Relationship between **disordered eating** & **clinical outcomes** in adults who elected the LSG

Dr Skye Marshall

BNutrDiet(Hons), APD, PhD; Director of Research

skye@rifhealth.org; @DrSkyeMarshall

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IFSO Napoli

1st Sept 2023

MDT JOB DESCRIPTION

AACE/TOS/ASMBS/OMA/ASA 2019 Guidelines

CLINICAL PRACTICE GUIDELINES FOR THE PERIOPERATIVE NUTRITION, METABOLIC, AND NONSURGICAL SUPPORT OF PATIENTS UNDERGOING BARIATRIC PROCEDURES – 2019 UPDATE: COSPONSORED BY AMERICAN ASSOCIATION OF CLINICAL ENDOCRINOLOGISTS/AMERICAN COLLEGE OF ENDOCRINOLOGY, THE OBESITY SOCIETY, AMERICAN SOCIETY FOR METABOLIC & BARIATRIC SURGERY, OBESITY MEDICINE ASSOCIATION, AND AMERICAN SOCIETY OF ANESTHESIOLOGISTS*

ENDOCRINE PRACTICE Vol 25 No. 12 December 2019 1

Table 7 Preprocedure Checklist (including Lifestyle Medicine)[a]	
☑	Complete H & P (obesity-related comorbidities, causes of obesity, weight, BMI, weight-loss history, commitment, and exclusions related to surgical risk)
☑	Routine labs (including fasting blood glucose and lipid panel, kidney function, liver profile, lipid profile, urine analysis, prothrombin time/INR, blood type, CBC
☑	Nutrient screening with iron studies, B_{12} and folic acid (RBC folate, homocysteine, methylmalonic acid optional), and 25-vitamin D (vitamins A and E optional); consider more extensive testing in patients undergoing malabsorptive procedures based on symptoms and risks
☑	Cardiopulmonary evaluation with sleep apnea screening (ECG, CSR, echocardiography if cardiac disease or pulmonary hypertension suspected; deep-venous thrombosis evaluation, if clinically indicated
☑	GI evaluation (*H. pylori* screening in areas of high prevalence; gallbladder evaluation and upper endoscopy, if clinically indicated)
☑	Endocrine evaluation (A1C with suspected or diagnosed prediabetes or diabetes; TSH with symptoms or increased risk of thyroid disease; androgens with PCOS suspicion (total/bioavailable testosterone, DHEAS, Δ_4-androstenedione); screening for Cushing syndrome if clinically suspected (1 mg overnight dexamethasone test, 24-hour urinary free cortisol, 11 PM salivary cortisol)
☑	Lifestyle medicine evaluation: healthy eating index; cardiovascular fitness; strength training; sleep hygiene (duration and quality); mood and happiness; alcohol use; substance abuse; community engagement
☑	Clinical nutrition evaluation by RD
☑	Psychosocial-behavioral evaluation
☑	Assess for individual psychological support/counseling
☑	Document medical necessity for bariatric surgery
☑	Informed consent
☑	Provide relevant financial information
☑	Continue efforts for pre-operative weight loss
☑	Optimize glycemic control
☑	Pregnancy counseling
☑	Smoking-cessation counseling
☑	Verify cancer screening by primary care physician

Abbreviations: BMI = body mass index; CBC = complete blood count; CSR = Cheyne Stokes respiration; ECG = electrocardiogram; GI = gastrointestinal; INR = international normalized ratio; PCOS = polycystic ovary syndrome; RBC = red blood cell; RD = registered dietician; DHEAS = dehydroepiandrosterone-sulfate; TSH = thyroid-stimulating hormone.
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Table 9
Postprocedure Checklist[a]

Checklist Item		LAGB	SG	RYGB	BPD/DS
Early postoperative care					
✓	monitored telemetry at least 24 h if high risk for MI	✓	✓	✓	✓
✓	protocol-derived staged meal progression supervised by RD	✓	✓	✓	✓
✓	healthy eating education by RD	✓	✓	✓	✓
✓	multivitamin plus minerals (# tablets for minimal requirement)	1	2	2	2
✓	elemental calcium (as calcium citrate)	1,200-1,500 mg/d	1,200-1,500 mg/d	1,200-1,500 mg/d	1,800-2,400 mg/d
✓	vitamin D, at least 3,000 units/d, titrate to >30 ng/mL	✓	✓	✓	✓
✓	vitamin B_{12} as needed for normal range levels	✓	✓	✓	✓
✓	maintain adequate hydration (usually >1.5 L/d PO)	✓	✓	✓	✓
✓	monitor blood glucose with diabetes or hypoglycemic symptoms	✓	✓	✓	✓
✓	pulmonary toilet, spirometry, DVT prophylaxis	✓	✓	✓	✓
✓	if unstable, consider PE, IL	PE	PE	PE/IL	PE/IL
✓	if rhabdomyolysis suspected, check CPK	✓	✓	✓	✓
Follow-up					
✓	visits: initial, interval until stable, once stable (months)	1, 1-2, 12	1, 3, 6, 12	1, 3, 6-12	1, 3, 6
✓	monitor progress with weight loss and evidence of complications each visit	✓	✓	✓	✓
✓	SMA-21, CBC/plt with each visit (and iron at baseline and after as needed)	✓	✓	✓	✓
✓	avoid nonsteroidal anti-inflammatory drugs	✓	✓	✓	✓
✓	adjust postoperative medications	✓	✓	✓	✓
✓	consider gout and gallstone prophylaxis in appropriate patients	✓	✓	✓	✓
✓	need for antihypertensive therapy with each visit	✓	✓	✓	✓
✓	lipid evaluation every 6-12 months based on risk and therapy	✓	✓	✓	✓
✓	monitor adherence with physical activity recommendations	✓	✓	✓	✓
✓	evaluate need for support groups	✓	✓	✓	✓
✓	bone density (DXA) at 2 years	✓	✓	✓	✓
✓	24-h urinary calcium excretion at 6 months and then annually[b]	x	x	x	✓
✓	B_{12} (annually; MMA and HCy optional; then q 3-6 months if supplemented)	✓	✓	✓	✓
✓	folic acid (RBC folic acid optional), iron studies, 25-vitamin D, iPTH	x	x	✓	✓
✓	vitamin A (initially and q 6-12 months thereafter)	x	x	optional	✓
✓	copper, zinc, selenium evaluation with specific findings	x	x	✓	✓
✓	thiamine evaluation with specific findings	✓	✓	✓	✓
✓	consider eventual body contouring surgery	✓	✓	✓	✓
✓	lifestyle medicine evaluation: healthy eating index; cardiovascular fitness; strength training; sleep hygiene (duration and quality); mood and happiness; alcohol use; substance abuse; community engagement	✓	✓	✓	✓
✓	hemoglobin A1c, TSH evaluation in long-term follow-up	✓	✓	✓	✓

Abbreviations: BPD/DS = biliopancreatic diversion with duodenal switch; CBC = complete blood count; CPK = creatine phosphokinase; DVT = deep vein thrombosis; DXA = dual-energy X-ray absorptiometry; HCy = homocysteine; IL = intestinal leak; iPTH = intact parathyroid hormone; LAGB = laparoscopic adjustable gastric band; MI = myocardial infarction; MMA = methylmalonic acid; PE = pulmonary embolus; plt = platelets; PO = orally; q = daily; RBC = red blood cell; RD = registered dietician; RYGB = Roux-en-Y gastric bypass; SG = sleeve gastrectomy; SMA-21 = chemistry panel; TSH = thyroid-stimulating hormone.
[a]Based on information included in Mechanick et al. *Endocr Pract*. 2013;19:337-372 and Parrott et al. *Surg Obes Rel Dis*. 2017;13:727-741 (1, 448).
[b]This testing should be considered for any patient after a bariatric procedure at 6 months and then annually if there is a history of renal stones.

RESEARCH INSTITUTE FOR FUTURE HEALTH

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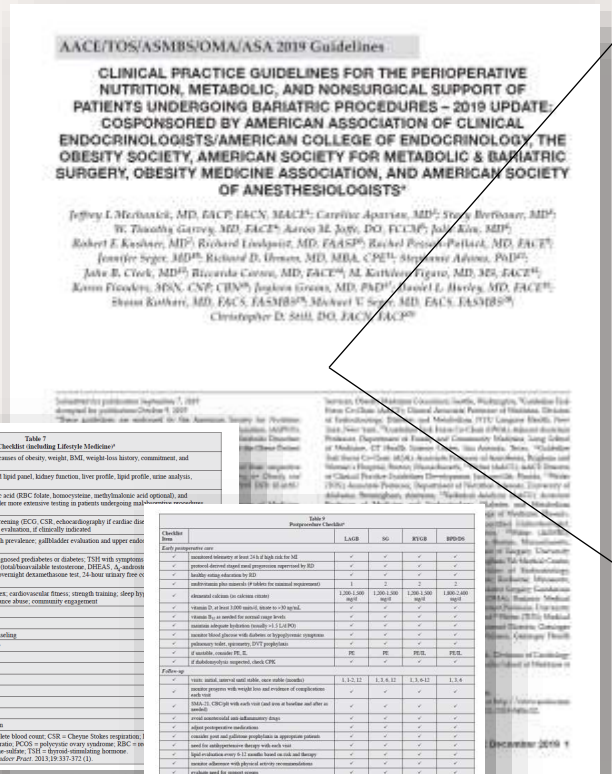

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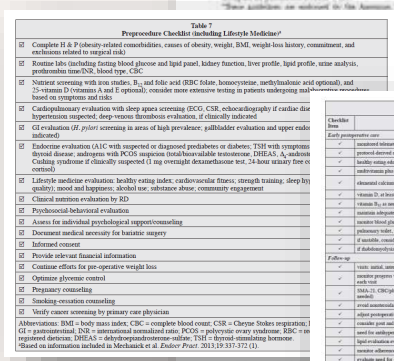
Jeffrey I. Mechanick, MD, FACP, FACN, MACE[1]; Caroline Apovian, MD[2]; Stacy Brethauer, MD[3]; W. Timothy Garvey, MD, FACE[4]; Aaron M. Joffe, DO, FCCM[5]; Julie Kim, MD[6]; Robert E. Kushner, MD[7]; Richard Lindquist, MD, FAAS[8]; Rachel Pessah-Pollack, MD, FACE[9]; Jennifer Seger, MD[10]; Richard D. Urman, MD, MBA, CPE[11]; Stephanie Adams, PhD[12]; John B. Clark, MD[13]; Riccarda Corsino, MD, FACE[14], M. Kathleen Figaro, MD, MS, FACE[15]; Karen Fleckner, MSN, CNP; CBN[16]; Jaqleen Greene, MD, PhD[17]; Daniel L. Hurley, MD, FACE[18]; Shaun Kothari, MD, FACS, FASMBS[19], Michael V. Sarao, MD, FACS, FASMBS[20], Christopher D. Still, DO, FACN, FACP[21]



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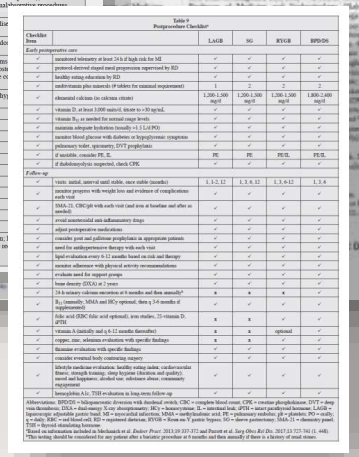

Table 8
Postprocedure Checklist[a]

Checklist Item	LAGB	SG	RYGB	BPD/DS
Early postoperative care				
✓ monitored tolerance at least 24 h if high risk for ME	✓	✓	✓	✓
✓ protocol-driven rapid meal progression supervised by RD	✓	✓	✓	✓
✓ healthy eating education by RD	✓	✓	✓	✓
✓ multivitamin plus minerals (# tablets for minimal requirement)	1	2	2	2
✓ elemental calcium (in calcium citrate)	1,200-1,500 mg/d	1,200-1,500 mg/d	1,200-1,500 mg/d	1,800-2,400 mg/d
✓ vitamin D, at least 3,000 units/d, titrate to >30 ng/mL	✓	✓	✓	✓
✓ vitamin B_{12} as needed for normal range levels	✓	✓	✓	✓
✓ maintain adequate hydration (usually >1.5 L/d PO)	✓	✓	✓	✓
✓ monitor blood glucose with diabetes or hypoglycemic symptoms	✓	✓	✓	✓
✓ pulmonary toilet, spirometry, DVT prophylaxis	✓	✓	✓	✓
✓ if needed, consider PE, IL	PE	PE	PE/IL	PE/IL
✓ if dumping syndrome suspected, check CPE	✓	✓	✓	✓
Follow-up				
✓ visits: initial, interval until stable, once stable (months)	1, 3, 6, 12	1, 3, 6, 12	1, 3, 6-12	1, 3, 6
✓ monitor progress with weight loss and evidence of complications each visit	✓	✓	✓	✓
✓ SMA-12, CBC/pth with each visit (and iron at baseline and after as needed)	✓	✓	✓	✓
✓ avoid nonsteroidal anti-inflammatory drugs	✓	✓	✓	✓
✓ adjust perioperative medications	✓	✓	✓	✓
✓ consider post and pulsione prophylaxis in appropriate patients	✓	✓	✓	✓
✓ need for antihypertensive therapy with each visit	✓	✓	✓	✓
✓ lipid evaluation every 6-12 months based on risk and therapy	✓	✓	✓	✓
✓ monitor adherence with physical activity recommendations	✓	✓	✓	✓
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✓ bone density (DXA) at 2 years	✓	✓	✓	✓
✓ 24-h urinary calcium excretion at 6 months and then annually[b]	x	x	x	x
✓ B_{12} (annually; MMA and HCy optional; then q 3-6 months if supplemented)	✓	✓	✓	✓
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✓ vitamin A (initially and q 6-12 months thereafter)	x	x	optional	✓
✓ copper, zinc, selenium evaluation with specific findings	x	x	✓	✓
✓ thiamine evaluation with specific findings	✓	✓	✓	✓
✓ consider eventual body contouring surgery	✓	✓	✓	✓
✓ lifestyle medicine evaluation: healthy eating index; cardiovascular fitness; strength training; sleep hygiene (duration, quality); mood and happiness; alcohol use, substance abuse, community engagement	✓	✓	✓	✓
✓ hemoglobin A1c, TSH evaluation in long-term follow up	✓	✓	✓	✓

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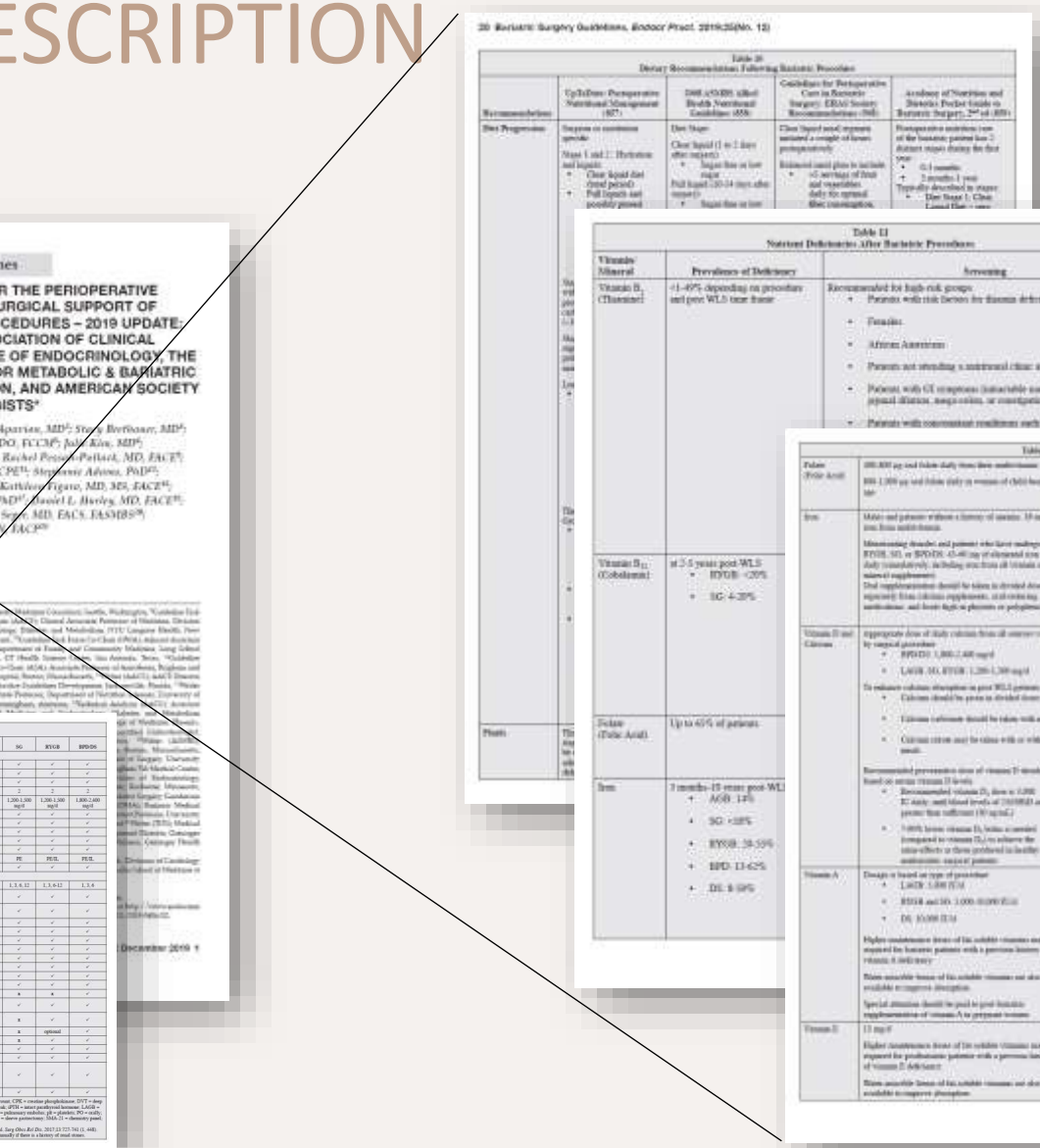

20 Bariatric Surgery Guidelines, *Endocr Pract*. 2019;25(No. 1)

Table 20
Dietary Recommendations Following Bariatric Procedure

Recommendation	Up To Date: Postoperative Nutritional Management (107)	DHE (ASMBS Allied Health Nutritional Guidelines (458)	Guidelines for Perioperative Care in Bariatric Surgery: ERAS/Society Recommendations (368)	Academy of Nutrition and Dietetics Pocket Guide to Bariatric Surgery, 2nd ed (459)
Diet Progression	Surgeon or nutritionist specific Stages 1 and 2: Hydration and liquids: • Clear liquid diet (timed pieces) • Full liquids and possibly pureed	Diet Stages: Clear liquid (1 to 2 days after surgery) • Sugar free or low sugar Full liquid (20-24 days after surgery) • Sugar free or low	Clear liquid need to maintain a weight of lower, postoperatively Reintroduce easily plan to include: • ≥5 servings of fruit and vegetables daily (to optimal fiber consumption,	Postoperative nutrition care of the bariatric patient has 2 distinct stages during the first year: • 0-3 months • 3 months-1 year Type diet described in stages • Diet Stage 1: Clear Liquid Diet—one

Table 11
Nutrient Deficiencies After Bariatric Procedures

Vitamin/ Mineral	Prevalence of Deficiency	Screening
Vitamin B_1 (Thiamine)	~1–69% depending on procedure and post WLS time frame	Recommended for high-risk groups: • Patients with risk factors for thiamin deficiency • Females • African Americans • Patients not attending a nutritional clinic after surgery • Patients with GI symptoms (intractable nausea and vomiting, jejunal dilation, mega colon, or constipation) • Patients with concomitant conditions such as cardiac failure
Vitamin B_{12} (Cobalamin)	at 2-5 years post-WLS: • RYGB: <20% • SG: 4-20%	
Folate (Folic Acid)	Up to 45% of patients	
Iron	3 months–15 years post-WL: • AGB: 14% • SG: <18% • RYGB: 38-59% • BPD: 13-62% • DS: 8-9%	

Table 12 Continued

Folate (Folic Acid)	400-800 µg oral folate daily from diet+multivitamin 800-1,000 µg oral folate daily in women of child-bearing age	Oral dose of 5000 µg of folate daily to achieve normal levels and then resume recommended dosage to maintain normal levels >1 mg/d supplementation is not recommended because of the potential masking of vitamin B_{12} deficiency
Iron	Males and patients without a history of anemia: 10 mg of iron from multivitamin Menstruating females and patients who have undergone RYGB, SG, or BPD/DS: 45-60 mg of elemental iron daily (cumulatively, including iron from all vitamin and mineral supplements) Oral supplementation should be taken in divided doses separately from calcium supplements, oral calcium-containing antibiotics, and foods high in phytates or polyphenols	Oral supplementation should be increased to provide 150-200 mg of elemental iron daily to maintain a high (> 300 ng/mL) ferritin level Oral supplementation should be taken in divided doses, especially from calcium supplements, acid-reducing medications, and foods high in phytates or polyphenols Vitamin C supplementation may be added to increase iron absorption and decrease risk of iron overload IV iron infusion should be administered if iron deficiency does not respond to oral therapy
Vitamin D and Calcium	appropriate dose of daily calcium from all sources varies by surgical procedure: • RYGB: 1,000–1,400 mg/d • LAGB, SG, BPD/DS: 1,200–1,500 mg/d To enhance calcium absorption in post-WLS patients: • Calcium should be given in divided doses • Calcium carbonate should be taken with meals • Calcium citrate may be taken with or without meals Recommended preventative dose of vitamin D should be based on serum vitamin D levels: • Recommended vitamin D_3 dose is 3,000 IU daily until blood levels of 25(OH)D are greater than sufficient (30 ng/mL) • 1,000 IU/day vitamin D_3 bolus is needed (compared to vitamin D_2) to achieve the same effects as those prescribed in healthy nonbariatric cases of patients	All bariatric patients with vitamin D deficiency or insufficiency should be repleted as follows: • Vitamin D_2 at least 1,000 IU/d and as high as 6,000 IU/d, to 50,000 IU vitamin D_2 1–3 times weekly • Vitamin D_3 is recommended over vitamin D_2, as a more potent treatment when comparing frequency and amount needed for repletion Repletion of calcium deficiency varies by surgical procedure: • BPD/DS: 1,800-2,400 mg/d • LAGB, SG, RYGB: 1,200–1,800 mg/d
Vitamin A	Dosage is based on type of procedure: • LAGB: 5,000 IU/d • RYGB and SG: 5,000–10,000 IU/d • DS: 10,000 IU/d Higher supplementation doses of fat-soluble vitamins may be required for bariatric patients with a previous history of vitamin A deficiency Water-soluble forms of fat-soluble vitamins are also available to improve absorption Special attention should be paid to post-bariatric supplementation of vitamin A in pregnant women	For bariatric patients with vitamin A deficiency without external changes, a dose of 10,000–15,000 IU/d of vitamin A should be given orally until clinical improvement is evident For bariatric patients with vitamin A deficiency with external changes, a dose of 50,000–100,000 IU of vitamin A should be administered IM for 1–2, followed by 50,000 IU/d for 2 weeks Routine patients with vitamin A deficiency should also be evaluated for concurrent iron and/or copper deficiencies because these can impair correction of vitamin A deficiency
Vitamin E	15 mg/d Higher supplementation doses of fat-soluble vitamins may be required for postbariatric patients with a previous history of vitamin E deficiency Water-soluble forms of fat-soluble vitamins are also available to improve absorption	Optimal therapeutic dose of vitamin E for bariatric patients is not defined Potential antioxidant benefits can be achieved with supplements of 200–400 IU/d, which is higher than the amount found in multivitamins. Additional supplementation may be required for repletion

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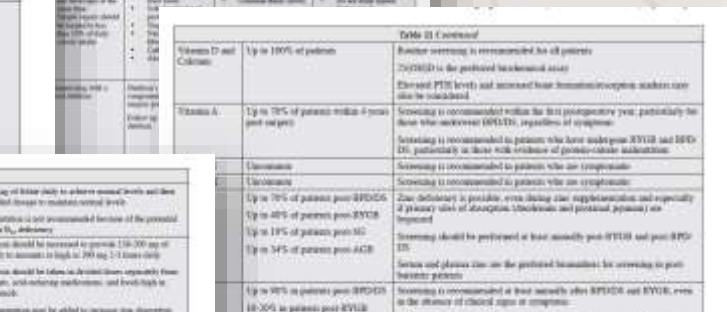

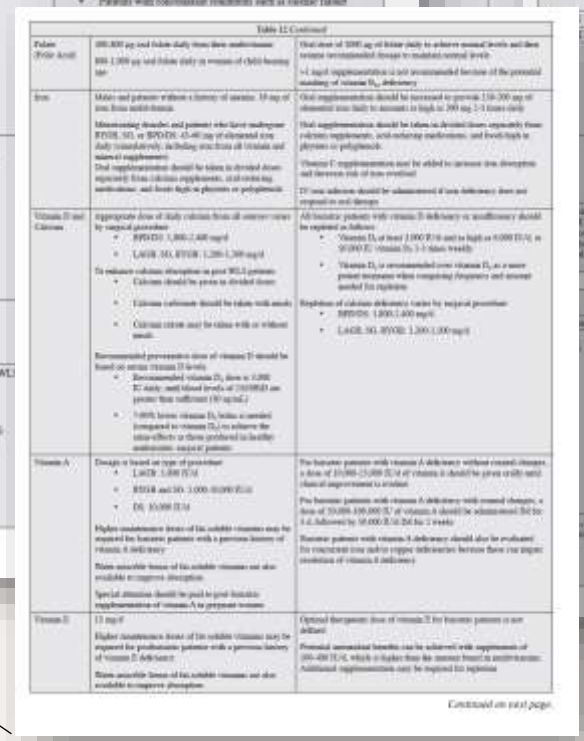

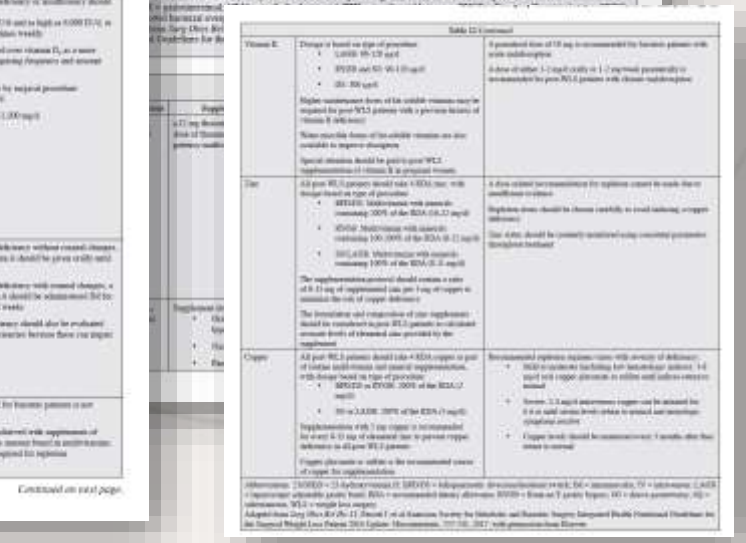

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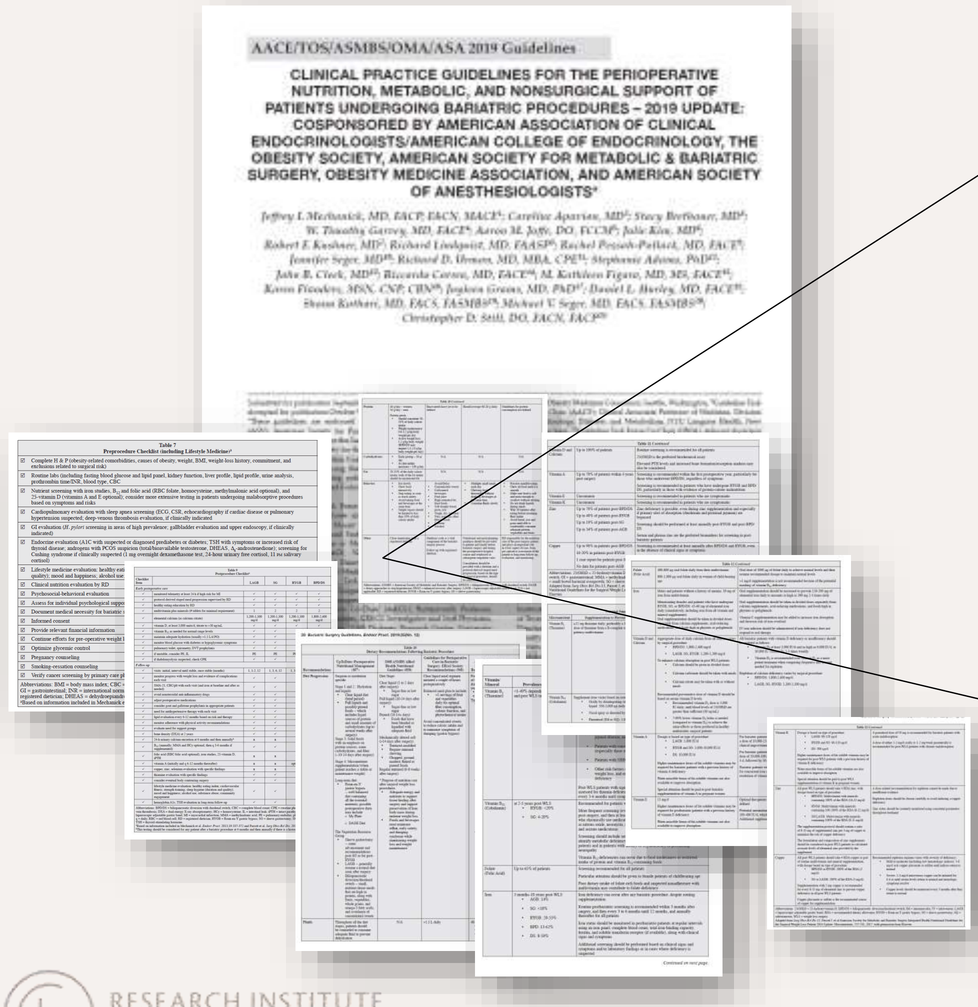
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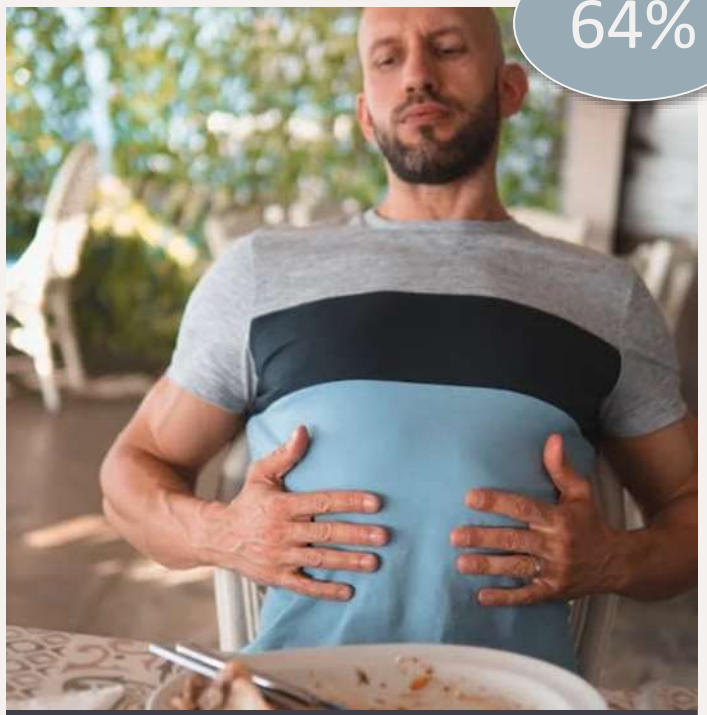
Task: Address eating and dietary behaviours because they influence

- Weight loss
- Risk and burden
- Patient-centeredness of care

DISORDERED EATING PATTERNS

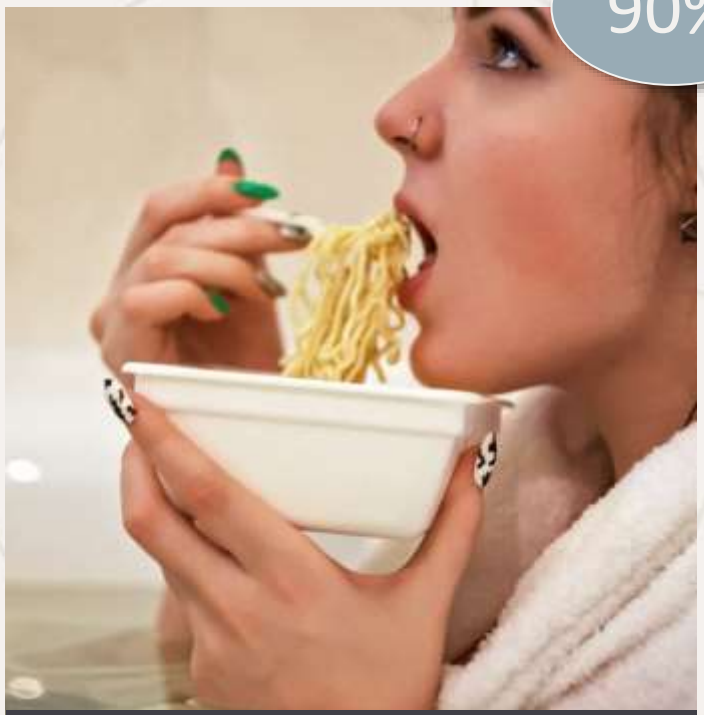


64%

Eating Disorders

61%

Problematic Eating Behaviours



90%

Food Behaviour Problems

WHAT WE DID

In the real-world, what is the association between the number and type of disordered eating patterns with clinical outcomes in LSG patients?

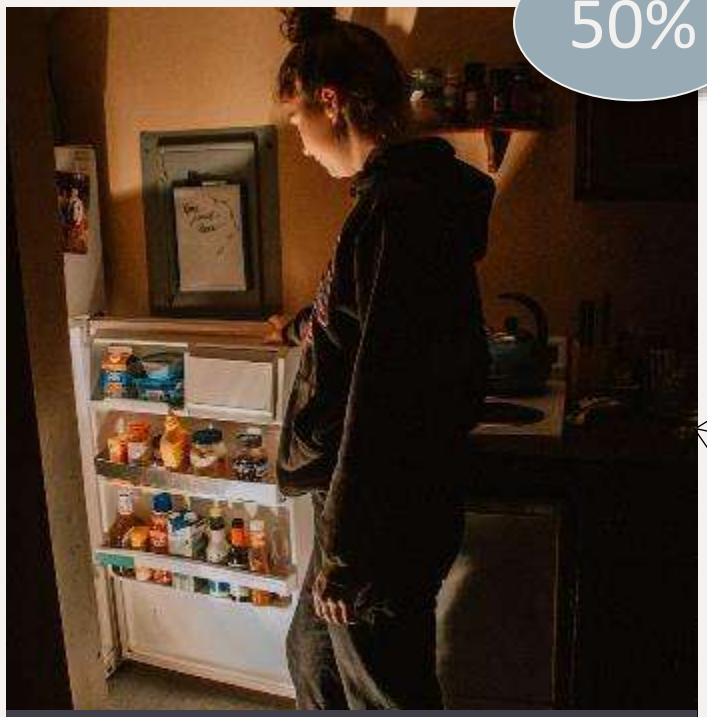
WHAT WE FOUND

20 unique types of Disordered Eating Patterns

Mean 6.4 (SD 2.1) per patient

90% identified preoperatively

SPECIFIC DISORDERED EATING PATTERNS



50%

Night Eating

Negatively associated with

GI events at 6-months

p<0.001

Nutrition event at 6- and 12-months

p=0.005, p=0.008

Medical event at 6-months

p=0.002, p=0.005

47%

Non-Hungry Eating

No association: Weight loss

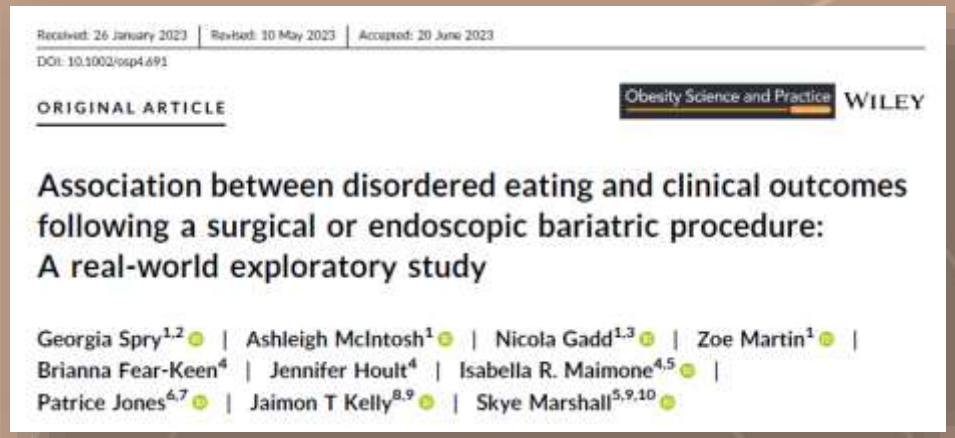
How should the MDT address disordered eating?

- Behaviour change (all patients)
- Target night eating (1 in 2 patients)
- Target non-hungry eating (1 in 2 patients)

THANK YOU

Acknowledge: Dr Reza Adib, WLSA staff, and co-authors

The 20 disordered eating patterns identified in the real world				
Binge eating	Interrupting family commitments	Frequent dieting	Frequent eating out	Poor food & cooking skills
Eating disorder (unspecified)	Grazing	Lack of satiety	Non-hungry eating	Reliance on commercial meals
Night Eating Syndrome	Irregular meal patterns	Meal skipping	Irregular meals and foods	Low protein
Emotional eating	Large portions	Night eating	Poor adherence to prescribed diets	Very poor diet quality



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ORIGINAL ARTICLE

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Association between disordered eating and clinical outcomes following a surgical or endoscopic bariatric procedure: A real-world exploratory study

Georgia Spry[1,2] | Ashleigh McIntosh[1] | Nicola Gadd[1,3] | Zoe Martin[1] | Brianna Fear-Keen[4] | Jennifer Hoult[4] | Isabella R. Maimone[4,5] | Patrice Jones[4,7] | Jaimon T Kelly[8,9] | Skye Marshall[5,9,10]

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