

# Remission of Hypertension Through Lifestyle Modification: A Case Study

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## ABSTRACT

Hypertension is a common comorbidity associated with obesity, and weight reduction offers numerous health benefits, including improved blood pressure control. This case study presents a 38-year-old man with an initial body mass index (BMI) of 35.5 kg/m<sup>2</sup> who achieved hypertension remission through comprehensive lifestyle modifications. A structured program incorporating dietary changes, regular physical activity, and behavioral therapy led to a sustained BMI reduction to 25.8 kg/m<sup>2</sup>. This weight loss was accompanied by a gradual normalization of blood pressure, allowing for the discontinuation of three antihypertensive medications irbesartan, hydrochlorothiazide, and amlodipine after approximately one year of lifestyle modification. Remarkably, his blood pressure remained within the normal range for three years following medication cessation, which was maintained through continued adherence to lifestyle interventions.

## INTRODUCTION

Hypertension is a major global risk factor for cardiovascular disease, and its strong association with obesity has been well documented. According to the Malaysian National Health and Morbidity Survey 2019 (NHMS 2019), the prevalence of hypertension among Malaysian adults is approximately 30%.<sup>1</sup> Obesity contributes to the development of primary hypertension through multiple physiological mechanisms, including neurohormonal activation, systemic inflammation and renal impairment.<sup>2</sup> These physiological mechanism leads to the expansion of extracellular fluid volume and an increase in cardiac output, primarily due to enhanced renal sodium reabsorption. This process is mediated by activation of the renin-angiotensin-aldosterone system (RAAS), sympathetic nervous system overactivity, and mechanical compression of renal structure by adipose tissue. All these changes increase the renal blood flow and glomerular filtration rate, in which over time, they contribute to the development of hypertension.<sup>2</sup>

An increase in the prevalence of obesity, is associated with an increase in hypertension and related cardiorenal conditions. Lifestyle modification, including dietary changes and regular physical activity remains the mainstay treatment for obesity.<sup>3</sup> However, its long-term

effectiveness in reducing adiposity, sustaining weight loss, and maintaining blood pressure control has been modest.<sup>4</sup> Bariatric surgery has been proven effective in promoting substantial weight loss and improving other metabolic disorders. Nonetheless, it carries potential risks such as bleeding, infection, anesthetic risks, dumping syndrome, and long-term nutritional deficiencies.<sup>2</sup>

Hypertension remission is defined as the normalization of blood pressure (BP) without the need for antihypertensive medications.<sup>5</sup> Although a universally accepted definition is lacking, growing research is beginning to explore this concept. Currently, comprehensive data on the long-term effects of intensive lifestyle intervention leading to sustained hypertension remission remain limited. Despite this gap, the present case study highlights how structured lifestyle modifications can result in significant weight loss and durable hypertension remission in an individual with obesity.

## CASE PRESENTATION

A 38-year-old man with underlying hypertension and obesity was referred from a private clinic in 2020 for obesity management. He expressed concern about his

increased risk of COVID-19 complications due to his underlying health conditions. He had been diagnosed with primary hypertension at the age of 20 during a routine medical check-up for university admission. Initially managed with daily amlodipine, his antihypertensive regimen was later escalated to include three antihypertensive medications: amlodipine 5 mg and irbesartan/hydrochlorothiazide 300/12.5 mg daily. Despite medication adherence, his blood pressure remained sub-optimally controlled, consistently ranging between 140-150/80-90 mmHg.

Regarding his weight history, the patient reported significant weight gain beginning in adolescence, which progressively increased over time. Initially, his weight was not perceived as problematic, as it did not noticeably affect his daily functioning, social interactions, or mental well-being. He led a sedentary lifestyle with minimal physical activity largely due to his desk-based occupation, which involved sitting for approximately 8 to 9 hours per day. His dietary habits were characterized by excessive intake of carbohydrates, fat, and salt diet. His typical daily meal consisted of large portions, including 4-5 scoops of rice accompanied by generous servings of curry gravy, fried chicken, and red meat. He frequently enhanced the flavor of his meals with soy sauce or fermented fish sauce. Additionally, he regularly snacked between meals on high-calorie foods such as fried bananas, crispy crackers, cakes, and other processed snacks. He also had a strong family history of hypertension and diabetes.

On physical examination, his height was 176 cm, weight was 110 kg and body mass index (BMI) was 35.5 kg/m<sup>2</sup>, consistent with obesity class II. Other system examinations were unremarkable. His laboratory investigations were all in the normal range as shown in Table 1.

The patient was diagnosed with obesity class II and uncontrolled hypertension. He was counselled for comprehensive lifestyle modification and a mutual agreement was reached regarding the implementation of these changes. A dietary plan introduced to him was based on the 'quarter-quarter-half' plate method comprising half of the plate filled with vegetables,

one-quarter with lean protein, and one-quarter with carbohydrates. He was advised to reduce his caloric intake by at least 500 kcal/day, primarily by eliminating high calorie snacks, from an estimated initial daily intake of approximately 2500-3500 kcal. Additionally, he was encouraged to limit the consumption of high-sodium foods, including processed foods, added sauces, and fermented foods, as well as sugary food and beverages. He was also referred to a dietitian for further support and individualized meal planning.

The patient was prescribed a personalized exercise regimen consisting of moderate-intensity aerobic activity, targeting 150-200 minutes per week. He began with 20-minute brisk walks twice a week, gradually progressing to 30 minutes per session, five days a week, within one month. The treatment goal was to achieve a 5-10% reduction in body weight over six months, with an emphasis on improving metabolic parameters.

Lifestyle modifications were introduced gradually, accompanied by substantial support through regular follow-up consultations aimed at providing motivation and addressing emerging challenges. Due to the constraints imposed by the COVID-19 pandemic, follow-ups were conducted every three months. These were supplemented with behavioral therapy, which included daily tracking of dietary intake and physical activity via mobile applications, weekly weight monitoring, goal setting, problem-solving strategies, and stimulus control techniques.

The patient demonstrated high motivation throughout the intervention, regularly monitoring his weight on a weekly basis. He adhered to a diet plan of 1800-2000 kcal per day, as prescribed by the dietitian, typically consuming 3-4 meals daily. Occasionally, he replaced his rice-based meal with salads. He also significantly reduced his intake of high-sodium foods, including soy sauce, processed food, and junk food. To manage hunger and food cravings, he employed coping strategies such as drinking water, engaging in focused tasks, and choosing healthy snacks. His physical activity included aerobic exercises such as cycling and jogging for at least 40-60 minutes, five days per week, and he increased his daily steps count

**Table I:** Progress of the parameters measured.

Parameter	Date	Oct 2020	Jan 2021	April 2021	June 2021	Oct 2021	Jan 2022	Sept 2022	Jan 2023	Oct 2023	Feb 2024
Weight (kg)		110.0	101.6	92.5	80.9	76.9	75.0	76.7	77.6	75.5	80.0
BP range (mmHg)		147/73	145-138/ 85-92	128/68	115-119 / 64-65	120-131/ 66-68	125-137/ 63-75		121-135 / 66-74		126-135/ 68-72
<b>Lipid profile</b>											
TC (mmol/L)		4.2				4.8		4.9		4.7	
HDL (mmol/L)		1.0				1.6		1.6		1.6	
LDL (mmol/L)		2.9				2.9		3.0		2.8	
TG (mmol/L)		0.7				0.6		0.6		0.7	
<b>Renal function</b>											
Creatinine (µmol/L)		79				68		72		79	
Serum uric acid (mmol/L)		0.49				0.39		0.47		0.43	
Antihypertensives		Aml0 5 mg, Irbesartan/ HCTZ 300/12.5mg		Irbesartan/ HCTZ 300/12.5mg	Irbesartan 150mg	off	off	off	off	off	off

Abbreviation: TC - total cholesterol, HDL - high-density lipoprotein, LDL - low-density lipoprotein, TG - total triglycerides

on non-exercise days. He used a smartwatch to monitor calorie expenditure. Support from family members further contributed to his adherence and success. After six months of consistent lifestyle changes, he achieved a weight loss of 17.5 kg.

At the seventh-month follow-up, he reported experiencing postural dizziness and noted low blood pressure reading (100/60mmHg). He also observed that his home blood pressure readings had ranged between 110-120/60-70 mmHg over the preceding month. These symptoms resolved after a reduction in his antihypertensive medication. Over subsequent visits, his medications were gradually tapered off as his blood pressure remained within the normal range. All antihypertensive medications were discontinued when he reached a weight of 80 kg at the 12-month of intervention. He continued with lifestyle therapy and further reduced his weight to 75 kg, achieving a total weight loss exceeding 30% of his original body weight. The patient expressed satisfaction with his progress.

Over the following three years, he remained under regular follow-up. His weight has been consistently maintained between 75 and 80 kg, with minor fluctuations of 3-5 kg. His blood pressure has remained within the normotensive range, and he has sustained his regular exercise routine and healthier dietary practices.

## DISCUSSION

This case illustrates the significant effectiveness of lifestyle modification in managing obesity and achieving hypertension remission. Numerous clinical trials have

demonstrated that lifestyle interventions can improve blood pressure control and, in some instances, lead to complete remission of hypertension.<sup>6-7</sup> For example, one study found that sustained dietary and lifestyle changes enabled 21.7% of obese hypertensive patients to discontinue antihypertensive medications entirely, highlighting the effectiveness of non-pharmacological approaches.<sup>8</sup> In this case, the patient achieved a remarkable 30% reduction in body weight, which was associated with a progressive decline in BP and the eventual cessation of all antihypertensive medications. This outcome underscores the potential of structured lifestyle changes in reversing hypertension, particularly when implemented through shared decision-making, continuous healthcare provider support, and patient empowerment via self-monitoring.

Weight reduction has a well-established impact on BP. On average, a 1 kg weight loss is associated with a 1–2 mmHg reduction in systolic and diastolic BP, respectively.<sup>9</sup> Several studies have linked weight loss to reduced activity in the sympathetic nervous system and the renin-angiotensin-aldosterone system, both of which play key roles in BP regulation.<sup>10</sup> Furthermore, fat mass reduction improves adipocyte function and mitigates sympathetic overactivity, contributing to BP normalization.<sup>11</sup> However, the degree of weight loss needed to achieve hypertension remission varies based on individual factors such as baseline weight, overall health status, and the severity of hypertension.<sup>12</sup> In this patient, the absence of complications and a baseline classification of stage 1 hypertension likely contributed to the successful remission.

The fundamental elements of comprehensive lifestyle modification for weight reduction includes diet therapy, physical activity and behavior therapy. A daily calorie deficit of 500–750 kcal is recommended, which typically results in a weekly weight loss of 0.5–0.75 kg.<sup>3</sup> For effective weight loss, moderate-intensity aerobic exercise for at least 150 minutes per week is advised, with longer durations necessary for weight maintenance. This can be complemented by resistance training 2-3 times per week, involving 8-10 exercises targeting major muscle groups. Behavioural therapy components include daily tracking of food intake and physical activity (using apps or diaries), weekly weight monitoring, goal setting, problem-solving strategies, stimulus control, and ongoing professional support.<sup>3</sup> These elements should be tailored to each patient's preferences and daily routines to enhance adherence and sustainability.

Self-monitoring is a cornerstone of behavioral intervention, offering patients insight into their progress and reinforcing commitment to their goals.<sup>3</sup> With the advent of digital health tools, wearable devices have made it easier to monitor physical activity, caloric expenditure, and other health metrics. Research shows that frequent monitoring of food intake and use of wearable technology (such as armbands) is associated with greater weight loss.<sup>3</sup> In this case, the patient used a smartwatch to track calorie burn, which supported his efforts in maintaining a consistent energy deficit.

Despite the promise of lifestyle interventions, their long-term efficacy and sustainability remain limited in many cases. While lifestyle changes often result in weight loss and metabolic improvements, maintaining these changes can be difficult for most individuals.<sup>13</sup> Successful long-term weight maintenance requires integrating healthy behaviors into daily routines and social contexts. This patient demonstrated strong intrinsic motivation, reinforced by positive outcomes, family support, and personal discipline. These factors, combined with regular healthcare provider follow-up and guidance, were crucial in sustaining his progress.

Continued support from healthcare professionals is essential in helping patients maintain lifestyle changes.

Regular follow-up enables individuals to address challenges, make informed decisions, and adjust their behaviors to ensure lasting health benefits. In this case, the patient's three-year sustained remission of hypertension and stable weight reflects the success of a comprehensive, patient-centred lifestyle intervention supported by multidisciplinary care.

## CONCLUSION

This case highlights that intensive lifestyle modifications, supported by self-monitoring and continuous healthcare provider engagement can lead to significant weight loss and subsequent remission of hypertension. While long-term sustainability remains a challenge for many, this patient successfully maintained lifestyle changes and normotensive blood pressure for over three years. A patient-centred, integrated approach is essential in achieving and sustaining weight loss through therapeutic lifestyle interventions, offering a viable non-pharmacological strategy for managing obesity-related hypertension.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

## DECLARATION OF PATIENT CONSENT

The authors certify that patient consent was obtained.

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