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**IMPORTANT NOTICE:** The World Health Organization (WHO<sup>®</sup>) has recommended that pregnant women and new mothers be informed on the benefits and superiority of breast-feeding – in particular the fact that it provides the best nutrition and protection from illness for babies. Mothers should be given guidance on the preparation for, and maintenance of, lactation, with special emphasis on the importance of a well-balanced diet both during pregnancy and after delivery. Unnecessary introduction of partial formula feeding or other foods and drinks should be discouraged since it will have a negative effect on breast-feeding. Similarly, mothers should be warned of the difficulty of reversing a decision not to breast-feed. Before advising a mother to use an infant formula, she should be advised of the social and financial implications of her decision: for example, if a baby is exclusively formula-fed, more than 400g per week will be needed, so the family circumstances and costs should be kept in mind. Mothers should be reminded that breast-milk is not only the best, but also the most economical food for babies. If a decision to use an infant formula is taken, it is important to give instructions on correct preparation methods, emphasizing that unboiled water, unsterilized bottles or incorrect dilution can all lead to illness.

**\*\*See:** International Code of Marketing of Breast Milk Substitutes, adopted by the World Health Assembly in Resolution WHA 34.22, May 1981.

**Headline**

## A new landscape of gestational diabetes mellitus

Emily Tai PhD, Mphil, MSc, BSc (Hons)

Gestational Diabetes Mellitus (GDM) has increased substantially over the decades and the International Diabetes Federation (IDF) speculates that one in seven births are to women with GDM<sup>1-3</sup>. With a view to enhance the management and care of GDM, the International Federation of Gynecology and Obstetrics (FIGO) established a pragmatic guide on GDM in 2015; whereas the Hong Kong College of Obstetricians and Gynaecologists (HKCOG) updated its guidelines for managing GDM in 2016<sup>4,5</sup>. The WHO criteria for diagnosis of diabetes mellitus in pregnancy published in 2013 were adopted in both expert recommendations<sup>4,5</sup>. Figure 1 summarized the diagnosis and classification of diabetes mellitus in pregnancy and GDM in the HKCOG guidelines.

**GDM predisposes both women and their offspring to higher risks of adverse health outcomes<sup>4</sup>.** A meta-analysis including more than 2 million women revealed that previous GDM was associated with a 7.76-fold risk of diabetes ( $p = 0.0091$ ), with the risk highest during the 3 to 6 years after GDM and at < 40 years of age (age at follow-up)<sup>6</sup>. A retrospective cohort study in Canada further demonstrated that women with prior GDM had a higher cumulative incidence of hospitalization

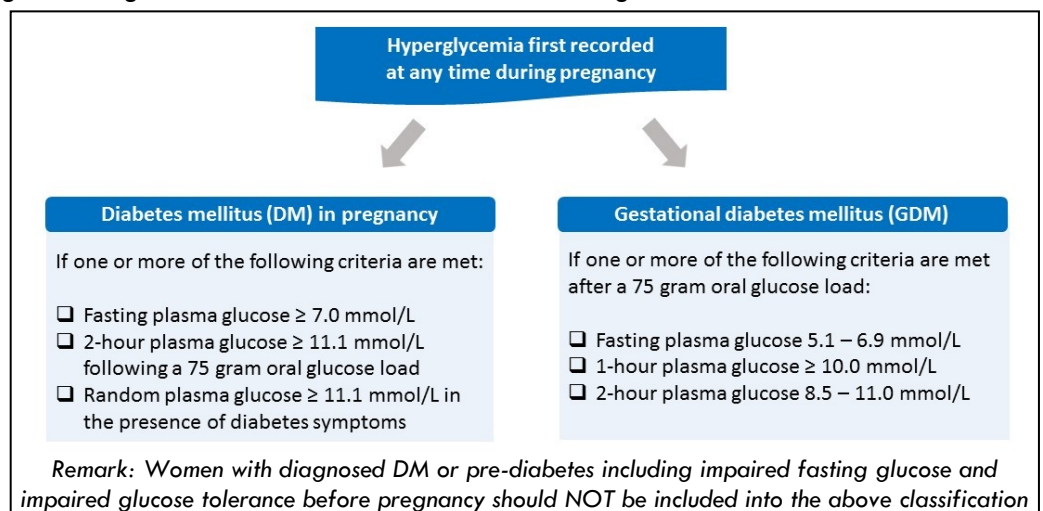
for cardiovascular diseases 25 years postpartum versus women without GDM (190.8 per 1000 women and 117.8 per 1000 women respectively)<sup>7</sup>.

The long-term influence of GDM on offspring health has also been examined in a recent local article that followed up 970 women who joined the Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study and their children (around 7 years of age)<sup>8</sup>. Compared with children born to mothers without GDM, those born to mothers with GDM as per WHO criteria showed higher rates of abnormal glucose tolerance (4.7% vs 1.7%,  $p = 0.04$ ), higher blood pressure, lower oral disposition index and a trend towards reduced beta-cell function<sup>8</sup>. Higher rates of overweight or obesity and adiposity were noted only among girls and not boys across the children born to mothers suffering from GDM<sup>8</sup>.

Nutrition counselling and physical activities are the primary tools in managing GDM<sup>4</sup>. **HKCOG advises women with GDM to consume a healthy diet and foods with low glycemic index (GI) together with regular exercise like walking for 30 minutes after a meal for glycemic control<sup>5</sup>.** Examples of food with low GI are listed

(Continued on P.4)

Figure 1. Diagnostic criteria and classification in HKCOG guidelines 2016<sup>5</sup>



in Table 1.

Emerging evidence has implicated that the gut microbiota could be a novel target for modifying GDM risk. Healthy gestation is characterized by profound alterations in the composition of microbiome<sup>9-11</sup>. In general, there is an increase in *Proteobacteria* and *Actinobacteria* and reduced bacterial richness at the end of gestation. This profile is typically related to inflammation and the shifts in microbiome are remarkable in obese women, women with excessive weight gain over pregnancy or a higher BMI<sup>9,10,12</sup>. A recent report additionally demonstrated associations between gut microbiome and GDM in which *Parabacteroides distasonis*, *Klebsiella variicola* were enriched in women with GDM while *Methanobrevibacter smithii*, *Alistipes spp.*, *Bifidobacterium spp.*, and *Eubacterium spp.* were enriched in healthy pregnant women<sup>13</sup>.

Luoto R's team has attested to the influence of probiotic-supplementation and dietary counselling on pregnancy outcome<sup>14</sup>. Healthy pregnant women ( $n = 256$ ) were randomized during their first trimester into a control group and an intervention group that received dietary counselling and were further randomized to receive a probiotic combination of *Lactobacillus rhamnosus* GG and *Bifidobacterium lactis* or placebo<sup>14</sup>. **Probiotic treatment significantly lowered the frequency of GDM (probiotic: 13%, placebo: 36%, control: 34%,  $p = 0.003$ )<sup>14</sup>; whereas dietary counselling reduced the risk of larger birth size in GDM cases ( $p = 0.035$  for birth**

**weight;  $p = 0.028$  for birth length)**<sup>14</sup>. Probiotic intervention starting in the first trimester was also reported to be safe for both the mothers and offspring<sup>14</sup>. Probiotics are believed to influence GDM through moderating the gut microbiota, normalizing the increased intestinal permeability and regulating the secretion of proinflammatory mediators<sup>12</sup>.

Pregnancy appears to be a very critical stage where early intervention lowering the risk of GDM offers an opportunity to enhance the health of mothers as well as the future generations.

**Table 1. Examples of low glycemic index foods ( $\leq 55$ )<sup>15-18</sup>**

- Apples, cherries, grapefruits, kiwi fruits and oranges
- Flat rice noodles, bean vermicelli and pasta
- Non-starchy vegetables and carrots
- Soybeans, kidney beans, black-eyed beans and lentils
- Sweet potato, corn and yam
- Unsweetened whole grain and cereals like barley, oatmeal (rolled or steel-cut), oat bran and muesli
- Whole milk, low fat milk and skim milk

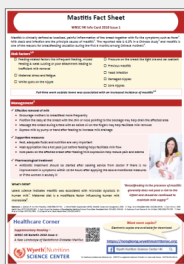
**Quick Fact – GDM prevalence in Hong Kong<sup>2</sup>**

- At least 20% of pregnant women in Hong Kong suffer from GDM according to the figures in 2016
- It is significantly higher than the figure (12%) recorded 25 years ago

References:

1. Dabelea D et al. *Diabetes Care*. 2005;28(3):579-584. 2. The Chinese University of Hong Kong. [http://www.cpr.cuhk.edu.hk/en/press\\_detail.php?id=2522&id=cuhk-recommends-oral-glucose-tolerance-test-for-all-pregnant-women-study-reveals-children-of-women-with-gestational-diabetes-mellitus-have-3-fold-diabetes-risk](http://www.cpr.cuhk.edu.hk/en/press_detail.php?id=2522&id=cuhk-recommends-oral-glucose-tolerance-test-for-all-pregnant-women-study-reveals-children-of-women-with-gestational-diabetes-mellitus-have-3-fold-diabetes-risk). Accessed on 23Jan2018. 3. IDF. [https://www.idf.org/diabetesatlas/2018/resources/newsletter/documents/IDF\\_SOD\\_NI01\\_Ver1\\_02\\_SP.pdf](https://www.idf.org/diabetesatlas/2018/resources/newsletter/documents/IDF_SOD_NI01_Ver1_02_SP.pdf). Accessed on 23Jan2018. 4. Hod M et al. *Int J Gynaecol Obstet*. 2015;131 Suppl 3:S173-S211. 5. HKCOG. *HKCOG guidelines*, Number 7, November 2016. 6. Song C et al. *Obes Rev*. 2017. doi:10.1111/obr.12645. 7. McKenzie-Sampson S et al. *Acta Diabetol*. 2018. doi:10.1007/s00592-017-1099-2. 8. Tam WH et al. *Diabetes Care*. 2017;40(5):679-686. 9. Koren O et al. *Cell*. 2012;150(3):470-480. 10. Collado MC et al. *Am J Clin Nutr*. 2008;88(4):894-899. 11. Neuman H and Karen O. *Nestle Nutr Inst Workshop Ser*. 2017;88:1-9. 12. Isolauri E et al. *Diabetes Obes Metab*. 2015;17(8):713-719. 13. Kuang YS et al. *Gigascience*. 2017;6(8):1-12. 14. Luoto R et al. *Br J Nutr*. 2010;103(12):1792-1799. 15. Hong Kong East Cluster Nutrition Information Web. [https://www3.ha.org.hk/dic/sdn\\_02\\_09.html](https://www3.ha.org.hk/dic/sdn_02_09.html). Accessed on 24Jan2018. 16. American Diabetes Association. <http://www.diabetes.org/food-and-fitness/food/what-can-i-eat/understanding-carbohydrates/glycemic-index-and-diabetes.html>. Accessed on 23Jan2018. 17. Harvard Medical School. <https://www.health.harvard.edu/diseases-and-conditions/glycemic-index-and-glycemic-load-for-100-foods>. Accessed on 31Jan2018. 18. American Diabetes Association. <http://www.diabetes.org/food-and-fitness/food/what-can-i-eat/food-tips/quick-meal-ideas/quick-breakfast-ideas.html>. Accessed on 31Jan2018.

**Info Card 2018 Issue 1**



**Mastitis Fact Sheet**

An overview of science and caring tips for mastitis

Distribution of the Info Card by healthcare professionals is welcomed. Electronic copy is available on the WNSC HK website under "WNSC Publications" for download and reprint.

**(Exclusive to registered users. Register now!)**

**Latest Science**

**The connections between myelination, nutrition and cognition**

**Vivian Tsang Nutritionist, MSc, BSc**

Myelination is the process which myelin sheath forms to surround the neuronal axon enabling efficient signal transmission<sup>1</sup>, this is an essential neurodevelopmental process that supports brain connections and cognitive functions<sup>2</sup>. A recent brain imaging study revealed **infants who were exclusively breastfed ( $n = 62$ ) over the first 3 months demonstrated significantly improved overall myelination ( $p < 0.05$ ), accompanied by increased cognitive measures in childhood up to 9 years old compared to those who were exclusively formula-fed ( $n = 176$ )<sup>2</sup>. On the other hand, among formula-fed**

**infants, retrospective formula composition analysis showed that myelin developmental variances were associated with DHA, AA, folic acid, iron, sphingomyelin (SM) and phosphatidylcholine (PC) ( $p < 0.006$ )<sup>2</sup>.**

Lipid and protein are two major components of myelin sheath<sup>6</sup>. Among these, total phospholipids including SM make up approximately 43% of lipid weight within human brain's myelin<sup>6</sup>. In human milk, SM represents approximately 35% of the total polar  
*(Continued on P.3)*

lipid fractions in milk fat globule membrane, higher than the approximately 25% as that in bovine milk<sup>7,8</sup>. As such, formula-fed infants may have lower intake of SM than breastfed infants, where infant formulas are typically manufactured with dairy-derived ingredients, e.g. skimmed milk powder and whey protein concentrate (WPC)<sup>7</sup>. Meanwhile, a recent study demonstrated increased levels of SM in infant formula were achieved by using  $\alpha$ -lactalbumin enriched WPC ingredient which undergoes a unique protein enrichment process, providing formula-fed infants who cannot be breastfed with SM levels that are closer to those found in human milk<sup>7</sup>.



Table 2. Roles of different nutrients in supporting neurodevelopment including myelination

Nutrients	Roles
Choline	A precursor for the biosynthesis of acetylcholine as neurotransmitter, and a component of phospholipid membranes including phosphatidylcholine and SM <sup>3</sup>
DHA	A key component of neuronal membrane structure, modulating synaptogenesis and myelination <sup>4</sup>
Iron	Important for basic neuronal processes including myelination and energy metabolism <sup>4,5</sup>

References: 1. Shils J and Jernigan TL. *Neuropsychol Rev.* 2010;20:327-348. 2. Deoni S et al. *Neuroimage.* 2017;pii:S1053-8119(17)31080-31087. 3. González HF and Visentin S. *Arch Argent Pediatr.* 2016;114(6):570-575. 4. Georgieff MK. *Am J Clin Nutr.* 2007;85(suppl):614S-620S. 5. Beard JL and Connor JR. *Annu Rev Nutr.* 2003;23:41-58. 6. Quarles RH et al. Chapter 4: Myelin Formation, Structure and Biochemistry. *Basic Neurochemistry: Molecular, Cellular and Medical Aspects.* 2006. 7. Moloney C et al. *Int Dairy J.* 2018;78:138-144. 8. Contarini G and Pavola M. *Int J Mol Sci.* 2013;14:2808-2831.

### Poll Corner – Do you know?

**Question: What is the daily vitamin D intake recommended for pregnant and lactating women by the Chinese Nutrition Society?**

- A. 8 mcg/day      B. 10 mcg/day      C. 12 mcg/day      D. 15 mcg/day

Scan to view more:



**Answer: B**

Interested in knowing more?

Read the WNSC HK Bulletin 2017 Issue 4 to discover more about:

- Recommendations on vitamin D and importance to optimal reproductive health

Available at: <https://hongkong.wyethnutritionsc.org/en/publications/bulletin/2017-issue-4>

Reference: Chinese Nutrition Society, Chinese DRIs handbook. 2013.

### Monthly Health Focus

### March is Colorectal Cancer Awareness Month!

**Peter Chiu** Registered Dietitian (Canada), MHS (Community Nutrition), BSc, eMBA

In 2000, US president Bill Clinton announced that March was to be declared as the National Colorectal Cancer Awareness Month<sup>1</sup>. While the incidence and mortality rates of Colorectal Cancer (CRC) remains highest in some Western countries, epidemiological data are suggesting that Asian countries are catching up<sup>2</sup>. Over the past decades, data showed that the **incidence of colorectal cancer in Asia has experienced a two- to four-fold increase**<sup>3</sup>. With abundant evidence suggesting that **changes in dietary habits and lifestyles** may well been some of the key underlying culprits for the increase<sup>3-5</sup>.

In Hong Kong, the age-standardized incidence rate of CRC has been

on an upward trend since 1983, and **accounted for 16.6% of all new cancer cases** in 2015<sup>4,5</sup>. Of these 5,036 registered cases, the male to female patient ratio is 1.3:1 (57% male vs. 43% female). And in terms of cancer mortality cases, **colorectal cancer is ranked second in Hong Kong**, accounting for 2,089 deaths (14.7%) in 2016<sup>4,5</sup>.

**Earlier detection of CRC by screening can lead to more effective treatments and hence a reduction in mortality and treatment costs**<sup>6</sup>. A cost-effective analysis of the common screening tools concluded that FOBT (Faecal Occult Blood Testing) remains the most

(Continued on P.4)

cost effective screening strategy<sup>6</sup>.

In 2012, the Cancer Expert Working Group (CEWG) on Cancer Prevention and Screening that was set up by the Cancer Coordinating Committee (CCC) and chaired by the Secretary of Food and Health reaffirmed the current CRC screening recommendations (fine-tuned in October 2017) for the general public (age 50 - 75) and high risk (hereditary) groups in Hong Kong<sup>5</sup>.

References:  
1. Colorectal Cancer Alliance. About National Colorectal Cancer Awareness Month. Available at: <https://www.colorectal.org/awareness-month/>. Accessed on 22Jan2018. 2. Pourhoseingholi MA. World J Gastrointest Oncol. 2012;4(4):68-70. 3. Sung JY et al. The Lancet Oncol. 2005;6(11):871-876 5. Centre for Health Protection DOH. Health Topic - Colorectal Cancer. Available at: <https://www.chp.gov.hk/en/healthtopics/content/25/51.html>. Accessed on 22Jan2018. 6. Department of Health. Colorectal Cancer in Hong Kong. Available at: [http://www.colonscreen.gov.hk/en/public/about\\_crc\\_in\\_hong\\_kong.html](http://www.colonscreen.gov.hk/en/public/about_crc_in_hong_kong.html). Accessed on 22Jan2018. 6. Tsoi KK et al. Aliment Pharmacol Ther. 2008;28:353-363.

**As healthcare professionals, you too can help promote Colorectal Cancer awareness in Hong Kong!**

For more information regarding colorectal cancer, screening and prevention, please visit: [https://www.chp.gov.hk/files/pdf/colorectal\\_ca\\_en.pdf](https://www.chp.gov.hk/files/pdf/colorectal_ca_en.pdf)

For the latest information on Department of Health's Colorectal Cancer Screening Pilot Programme please visit: <http://www.colonscreen.gov.hk>

# Wyeth® Nutrition Science Center Hong Kong Website

An online nutrition resources center for healthcare professionals in Hong Kong

**FOOD GROUP EXCHANGE TIPS CARD**  
HOW MUCH GRAINS SHOULD WE EAT?

**NUTRITION FACTS**

**RECOMMENDED SERVINGS FOR HEALTHY INDIVIDUALS BY THE HONG KONG DEPARTMENT OF HEALTH<sup>2,3</sup>**

Age Group	Male (serving/week)	Female (serving/week)
18-24 years old	12-14	10-12
25-34 years old	12-14	10-12
35-44 years old	12-14	10-12
45-54 years old	12-14	10-12
55-64 years old	12-14	10-12
65-74 years old	12-14	10-12
75 years old and above	12-14	10-12

**HOW MUCH IS ONE SERVING?<sup>4,5</sup>**

**食物種類換算小貼士**  
我們應吃多少穀類?

**換算提示**

**香港衛生署對健康人士的攝取建議<sup>2,3</sup>**

年齡組別	男性 (份/星期)	女性 (份/星期)
18-24 歲	12-14	10-12
25-34 歲	12-14	10-12
35-44 歲	12-14	10-12
45-54 歲	12-14	10-12
55-64 歲	12-14	10-12
65-74 歲	12-14	10-12
75 歲或以上	12-14	10-12

**一份等於多少?<sup>4,5</sup>**

**New series on how to do portion exchange in food groups**

**Check out the first tips card now!**  
**Food group exchange tips card - Grains**

Wyeth Nutrition Science Center HK

**Featured News**

## Local research - Studying Impact of Nutrition on Growth (SING) Study

**Danica Yau Accredited Practising Dietitian (DAA), MSc, BSc (Hons)**

Research into the diet quality of Hong Kong children provides insights on their nutritional status and help develop nutrition interventions to improve children's wellbeing. A study by Yip et al. (2017) investigated the diet quality and eating behavior of 302 local preschool children, which found inadequate intake of nutrients such as vitamin D, calcium, iron and zinc within the group against the reference nutrient intake or adequate intake ( $p < 0.05$ )<sup>1</sup>. This cross-sectional study provided a snapshot, without capturing the longitudinal changes of nutritional patterns and lifestyle status over time<sup>1,2</sup>.

To date, there have been two community cohort studies in Hong Kong<sup>2</sup>. The FAMILY cohort which focused on happiness, harmony and health of families<sup>3</sup>, whereas the 'Children of 1997' birth cohort looked into the impact of the first 18 months of life on children's health<sup>4</sup>. While valuable data was collected, it has come to the attention of local researchers that a knowledge gap



still exists in terms of the long-term impact of nutritional and lifestyle factors on the health and growth of children<sup>2</sup>.

In view of this, Lee and his research team undertook a cohort study in 2014/2015, which aimed to explore the prospective association between the diet quality of local preschool children and their health status over a four-year follow-up period<sup>2</sup>. The **Studying Impact of Nutrition on Growth (SING) study will provide insights on how exposures in early life, such as suboptimal breastfeeding, dietary patterns, parenting skills and household environment, will affect later development<sup>2</sup>**. A total of 3,223 parents of children aged 2 to 4 years have completed the baseline study, and below are findings from the data collected at the end of recruitment regarding early feeding practice and habit of picky eating<sup>2</sup>.

Early feeding practice (% of subjects)		Habit of picky eating (top 4 rejected food categories, % of subjects)	
Breast-fed at early stage, then fed with formula milk	39.0%	Vegetables	26.2%
Both human milk and formula milk	27.8%	Meat	11.9%
Exclusively formula-fed	19.1%	Water	8.3%
Exclusively breast-fed	13.4%	Rice	8.2%

It is exciting to wait and learn more as the SING study fills the research gap, unveiling the relationship between early life determinant factors and childhood outcomes!

References:  
1. Yip PS et al. Asia Pac J Clin Nutr. 2017;26(2):298-307. 2. Lee A et al. BMJ Open. 2017;7:e018380. 3. Leung GM et al. Int J Epidemiol. 2017;46(2):e1. 4. Lam TH et al. Pediatrics. 2001;107(6):e91.