

Original Research Article

The Use of Intensive Therapeutic Lifestyle Management of Metabolic Syndrome: A Case Study

Tijani I. A. OSENI^{1,2}, Kenneth ATOE^{3,4}, Caleb U. ADEBAYO²

¹Department of Family Medicine, Edo State University, Uzairue, Nigeria.

²Department of Family Medicine, Edo State University Teaching Hospital, Auchi, Nigeria.

³Department of Chemical Pathology, Edo State University, Uzairue.

⁴Department of Chemical Pathology, Edo State University Teaching Hospital, Auchi, Nigeria.

*For correspondence: Email: Oseni.tijani@edouniversity.edu.ng; +23408036281897

Sent for review: 01 December 2024

Revised accepted: 01 January 2025

Abstract

Purpose: Metabolic syndrome (MetS) is a major cause of morbidity and mortality. We present a case of metabolic syndrome in a 55 year old driver that was managed with intensive therapeutic lifestyle modification.

Methods: A 55-year-old driver with obesity who was not a known hypertensive or diabetic presented to our facility with a two weeks history of weakness and dizziness. He was diagnosed with metabolic syndrome (hypertension, diabetes and dyslipidaemia). Patient had three months of intensive lifestyle modification intervention consisting of low calorie, high fibre diet from locally sourced natural food, salt reduction, brisk walking daily from an initial 20minutes per day to 40 minutes per day for a minimum of six days a week, stopping alcohol intake, together with strong family support, mostly from his wife. He was also placed on medications for his hypertension, diabetes and dyslipidaemia.

Results: Three months after commencement of therapy and intensive lifestyle modification, patient improved significantly loosing 10 kg body weight from class II obesity to class I, with associated reduction in waist circumference (from 1.09 to 1.02m), becoming normotensive (120/80mmHg) and fasting blood sugar significantly reduced (138 mg/dl) compared to baseline (440mg/dl). His lipid profile also improved will all the parameters within normal limits.

Conclusion: Intensive Therapeutic Lifestyle Intervention led to remission in hypertension and improvement in glycaemic control and lipid panel leading to reduction in the number and doses of medications taken. It is important therefore that clinicians incorporate lifestyle medication prescription in routine clinical practice particularly for patients with chronic medical conditions.

Key words: metabolic syndrome, therapeutic lifestyle intervention, hypertension, diabetes, remission

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited.

Tropical Journal of Drug Research is indexed by Chemical Abstracts, Embase, Index Copernicus, EBSCO, African Index Medicus, JournalSeek, Directory of Open Access Journals (DOAJ), African Journal Online, Bioline International, Open-J-Gate and Pharmacy Abstracts

© 2025 The authors. This work is licensed under the Creative Commons Attribution 4.0 International License Trop J Drug Res, January 2025; 2(1): 1 – 5

INTRODUCTION

Metabolic syndrome (MetS) is the presence of obesity and two of the three following criteria: hypertension, impaired glucose metabolism or elevated non-HDL cholesterol level (atherogenic dyslipidaemia).¹ It is a major cause of morbidity and mortality globally.²

Management of metabolic syndrome is mainly through the use of medications. However, lifestyle interventions have been shown to improve outcome in patients with metabolic syndrome.³ It has also been shown to be improve outcome in the management of chronic diseases with the World Health Organisation recommending its use in the management of chronic diseases both as a first line management and its continued use alongside medications when blood pressure is not controlled with lifestyle modification only.²

Lifestyle intervention consists of healthy diet high in fibre and low in calorie, reduced salt intake of less than 2300mg of sodium per day, physical activity consisting of moderate to intense physical activity (such as brisk walking, jogging, running, swimming, cycling, skipping and dancing) for a minimum of 150 minutes weekly. Other components of lifestyle intervention include restorative sleep of about 7 hours per night, avoidance of harmful substances like tobacco and alcohol, stress management and social connectedness. These lifestyle interventions have been shown to improve outcomes in chronic diseases like hypertension, type 2 diabetes and cancers.^{2,3,4} We present a case of metabolic syndrome in a middle commercial driver who was managed with intensive therapeutic lifestyle modification together with medications for three months with significant improvements in his parameters.

CASE PRESENTATION

Mr. MO, a 55-year-old commercial driver presented to our facility on the 29th of June 2024 with a two weeks history of weakness and dizziness. There was associated poor sleep with patient sleeping for 4 to 5 hours per night. There was history of polyuria, polydipsia and polyphagia. There was easy fatigability but no dyspnoea on exertion or at rest. He was not a known hypertensive or diabetic patient. He has however not checked his blood pressure or blood glucose level in the preceding 2 years prior to presentation. He has not been diagnosed of dyslipidaemia, heart disease, kidney or liver disease. There was no family history of hypertension. His mother was

however diabetic. He was not on medication for any chronic medical condition and did not have any drug allergy.

Patient was a long distant driver who sits behind the wheel most of the day. A 3-day dietary recall was used to obtain dietary history from the patient. His diet was mainly carbohydrates with meat and energy drinks which he bought mostly from vendors in motor parks or in transit. He also took much of fried food like fried meat, buns and potato chips. He occasionally took fruits like water melon about 2 servings (a serving of fruit is a moderate sized fruit) a day for an average of three days a week. He seldom took vegetables. He preferred melon soup and pounded yam with plenty meat most times. He loved his food salty and added extra salt to meal when he felt the salt was not enough.

Patient took about 3 bottles of beer per day for about 3 days a week. He occasionally engaged in binge drinking not more than once in a month. This was usually on weekends when he hanged out with friends and co – drivers. He however did not smoke actively but was occasionally exposed to passive smoking while with his friends and colleagues.

Patient was sedentary and did not meet the WHO physical activity level of 150 minutes per week.

Patient did not have any major stressor. His job was well remunerated and his children were doing well in school. His family were very supportive. His only challenge was his illness.

He however was not sleeping well. He slept for an average of 5 hours at night which was not adequate. His poor sleep was as a result of increased screen usage as he usually watched TV or used his phone till late in the night. He was married in a monogamous setting with 4 children. He enjoyed strong moral support from his family. At presentation, his weight was 110Kg, height 1.70m, BMI 38.1Kg/m², Waist circumference 1.09m, Blood Pressure was 180/110mmHg, Fasting Blood Glucose was 440 (70 – 140)mg/dl and Fasting Lipid Profile was: TC 5.78 (3.1 – 5.2)mmol/L, TG 2.92 (C1.77) mmol/L, HDL 0.86 (0.8 – 1.8) mmol/L, LDL 2.0 (<3.80) mmol/L, VLDL 0.58 (<0.35) mmol/L.

MANAGEMENT

A diagnosis of metabolic syndrome was made on account of Stage 2 hypertension, Type 2 diabetes mellitus, dyslipidaemia-elevated total cholesterol, triglycerides and very low-density lipoprotein.

The patient, in collaboration with the medical team and with the support of his wife, drew up an action plan on the type of food and schedule for the family menu to make its adoption easy.

The wife agreed to make food for him to take to work. His meal now consisted of whole grains, legumes and vegetables. She also agreed to reduce the salt content of his food while he agreed to stop adding extra salt to food after serving. When he could not return same day, he ate naturally prepared whole grains and vegetables from local eatery rather than snacks and fizzy drinks. He also agreed to increase his fruits intake.

The patient with the physician drew up a physical activity action plan which included walking out every morning before commencing the day's activity. The wife agreed to join him in the morning walk out where feasible.

He agreed to start with 20 minutes of brisk walking and gradually increase it as his body tolerates and his work schedule permits.

He also decided to walk more and drive less when not at work, particularly if the distance was not too far.

Motivational interviewing was used to help the patient resolve ambivalence and change his poor sleep hygiene.

He was counselled to go to bed early and reduce his screen time and the time spent on phone. He also was to keep a regular sleep and wake time, restrict the bed to only sleep and sex, with lights in the bedroom dim. He was also taught to power down 30 minutes before bedtime.

He was encouraged to maintain his good social connectedness.

RESULT AND DISCUSSION

The patient changed his meal to predominantly plant-based meal with plenty of vegetables and fruits. He took up to five servings of fruits and vegetables daily. Fruits commonly consumed included carrots, cucumbers, watermelons and apples. Vegetables were locally sourced mostly from the wife's garden and from local market and included green, leafy vegetables like pumpkin, bitter leaf and Okro.

He stopped adding salt to food and took food prepared with little salt.

He stopped alcohol and other sugary beverages.

He took fruits and nuts as snacks.

He also reduced the portions of food consumed.

He stopped eating meat and replaced it with fish.

The patient started with 20 minutes of brisk walking in the morning before going to work and gradually increased to 40 minutes for a minimum of six days every week. When he couldn't walk out in the morning, he did in the evening after work. His wife and daughter joined him in the daily workout which made it easy for him to continue.

He was also motivated enough to increase his daily steps by walking to places not far from his house rather than driving. He was happy that he felt lighter.

Patient stopped watching TV or using phone after 10pm and woke up by 5pm for his morning prayers, meditation and physical exercise before commencing the day's activity. This gave him a minimum of 7 hours of sleep daily which was adequate.

Patient had three months of intensive lifestyle modification intervention consisting of low calorie, high fibre diet from locally sourced natural food including a minimum of five daily servings of fruits and vegetables, salt reduction, brisk walking daily from an initial 20minutes per day to 40 minutes per day for a minimum of six days a week, stopping alcohol intake, together with strong family support, mostly from his wife.

He was also placed on medications for his hypertension, diabetes and dyslipidaemia.

Three months after commencement of therapy and intensive lifestyle modification, patient improved significantly losing 10kg body weight from class II obesity to class I, with associated reduction in waist circumference (from 1.09 to 1.02m), becoming normotensive (120/80mmHg) and blood sugar significantly reduced (138mg/dl) compared to baseline (440mg/dl). His lipid profile also improved with all the parameters within normal limits. Table 1

Patient was happy with the achievement and was motivated to sustain the gains achieved.

His drugs were subsequently modified with the metformin dose reduced and the amlodipine stopped. Table 2.

The patient is still being followed up to ensure gains made are sustained and patient does not relapse. In the event of relapse, motivational interviewing would be used to help patient get back on track.

We also anticipate achieving total remission and further reducing and subsequently stopping the drugs for the patient while he continues with the lifestyle modification interventions.

Table 1: Anthropometric and Laboratory Parameters Before and After Intervention

	Weight (Kg)	Height (m)	BMI (Kg/m ²)	WC (m)	BP mmHg	FBS (mg/dl)	Lipid Profile (mmol/L)
Pre (29/06/24)	110	1.70	38.1	1.09	180/110	440 (70 – 140)	TC: 5.78 (3.1 – 5.2) TG: 2.92 (< 1.77) HDL: 0.86 (0.8 – 1.8) LDL: 2.00 (< 3.88) VLDL: 0.58 (< 0.35)
Post (06/10/24)	100	1.70	34.6	1.02	120/80	138 (70 – 140)	TC: 4.81 (3.1 – 5.2) TG: 1.26 (< 1.77) HDL: 1.79 (0.8 – 1.8) LDL: 1.76 (< 3.88) VLDL: 0.25 (< 0.35)

Table 2: Medication Use Before and After Intervention

Relevant Medications	Dosage Before Intervention	Dosage After Intervention
Metformin	1g tds	1g bd
Glibenclamide	10mg bd	5mg bd
Amlodipine	10mg daily	-
Lisinopril	10mg daily	10mg daily
Atorvastatin	10mg nocte	10mg nocte

Metabolic syndrome (MetS) is the presence of obesity and two of the three following criteria: hypertension, impaired glucose metabolism or elevated non-HDL cholesterol level (atherogenic dyslipidaemia).¹ The patient at presentation had all criteria: obesity (BMI of 38.1kg/m²),² hypertension, impaired FBG and dyslipidaemia. He was commenced on intensive lifestyle modification with healthy diet, exercise prescription as well as sleep hygiene which have all been shown to be very effective in the management of MetS and the patient responded very well.^{3,4,5,6}

Getting the appropriate food and physical activity prescription was difficult as patient was away from home most time. It was difficult to find the time and conducive environment for daily exercise as well as getting appropriate food prescribed from the food vendors outside.

The barrier was overcome by tailoring intervention to suit patient's daily activities. Thus, even though patient still ate out, he bought healthy meals from those vendors he identified that prepared food with low calorie and high fibre. The wife also gave him home prepared meal to take with him. He bought fruits which he ate mostly in between meals. He also engaged in brisk walking before or after work where feasible.

The case highlights the role of lifestyle modification and prescription in the management of chronic medical conditions and improvement in health and wellbeing. Studies have confirmed lifestyle modification as the most effective treatment for metabolic syndrome.^{7,8,9,10,11} This was evident in the management of the index patient where lifestyle modification led to reduction in the number and doses of medications used.

CONCLUSION

Intensive therapeutic lifestyle intervention was used to achieve remission in hypertension and improvement in glycaemic control and lipid profile leading to reduction in the number and doses of medications taken. Patient was satisfied with the gains achieved and was motivated to continue with the lifestyle interventions.

It is important therefore that clinicians incorporate lifestyle medication prescription in routine clinical practice particularly for patients with chronic medical conditions.

Conflict of interest

The authors declare no conflict of interest.

Authors Declaration

The authors hereby declare that the works presented in this article are original and that any liability for claims relating to the content of this article will be borne by them.

Open Access

This is an Open Access article that uses a funding model which does not charge readers or their

institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited.

REFERENCES

1. Dobrowolski P, Prejbisz A, Kuryłowicz A, Baska A, Burchardt P, Chlebus K, Dzida G, Jankowski P, Jaroszewicz J, Jaworski P, Kamiński K. Metabolic syndrome—A new definition and management guidelines. *Arterial Hypertension*. 2022;26(3):99-121.
2. WHO. Obesity. World Health Organisation. 2024. Accessed October 12, 2024. Available at <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
3. Castro-Barquero S, Ruiz-León AM, Sierra-Pérez M, Estruch R, Casas R. Dietary strategies for metabolic syndrome: a comprehensive review. *Nutrients*. 2020 29;12(10):2983.
4. Mozaffarian, D. Dietary and Policy Priorities for Cardiovascular Disease, Diabetes, and Obesity: A Comprehensive Review. *Circulation* 2016, 133, 187–225.
5. Lăcătușu CM, Grigorescu ED, Floria M, Onofriescu A, Mihai BM. The Mediterranean diet: from an environment-driven food culture to an emerging medical prescription. *Int J. of Env Res and Pub Hlt*. 2019;16(6):942.
6. Haufe S, Kerling A, Protte G, Bayerle P, Stenner HT, Rolff S, Sundermeier T, Kück M, Ensslen R, Nachbar L, Lauenstein D. Telemonitoring-supported exercise training, metabolic syndrome severity, and work ability in company employees: a randomised controlled trial. *The Lancet Pub Hlt*. 2019 1;4(7):e343–352.
7. Franz MJ, Boucher JL, Rutten-Ramos S, VanWormer JJ. Lifestyle weight-loss intervention outcomes in overweight and obese adults with type 2 diabetes: a systematic review and meta-analysis of randomized clinical trials. *J Acad Nutr Diet*. 2015;115:1447–1463.
8. Wang HH, Lee DK, Liu M, Portincasa P, Wang DQ. Novel insights into the pathogenesis and management of the metabolic syndrome. *Ped Gastro, Hep & Nut*. 2020;23(3):189.
9. Park S, Lee J, Seok JW, Park CG, Jun J. Comprehensive lifestyle modification interventions for metabolic syndrome: A systematic review and meta-analysis. *Journal of Nurs Schol*. 2024;56(2):249–259.
10. Marcos-Delgado A, Hernández-Segura N, Fernández-Villa T, Molina AJ, Martín V. The effect of lifestyle intervention on health-related quality of life in adults with metabolic syndrome: a meta-analysis. *Int J. of Env Res and Pub Hlt*. 2021;18(3):887.
11. Kim HL, Chung J, Kim KJ, Kim HJ, Seo WW, Jeon KH, Cho I, Park JJ, Lee MH, Suh J, Lim SY. Lifestyle modification in the management of metabolic syndrome: statement from Korean Society of CardioMetabolic Syndrome (KSCMS). *Kor circ journ*. 2022 1;52(2):93-109.