Diabesity: Multifactorial, Multidisciplinary and Holistic Care

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Objectives

• Learn the benefits and challenges of multifactorial, multi-disciplinary and holistic approaches to managing diabesity.

• Learn how stress and metabolism inter-relate.

• Integrating a holistic approach into practice.
Case 1

• Mr C, 72 year old man with 8 years of Type 2 diabetes and HbA1c of 7.6% on:
  – Metformin 1g bd
  – Gliclazide MR 60mg
  – Byetta 10mcg bd
• He has had CABG and suffers from neuropathic pain involving both feet requiring 75mg bd pregabalin.
• No smoking or drinking.
• Weights 115kg.
• He has been lethargic on waking and has awoken from hypos every few days.
Case 1 (continue)

- Ceased his gliclazide.
- On review, he had a troubling hypo the night after cessation of gliclazide but hypos had subsequently ceased.
- He was waking in the morning and feeling more energy, describing himself as ‘like a new man’.
- Still troubled with neuropathic pain.
- Increased pregabalin dose to 150mg nocte and 75mg mane which allowed him to do regular walking.
- He wants to lose weight but did not want to use Byetta.
Case 1 (continue)

• Commenced him on dapagliflozin 10mg daily
• He commenced regular exercise with help from our exercise physiologists.
• On review 1 month later, he had lost 5.5kg.
• Neuropathic pain had also improved.
• Urged him to see dietitian.
• Subsequent review 1 month later, he lost another 3kg.
Case 1 (Continue)

- Checked his HbA1c and he had gone from 7.6% to 6.8%.
- Last review, he had lost more weight (115 to 98kg), losing a total of 16.9kg since initial consult 18 months ago.
Importance of a multifactorial approach

STENO-2 study

- Multifactorial management significantly reduced the risk of CV events

Adapted from Gaede et al. 2003.1

*Primary endpoint was a composite of death from CV disease, non-fatal MI, non-fatal stroke, revascularisation, and amputation.

Intensive therapy involved behaviour modification and pharmacological therapy targeting hyperglycaemia, hypertension, dyslipidaemia, and microalbuminuria, with secondary prevention of CV disease with aspirin.

CV: cardiovascular; MI: myocardial infarction.

Obesity Rates are Increasing
Weight Loss is Difficult to Maintain

The graph illustrates the weight change (kg) over years after intervention for different dieting approaches. The x-axis represents years after the intervention, ranging from 1 to 5. The y-axis shows the weight change in kilograms, ranging from -20 to 5. Three different lines represent different dieting strategies:

- Very-low-calorie diet (yellow circles)
- Modified diet plus behavior therapy (blue triangles)
- Very-low-calorie diet plus behavior therapy (green squares)

The graph shows that all strategies result in significant weight loss immediately after the intervention, but the weight regain over time is notable, especially for the very-low-calorie diet alone. The combination of diet and behavior therapy seems to offer better long-term weight management compared to other strategies.
Questions

• Why does weight regain in the vast majority of patients motivated to lose weight?
• Is asking people to diet actually effective or even safe?
• Are the causes of weight gain not actually being taken into account leading to weight regain?
Large scale studies show that 90% of cardiovascular disease and type 2 diabetes is preventable through healthy lifestyle practices.

- Chen et al., Framingham Study, JAMA 2016
- Birkhead et al., Nurses Health Initiative, AmJPubHealth, 2017
- Yusuf et al., Lancet 2004
- Ornish et al., Lancet 1990

*Egger et al., Medicine Today, 2017
An Iterative Approach to Weight Loss

Nutrition

Stress Management

Exercise

Sleep
Multidisciplinary Approach to Weight Management

- Nutrition
- Stress Management
- Sleep
- Exercise

Dietitians
DNE

Psychologist
Diabetes Detection Dog

Sleep Lab

Endos

EPs
Case 2

• JJ is a 50 y.o. female who struggles with weight, weighing 98.9kg in November 2013 from Bendigo (BMI 41).

• PMHx:
  – Irritable bowel syndrome
  – Bipolar affective disorder
    • Epilim 200mg noce
    • Seroquel XR 100mg noce
    • Efexor XR 450mg/d
  – Epilepsy
    • Lamictal 100mg noce
Progress 1

- Investigate for complications of weight gain.
- Found to have impaired glucose tolerance.
- Comfort food eats when feeling bored or stressed.
- Commenced Metformin 500mg daily
- Introduced mindfulness based movement.
- Review by dietitian.
Progress 2

- 3 months later, she returned with weight loss of 5kg.
- Husband who rides down from Bendigo with her reports less comfort food eating.
- Listed stressors for discussion.
- Encouraged to re-engage with psychologist, CBT and mindfulness based therapy.
- Consistency in walking after work improved.
- Increased metformin to 500mg bd without gastrointestinal side effects.
Progress 3

• Returns in 6 months with further weight loss of 5.5kg.
• In consultation with her GP, she reduces her efexor dose to 150mg and Seroquel to 25mg.
• She is now adopting a mindfulness way of living with improvements communicating with her daughter.
• 12 months later, weight is further reduced by 7kg.
• Total weight loss thus far is 17.5kg (starting weight 98.9kg).
• Commenced low dose saxenda (1.2mg daily) for weight maintenance.
• Recently husband suffered a CVA & she became his support.
Stress & Weight

• How does stress affect weight?
• What actually is stress?
• How does the body perceive psychological stress?
• What can stress management do to improve physical health?
• How can stress management be implemented in the medical clinic?
How does stress affect your weight?

a. Increase
b. Decrease
c. No change
Weight & Stress

- Studies have mixed results regarding the impact of psychosocial stress and weight gain.
- Large prospective study showed that psychosocial stress is correlated with weight gain (Block et al., 2009)
  - Men & women share (job demands, difficulty paying bills) but also differ (strains in relations) in type of stress that affects weight gain.
- Recent meta-analysis (n = 32 studies) showed that 70%, 25% and 5% of studies showed null effect, increase and decrease in weight with psychosocial stress respectively (Wardle et al., 2011).
Stress & Weight

• Whitehall (II) Study shows that *job strain and job control but not job demand correlates with change in weight (Kivimäki et al., 2006)\(^1\).

• This weight change was bidirectional.
  – Men that have low BMI (<22) lose further weight with job strain while men with high BMI (>27) gain weight with job strain.

• *Job strain = Job demand – Job control score

What is stress?
Stress is Ubiquitous

- A term that covers the spectrum from daily worries to clinically significant anxiety and depression.
- 2/3 of Australians lost sleep in past year due to stress (Lifeline 2013 Stress Poll).
- Work stress (71%) and financial stress (78%) were the top contributors.
- 70% loss sleep occasionally while 20% loss sleep regularly.
Neuroendocrine Stress Response

- Stress Response
  - Sympathetic
  - HPA Axis
    - Neurosympathetic
    - Sympathetic Adrenal Medulla (SAM)
Hypothalamic-Pituitary Adrenal Axis

Hypothalamus → CRH/AVP → ACTH → Cortisol → Glucocorticoid Receptor (GR)

HSD Type I: Cortisone (Inactive) → HSD Type II

HSD – 11-beta-hydroxysteroid Dehydrogenase
Stress Response Correlates with Food Intake.

(Epel et al. 2001, George et al. 2010)
Stress and Energy Balance

• Stress leads to different food choices, especially those that are high cortisol responders.

• High cortisol responders also have reduced adaptive thermogenic response to food. (Lee et al., FACEB, 2012)

• High cortisol responders also have innate differences in coping styles to stress (Lee et al., PNE, 2014).
  – High cortisol responders are more reactive while low cortisol responders are more pro-active.

• Stress also leads to altered epigenetic alterations and predisposition to weight gain in offspring.
How do you tackle stress and stress responsiveness?
Mindfulness Intervention in Diabetes
Friis et al., a.friis@auckland.ac.nz
Published Diabetes Care 2016: Nov 29(11):1963-1971

- Randomized control trial
- Intervention: 8 week Mindfulness Self Compassion (MSC) program
- N = 32, wait list control, n = 31
- Mean age 43, range 18-70
- Patients with Type 1 and Type 2
- Measured self-compassion, depressive symptoms, diabetes specific distress and HbA1c
- Follow Up Duration: Baseline (T1), week 8 (T2) and 3 months (T3).
MSC increased self compassion
(26 item SC Scale)
MSC reduced Diabetes Distress (17 item DDS)
MSC Reduced Depression (PHQ-9)
MSC reduced HbA1c by ~ 1% 
(Baseline ~8.9%)
Every 1% reduction in HbA$_{1c}$ counts for your patients\(^1\)

A 1% reduction in HbA$_{1c}$ leads to reductions in:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Reduction</th>
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<tbody>
<tr>
<td>Peripheral vascular disease(^\dagger)</td>
<td>43%*</td>
</tr>
<tr>
<td>Microvascular disease</td>
<td>37%*</td>
</tr>
<tr>
<td>Deaths related to type 2 diabetes</td>
<td>21%*</td>
</tr>
<tr>
<td>Cataract extraction</td>
<td>19%*</td>
</tr>
<tr>
<td>All cause mortality</td>
<td>14%*</td>
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</tbody>
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*\(p<0.0001\).
\(^\dagger\)Amputation or death from peripheral vascular disease. Newly diagnosed T2DM at baseline; follow-up median=10 years.

MSC – Mindfulness Self Compassion

- 8 weekly session, 2.5h per session.
- Clinical supervision weekly through skype.
- Standardized email 2 days after each session that summarized the teachings and encouraged practice.
- 8-12 people per session.
- Session included formal and informal mindfulness practices.
Limitations

• Findings are generalized only to those who volunteer for RCT (low drop out of 6% c/w 30% in most diabetes trials).

• Greater proportion of clinical significant depression (30%) compared to population (10%) – Lloyd et al., 2012.

• Failure of complete randomization of all baseline characteristics.

• Absence of active control group.
8 Sessions for MSC

- Introduction and review of self-compassion
- Foundational knowledge and practice of mindfulness
- Discussion of application of practices in various aspects of life
- Recognize the inner critic
- Recognize importance with living with core values
- Skills to deal with difficult emotions
- Skills for dealing with interpersonal relationships
- Skills to relate to positive aspects of self and one’s life with appreciation.
Stress Management Strategies

• Psychological Based Tools
  – Reflective Practice
  – Cognitive Tools, CBT, Psychoanalysis, ACT
  – Mind to Body Approaches eg NLP

• Somatic Based Tools
  – Nutrition, Exercise, Supplements, Medications
  – Body to Mind Approaches eg Kinesiology, Sleep.

• Transcendental Tools
  – Mindfulness, Body Scans etc.
What is mindfulness?

• Mindfulness is an inherent aspect of consciousness that can be enhanced through mental or physical training.

• Paying attention in a particular way, on purpose, in the present moment, non-judgementally (Kabat-Zinn, 1990).

• A manner of observing with an element of curiosity, kindness, compassion and patience.
Benefits of Mindfulness

- Enhanced ability to disrupt ruminative thought processes that lead to prolonged stress reactivity and mental illness (Teasdale et al., 1995).
- Improve detection of potential stressor and that effective coping will be implemented in a timely manner (Epel et al., 2009).
- Improve interoceptive processes, awareness of visceral signals and subtle emotional feelings important in emotion regulation (Nielson et al., 2006).
Physical Benefits of Mindfulness

• Mindfulness has been shown to affect the immune system:
  – Increase in salivary IgA levels (Tang et al., 2007)
  – Reduce the cortisol rise associated with stress.

• Mindfulness also facilitates weight loss with lower Neuropeptide Y levels. (Johnston et al., 2014).

• Mindfulness also reverses cellular aging
  – Improved telomerase activity (Jacob et al., 2011).
Telomeres and Aging

What We Lose With Age

As cells divide over time...

Telomeres end caps that protect the chromosome

...telomeres shorten, and eventually cell division stops
Mindfulness & Medicine

• Immune
  – Psoriasis (Kabat-Zinn et al., 1998, 2007)
  – Fibromyalgia (Curtis et al., 2011, Cash et al., 2015)
  – Ulcerative Colitis (Jedel et al., 2014)

• Metabolic Syndrome
  – Obesity (Daubenmier et al., 2012)
  – Polycystic Ovarian Syndrome (Stefanaki et al., 2015)
  – Heart Disease (Younge et al., 2015)

• Cancer
  – Breast cancer (Dodds et al., 2015)
  – Prostate Cancer (Ornish et al., 2013)

• Psychological
  – Alcohol Dependence (Zgierska et al., 2008)
  – Post traumatic Stress Disorder (Bergen-Cico et al., 2014)
Medicine and Mindfulness
Iterative Approach to Diabesity Management

- Nutrition
- Stress Management
- Exercise
- Sleep
Hierarchy in Diabesity Management

Well Being

Diet & Exercise

Surgery and Medication
Integrating Mindfulness in Treating Diabesity

• Demonstrate mindfulness in action in your consultation.
  – Blood Pressure Measured Pre and Post-3 mindful breaths.

• Inform your patient on how mindfulness can reduce stress related glycaemic excursions, weight, blood pressure through:
  – Improvement in sleep depth
  – Reduced cortisol levels
  – Reduced comfort food eating and metabolism.

• Show them how to integrate mindfulness in daily life:
  – Mindfulness breathing or body awareness whilst waiting or sitting.
  – Learn to identify stressors and use psychological and mindfulness tools to deal manage them.

• Engage with mindfulness yourself to help those around you.