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“Flu” of Chemical Origin - An Under Recognized Public Health Concern

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ABSTRACT:

The term "flu" is the acronym of an Italian word influenza which is believed to have derived from an epidemic in Florence in 1357 entitled ‘influenza di freddo,’ meaning ‘influence of cold’. But the word could have simply been a figure of speech for what appeared to be a disease. Later in 1933, the National Institute for Medical Research in London isolated a virus from the nasal secretions of an infected patient which eventually known as the causative agent of influenza, an acute infection of the respiratory tract (1). The common symptoms of influenza virus infection are fever, cough, sore throat, sneezing, headache, malaise, myalgia, nausea, vomiting and diarrhea (2).

Editorial

The term "flu" is the acronym of an Italian word influenza which is believed to have derived from an epidemic in Florence in 1357 entitled ‘influenza di freddo,’ meaning ‘influence of cold’. But the word could have simply been a figure of speech for what appeared to be a disease. Later in 1933, the National Institute for Medical Research in London isolated a virus from the nasal secretions of an infected patient which eventually known as the causative agent of influenza, an acute infection of the respiratory tract (1). The common symptoms of influenza virus infection are fever, cough, sore throat, sneezing, headache, malaise, myalgia, nausea, vomiting and diarrhea (2).

It was found that heating of metal releases oxide fumes

such as zinc, copper and magnesium and inhalation of these chemicals causes a self-limiting illness known as metal fume fever, whose symptoms resolve within 24 to 48 hours after exposure ends (4).

Similarly, toxicity from overheating of polytetrafluoroethylene (PTFE) fluoropolymer also led to flu-like symptoms and was named "polymer fume fever", or more colloquially Teflon flu. Recently, there have been many incidences in the growing trajectory of polymer utilization in the household cookware. A sharp surge of more than 250 suspected cases were reported in the USA marking the highest incidence in 2023 (5). The information related to polymer fume fever across the globe is scarce since it is often misdiagnosed or overlooked as it mimics other respiratory illnesses.

The synthetic polymer Teflon composed of a linear chain of carbon atoms; each atom bonded to two fluorine atoms. This special molecular structure gives remarkable thermal stability to withstand temperatures from 200 to 300°C without much degradation (6). However, under high heat or stress the polymer thermally decomposes, releasing a mixture of volatile organic compounds and particulates including perfluoroisobutylene (PFIB), which can be acutely toxic to humans. Being particularly prominent in domestic cooking settings where over heating of nonstick cook ware is practiced, the degradation of fumes results in releasing fluorinated compounds, the identity of which may vary according to formulation.

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Repeated exposure to and negligence without proper protection can lead to chronic respiratory issues that will compound your long-term health risks. As an example, chronic PTFE exposure has been linked to granulomatous lesions of the lung and the cause of pulmonary edema (6, 7).

From a public health perspective, it is important to enforce stringent occupational health and safety regulations and the preventive measures in place to guard against preventable illness. Paradoxically the condition also underscores how economically costly it is to healthcare systems generally, but especially in regions where safety norms are not strictly enforced.

The raising cases of fume fever illustrates large gaps in worker safety protocols. Recent studies have reported that the inflammatory response to these fumes is of major importance, as the urgency in putting comprehensive prevention strategies in place is stressed as well as the need for improved occupational health regulations and education to protect workers vulnerable to exposure. Disentangling the meaning of this syndrome and documenting the relevant health outcomes not only furthers our collective efforts to improve health outcomes but also fulfills a broader public health responsibility to reduce workplace exposure to toxic substances. Current diagnostic criteria primarily rely on clinical evaluation and patient history, as laboratory findings may often appear normal despite the presence of significant symptoms, such as fever and myalgia. Typically, treatment consists of support of respiratory symptoms with analgesics and antipyretics and symptomatic relief. Prevention, on the other hand, is essential — and that means good ventilation in the workplace, the usage of personal protective equipment, and training of workers about the hazards that result from breathing in Teflon fumes.

The pursuit of Teflon Fume Fever has pointed to what should be attended to, i.e. recognizing and minimizing the health hazards of polymer fume exposure, especially within occupational environments. Results suggest that even brief exposure to heated Teflon can produce serious respiratory symptoms, therefore requiring strict safety procedures for workers involved in manufacturing and culinary applications. These results have profound implications for future research, which should elucidate further the long-term effects of repeated exposure and investigate possible interventive strategies.

Public health policies should develop educational programs for the wider public to increase awareness in relation to the health hazards inflicted by Teflon fumes and reinforce existing safety guidelines for related industries. In the end, these proactive approaches improve worker safety and provide a better understanding of chemical exposure so that future rules can be based on public health concerns in community and occupational settings.

In conclusion, prevention of polymer fume fever requires a multifaceted approach encompassing regulations, safety standards, education, PPE provision, and health monitoring. By implementing a comprehensive policy framework, we can reduce the incidence of PFF, protect worker health, and ensure safer handling of fluoropolymers across industrial settings. In doing so, we can create a safer environment for those exposed to polymer fumes and safeguard the broader public from unnecessary health risks.

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