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Narrative Review: Clinical Poisonings Imposed by COVID-19 Pandemic

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ABSTRACT

Background: Along with the COVID-19 pandemic, a new problem has appeared in the healthcare facilities: toxicities and poisonings caused by medications and home remedies, by which people have been trying to protect themselves from infections. This paper aimed to notify the global scientific society of several substances and medications that either have led to poisoning or a potential outbreak.

Methods: The literatures of medical English case reports of poisonings during this pandemic between January and December 2020. Substances and drugs that could be a potential concern to public health were reviewed.

Results: Alcohols and chemical substances have been the main causes of poisonings during this pandemic. Opioids, household products and herbal remedies were partly to blame. Global spread of incorrect information related to the COVID-19 prevention and treatment is a major risk to human lives, particularly in this difficult situation where healthcare systems are overwhelms with high rate of COVID-19 morbidity and mortality.

Conclusion: As additional waves of the coronaviruses may hit countries in the coming winter, confinements may continue Therefore, emergency physicians must be prepared for possible outbreaks of poisonings and be able to predict any unusual pattern of toxicities.

1. Objectives

It is now almost a year that we are experiencing a historical worldwide pandemic of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), causing COVID-19 disease. Since its first official report from Wuhan, China, in December 2019, morbidity and mortality due to this disease are rising worldwide, and almost no country has been spared from its complications. To date, no definite cure or approved vaccine has been found or made to control this wild disease, although a handful of promising vaccines and treatments showed promising results to resume our routine social lives [1].

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Unless confirmed vaccines and drugs are widely available, we should follow a new lifestyle and practice three vital yet simple rules known as 3-Ws: wearing a mask, watching a 6-foot physical distance from other individuals, and washing hands frequently. Dealing with this pandemic, we must follow guidelines and recommendations of prominent international health organizations such as the World Health Organization (WHO), Center for Disease Control (CDC), etc., all of which emphasize the abovementioned rules along with contact tracing [1-3]. In the meantime, several treatments have been proposed to help alleviate COVID-19 symptoms ranging from simple herbal remedies to more sophisticated medications such as antimalarial drugs and antibiotics [4].

Apart from the challenges to control COVID-19, numerous healthcare services are dealing with a serious setback: toxicities and poisonings caused by medications and home remedies, by which people are trying to protect themselves against the virus. Since the beginning of the pandemic, toxicology centers got involved in this unexpected outbreak to deal with an unusual poisoning patterns. Fear of prevalence of an unknown contagious disease with no cure or vaccine on one side, and numerous hoax on social media bombarding people with false information on the other side, have led to extreme hygienic conduct among some people and put an extra burden on the healthcare system [5, 6]. The recent outbreak of methanol mass poisoning in Iran following fake news about the disinfectant effect of alcoholic beverages is a prime example of a superfluous workload that resulted in a near-collapsed healthcare system in the early days of the pandemic [7, 8].

There were several other substances and medications either can poison or have the potential for causing another outbreak. Some of the most significant events and concerns are mentioned herein.

2. Evidence Acquisition

Data were collected by searching in MEDLINE, Google Scholar, PubMed, and references from relevant English-language articles and media using the key terms “Poisoning,” “COVID-19,” “Pandemic,” “Outbreak,” “Alcohol,” “Opium,” “Herbal remedies,” “Supplements,” and “Household.” Abstracts and reports from reliable news agencies were included providing their direct relevance to published papers. Related publications were included from January 2020 to date.

3. Results and Discussion

Alcohols

Alcohols, regardless of their usage as beverages, industrial solvents, or disinfectants such as hand sanitizers, have considerable potential for developing clinical poisonings, especially in this period that their global demand is high.

One of the world’s biggest methanol mass poisonings occurred in Iran in early 2020. Following false information on social media that drinking or gargling alcohol can prevent pathogenicity of the virus, people rushed to use alcohol. Since the production, distribution, sale, and consumption of alcoholic beverages in Iran are prohibited by law, most alcoholic brews are produced illegally. Therefore, they contain substantial amounts of methanol because of either its lower price and higher availability or using substances such as bleach to discolor industrial alcohols by illegitimate sellers. Affecting key centers of toxicology in the country and occupying ICU beds and healthcare workforces, who were highly required to deal with COVID-19 patients, this outbreak left approximately 800 deaths, 5800 hospital admission, and 60 total blindness in an estimated 2-month period [7-9]. Similar disasters struck in Turkey, Mexico, and Egypt with 30, 200, and 1 death(s), respectively [5, 10, 11].

There are additional concerns about methanol toxicity when using hand sanitizers that either produced out of WHO-recommended formulations or contain methanol instead of methylated spirits [12]. Such products have led to poisoning after a rumor about the disinfectant effect of alcohol ingestion [5]. Another problem with hand sanitizers arises from accidental poisoning when ingested by children. A study from Australia reported acute ethanol poisoning in a 5-year-old child following ingestion of unknown amounts of ethanol-based hand sanitizer in school [13]. In children, ingestion of small amounts of alcohol can cause life-threatening poisoning and even death. Therefore, based on the Food and Drug Administration (FDA) recommendation, a proper label listing the ingredients, warnings, and precautions must be printed on the product. Adding a bitter taste to hand sanitizers also helps prevent their appeal to children [14].

On the other hand, periods of lockdown and quarantine in many countries have raised concern that isolation is associated with an increased rate of self-harm, alcohol consumption, and abuse. Stress and solitude are two primary triggers for alcohol abuse and its related health complications, such as alcohol dependence and intoxication [15]. Moreover, uncommon clinical presentations of COVID-19 can misguide physicians when diagnos-

ing alcohol consumption or withdrawal, which results in delayed medical care [16]. Thus, during this pandemic, alcohol sales and consumption have been subject to the complete or partial prohibition in several countries to decrease alcohol-related hospital admissions. This measure will help reduce the burden on the healthcare system and prevent viral transmission because intoxicated people might not observe personal hygiene and physical distancing effectively [10].

Opioids

There is growing concern regarding opioids abuse and overdose during this pandemic. A rumor on local Iranian media [17] and then a scientific publication claimed that opium addicted individuals are at lower risk for contracting COVID-19. Although the authors soon retracted the paper, the false news spread amongst the addicted population, and some toxicology centers faced a high load of overdoses in a short period (documented data not available). Opium abuse not only has protective effects against the coronavirus, but it also increases levels of interleukin-6 in the body, which possibly has a direct relationship with a severe form of COVID-19 [18]. Based on data from the United Nations Office on Drugs and Crime, there are approximately 16 million opioid users worldwide. Given that most of these people have poor nutritional and hygienic state, special considerations must be given to them as a vulnerable group to the SARS-CoV-2 [18].

Household products

Another challenge met during the lockdown period is the fact that families have to spend much more time in the house: adults working from home and children are home-schooling, and typically the family members have more time to check social media filled with misinformation about drugs and substances to treat the virus. Therefore, there is a strong possibility for accidental or intentional exposures to household products, including bleach, potentially poisonous plants, and household cleaners, sanitizers, medications, and so on [6, 19].

In a dangerous false claim on social media, fumes of baking soda or vinegar were recommended to help protect against COVID-19 [20]. Mixing baking soda (sodium bicarbonate) and bleach (sodium hypochlorite) is another hazardous action that puts people's lives at risk. Not only is this remedy unscientific and ineffective, but it can also have a destructive effect on airways by emitting chlorine gas and carbon dioxide that may lead to acute respiratory symptoms, hypoxia, and asphyxia [21].

Supplements

To prevent the SARS-CoV-2 virus, several minerals and vitamins such as vitamins A, C, D, E, and B complex and zinc and selenium have been suggested thus far [22]. Vitamin D is one of the main supplements proven to play a key role in the immune system and help regulate several physiological systems and pathways in the body [23]. Currently, the body of data confirms that deficiency of this steroid hormone directly correlates with viral infections and perhaps a severe form of COVID-19 [24, 25]. Although very effective and widely available, the fat-soluble vitamin D, like other fat-soluble vitamins, has a slight potency for toxicity when taken in amounts much higher than the recommended daily doses (400-2000 IU per day) [23]. Thus, when advising the general population to take daily doses of supplements, physicians should be aware of the possible risk of acute and chronic poisoning, especially in neonates and children.

Plants and herbal remedies

Some medicinal plants with antiviral effects have also been advocated to help prevent and treat novel coronavirus disease. Black cumin (Nigella sativa L.), saffron (Crocus sativus), Nerium oleander, and Laurus nobilis have had a promising inhibitory effect on SARS-CoV-2. Nevertheless, each herbal can cause life-threatening poisonings when ingested out of recommended doses [26, 27]. Apart from medicinal plants, other herbal substances with known toxic effects have caused mass poisonings until now. A small outbreak due to Datura was recently reported in India after people believed false information from a video on social media that Datura seeds can immunize against COVID-19 [5]. Twelve individuals, including 7 adults and five children, were poisoned after drinking liquor made with Datura in the hope of curing the COVID-19.

Other drugs

Apart from the abovementioned substances, additional drugs with promising antiviral effects have been studied as a potential cure for COVID-19, such as colchicine [28, 29], famotidine [30], statins [31], and ivermectin [32], to name but a few. Some of these drugs can cause acute poisonings when used higher than their indicted therapeutic doses and in susceptible age groups. Among these, colchicine is a double-edged sword since it is used as a poison and a drug for the prevention and treatment of gout for centuries [33]. Despite having anti-inflammatory and antiviral effects, colchicine interacts with a wide range of drugs. For instance, lopinavir/ritonavir,

which is now used as an antiviral in COVID-19 infection, can increase the likelihood of colchicine toxicity [33]. Hence, until sufficient data are available, routine use of these drugs in COVID-19 patients should be saved for situations that the their benefits outweigh their risks.

4. Conclusion

The global spread of incorrect information related to COVID-19 prevention and treatment is a major risk to human lives, particularly in this challenging situation where healthcare systems are overwhelming with the high rate of COVID-19 morbidity and mortality. As additional waves of the coronaviruses may hit countries in the coming winter, confinements may as well continue. Therefore, emergency physicians must be prepared for possible outbreaks of poisonings and predict any unusual patterns.

Currently, as we look forward to the confirmed vaccines to come to our rescue, preventive measures are the most effective weapons to fight this pandemic. To date, COVID-19 has no proven cure or vaccines, and investigations are continued until the best treatments are discovered. Physicians must make every effort to treat COVID-19 cases with detailed consideration to avoid extra harm to the patient.

Ethical Considerations

Compliance with ethical guidelines

All ethical principles are considered in this article.

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Author's contributions

Conceptualization, Data collection, and Investigation: Maryam Vahabzadeh; Writing – original draft, Writing – review & editing, and Supervision: All authors.

Conflict of interest

The authors declared no conflict of interest.

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