

## COVID LOCKDOWN INDUCED METABOLIC SYNDROME IN ADOLESCENTS- A DIAGNOSIS PROMPTED BY CUTANEOUS SIGNS

Dr. Sujata R. Mehta- Ambalal<sup>1</sup>

<sup>1</sup>Consultant Dermatologist, Skin clinic, Sumeru

**Corresponding Author:**

Dr. Sujata R. Mehta- Ambalal

MD

'Sumeru', Opp. Campus Corner Building, St. Xavier's College Corner, Navrangpura, Ahmedabad 380009

### Abstract

A prolonged period of lockdown due to the ongoing COVID 19 pandemic has forced millions of people into inactivity. A consequence of this is weight gain. Adolescents are particularly susceptible to weight gain as a result of physiological and behavioral reasons. A growth spurt along with intake of junk food and a sedentary lifestyle brought about by academic obligations or prolonged screen time can easily lead to insulin resistance and obesity. Added to this are unhealthy sleep habits and exam stress. This age group is likely to visit dermatologists for acne, acanthosis nigricans and other skin conditions, providing us with a unique opportunity to 'catch them early' on the road to dangerous consequences of the metabolic syndrome.

**Key words:** COVID lockdown, adolescent metabolic syndrome, cutaneous signs

### Introduction

The metabolic syndrome, a sequela of long-term insulin resistance, was earlier seen mostly in elderly people. Now it is increasingly seen in the younger age group. We present two cases of adolescents who underwent dramatic weight gain during the lockdown and were diagnosed with the metabolic syndrome based on skin complaints.

The diagnosis of metabolic syndrome<sup>[1,2]</sup> requires 3 of the following 5 criteria<sup>#</sup>

\*IDF= International Diabetes Federation, AHA= American Heart Association, NHLBI= National Heart, Lung and Blood Institute

# WHO guidelines of 1999 include a BMI of over 30 kg/m<sup>2</sup>

Case reports

#### Case 1

A 17-year-old female visited our clinic after 4 months of lockdown with acanthosis nigricans, striae, skin tags, acne, keratosis pilaris, seborrheic dermatitis and hair fall. (Figure 1 and 2) Having completed her class 12 board exams, she now enjoyed baking and eating cakes and cookies. She had regular late nights

**Table 1.** Criteria for diagnosis of metabolic syndrome

	IDF and AHA/NHLBI* Harmonized criteria + Consensus statement for Asian Indians 2009 (any 3 or more risk factors)
Blood glucose	>5.6 mmol/L (100 mg/dl) or diagnosed diabetes
HDL cholesterol	< 1.0 mmol/L (40 mg/dl) in men, < 1.3 mmol/L (50 mg/dl) in women or drug treatment for low HDL-C
Triglycerides	> 1.7 mmol/L (150 mg/dl) or drug treatment for elevated triglycerides
Blood pressure	Blood pressure > 130/85 mmHg or drug treatment for hypertension
Anthropometric measurement for abdominal obesity	Population, ethnicity or country specific criteria should be used. For Asians, waist circumference ≥ 90 cm (men) or ≥ 80 cm (women)

when she binged on wafers and chips. She had gained 16 kg weight during the lockdown and weighed 97 kg at presentation. Her waist circumference was 111 cm, BMI 38.9 and blood pressure was 132/86 mm Hg. On investigation, her total cholesterol was 154.6 mg/dl, HDL 35.08 mg/dl, LDL 121.9 mg/dl, triglycerides 122 mg/dl, fasting blood sugar was 98 mg/dl and fasting insulin was 14.07 μIU/ml. Vitamin D was <8.1 ng/ml. Both her parents were diabetic.



**Figure 1 :** Female showing acanthosis nigricans and skin tags

#### Case 2

A 16-year-old male patient presented to our clinic after 6 months of lockdown with acne, acanthosis nigricans and male pattern hair loss. (Figure 3) He weighed 97.4 kg at presentation, after a self-admitted 27 kg weight gain during the past 8 to 9 months. Among his dietary habits were a large quantity of sugary foods including chocolates, chocolate syrup in milk-shake and packed and processed snacks. Late nights were frequent. He was in class 10, had online classes and spent all day sitting in front of a screen. His waist circumference was 108 cm and BMI was 34.9. Blood pressure was 124/68 mm Hg. On investigation, his total



**Figure 2 :** Same female as in figure 1 showing abdominal obesity and striae

cholesterol was 169.9 mg/dl, triglycerides 186.9 mg/dl, HDL 26.3 mg/dl and LDL 110.6 mg/dl. Fasting blood sugar was 95.5 mg/dl and fasting insulin levels were 27.7  $\mu$ IU/ml. Vitamin D was 10.2 ng/ml. His 43-year-old father, who accompanied him, also had acanthosis nigricans, male pattern hair loss and skin tags. (Figure 4) The father's waist circumference was 115 cm with a BMI of 34.2. He was recently diagnosed with type 2 diabetes mellitus and dyslipidemia.



**Figure 3 & 4 :** Male with acne, acanthosis nigricans and male patterned hair loss and father with acanthosis nigricans and male patterned hair loss

Both patients were advised strict and sustainable lifestyle changes, dietary modifications, regular exercise and weight loss. They were advised weight loss at the rate of 500 g to 1 kg per week and physical activity to burn at least 700 calories per week with exercise. This translates into 150 mins of moderate physical activity similar in intensity to brisk walking.<sup>[3]</sup> Vitamin D supplements were prescribed, along with topicals for their skin problems.

#### Discussion

Metabolic syndrome increases the risk of atherosclerotic cardiovascular diseases, diabetes mellitus and stroke. It is also associated with a host of other diseases ranging from non-alcoholic fatty liver disease, polycystic ovarian syndrome and obstructive sleep apnea to cancer, neurological and kidney disorders. The basis of metabolic syndrome lies in calorie excess compared to energy expenditure.

In the above cases, an intake of sugary and junk food coupled with a sedentary lifestyle led to insulin resistance and intraabdominal or visceral obesity, as evidenced by their weight gain and increased waist circumference. Genetic and epigenetic factors also play a role.<sup>[4]</sup> Both adolescents have parents suffering from diabetes mellitus, obesity and dyslipidemia. Vitamin D deficiency is ubiquitous in the urban population and prolonged periods spent indoors due to lockdown is likely to have worsened their deficiency. Lack of vitamin D<sup>[5]</sup>, chronodisruption<sup>[6]</sup> i.e. disturbance of the circadian rhythm, and stress<sup>[7]</sup>, in our cases, that of board exams, are also associated with the metabolic syndrome.

The skin provides visual clues to metabolic disturbances, which may remain hidden for many years till systemic complications set in. These adolescents presented to a dermatology clinic with seemingly innocuous problems like acne. When acne is associated with signs of insulin resistance like acanthosis nigricans and patterned hair loss<sup>[8]</sup>, it warrants at least basic anthropometric measurements of waist circumference and BMI. Blood pressure measurement and basic investigations like fasting blood sugar and lipid profile should be done. In this age group, our patients were unlikely to have gotten tested for lipids or sugar and a diagnosis of metabolic syndrome may have been delayed by years. Awareness about this syndrome and rigorous counselling can help save these teens from life threatening complications in the future.

#### How to cite this article:

Mehta- Ambalal SR COVID lockdown induced metabolic syndrome in adolescents- a diagnosis prompted by cutaneous signs. *JDA Indian Journal of Clinical Dermatology*. 2020;3:76-77

#### References

1. Alberti KG, Eckel RH, Grundy SM, Zimmet PZ, Cleeman JI, Donato KA, et al. International Diabetes Federation Task Force on Epidemiology and Prevention, National Heart, Lung, and Blood Institute, American Heart Association, World Heart Federation, International Atherosclerosis Society, International Association for the Study of Obesity Harmonizing the metabolic syndrome: a joint interim statement of the International Diabetes Federation Task Force on Epidemiology and Prevention; National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity. *Circulation*. 2009;120(16):1640-1645.
2. Misra A, Chowbey P, Makkar BM, Vikram NK, Wasir JS, Chadha D, et al. Consensus Group. Consensus statement for diagnosis of obesity, abdominal obesity and the metabolic syndrome for Asian Indians and recommendations for physical activity, medical and surgical management. *J Assoc Physicians India*. 2009 Feb;57:163-70.
3. Diabetes Prevention Program (DPP) Research Group. The Diabetes Prevention Program (DPP): description of lifestyle intervention. *Diabetes Care*. 2002 Dec;25(12):2165-71.
4. Mendrick DL, Diehl AM, Topor LS, Dietert RR, Will Y, La Merrill MA, Bouret S, et al. Metabolic Syndrome and Associated Diseases: From the Bench to the Clinic. *Toxicol Sci*. 2018 Mar 1;162(1):36-42.
5. Park JE, Pichiah PBT, Cha YS. Vitamin D and Metabolic Diseases: Growing Roles of Vitamin D. *J Obes Metab Syndr*. 2018;27(4):223-232.
6. Erren TC, Reiter RJ. Defining chronodisruption. *J Pineal Res*. 2009;46(3):245-247.
7. Pykkönen AJ, Räikkönen K, Tuomi T, Eriksson JG, Groop L, Isomaa B. Stressful life events and the metabolic syndrome: the prevalence, prediction and prevention of diabetes (PPP)-Botnia Study. *Diabetes Care*. 2010;33(2):378-384.
8. Mehta-Ambalal S. Clinical, Biochemical, and Hormonal Associations in Female Patients with Acne: A Study and Literature Review. *J Clin Aesthet Dermatol*. 2017;10(10):18-24.