

Case report of a female western Indian vegetarian with obesity

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A B S T R A C T

Background: South Asians are defined as those indigenous to the Indian subcontinent - India, Pakistan, Sri Lanka, Nepal, Maldives, Bhutan, and Bangladesh. This ethnic group is a unique population with increased prevalence of metabolic syndrome even at a lower body mass index (BMI). Should they also have increased BMI, the risk for development of diabetes mellitus and cardiovascular complications are further magnified. Strong cultural perceptions about ideal body weight, lack of awareness about the race and ethnicity-specific risks, and knowledge gaps regarding different dietary patterns among the healthcare providers confound further the metabolic issues pertinent to South Asians living in North America.

Methods: In this case study of a South Asian patient, we present asynchronous co-management of obesity by an obesity specialist and the primary care provider in a university-based clinic.

Results: Intense lifestyle interventions including a custom-tailored Indian vegetarian meal plan and weekly injectable Semaglutide was offered to the patient as treatment plan. The patient lost 59 pounds, and BMI changed from 34.1 kg/m² to 23.5 kg/m².

Conclusion: Intensive lifestyle interventions with custom-tailored dietary changes, regular physical activity and behavior modifications combined with appropriate pharmacotherapy can be very successful in the management of obesity among South Asians living in North America.

1. Introduction

The prevalence of obesity is rapidly increasing globally irrespective of racial, ethnic, and geographical boundaries [1]. Systemic disparities based upon race, ethnicity, gender, sexual orientation, income, access to healthcare, are the barriers to management of obesity [2]. Studies suggest increased metabolic risk profile in South Asian immigrants [3]. Theories of epigenetics suggest that South Asians have evolutionarily determined limitations in beta cell function potentially resulting in impaired insulin secretion and when they gain excess visceral fat it promotes insulin resistance [4]. This is further influenced by acculturation status in Asian immigrants [5]. Living in North America adds complexity with changes in lifestyle, with a greater exposure to the availability of unhealthy processed foods and sugar concentrated beverages [5]. Asian immigrants and their families are exposed to the western environment including the traditional American diet [6]. With this background the aim of this manuscript is to illustrate that a custom-tailored intense lifestyle interventions combined with pharmacotherapy can be successfully implemented in management of obesity in South Asians living in North America.

2. Diagnostic criteria for obesity

Body mass index (BMI) is used for defining and classifying obesity. BMI is calculated as weight in kilograms divided by height in square meters. Because of the increased risk of cardiac and metabolic complications with lower BMIs, the cutoff for South Asians has been defined by the World Health Organization Asia-Pacific as BMI ≥ 23 kg/m² as overweight and ≥ 25 kg/m² as obesity [7]. Abdominal obesity with excess visceral fat is associated with increased cardiovascular risk among South Asians [8]. The waist circumference seems to have better correlation with cardiovascular disease in South Asian patients with normal or low BMI [9]. However, the waist circumference varies widely among South Asians [10]. Observational studies have demonstrated waist weight ratio (WWR) may be more beneficial in assessing risk in Asian Indians than waist hip ratio (WHR) [10].

3. Challenges in the management of obesity among South Asians

Obesity is a chronic, relapsing, progressive, neurobehavioral, and degenerative multisystem disease [11]. Because of this, the treatment plan must be sustainable and affordable in the long term to prevent relapse. Culture strongly influences attitudes and behaviors towards diet and physical activity [12]. We present a clinical case report of a patient

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who presented to a university-based obesity clinic and the response to custom-tailored treatment plan that was offered.

4. Case report

4.1. Patient Information

Fifty-year-old female originally from Western India who moved to the United States over twenty years prior, who upon establishing care with a new primary care provider, described her inability to lose weight despite trying multiple options including strict lifestyle interventions. Her initial work up revealed hypothyroidism which was treated with levothyroxine. She is vegetarian and was eating predominantly at home, healthy meals with small portion size, doing regular household chores and keeping herself active. She was frustrated with the inability to lose weight and was interested in pharmacotherapy.

4.2. Clinical findings

Her physical exam revealed normal vital signs, normal systemic exam, and abdominal visceral obesity.

4.3. Timeline of events

Fig. 1.

4.4. Diagnostic Assessment

Her blood work showed total cholesterol 219 mg/dl, triglycerides 93 mg/dl, High density lipoprotein cholesterol (HDL-C) 46 mg/dl, Low density lipoprotein cholesterol (LDL-C) 154mg/dl, Hemoglobin A1c 5.3%, Thyroid stimulating hormone (TSH)1.25 mIU/ml, free Thyroid 4 hormone 0.93 ng/dl, fasting glucose 101mg/dl and Anti-nuclear antibody (ANA) 1:80. Her thyroid ultrasound showed a mildly enlarged gland with two small nodules.

4.5. Therapeutic Intervention

The primary care physician (PCP) prescribed Bupropion and referred

her to an obesity specialist, the patient’s Body Mass Index (BMI) was 32.61 kg/m² at the time. She did not lose weight, so Bupropion was stopped. PCP started her on Topiramate. Her appetite decreased significantly with Topiramate, however still no weight loss and so phentermine was added. She lost 10 pounds with this combination and then hit a weight loss plateau in 4 months. During this time, she was seen by an obesity specialist who prescribed a custom-tailored Indian Vegetarian meal plan for 1200 calories (Table 1) along with SMART goal patient instructions (Table 2).

4.6. Follow-up and Outcomes

She had two visits with the obesity specialist and then followed up regularly with PCP. She regained the weight and went to India, tried a program with strict all-natural diet and liposuction. She was exercising regularly. She lost 10 pounds. However, in a year, she gained all the weight back and returned to PCP with a Weight of 200 pounds and BMI of 34.1 kg/m². She was then started on weekly injectable Semaglutide, and the dose was titrated up to maximum dose. She continued her lifestyle interventions and lost a total of 59 pounds and BMI decreased from 34.1 kg/m² to 23.5 kg/m². Semaglutide dose was slowly decreased, and she is now maintained on the optimal dose to prevent weight regain.

5. Discussion

This single case report of a South Asian patient responding well with a custom-tailored meal plan and pharmacotherapy enabled us to do a literature review of obesity management in South Asians. Our discussion will be based upon the limited studies that are available in this population, addressing the five pillars of obesity management. Comprehensive, evidence-based obesity management combines behavioral interventions, nutrition, physical activity, pharmacotherapy, and bariatric procedures for individual patients [11]. Evidence suggests that lifestyle interventions alone provide 5–10 % weight loss. Clinical trials show that patients treated with glucagon-like peptide receptor 1 (GLP-1) agonists and glucose-dependent insulinotropic polypeptide/GLP-1 receptor agonists attain approximately 8 %–21 % weight loss and with bariatric surgery attain approximately 25 %–30 % weight loss [11].

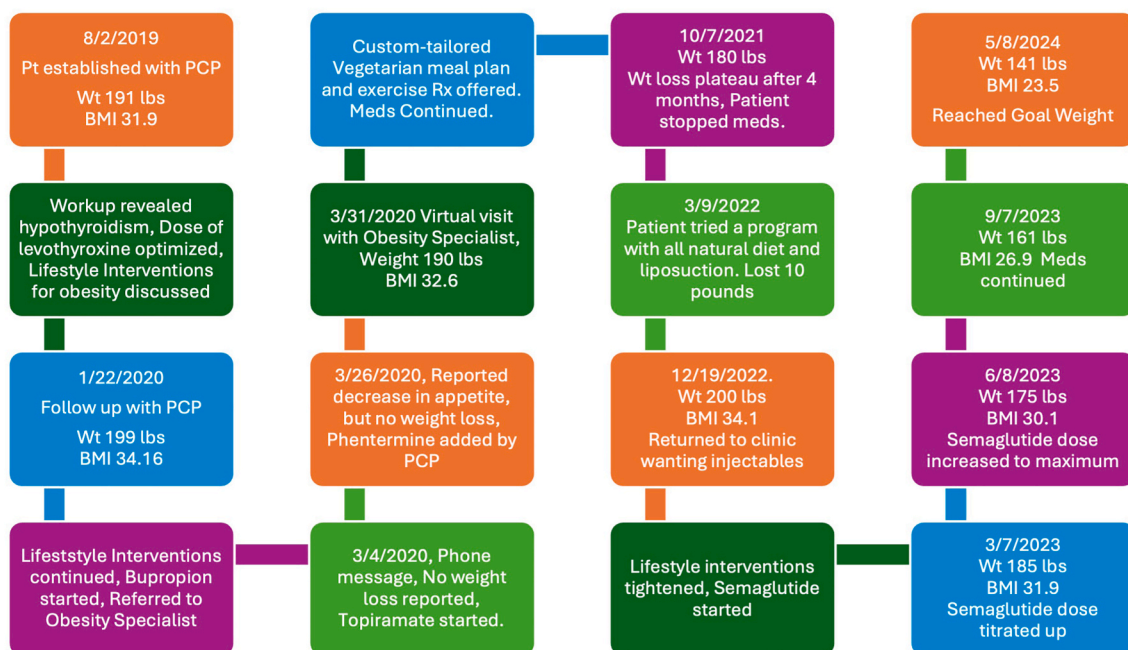


Fig. 1. Timeline of events.

Table-1
Customized Indian Vegetarian Meal Plan –1200 calories.

Meal	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Breakfast	Coffee with milk Protein shake with fruits and almond milk	Tofu stir fry vegetables	Steel cut oats- 1 cup Almond Milk 1 cup	Cottage cheese –1 cup Pears- 1 cup	Raisin bran cereal 1 cup Almond milk 1 cup Walnuts –6	Banana –1 Almond milk-1 cup Protein powder shake	Almond milk Blueberries Protein powder shake
Snack –1	Protein bar (15 Grams of protein)	Protein bar	Protein bar	Protein bar	Protein bar	Protein bar	Protein bar
Lunch	Chickpeas cooked in tomato and onion broth-1 cup Greek Yogurt 1 cup	Salad with greens, olive oil, nuts	Arugula salad tomatoes Olive oil Lemon juice	Black eyed beans cooked with onions and tomatoes Greek Yogurt	Salad stir fry Vegetables cooked in Olive oil with Curry powder	Black bean burger patty-1 Cottage cheese	Stir fry tofu With vegetables and Cottage cheese
Snack-2	Hummus ¼ cup vegetables	1 small apple Cottage cheese	Nuts Cottage cheese	Hummus ¼ cup 1 Apple	1 Apple Cottage cheese	Hummus Vegetables	Pears Avocado
Dinner	Tofu stir fry With vegetables Brown rice 1 cup (cooked)	Sambar Vegetable curry made in Indian style other than potato –1 cup Brown rice 1 cup	Idli 4 Sambar 1 cup	Multigrain Dosa –2 Chutney	Roti-2 Kidney beans (Rajma) 1 cup	Rajma 1 cup Greek Yogurt 2–3 tablespoons	Rasam- 1 cup Quinoa 1 cup Eggplant curry - 1 serving Blueberries
Snack	Dark chocolate bar small piece	Grapes	Protein biscuits	Almonds And raisins	Dark chocolate bar	Walnuts	

Table –2
SMART goals patient instructions.

Nutrition
Follow a 1200 calorie-based meal plan as above at least 5 days of the week.
Skip snacks if you are not hungry.
Wait 10 minutes before seconds.
Substitute tofu for eggs in recipes.
Exercise
Walk 30 minutes a day 4–5 times a week and increase the time and intensity as tolerated.
Do strength training workout including yoga twice a week.
Sleep
Try to get 6–7 hours of uninterrupted sleep.
Medications
Start medication as instructed and follow up in 3 months.

5.1. Lifestyle Interventions – Nutrition

Though studies specifically addressing management of South Asians with obesity is limited, we have consensus on medical nutrition therapy on South Asian patients with Diabetes and Obesity [12]. Evidence suggest consistent lifestyle interventions used with pharmacotherapy prevents diabetes in South Asians with impaired glucose tolerance [13]. Recent studies emphasize the need for culturally tailored healthcare interventions [14]. In order to provide that, it is important for providers to understand the wide variation in the dietary pattern among South Asians [15]. Many patients from India and Nepal tend to be vegetarians and they eat predominantly home cooked meals high in carbohydrates [15].

Many South Asians consume a variety of desserts and sweets in excess, especially during the holiday season [15]. The convenience of ultra-processed foods in grocery stores has changed the patterns of consumption of unhealthy foods in recent years [16,17]. Those patients will benefit when clinicians educate them about low carb, plant-based meal plans [18]. Evidence suggest that meal plans offered in the local language and knowledge of cultural foods by the providers improves adherence by the patients [19]. The Obesity Medicine Association has issued cultural healthy eating guides for providers to use which is a valuable resource [20].

Intermittent fasting among South Asians may modestly reduce body weight and change the lipid profile favorably to offer protection against cardiovascular disease risk factors [21]. There is mixed evidence for the impact of intermittent fasting on insulin resistance, fasting glucose and lipid profile. Some studies focused on populations of Muslim patients fasting during Ramadan [22]. They showed that it may lead to weight loss and improvement of metabolic parameters during fasting, although the effects are reversed when fasting is finished [22].

5.2. Lifestyle interventions – Physical Activity

World Health Organization 2020 physical activity guidelines suggest all adults should undertake 150–300 min of moderate-intensity, or 75–150 min of vigorous-intensity physical activity per week combined with regular muscle strengthening activities [23]. A total of 60 min of physical activity every day with a combination of 30 min of moderate-intensity aerobic activity, 15 min of work-related activity, and 15 min of muscle-strengthening exercises is recommended for healthy South Asian Indians [24]. Evidence suggest all types of exercises are associated with improvements in glycemic control, blood pressure, waist circumference, blood lipids, muscle strength, functional mobility, and quality of life in South Asians [25]. However, meta-analysis reports that only one out of five adults meet the recommended guidelines [26]. The perceived barriers to exercise varied with age, gender, and marital status. The most common ones are lack of time and physical discomfort [27]. South Asian patients were concerned with lack of gender specific exercise facilities and fear of injury or worsening health with exercise [28]. Exercise coaches who are familiar with these barriers will be able to provide culturally appropriate advice.

A pilot study suggests that a culturally tailored exercise intervention had physical and psychosocial benefits in South Asian mothers with risk factors for Diabetes Mellitus [29]. Innovative ideas of working out from home, using free online exercise videos, motivating with a buddy system may be beneficial. Encouraging patients to go for walks after a heavy meal may help bring down the postprandial glycemic response. Simple suggestions like gardening, moving for 3 minutes for every 30 minutes of sitting, taking the stairs, parking the car as far as possible, walking during lunch hour, walking children to school or sports activity, are some of the useful tips that can be offered to the patients.

5.3. Lifestyle interventions – Sleep hygiene and Stress reduction

Some studies indicate that cardiovascular events in South Asians may be associated with sleep disorders in the immigrant population [30]. According to one study, South Asians sleep for fewer than 7 hours and more often suffer from sleep apnea [31]. Education about the significance of sleep hygiene must be emphasized in South Asian populations [30,31].

Mental health stigma and binge eating is high among South Asian immigrants and is best addressed by trained professionals [31]. Creating an environment that is safe to share their feelings is important. Community and local resources can be used to provide this growing need. For example, an organization called South Asian Mental Health Initiative & Network (SAMHIN) addresses a broad range of mental health needs of the growing South Asian community in the United States. It includes a team of psychiatrists and behavior therapists who have expertise in working with South Asians [15].

5.4. Pharmacotherapy

Commonly prescribed medications that may cause weight gain such as antidepressants, antihistaminics and some antihyperglycemics (sulfonylureas or insulin) should be reviewed by clinicians and alternative medications should be considered [32]. We have six medications approved by the US Food and Drug Administration for long-term obesity management. They are glucagon-like peptide receptor 1 (GLP-1) agonists (semaglutide and liraglutide), a glucose-dependent insulinotropic polypeptide/GLP-1 agonist (Tirzepatide), phentermine-topiramate, naltrexone-bupropion, and orlistat. Of these, tirzepatide has the greatest effect, with mean weight loss of 21 % at 72 weeks [11].

The data of anti-obesity medications specifically in South Asians is limited. Among South Asians with obesity complicated by prediabetes and type 2 diabetes mellitus, preferred medications may include metformin, glucagon like peptide - 1 receptor agonists, and sodium-glucose co-transporter-2 (SGLT2) inhibitors [33]. GLP-1 agonists and SGLT2 inhibitors when used for diabetes management appear to have no differences in cardiorenal outcomes between the subgroups of Asian patients and the overall trial cohorts [34]. Specific guidelines are issued for use of GLP-1 agonists in patients with diabetes during Ramadan [35].

Four phenotypes are proposed in obesity: 1. Hungry brain, with abnormal satiation, mainly controlled by the brain-gut axis, 2. Emotional hunger with intense desire to eat to cope with positive or negative emotions 3. Hungry gut with abnormal duration of fullness and 4. Slow burn with decreased metabolic rate. In A Pragmatic Trial, the phenotype-guided approach was associated with 1.75-fold greater weight loss after 12 months with mean weight loss of 15.9 % compared with 9.0 % in the non-phenotype-guided group [36]. This is yet to be further studied in different ethnic groups to give us a better understanding of what pharmacotherapy would be better in each group of patients.

5.5. Endoscopic procedures and bariatric surgery

Bariatric surgery is fast emerging and has proven to be highly successful and cost-effective at producing remission of complications associated with obesity in South Asian countries [37]. It is found to be effective in Asians in reducing total body fat and visceral fat, with improvement of hepatic steatosis and liver enzyme levels [38]. Endoscopic procedures with intragastric balloon and endoscopic sleeve gastropasty can attain 10 %–13 % weight loss in 6 months [11]. Weight loss from metabolic and bariatric surgeries - laparoscopic sleeve gastrectomy and Roux-en-Y gastric bypass ranges from 25 % to 30 % at 12 months [11]. Weight loss after surgery is also influenced by ethnicity due to different eating patterns and the outcome data varies accordingly [39, 40]. Ethnic disparities exist among the patients who receive bariatric surgery after being referred, and only 42 % of Asians who are referred

receive the surgery according to a New Zealand based study [41].

5.6. Future of Obesity management

The future of obesity management is based upon using custom tailored treatment plans for patients. This includes using precision nutrition targeted on phenotype and genotype [42]. Healthcare professionals should understand interindividual differences and tailor recommendations for weight loss optimization, weight regain prevention and long-term weight loss maintenance. It is also essential that these recommendations align with individual food preferences, social and cultural circumstances, and culinary expertise [42]. Further, using the existing technology for remote patient monitoring with image assisted dietary apps can help maintain patient accountability. Remote monitoring will also offer continuous motivation for patients to maintain lifestyle changes including regular physical activity, maintain good sleep hygiene and reduce stress. Combining this with phenotype-based pharmacotherapy will help us reverse obesity. With the growing rate of obesity as a new pandemic we need more public health interventions to reverse obesity [43]. We need more research on South Asians with a cultural and ethnicity-based approach to reduce the morbidity and mortality in this unique population.

6. Patient perspective

Patient is very happy with the weight loss. She can do housework without pain, and her knee pain is much better. She walks and bikes a lot. She is happy that she can maintain her weight.

7. Informed consent

The patient in this case provided informed consent to be included in this case report.

8. Author contribution via CRediT format

The concept of the submission was created by Dr. Niranjan. Dr. Ozimek contacted the patient to get informed consent and contributed to write the clinical information of the case report. Dr. Niranjan wrote the first draft. Dr. Niranjan and Dr. Ozimek together reviewed, edited, and approved the final submission and publication.

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10. Ethical adherence and ethical review

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11. Artificial intelligence

Artificial intelligence was not used in preparing this manuscript.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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