

Laporan Kes/Case Report

Optimising Metabolic Outcomes in Bariatric Surgery: The Impact of Dietitian Care – A Case Report

Peranan Ahli Dietetik dalam Mengoptimumkan Hasil Metabolik Pesakit Bariatrik- Laporan Kes

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ABSTRACT

This case report highlights the dietitian's role in optimising metabolic outcomes through pre- and post-operative strategies in bariatric patients. Mrs. A, a 55-year-old Malay woman with multiple comorbidities, including morbid obesity (BMI: 51.3 kg/m²), Obstructive Sleep Apnea (OSA), and fatty liver, was referred to the dietitian a year before bariatric surgery. Initial nutrition assessment revealed the patient had poor glycemic control, impaired liver enzymes, and dyslipidemia. The nutrition diagnosis was obesity related to excessive energy intake and physical inactivity as evidenced by a BMI of 51.3 kg/m² and reported energy intake of 2,215 kcal, exceeding the energy requirement of 1,715 kcal and a sedentary lifestyle. Pre and post-operative nutrition interventions were implemented through regular follow-ups every three months. A one-year pre-operative calorie deficit, two weeks of a very low-calorie diet (VLCD), and the post-operative strategies focused on a structured diet progression—from clear fluids to regular meals over two months—were implemented to sustain weight loss and improve metabolic outcomes. Mrs. A achieved 28.6% weight loss (32 kg) and an excess weight loss (EWL) of 52% through combined pre- and post-bariatric dietary interventions. Significant metabolic outcomes were observed, such as normalised glycemic control (HbA1c and fasting blood glucose), normalised liver enzymes (ALT and AST), and improved lipid profile to near normal. This case underscores the dietitian's impact on bariatric care, demonstrating significant benefits in metabolic health and long-term weight management.

Keywords: Bariatric, pre-bariatric, post-bariatric

ABSTRAK

Laporan kes ini menekankan peranan ahli dietetik dalam mengoptimumkan hasil metabolik melalui strategi pra dan pasca pembedahan bagi pesakit bariatrik. Puan A, seorang wanita Melayu berusia 55 tahun dengan pelbagai komorbiditi termasuk obesiti morbid (BMI: 51.3 kg/m²), apnea tidur obstruktif, dan hati berlemak, telah dirujuk ke Klinik Diet setahun sebelum pembedahan bariatrik. Penilaian awal pemakanan menunjukkan bacaan gula yang tidak terkawal, enzim hati yang tidak normal dan dislipidemia. Diagnosis pemakanan ialah obesiti yang berkaitan dengan pengambilan tenaga berlebihan dan kurang aktiviti fizikal, dibuktikan melalui BMI 51.3 kg/m² dan pengambilan tenaga sebanyak 2,215 kcal, melebihi keperluan tenaga 1,715 kcal dan gaya hidup yang sedentari. Intervensi pemakanan sebelum dan selepas pembedahan dilaksanakan melalui temu janji susulan berkala setiap tiga bulan. Pelan defisit kalori selama setahun bersama dua minggu diet sangat rendah kalori (VLCD) sebelum pembedahan dan pelan pemakanan berstruktur pasca pembedahan telah dilaksanakan untuk mengekalkan penurunan berat badan dan memperbaiki kesan metabolik. Puan A berjaya menurunkan berat badan sebanyak 28.6% (32kg) dan mencapai penurunan berat badan berlebihan (EWL) sebanyak 52% melalui gabungan pelan pemakanan sebelum dan selepas pembedahan. Terdapat kesan metabolik yang ketara seperti kawalan glisemik yang kembali normal (HbA1c dan paras gula darah puasa), enzim hati yang normal (ALT dan AST), serta profil lipid menunjukkan pengurangan hampir ke arah normal. Kes ini menegaskan peranan penting ahli dietetik dalam penjagaan pesakit bariatrik, yang menunjukkan manfaat ketara terhadap kesihatan metabolik dan pengurusan berat badan jangka panjang.

Kata Kunci: Bariatrik, pra-bariatrik, pasca-bariatrik

INTRODUCTION

Obesity is characterised as excessive fat that can negatively impact health, and it can increase the risk of having metabolic disorders such as cardiovascular disease, type 2 diabetes, bone health complications, reproductive challenges, and certain types of cancer (WHO 2024). Management strategies for obesity include lifestyle modifications as the primary approach, alongside medication and surgical interventions (Kloock et al. 2023). Bariatric surgery (BS) has become the most effective long-term solution for significant weight reduction and mitigating metabolic health by addressing obesity-related comorbidities such as type 2 diabetes, dyslipidemia, and hypertension (Zarshenas et al. 2020). However, the outcomes of bariatric surgery extend beyond the surgical procedure itself; it requires a comprehensive, multidisciplinary approach, where dietary management is fundamental to optimise the outcomes (Simancas-Racines et al. 2025). Dietitians are critical in pre and postoperative nutritional care, enhancing initial weight loss and improving metabolic outcomes over time (Schiavo et al. 2023). This case report highlights the role of pre- and post-surgical dietary strategies in improving metabolic markers, facilitating weight loss, and enhancing overall patient health. This case emphasises the importance of individualised nutrition care in bariatric surgery management.

PATIENT PROFILE

Mrs. A, a 55-year-old Malay woman, is a secondary school teacher and a mother of two. She has multiple comorbidities, including Obstructive Sleep Apnea (OSA), Morbid Obesity, Neck Lipoma, Hiatal Hernia, Esophagitis, Gastritis, Fatty Liver, and Cholelithiasis. Her current medications include Pantoprazole 40 mg BD and Amlodipine 10 mg OD. She also has a strong family history of diabetes (maternal side). She was referred to the dietitian for weight management as part of her bariatric surgery workup.

NUTRITION ASSESSMENT

ANTHROPOMETRY DATA

During the first visit to the dietitian, one year before surgery, the patient's measured weight is 120 kg, with a height of 153 cm, and the calculated Body Mass Index (BMI) is 51.3 kg/m², categorised as Obese Class 3 (Ministry of Health Malaysia 2023). Body composition analysis reveals 49.0% body fat and 30 visceral fat, and a waist circumference of

133.5 cm, indicating abdominal obesity (WHO 2011). Before seeing a dietitian, Mrs. A has struggled with excess weight since childhood. Her weight increased from 68 kg to 103 kg during her first pregnancy and 113 kg after her second pregnancy. Her weight continued to rise, increasing by 2.8 kg from 117.2 kg to 120 kg in the last 5 months before seeing a dietitian.

BIOCHEMICAL DATA, MEDICAL TESTS AND PROCEDURES

During the first visit to the dietitian, one year before surgery, the patient's biochemical profile reveals elevated HbA1c (7.2%) and fasting blood sugar (7.73 mmol/L), indicating poor glycemic control (Sherwani et al., 2016). Abnormal lipid levels, including total cholesterol (6.3 mmol/L), triglycerides (2.39 mmol/L), LDL (4.2 mmol/L), and HDL (1.01 mmol/L) cholesterol, indicate dyslipidemia (National Heart Association of Malaysia, 2023). Elevated liver enzymes, AST 95 U/L and ALT 84 U/L, suggest fatty liver (Xuan et al., 2024). Mrs A was scheduled for laparoscopic sleeve gastrectomy (LSG) in July 2024, following a year of preoperative dietary and lifestyle intervention with a dietitian.

CLINICAL DATA

The patient's blood pressure (138/75 mmHg) was controlled within the recommended range using a single anti-hypertensive drug, and her knee pain caused limited movement.

FOOD NUTRITION-RELATED HISTORY

During the first visit to the dietitian, one year before surgery, dietary patterns were analysed using the usual 24-hour dietary recall, and she was estimated to have excessive energy (2215 kcal) and an imbalance of macronutrient intake. Despite having adequate carbohydrates (250 g/d, 45%) and high fat (114 g/d, 46%), the patient has insufficient protein intake (54 g/d, 9%). Her fat intake is mainly from high-energy-dense food and undesirable habits of eating large portion sizes at breakfast and dinner. She also has an inadequate fibre intake. She has difficulty doing physical activity due to knee pain when walking long distances, and has a sedentary lifestyle.

NUTRITION ASSESSMENT

Obesity related to excessive energy intake and physical inactivity as evidenced by a BMI of 51.3 kg/m² and reported energy intake of 2,215 kcal,

exceeding the energy requirement of 1715 kcal and sedentary lifestyle.

NUTRITION INTERVENTION

PRE-BARIATRIC DIETARY STRATEGIES- CALORIE DEFICIT APPROACH:

Prebariatric dietary strategy focuses on weight reduction of 0.5 - 1.0 kg per week. This goal was discussed and agreed upon with the patient. A tailored calorie deficit of 500–1000 kcal per day from the patient's usual intake was planned to achieve steady weight loss of 0.5 -1.0 kg per week. The patient was encouraged to have adequate protein 1.0–1.5 g/kg ideal body weight (64 - 96 grams daily). Dietary counselling also emphasises a healthy and balanced meal with guidance on portion control, healthy food choices, and adequate fibre intake. Due to the patient's movement limitation (knee pain), she was encouraged to be active with chair-based aerobic exercises for at least 150 minutes weekly. These strategies are monitored over a year, with three follow-up appointments scheduled every three months at the dietetic clinic.

PRE-BARIATRIC DIETARY STRATEGIES- VERY LOW CALORIE DIET (VLCD):

Two weeks before surgery, the patient was prescribed a very low-calorie liquid diet (600–800 kcal per day, 60–80 grams of protein). The patient was given two options for the liquid diet regimen:
Option 1: One sachet VLCD shake mixed with 200–300 ml of water, 3 to 4 times per day.
Option 2: Three scoops of a low glycemic index formula added with three scoops of protein modular, mixed in 200–300 ml of water, 3 to 4 times per day.

POST-BARIATRIC DIETARY STRATEGIES:

A structured dietary plan following bariatric surgery was given to the patient. The patient will start with a clear liquid diet for 24 to 48 hours postoperatively (no specific energy or protein targets), followed by a full liquid diet (two days to two weeks) providing 600 kcal and 60 g protein/day. From weeks two to four, a pureed diet was introduced (600–800 kcal, 60–80 g protein/day), progressing to a soft diet in weeks four to eight (800–1000 kcal, 60–80 g protein/day). After eight weeks, the patient transitioned to a regular low-calorie diet (1000–1200 kcal/day) with continued protein intake of 60–80 g/day. Nutritional counselling and regular follow-ups every three months were implemented to prevent complications such as dumping syndrome and to support long-term weight maintenance.

NUTRITION MONITORING & EVALUATION

PRE-BARIATRIC- CALORIE DEFICIT APPROACH OUTCOMES:

According to Table 1, the patient successfully reduced calorie intake over a year and achieved a daily calorie deficit of 500–1000 kcal, reducing energy intake from 2215 to 1180 kcal/day. Protein intake improved from 54 g to 62 g/day despite the low-calorie diet. Although dietary compliance was good, physical activity goals were unmet. She lost 3.5 kg (3%), with reductions in body fat (49% to 47.3%), waist circumference (133.5 cm to 124.5 cm), and BMI (51.3 to 49.8 kg/m²), while visceral fat remained unchanged. Glycemic control improved markedly (FBS: 7.73 to 5.3 mmol/L; HbA1c: 7.2% to 6.4%). Lipid profile showed modest improvement, with increased HDL-c (1.01 to 1.07 mmol/L) and reduced triglycerides (2.39 to 2.29 mmol/L), though LDL-c and total cholesterol were unchanged. Liver enzymes normalised significantly (AST: 95 to 18 U/L; ALT: 84 to 16 U/L).

PRE-BARIATRIC- VERY LOW CALORIE DIET (VLCD) OUTCOMES:

Two weeks pre-bariatric, she followed a very low-calorie liquid diet (VLCD) providing 600 kcal with 60 grams of protein while hospitalised for proper monitoring. The patient lost 8.75% (10.5 kg) weight, lowering BMI to 45.3 kg/m². Due to limitations in ward facilities, body composition data such as body fat and visceral fat could not be obtained. FBS remained normal (4.43 mmol/L). Lipids improved (cholesterol: 6.3 to 4.85 mmol/L; triglycerides: 2.29 to 1.52 mmol/L; LDL-c: 4.2 to 3.25 mmol/L), though HDL-c declined (1.07 to 0.9 mmol/L). Liver enzymes were elevated (AST: 95 U/L; ALT: 84 U/L).

POST-BARIATRIC OUTCOMES:

Three months post-bariatric, the patient had a regular diet of 800–1000 kcal daily, with a 42 - 65 grams protein intake. She lost 18 kg (17%), reducing her BMI to 37.6 kg/m². Waist circumference dropped to 115 cm; visceral fat to 25; and body fat to 39.2%. Glycemic control (HbA1c: 5.5%) and liver enzymes (AST: 33 U/L; ALT: 28 U/L) were normalised. Lipids improved, though HDL-c (0.93 mmol/L) and LDL-c (3.40 mmol/L) remained suboptimal. Blood pressure remained normal. Protein intake (42–65 g/day) was borderline due to early satiety and small portion size. The patient also did not comply with prescribed multivitamin supplements, citing allergic reactions as the reason for discontinuation, resulting in low iron levels (7 µmol/L), while folate and Vitamin B12 remained

normal. No signs of dumping syndrome were observed.

OVERALL OUTCOMES:

Mrs. A achieved a total weight loss of 28.6% (32 kg) and 52% excess weight loss through a combination of pre-operative dietary interventions—including a 14 kg (11.6%) reduction over one year and a 2-week VLCD—and an additional 18 kg (17%) loss within three months post-bariatric surgery.

DISCUSSION

PRE-BARIATRIC DIETARY STRATEGIES- CALORIE DEFICIT APPROACH:

Before surgery, the Malaysian Clinical Practice Guidelines (CPG, 2023) recommend including diet therapy, physical activity and behavioural strategies to achieve optimal weight loss and patient readiness (Ministry of Health Malaysia, 2023). Diet therapy focused on a tailored calorie deficit of 500–1000 kcal per day from the patient's usual intake, targeting steady weight loss of 0.5–1.0 kg per week (Ministry of Health Malaysia, 2023). The patient was encouraged to have adequate protein 1.0–1.5 g/kg of the ideal body weight daily, crucial for preserving muscle mass, supporting metabolic functions, and preventing sarcopenic obesity (Ministry of Health Malaysia, 2023). The Malaysian Clinical Practice Guidelines (CPG, 2023) also highlight that dietary counselling should be part of a medical nutrition therapy approach, including portion control, healthy food selection, fibre intake and regular physical activity to support sustainable weight loss, adaptation to new dietary modifications and long-term lifestyle change (Ministry of Health Malaysia, 2023). The patient was scheduled for follow-up appointments at the dietetic clinic every three months to assess progress and adjust the intervention as needed (Ministry of Health Malaysia, 2023). Even though the patient achieved minimal weight loss targeted over a year, only achieved 3% (3.5 kg) weight reduction, due to limited physical activity (knee pain), notable improvement in metabolic outcomes has been shown, such as blood glucose, lipid profiles and liver enzymes (Tang et al., 2024).

PRE-BARIATRIC DIETARY STRATEGIES- VERY LOW CALORIE DIET:

According to the European Society for Clinical Nutrition and Metabolism (ESPEN, 2023), the use of a very low calorie diet (VLCD), 2–4 weeks before surgery, is recommended as part of preoperative nutritional preparation (Bischoff et al., 2023). VLCD is a liquid-based formula designed to provide 600–800 kcal per day, 60–80 grams protein per day ($\geq 0.8 - 1.2$ g/kg ideal body weight) with low carbohydrate, minimal fat and adequate vitamins and minerals to prevent deficiencies to reduce liver

volume, shorter operative times, and fewer complications (Schiavo et al., 2023). The primary rationale is to optimise metabolic outcomes before surgery and to psychologically prepare the patient for the post-operative dietary restrictions, thereby supporting long-term dietary compliance (Schiavo et al., 2023). VLCD facilitates rapid weight loss by inducing ketosis, a metabolic state that uses ketones from fat as the primary energy source (Hirschberger et al., 2024). During this phase, Mrs. A achieved weight loss of 8.75% (10.5 kg). Even though all the metabolic parameters improved, the patient experienced elevated AST and ALT, possibly due to induced hepatic inflammation caused by rapid weight loss (Tsai et al., 2017). The patient was hospitalised for proper monitoring before commencing the VLCD diet as a precautionary measure.

POST-BARIATRIC DIETARY STRATEGIES:

The European Society for Clinical Nutrition and Metabolism (ESPEN, 2023) emphasises early and individualised nutritional strategies for managing diet transitions after surgery and proactive management of complications (Bischoff et al., 2023). ESPEN (2023) indicates that a well-organised nutritional regimen starts with a clear liquid intake during the first day following surgery; this practice helps maintain gut barrier function and lowers infection risk (Bischoff et al., 2023). After the clear fluid stage, Mrs. A started a full liquid regimen of 600 kcal and 60 grams of protein daily. The primary rationale for starting with a full liquid diet is to promote optimal healing and adequate hydration while deliberately promoting weight loss (Schoff et al., 2023). By weeks two to four, Mrs. A could transition her diet to a pureed diet with 600–800 kcal and 60–80 grams of protein daily and later progressed to a soft diet in weeks four to eight with 800–1000 kcal, 60–80 grams of protein daily. During this period, the aim is to gradually increase the food volume and transition from liquid to soft texture (Bischoff et al., 2023). After eight weeks, Mrs. A transitioned to a regular low-calorie diet (800–1000 kcal daily) with a 42–65 grams protein intake. The low-calorie diet is supposed to maintain between 1000–1200 kcal and 60 to 80 grams of protein daily to support steady weight loss without compromising the nutrition status, and is supposed to transition to a regular diet in week six; however, it depends on individual tolerance after surgery (Bischoff et al., 2023). The failure to achieve optimal protein intake was due to early satiety. After bariatric, early satiety is often due to alterations in the gastrointestinal structure and gut hormone levels (Ramasamy, 2024). The patient was advised to optimise protein intake, appropriate portions, and a protein-dense meal at each meal (Thibault et al., 2021). Nutrition education focusing on preventing

dumping syndrome was also implemented following gastrectomy, including a low-sugar, low-fat diet, eating small, frequent meals, and avoiding fluids with meals (Bischoff et al., 2023). Mrs. A was able to safely transition her diet from clear liquid to a regular diet within three months and has a weight reduction of 17% (18kg) and did not experience symptoms of dumping syndrome. However, the patient also had low iron levels (7 $\mu\text{mol/L}$), while folate and Vitamin B12 remained normal due to non-compliance with the supplements prescribed and micronutrient deficiencies post-surgery. After gastrointestinal surgery, iron, vitamin B12, folate, vitamin D, and calcium will be affected, and supplements are important for preventing long-term complications (Bischoff et al., 2023). The dietitian will address this by encouraging the patient to discuss suitable supplement options with medical practitioners (Muscaritoli et al., 2021). She was also advised to continue physical activity under the physiotherapist's guidance and follow-up in three months for further monitoring after surgery (Mechanick et al., 2020).

WEIGHT LOSS AFTER BARIATRIC:

Excess Weight Loss (EWL) over 50% within six months is a benchmark of bariatric surgery success (D'Eusebio et al., 2020). Mrs. A achieved a total weight loss of 28.6% (32 kg) and an EWL of 52% through combined pre- and post-bariatric dietary interventions, successfully meeting her weight loss target. This was accompanied by marked improvements in glycemic control (fasting glucose and HbA1c), liver enzymes (AST, ALT), and lipid profile—including normalisation of total cholesterol, triglycerides, and improved LDL-C

(Tang et al., 2024). However, the slight reduction in HDL cholesterol from pre- to post-bariatric suggests the need for targeted dietary and lifestyle changes after post-bariatric (Hageman and Sharma, 2020).

CONCLUSION

This case highlights the role of pre- and post-bariatric dietary strategies in bariatric patients. Mrs. A had improved metabolic outcomes, including normalised HbA1c levels, improved lipid profiles, and normalised liver enzymes following weight reduction in pre and post-bariatric. Despite significant metabolic outcomes, the patient faced suboptimal protein intake and non-compliance with supplements. This case highlights the impact of dietitian care in addressing these challenges to improve overall health while aiming for weight reduction.

CONSENT

Verbal consent has been obtained from the patient.

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DECLARATION OF CONFLICT OF INTERESTS

The authors declared no potential conflicts of interest concerning the preparation and publication of this article.

TABLE 1 A comparison of the nutrition assessment data of Mrs A from pre to post-bariatric

Criteria	Unit	Normal range	Result				Interpretation
			First Visit (1 year pre-op)	2 months pre- op (LCD)	2 weeks pre- op (VLCD)	3 months post-op (LCD)	
Energy	kcal	600-1200	2,215	1180	600	800 - 1000	Achieved
Protein	g	60 -80	54	62	60	42–65	Suboptimal
BMI	kg/m2	18.5–22.9	51.3	49.8	45.3	37.6	Improved

Body fat	%	20.0- 29.9	49.0	47.3	-	39.2	Improved
Visceral fat		1 - 9	30	30	-	25	Improved
Waist circumference	cm	<80	133.5	124.5	-	115	Improved
HbA1c	%	<5.7	7.2	6.4	-	5.5	Normalised
Fasting blood sugar	mmol/L	4.0–6.0	7.73	5.3	4.43	4.44	Normalised
Total cholesterol	mmol/L	<5.2	6.3	6.3	4.85	4.8	Normalised
Triglyceride	mmol/L	<1.7	2.39	2.29	1.52	1.04	Normalised
LDL cholesterol	mmol/L	<3.0	4.2	4.2	3.25	3.40	Improved
HDL cholesterol	mmol/L	≥ 1.3	1.01	1.07	0.91	0.93	Decreased
AST	U/L	5 - 34	95	18	95	33	Normalised
ALT	U/L	0 - 55	84	16	84	28	Normalised
Blood pressure	mmHg	<140/80	138/75	120/ 80	134/72	130/75	Normal

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