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Correspondence



Long COVID-19 and used cooking oil consumption in India: The potential for concurrent and cascading scourges – Correspondence

Dear Editor,

Long COVID-19 (also termed post-acute sequelae of COVID-19 or long COVID) is a multi-organ disease with high global prevalence and causes serious repercussions, including suicide [1,2]. The clinical spectrum of long COVID is associated with more than 200 symptoms and multiple organ dysfunctions, ranging from lung which cardiovascular disorders to nervous and gastrointestinal disorders [3]. In the long-term, the effects of long COVID might be devastating, especially in the low- and middle-income regions due to their lower healthcare capacity. In India, about 27.9 million people were affected due to long COVID in 2021 which is approximately 2.3-fold more than in 2020 [4]. A study on the Indian population found that 60.8% of inpatients who have received treatment for COVID-19 presented with long COVID symptoms six weeks after their hospital discharge [5].

Considering the scale of the burden, it is quintessential to investigate the critical risk factors for long COVID. According to a recent report, India has been grappling with an alarming increase in death due to Non-Communicable Diseases (NCDs) from 37.9% in 1990 to 61.8% in 2016—possibly even more now [6]. It is accentuated that an unhealthy diet is one of the four major risk factors (others include physical inactivity and use of tobacco and alcohol) for NCDs. In this context, a first-of-its-kind study in India showed that about 60% of the Used Cooking Oil (UCO) is being diverted back into the food stream, which makes the diet unhealthy and poses serious public health repercussions [7]. Repeatedly heated UCO (RH-UCO) generates umpteen oxidative compounds like hydroperoxide, aldehydes, polycyclic aromatic hydrocarbons, acrylamide, etc. These thermally-activated complex and heterogeneous compounds are known as dietary advanced glycation end products (AGEs) or glycotoxins [8]. Regular consumption of diet containing such noxious products and their intermediates (in the form of RH-UCO) has been associated with an array of diseases, including cancers, cardiovascular diseases, gastrointestinal diseases, and multi-organ damage [8–10].

The binding of glycotoxins with the receptor for advanced glycation end-product (RAGE) causes aberrant activation of oxidative/nitrosative stress, inflammation, and adaptive immune response pathways. Besides, these glycotoxins crosstalk with proteins and lipids to form irreversible protein complexes and altered lipid profiles, thereby leading to metabolic dysfunctions [8,11]. Notably, the generation of AGEs and activation of their receptor (RAGE; receptor for advanced glycation end products) play a crucial role in COVID-19 severity and associated complications [12,13]. Hence, RAGE might be an appropriate biomarker for prognosis of not only COVID-19 but also long COVID [14]. Interestingly, novel, non-invasive techniques like skin fluorescence are being developed to assess accumulation of AGEs in various chronic diseases. Exploring the utility of skin fluorescence for detecting AGEs in the

context of long COVID might open newer avenues to diagnose and proactively manage long COVID repercussions.

Although RH-UCO consumption and long COVID are independently associated with multi-system complications, the likelihood of RH-UCO consumption as a critical risk factor for long COVID warrants further research. On the other side, considering the magnitude of RH-UCO consumption among Indians, the probability of these entities creating a synchronized and “silent” public health menace [7,15] should be not overlooked.

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ArunSundar MohanaSundaram - conceptualization, manuscript writing. Shanmugarajan Thukani Sathanantham - conceptualization, editing. Ravichandiran Velayutham - conceptualization, review.

Guarantor

The Guarantor is the one or more people who accept full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish. Please note that providing a guarantor is compulsory.

ArunSundar MohanaSundaram.

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