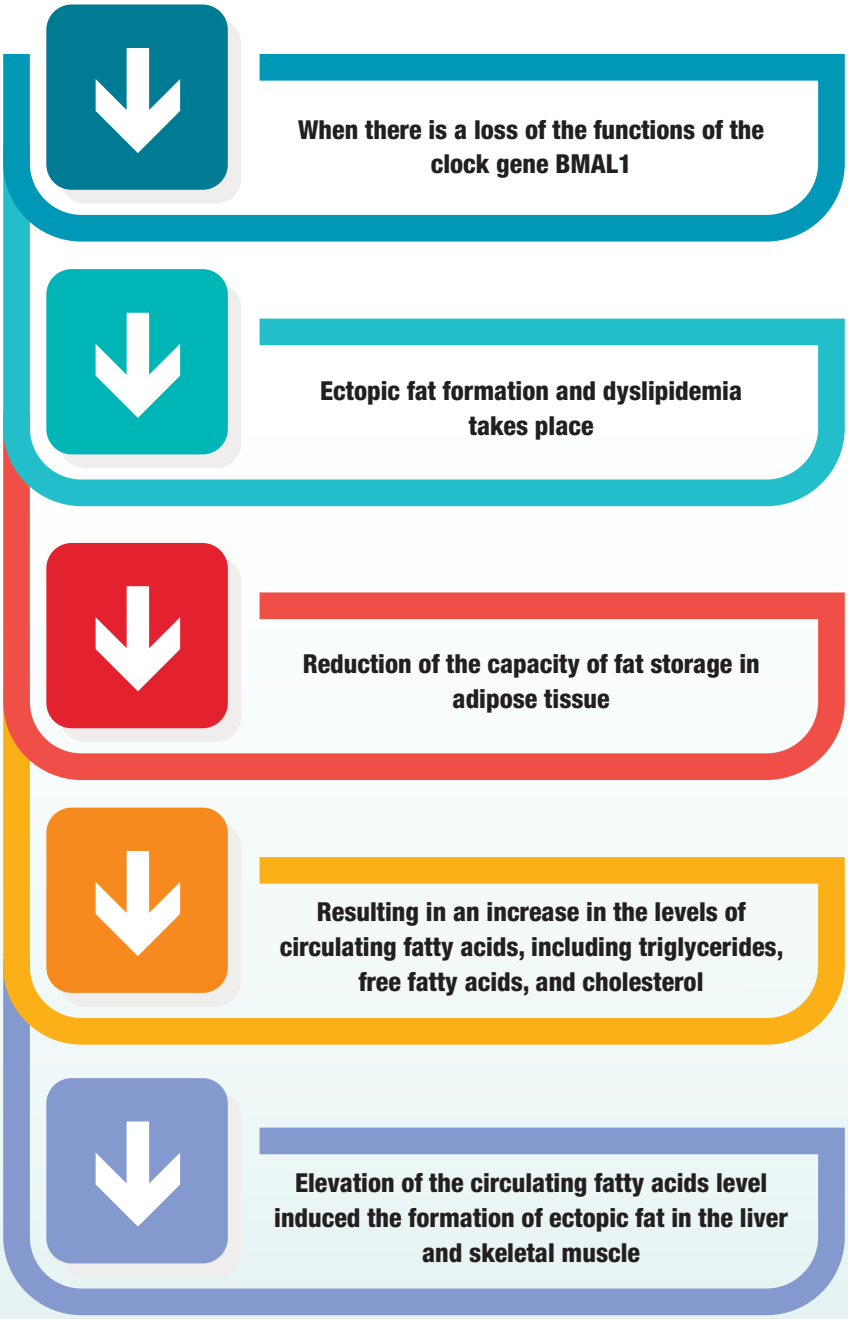

In conclusion, the time you eat is very important in controlling your weight. Master clock in our brain has a very important role in coordinating biological and physiological processes of the body through the peripheral clocks in organs that contain clock genes such as human white adipose tissue, leucocytes, fibroblasts, liver, pancreas, adrenal cortex, and heart influencing nutrition leading to metabolic changes and obesity. Several factors can affect this process of synchronization: seasons, ecosystem, high attitudes, light, heredity mutation in clock genes, and life style changes such as shift in working hours, sleep/wake cycle.

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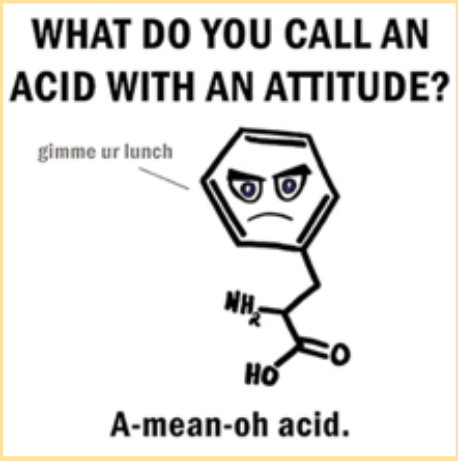

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