

Navigating The Diet At Home For Diabetes Control: *Strategies Beyond Standard MNT*



Prof Dr Winnie Chee

Professor, Nutrition & Dietetics,
School of Health Sciences, IMU

MDA Live Webinar, 11th July, 2020

Learning Outcomes

Describe the key updates on the MNT for Type 2 diabetes mellitus

Describe how to support dietary self-care at home including for vulnerable patients from lower socioeconomic group with food insecurity

Describe the use of technology as an enabler to deliver MNT

Appreciate enhanced skills set required for dietitians





<https://www.middletontranscript.com/opinion/20200421/landgren-cartoon-covid-19>

MCO diets drive up Malaysia's obesity rates

NATION ^{af}

Monday, 22 Jun 2020

9:43 AM MYT



KUALA LUMPUR (Bernama): Many Malaysians have been complaining about their weight gain during the movement control order (MCO) period, which was not really a surprise considering that they were homebound and less active physically.

Some even chose not to share their most recent photographs on their social media accounts to avoid receiving criticism from their friends.

One of them Nur Athirah Rosli, 34, a public-sector employee, had put on 2kg over the MCO period.

"Whenever I felt like eating, I would order food online ... It was so easy," said Nur Athirah, who is in the obese category as she weighs 92kg and is currently following a

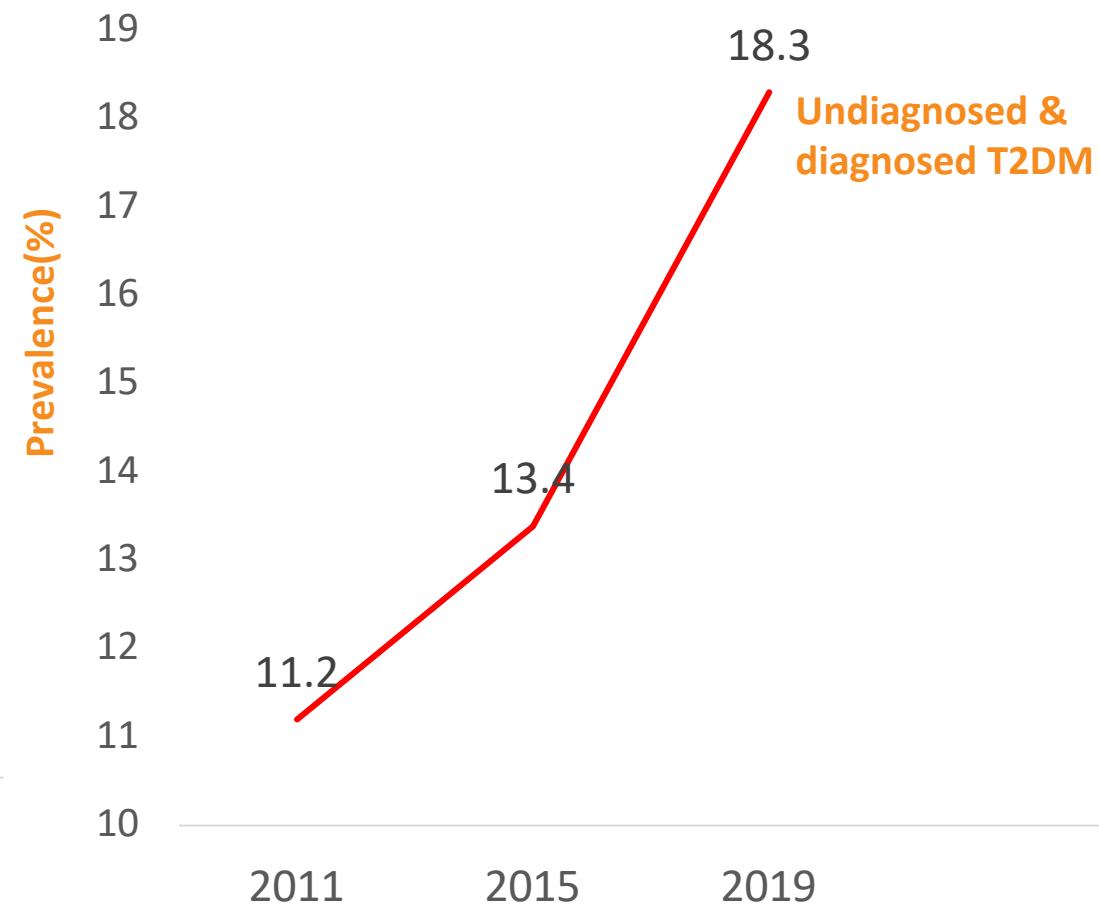
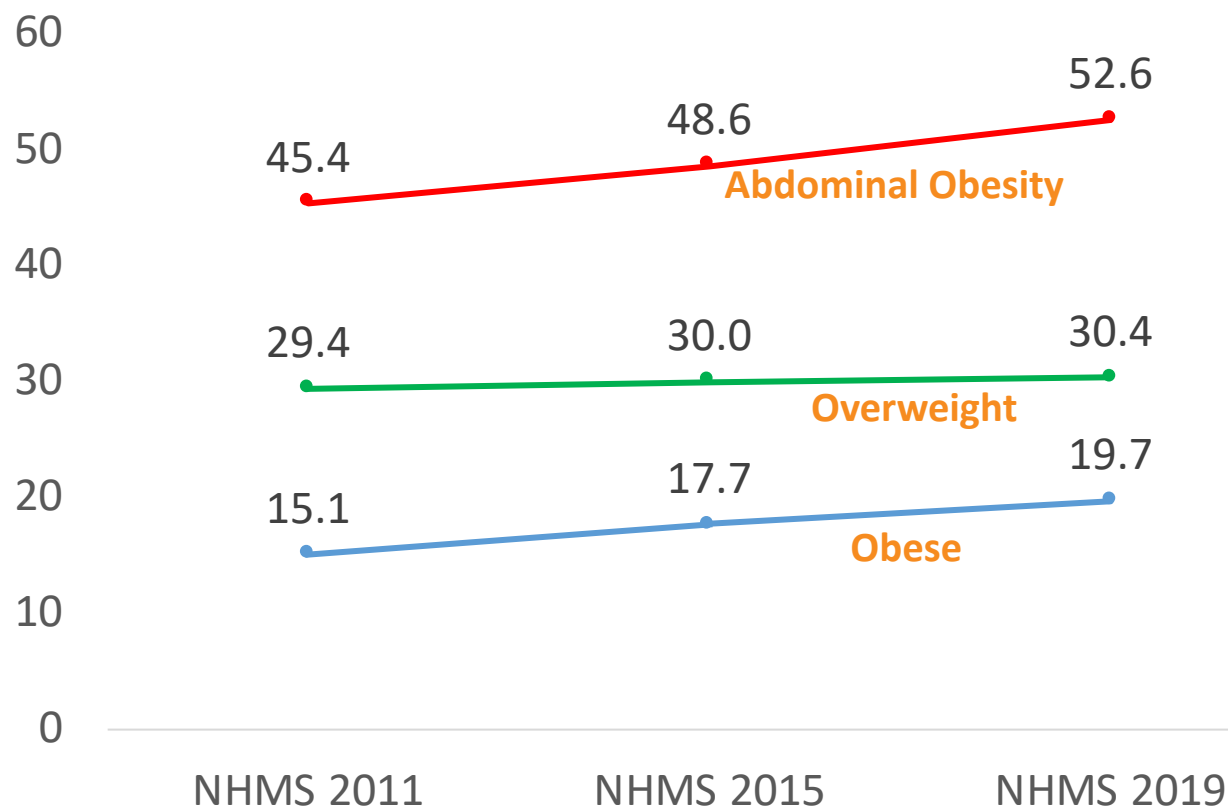
<https://www.thestar.com.my/news/nation/2020/06/22/mco-diets-drive-up-malaysias-obesity-rates>

1 in 2 adults in Malaysia
were **overweight**
or **obese**

1 in 5 adults in
Malaysia
have **diabetes**



Prevalence(%)



Patients at home



01

Reduce physical activity

More sedentary



02

Increased mental stress

WFH and children at home



03

Increased diabetes distress

*stress, guilt, or denial that arise from living with **diabetes** and the burden of self-management*



04

Food stock-piling

Eating frequency

Snacking

Home cooking

Online food ordering



05

Increased food insecurity

Loss of income

Limited access to affordable & healthy foods



Reduced clinic attendance due to COVID-19, especially for older adults

Not all negative ! Home cooking benefits, less eating out ●●●●●●

RESEARCH ARTICLE

Consumption of Meals Prepared at Home and Risk of Type 2 Diabetes: An Analysis of Two Prospective Cohort Studies

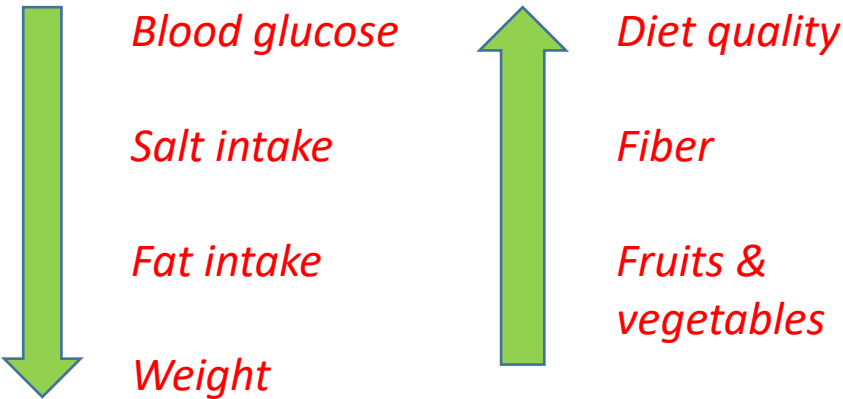
Geng Zong¹, David M. Eisenberg¹, Frank B. Hu^{1,2,3}, Qi Sun^{1,3*}

1 Department of Nutrition, Harvard T.H. Chan School of Public Health, Boston, Massachusetts, United States of America, 2 Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, Massachusetts, United States of America, 3 Channing Division of Network Medicine, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, Massachusetts, United States of America

* qisun@hsph.harvard.edu



People who eat meals prepared at home more frequently have a lower long-term risk of developing T2D (14%) , and that this association is partially explained by less weight gain over time.

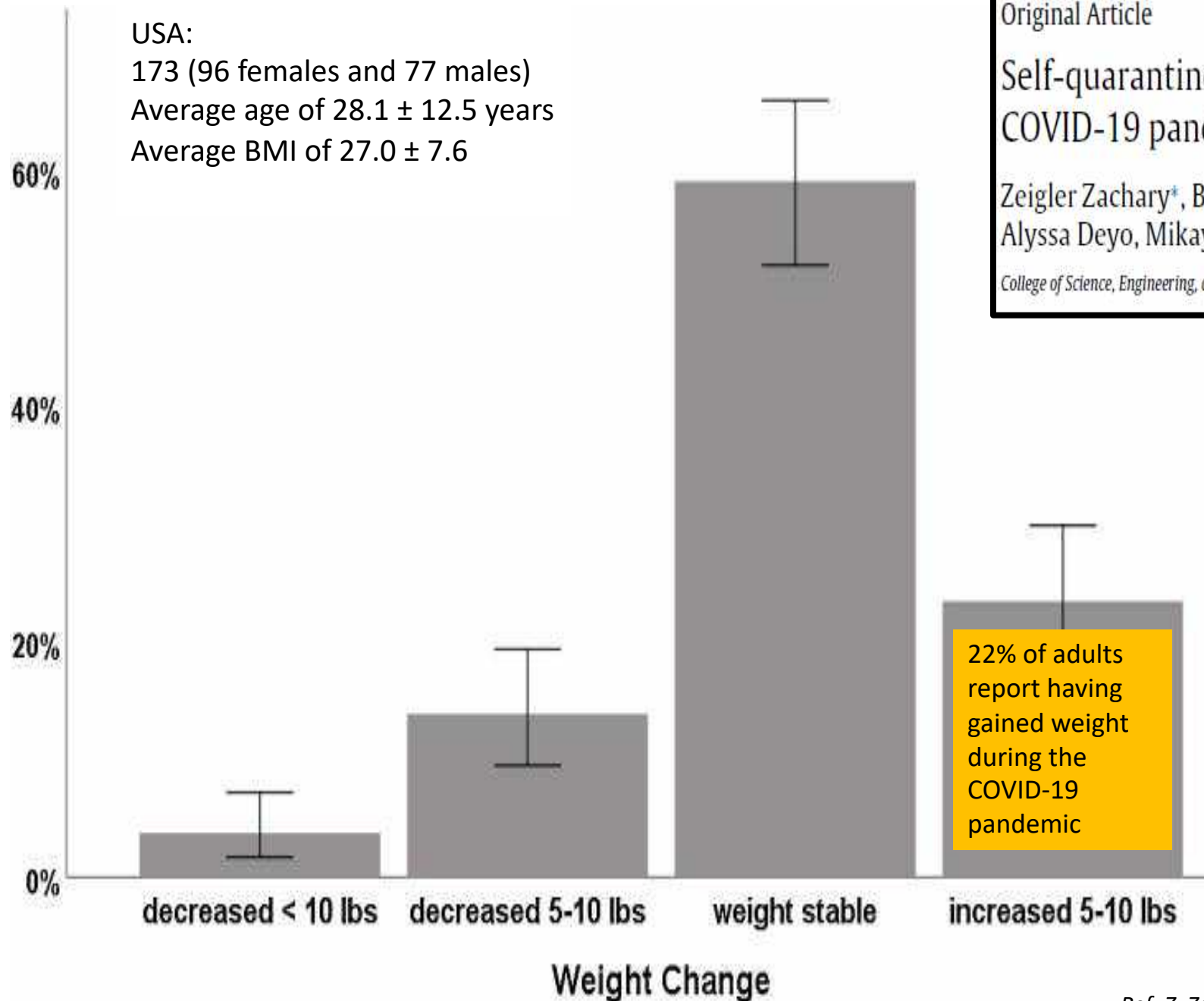


USA:

173 (96 females and 77 males)

Average age of 28.1 ± 12.5 years

Average BMI of 27.0 ± 7.6



Original Article

Self-quarantine and weight gain related risk factors during the COVID-19 pandemic

Zeigler Zachary*, Brianna Forbes, Brianna Lopez, Garrett Pedersen, Jade Welty, Alyssa Deyo, Mikayla Kerekes

College of Science, Engineering, and Technology, Grand Canyon University, Phoenix, AZ, USA

Lack of sleep

Decreased physical activity

Snacking after dinner

Eating in response to stress

Eating because of the appearance and smell of food

The Impact of Covid-19 on the Urban Poor: Three Major Threats – Money, Food and Living Conditions

TAGS Covid-19 Jobs Social Protection Society

by Puteri Marjan Megat Muzafar and Theebalakshmi Kunasekaran, 27 March 2020

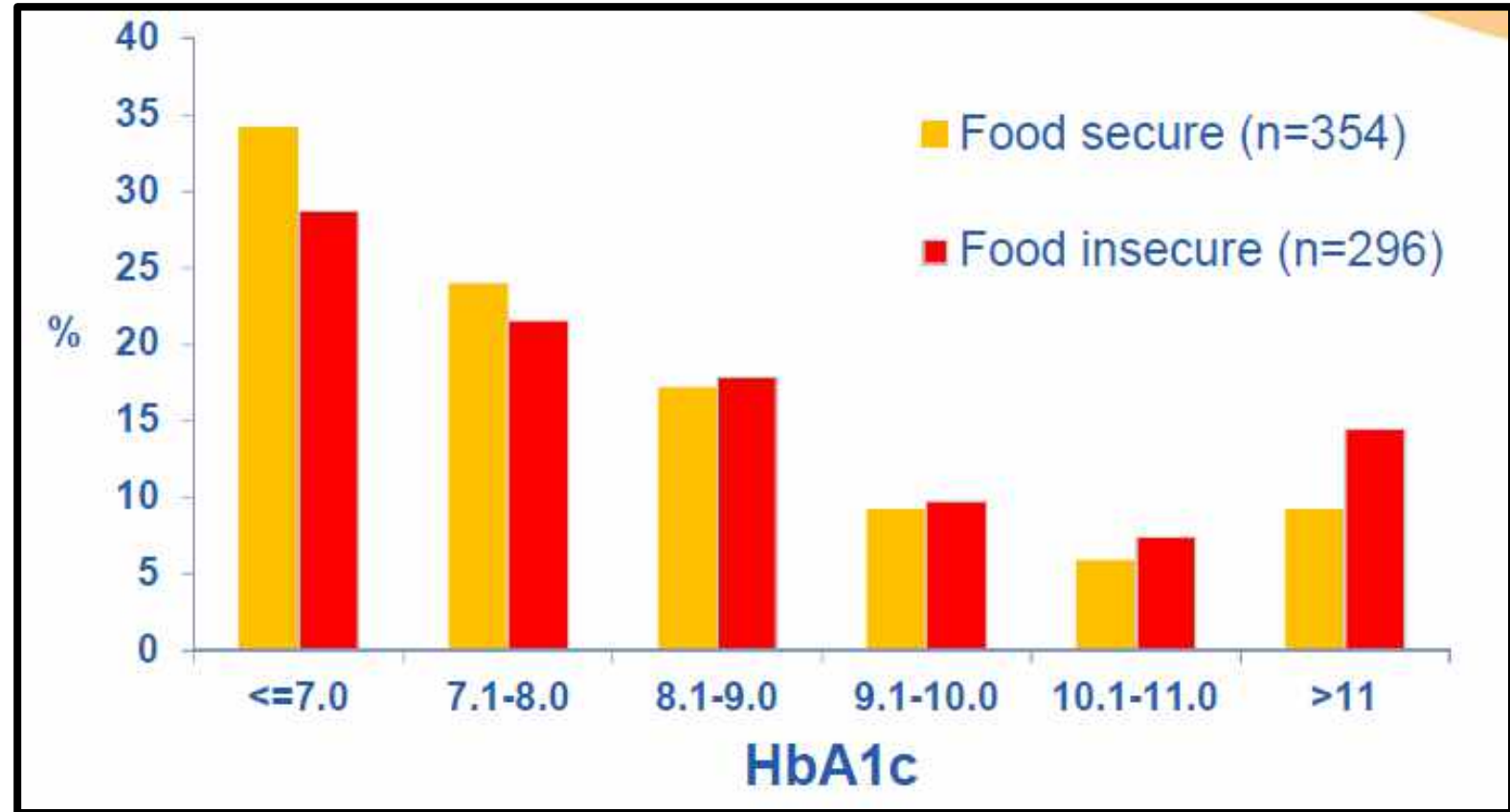


Limited access to affordable food and goods

Restriction on night markets (pasar malam) and farmers' markets (pasar tani)

- a source of income and affordable products for many low-income households to access cheap food and goods (e.g. fresh produce, household goods, clothes)

Food Insecure Adults with Diabetes Have Higher Average Blood Sugars



Seligman et al. 2012. Food Insecurity and Glycemic Control Among Low-Income Patients With Type 2 Diabetes, *Diabetes Care*, 35(2), 233-38.

First Line Approach



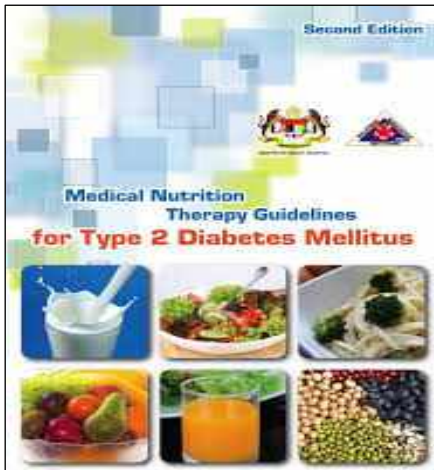
Patients at home



01

MNT

*strategies for
modulating
blood sugars at
home*



02

Enhancing dietary
self-care at home



03

Technology as
enabler for diet
counselling



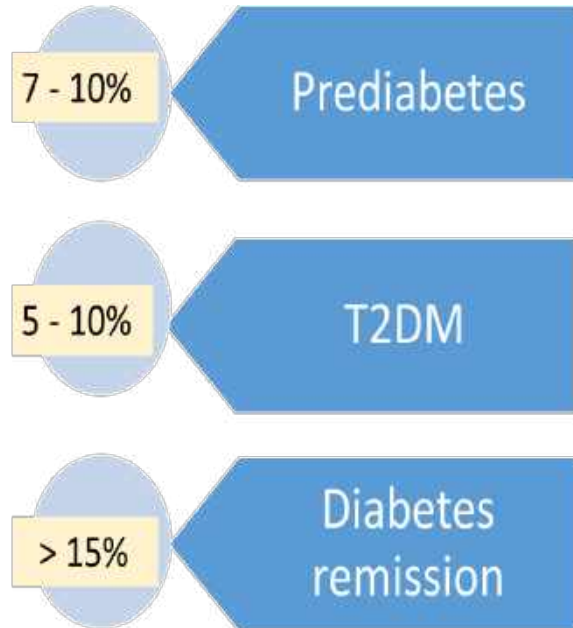
Goals of MNT ● ● ● ● ● ●

- The goals of MNT are:
 - improve HbA1c, Blood pressure and Cholesterol levels, achieve and maintain body weight goals
 - promote healthful eating patterns in appropriate portion sizes and limiting food choices only when supported by scientific evidence
 - provide nutrition needs based on cultural preferences, health literacy and numeracy, willingness and ability to make behavioural changes (Level III)

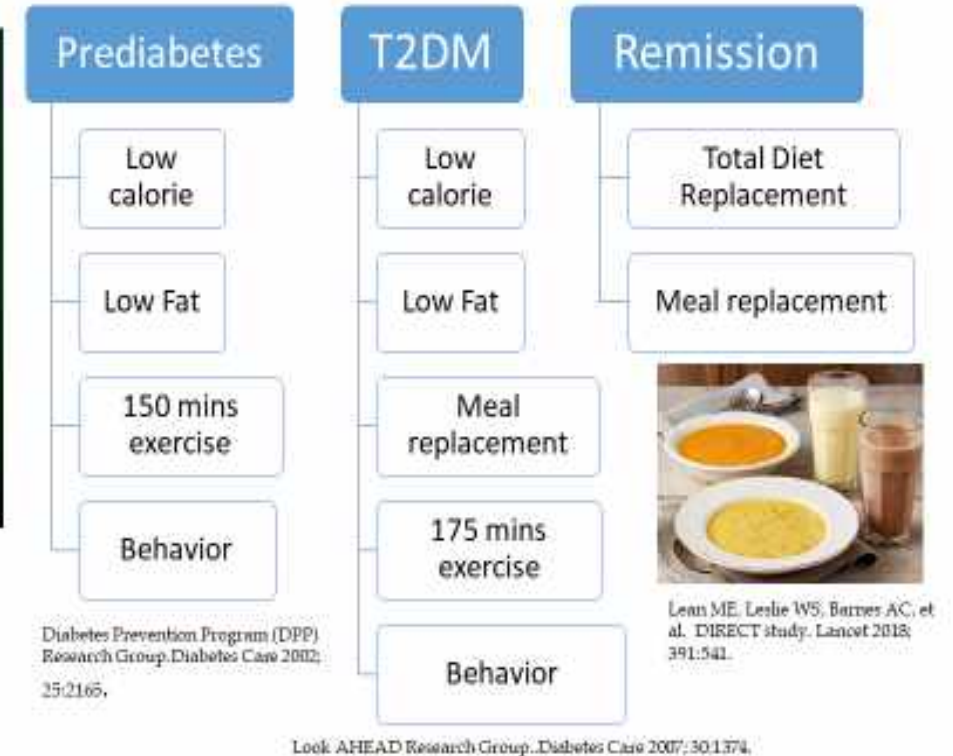


STANDARD MNT for T2DM ●●●●●●

01 Managing WEIGHT



Evidence-based lifestyle intervention





Structured lifestyle intervention and:

- MRP have been shown to be effective in lowering HbA_{1c}, lipid profile and BP (Level I)
- total diet replacement (TRP) (≤ 800 kcal/day) inducing weight loss up to 15% (approximately 15 kg) from baseline has been shown to lead to diabetes remission in T2DM patients (Level I)

STANDARD MNT for T2DM ●●●●●●

02 Managing CARBOHYDRATES

<u>CHO awareness</u> <i>Identify CHO vs non-CHO foods</i>	<u>Basic CHO Counting</u> <i>Diet alone, OAD or fixed insulin regimen</i>	<u>Advanced CHO counting</u> <i>MDI injection or use insulin pump</i>
<ul style="list-style-type: none">• Explain relationship between CHO and BGL• CHO food alone may raise BGL more quickly than mixed CHO dishes (Fat, protein, fibre)• Liquid vs solid based CHO → rapidly digested 	<ul style="list-style-type: none">• Total amount• Type of CHO• Time (consistent day-to-day) 	<ul style="list-style-type: none">• Insulin: Carbs Ratio (ICR) and Insulin sensitivity factor• Offers greater flexibility in food choices, portion sizes, and timing of meals

A balanced diet consisting of 45%–60% of energy from CHO, 15%–20% energy from protein and 25%–35% energy from fat are encouraged (Level III)

Monitoring the **total amount of CHO intake** remains a key strategy in achieving glycaemic control (Level1)

STANDARD MNT for T2DM



03 PROTEINS

15%–20% energy
& lean proteins
(Level I)

*Impaired renal
function, protein
restriction of 0.8–
1.0 g/kg body
weight/day*



04 FATS

Limit total fat
(25%–35% energy
intake)

*Saturated fats (<7%
energy intake) &
trans-fat (<1%
energy intake)*

**Blended oils*



03 SODIUM

Reduced sodium
intake (<2,000 mg
sodium/day or 5 g of
salt a day or 1
teaspoon)

*Diet high in fruits,
vegetables, and low-fat
dairy products^(Level I)*



04 HEALTHFUL DIETARY PATTERN

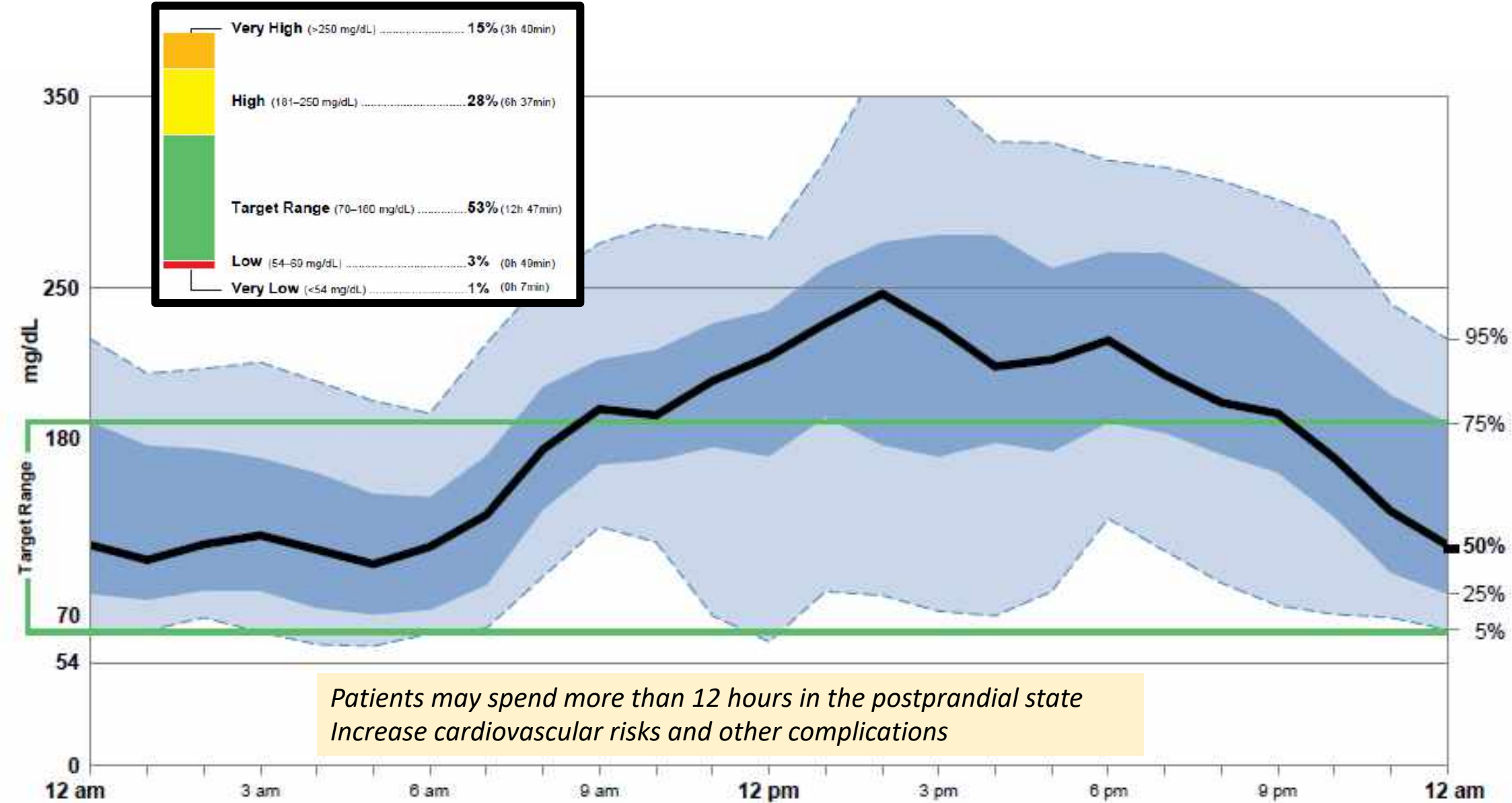
A healthy diet incorporating oats, nuts and legumes, green leafy vegetables and soy protein for cardiovascular health.

Following the Malaysian Healthy Plate Model may help increase consumption of vegetables and fruits and control portion size of meals



*Ketogenic diet (<50g
CHO) are **discouraged**
Intermittent Fasting is
uncertain*

The glucose excursions in a patient's life... CGMS data



Strike Post-Meal Spike with Lifestyle Management ●●●●●●

01 PORTION SIZE

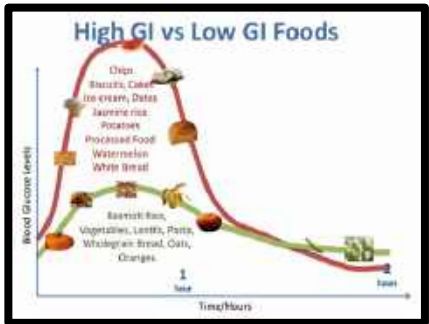
Small meals with snacks rather than large meals



02 GLYCAEMIC INDEX

Low GI foods reduces PPG, and modestly improves HbA1c *provided the energy and total CHO intake are not excessive* (Level 1

High soluble fiber
Solid, not liquid
Unripe, undercooked
Higher fat
Unprocessed
Acidity



03 PROTEINS AT BREAKFAST

Eat Breakfast
More protein at breakfast
attenuates PPG, insulin, C-peptide, and GLP concentrations in response to subsequent meal



04 WALK AFTER EATING

10 or 15 minutes (or more) of mild activity

Avoid sitting for extended periods of time after eating

Schedule 30 mins exercise after meals



Young-Min Park, et al. *The Journal of Nutrition*, 2015
Manohar C et al *Diabetes Care* Aug 2012,

Eat Carbohydrate Last

Ref: Lee CL, Sangeetha S et al

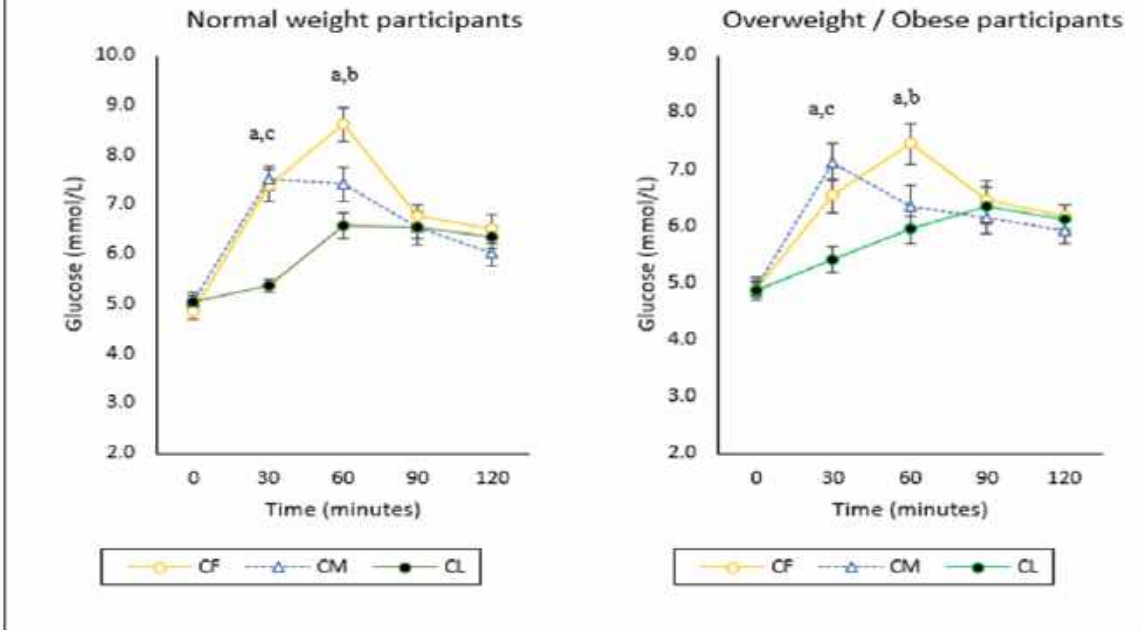
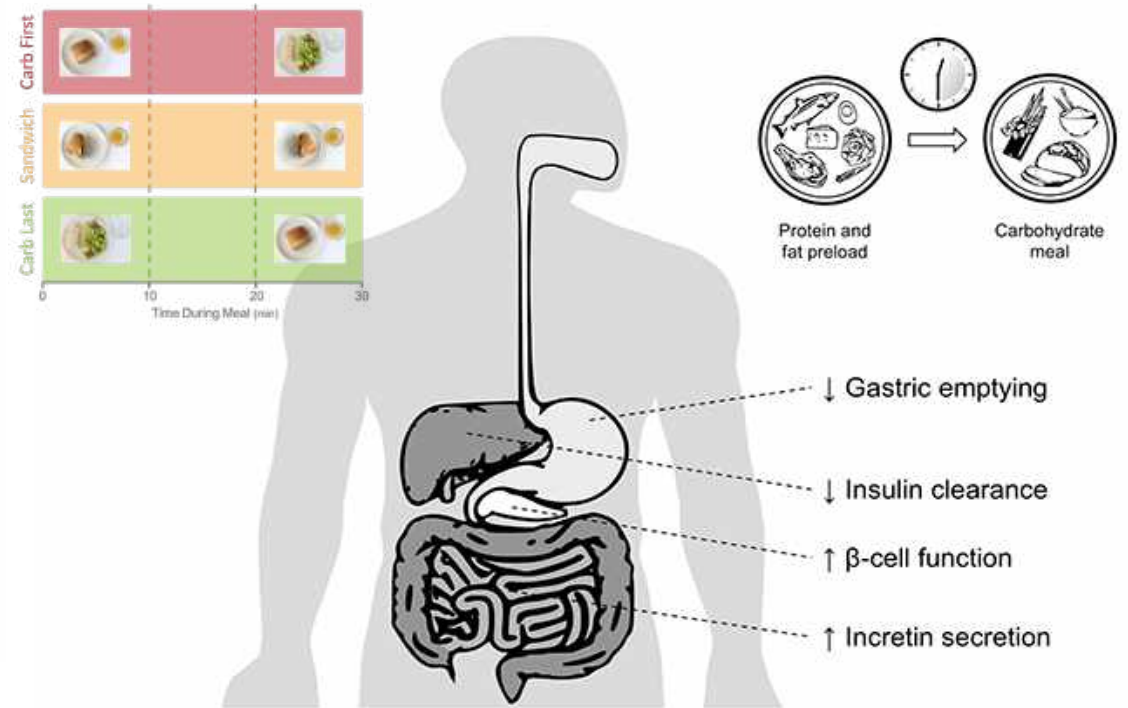


Figure 2 Postprandial glucose excursion following Carbohydrate first (CF), Composite meal (CM) and Carbohydrate last (CL) food order in normal weight and overweight participants[#].

[#] All values are means \pm SEMs; Shared subscript denotes significant difference ($p < 0.05$) between meal sequences: a = CF and CL, b = CF and CM, c = CM and CL.

Meal sequencing/food order

A Schematic representation of glucose-lowering mechanisms



More than 50 studies

Premeal consumption of non-carbohydrate macronutrients (i.e., **protein and fat “preloads”**) or **carbohydrate-last** reduce postprandial glycemia by 30-40%

Mechanism by delaying gastric emptying, enhancing glucose-stimulated insulin release, and decreasing insulin clearance.

Ref : Nesti et al *Front. Endocrinol.*, 08 March 2019

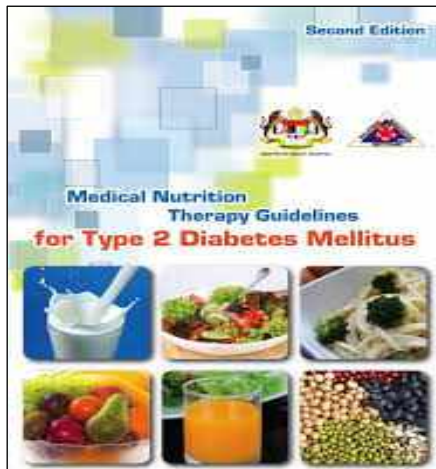
Patients at home



01

MNT

*strategies for
modulating blood
sugars at home*



02

**Enhancing dietary
self-care at home**



03

Technology as
enabler for diet
counselling



Diet Self-Care ●●●●●●

Maintain a reasonable body weight

Monitor blood glucose levels regularly

Eat three meals a day at consistent times

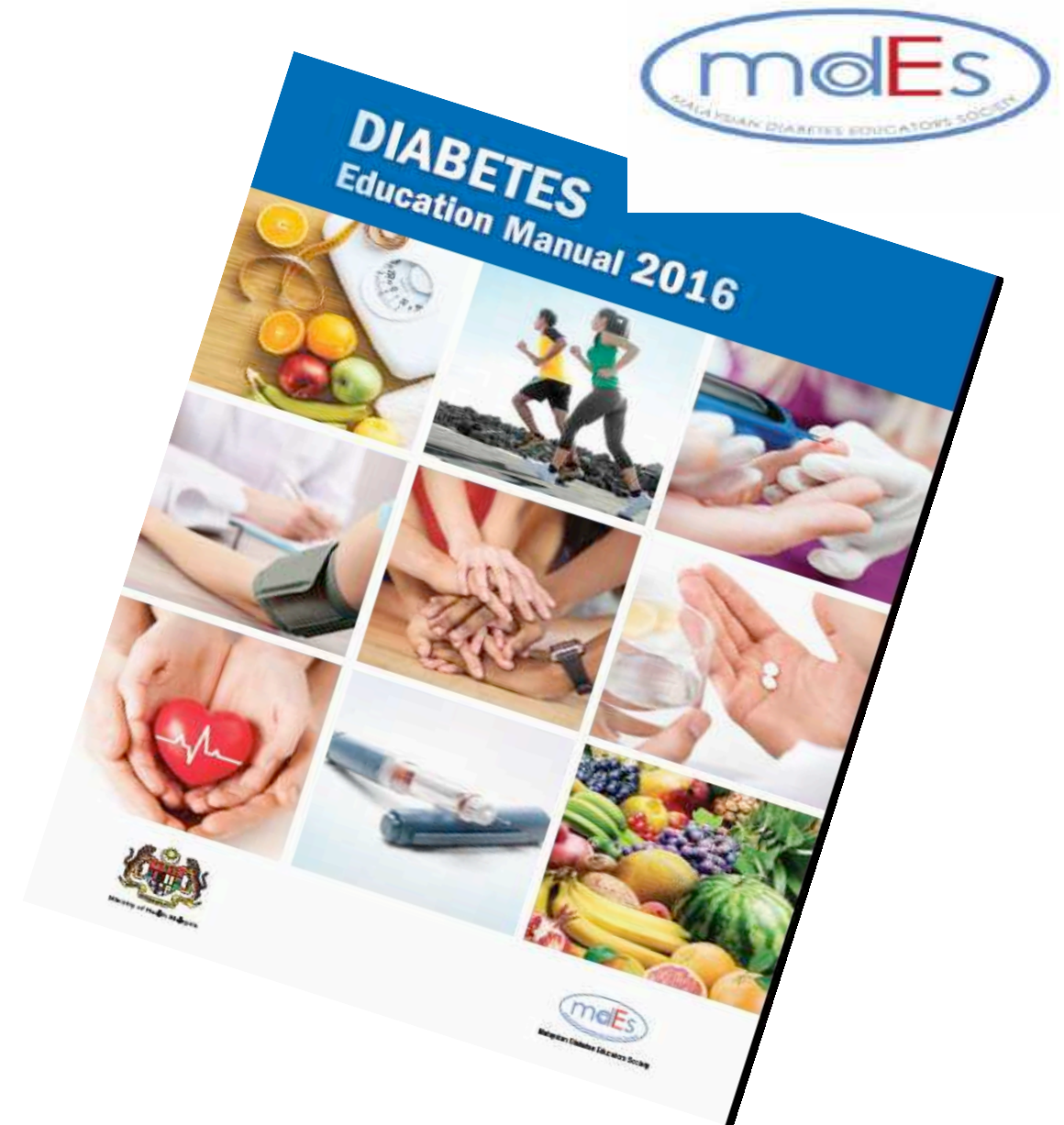
Use a meal plan to help monitor food portions

Identify foods high in carbohydrate, sugar, fats and sodium

Make appropriate food selections when dining out

Use sugar-free or no-added-sugar foods appropriately

Treat hypoglycaemia / hyperglycaemia appropriately





AADE7 Self-Care Behaviors® HEALTHY EATING

Set **realistic**, achievable healthy eating goals

Review your **food logs** for trends and help you determine small changes that can help you meet your health goals

Develop a **meal plan** that fits into your daily routine

Learn about the right **portions/serving sizes** for you

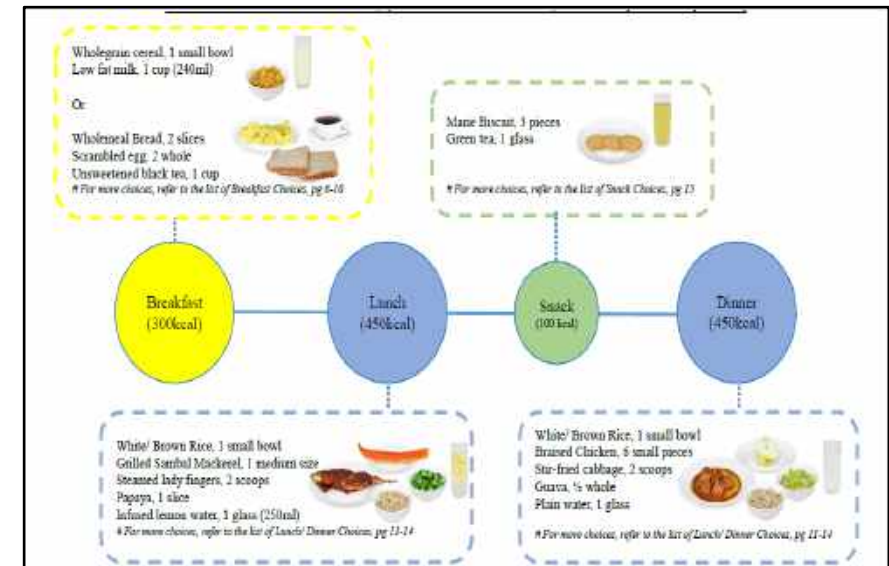
Understand how to use the **nutrition facts label** to make healthy choices

Learn to **count carbohydrates**

Learn about **sources of salt and saturated fat** in the foods you eat and small changes that can help you meet blood pressure or cholesterol goals

Adjust meal plan for **physical activity, holidays and travel**

Find apps for tracking or looking up **food values**



Malaysian Healthy Plate Model for Diabetes Self-Care

Focus more on carbohydrates and portion control

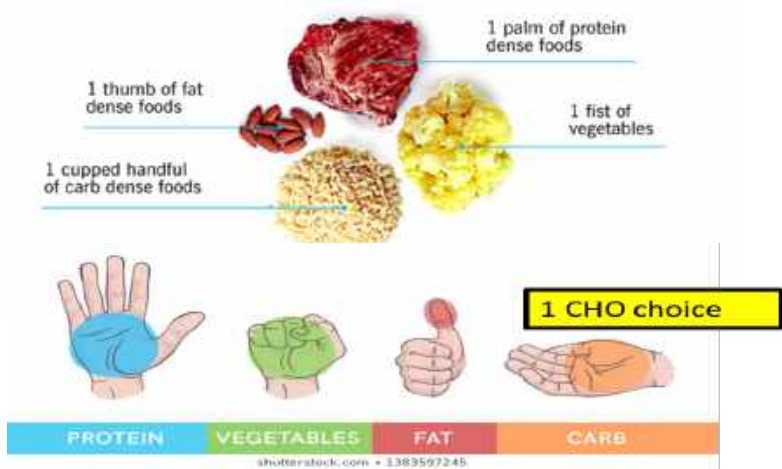
Visually show patients what portion sizes look with food options they may have available to them

Focus on the types of foods that fit into each category (protein, fruit, vegetable, grains, dairy).

Identify the different types of carbohydrates as the primary concern regarding diabetes.

Complex vs simple
Solid vs liquid

Demonstrate what one serving of carbohydrate looks like, and how it is generally 15 grams of carbohydrate. Explain how many servings the patient should aim for at each meal.



Discuss how to limit other foods that may be high in fats and sodium since they are more likely to have hypertension and heart disease.

Glycaemic index of Malaysian foods

<http://pendidikanpesakit.myhealth.gov.my/en/glycaemic-index-and-glycaemic-load/>

<https://www.dietitians.org.my/publication> (MNT for Type 2 DM)

Malaysian healthy recipes, foods, snacks, eating out, affordable meals

https://www.moh.gov.my/moh/resources/Penerbitan/Rujukan/NCD/Garam/Buku_Resept_23_april.pdf

<https://www.healthworks.my>

<https://www.nutritionmonthmalaysia.org.my/publications/>

<https://focos.hpb.gov.sg/eservices/ENCF/>

<https://www.dietitians.org.my/publication>

Malaysian healthy food delivery services: <https://foodtime.asia/blog/healthy-food-delivery-services-malaysia/>

Portion size & calories of food

<https://www.myfitnesspal.com/>

<http://www.moh.gov.my/index.php/pages/view/84?mid=54>

Reading Food labels

<https://www.nutritionmonthmalaysia.org.my>



Strategies for the vulnerable patient

Food insecurity

- shop in bulk
- generic brands
- eat low-cost, highly energy-dense foods
- experience low variety of foods
- skip meals
- eat less at each meal



Smaller portions of carbohydrate foods, spread meals



Add eggs, beans, legumes, tempe, tofu



Drink plain water



Sick day rules/hypoglycemia



*Buy fruits and vegetables at pasar tani/pasar malam.
Eat 1 fruit a day at least and 1 serving vegetable/meal.*



Grow own vegetables that are easy to plant at home.



Use low cost spices to season food – pepper, ginger, turmeric powder, etc



Skill-development in the areas of: grocery list development, budget planning, preparing recommended foods, label reading, or cooking with limited resources

Identify low-cost foods that are good sources of iron, folate, calcium, magnesium, zinc, and vitamins A, B₆, B₁₂, and C to prevent nutrient deficiencies. Consider low cost nutrition supplement.

Coordination of care – refer physician, social worker



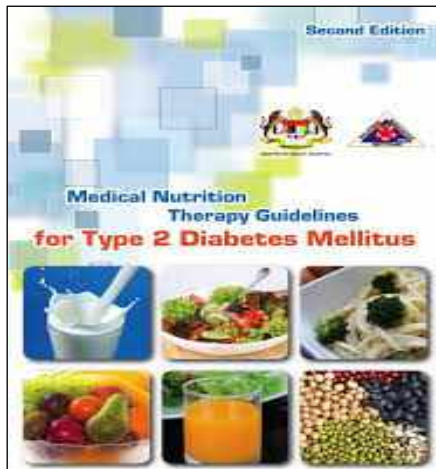
Patients at home



01

MNT

*strategies for
modulating blood
sugars at home*



02

Enhancing dietary
self-care at home



03

Technology as
enabler for diet
counselling



Technology as an enabler ●●●●●●

“Telehealth” refers to the **remote delivery** of health services using information and communication technologies to **exchange health/nutrition information** :

- synchronously (ie, two-way communication in real time; e.g. **telephone and videoconference consultations**)
- asynchronously (ie, one way communication at any time; e.g. **text-messaging and web-portals**).

“Digital health” modalities (encompassing telehealth) also include the remote delivery of nutrition interventions via

- electronic health (**eHealth**) modes - such as web-based programs, software programs
- mobile health (**mHealth**) options - smartphone applications (apps), text messaging programs and wearable devices.



Technology as an enabler: what's the evidence?

Telehealth methods to deliver dietary interventions in adults with chronic disease: a systematic review and meta-analysis^{1,2}

Jaimon T Kelly,³ Dianne P Reidlinger,³ Tammy C Hoffmann,⁴ and Katrina L Campbell^{3,5*}

³Faculty of Health Sciences and Medicine, ⁴Centre for Research in Evidence Based Practice, Bond University, Gold Coast, Australia; and ⁵Nutrition and Dietetics Department, Princess Alexandra Hospital, Brisbane, Australia

1. randomized controlled trial (RCT), cluster RCT, or quasi-RCT;
2. adult participants (> 18 y)
3. established diet-related chronic disease defined as obesity, **diabetes mellitus**, heart disease, hypertension, stroke, or kidney disease
4. dietary education delivered at least 50% and using >1 telehealth strategy – **phone, messaging, videoconf, internet**
5. delivered by a qualified health care professional (nurse, dietitian, physician)
6. reported on any measure of dietary intake at baseline and **4 weeks follow up**

Effective significantly for :

Diet quality : MD 0.22

Fruit and vegetable intake: MD 1.04 servings/d

Dietary sodium intake MD -0.39mg

Systolic blood pressure MD: 22.97 mm Hg

Total cholesterol MD: 20.08 mmol/L

Triglycerides MD: 20.10 mmol/L

Weight MD: 20.80 kg

Waist circumference MD: 22.08 cm



Research Article

For reprint orders, please contact: reprints@futuremedicine.com

Evaluation of a mobile social networking application for improving diabetes Type 2 knowledge: an intervention study using WhatsApp

Turki Alanzi^{*1}, Sulaiman Bah¹, Sara Alzahrani¹, Sirah Alshammari¹ & Fatima Almunsef¹

¹Health Information Management & Technology Department, College of Public Health, Imam Abdulrahman Bin Faisal University, Dammam 31441, Saudi Arabia

^{*}Author for correspondence: Tel.: +966 133 332 703; Fax: +966 133 332 703; talanzi@iau.edu.sa

Journal of **Comparative Effectiveness Research**

SAUDI ARABIA :

Female T2DM (N=82)

Control group = usual care

Intervention = WhatsApp WEEKLY

diabetes care knowledge, diabetes signs and symptoms, diet therapy and exercise

Measure using DSMES

Health Behaviour Change Model

Outcome measure	Group	Mean ± SD	95% CI	p-value
Post knowledge level	Control	13.85 ± 1.81	7.21–8.69	<0.001
	Intervention	21.8 ± 1.59		
Post self-efficacy level	Control	6.02 ± 2.01	0.59–2.05	<0.001
	Intervention	7.34 ± 1.26		

SD: Standard deviation.



Significant improvements in knowledge and self-efficacy levels after 8 weeks

Digital health platforms : rewards/incentive based



Welcome

is an online platform that operates across the healthcare continuum connecting patients to healthcare professionals anytime and anywhere, while incentivising all to stay active.

Introducing 5 features of BookDoc



1. Search & Book

Search & Book your preferred healthcare professionals anytime, anywhere



2. BookDoc Activ

Get rewarded for staying active based on your steps



3. Marketplace

Shop online for your healthcare needs



4. Tele-consult

Chat with healthcare professionals privately and securely



5. Events & News

Get to know the latest health events and news



More steps, more rewards!

View our reward list here
<https://activ.bookdoc.com/listings>





[DOI: 10.1186/1745-6215-13-104](http://dx.doi.org/10.1186/1745-6215-13-104)
 Published online: 11 July 2014

Open Access

A Promising Food-Coaching Intervention Program to Achieve Optimal Gestational Weight Gain in Overweight and Obese Pregnant Women: Pilot Randomized Controlled Trial of a Smartphone App

Ling-Jue Lin^{1,2,3*}, MTH, PhD; Jacqueline M. Auer^{1,2,3}, PhD; Wei-Ming Hsu^{1,2,3}, MD; Kuo-Hsin Tsai^{1,2,3}, MD

*Correspondence: lingjue.lin@ntu.edu.tw
 Department of Obstetrics & Gynecology, KJ. Research and Education Building, Singapore
 Division of Obstetrics Research, Singapore, 1. School of Health Sciences, National Medical University, Singapore
 (See background for author details)

Department of Nutrition, 3. National Institute of Health, Singapore

Background:
 Ling-Jue Lin, MTH, PhD
 Department of Obstetrics & Gynecology
 KJ. Research and Education Building
 100 Bukit Timah Road, Outpatients Tower Level 2
 Singapore, 220097
 Phone: +65 67441899
 Email: lingjue.lin@ntu.edu.tw

Abstract

Background: Traditional dietary recommendations for achieving optimal gestational weight gain are ineffective for pregnant women due to the lack of timely communication and behavior modification programs.

Objectives: In this pilot study, we aimed to determine the feasibility of a novel food-coaching smartphone app for controlling gestational weight gain and nutritional intake during pregnancy and these program results.

Methods: We designed a randomized controlled trial and recruited 20 pregnant women (11 control group and 9 intervention group) during 16-24 weeks of gestation and followed them up after 4 and 8 weeks, respectively. Both groups received standard pregnancy care, while the intervention group received a 4-week trial of the food-coaching smartphone app. The food-coaching smartphone app (My Pregnancy Coach) was designed to provide real-time feedback on pregnancy weight gain. The food-coaching smartphone app (My Pregnancy Coach) was designed to provide real-time feedback on pregnancy weight gain. The food-coaching smartphone app (My Pregnancy Coach) was designed to provide real-time feedback on pregnancy weight gain.

Conclusions: Our findings suggest that the food-coaching smartphone app is feasible and effective for weight gain control and behavioral change control among overweight and obese pregnant women. Although no results were seen in significant changes, the small sample size, 12 possible period of coverage for the feasibility of applying mobile technology in health behavioral control study with a larger sample size, an initial intervention time, and longer follow-up for overweight and obese pregnant women.

HEALTH COACHING
1. 5X more likely to achieve health goals

FOOD JOURNAL
2. 3X more likely greater weight loss

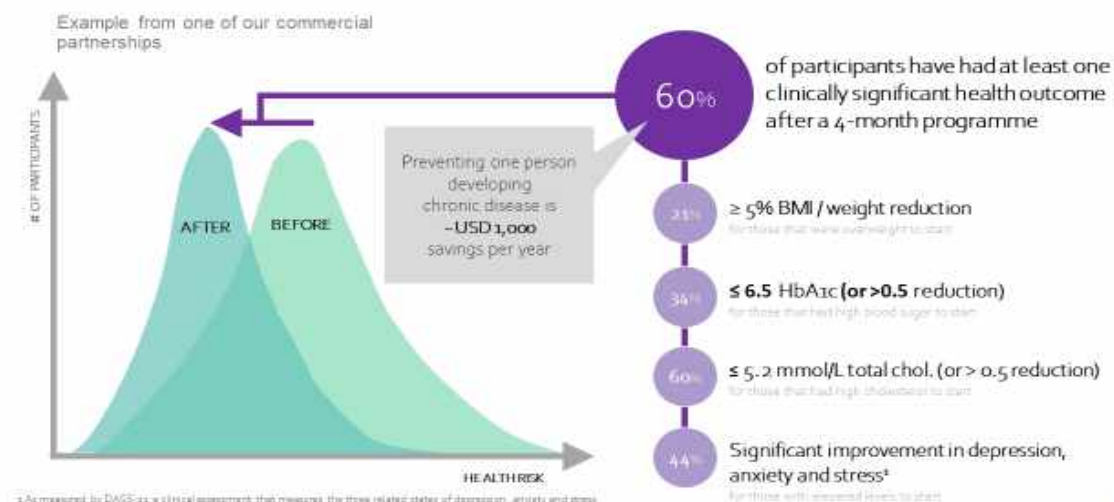
DAILY MODULES
2. 2X better outcomes

THOUGHT JOURNAL
2. 6X better psychological well-being

CONNECTED WEIGHING SCALE
2. 1X better success

PLANNER
3. 5X higher likelihood of achieving targets

30



Expand dietitians' skills set



Culinary Skills



Behaviour change diet consultation skills



Digital Literacy



Advanced courses

Conclusion



1. MNT : Manage weight, manage carbs, healthful eating pattern, manage post—prandial meal spikes
2. Provide resources to patients for self care
3. Use technology as enabler to support patients self efficacy
4. Expand our skills sets to include culinary skills, behaviour change counselling and digital literacy

Now is the best time to be a dietitian!



*Thank
you*