

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/349692943>

Levels of Heavy Metals among COVID.19 Patients

Article · March 2021

CITATIONS

0

READS

232

2 authors:



Mosab Nouraldein Mohammed Hamad
Elsheikh Abdallah Elbadri University

566 PUBLICATIONS 171 CITATIONS

SEE PROFILE



Sufian K. Noor
Nile Valley University

25 PUBLICATIONS 166 CITATIONS

SEE PROFILE

Levels of Heavy Metals among COVID.19 Patients

Mosab Nouraldein Mohammed Hamad^{1*} and Sufian Khalid M Noor²

¹Phylum of Medical Parasitology, Department of Medical Laboratory Sciences, Faculty of Health Science, Elsheikh Abdallah Elbadri University, Berber, Sudan

²Professor of Medicine, Faculty of Medicine, Nile Valley University, Atbara City, Sudan

***Corresponding Author:** Mosab Nouraldein Mohammed Hamad, Phylum of Medical Parasitology, Department of Medical Laboratory Sciences, Faculty of Health Science, Elsheikh Abdallah Elbadri University, Berber, Sudan.

Received: January 27, 2021

Coronavirus is one of the foremost microbes that predominantly target the human respiratory tract. Previous epidemics of coronaviruses (CoVs) include the severe acute respiratory syndrome (SARS)-CoV and the Middle East respiratory syndrome (MERS)-CoV which have been previously notable as mediators that are a huge public health hazard. In last month of 2019, a collection of sick persons was admitted to hospitals with an initial diagnosis of pneumonia of an unknown origin. This collection of patients was epidemiologically linked to a seafood and wet animal wholesale souk in Wuhan, Hubei Province, China. Initial reports expected the start of a probable Coronavirus epidemic assumed the estimate of a reproduction number for the 2019 Novel (New) Coronavirus (COVID-19, called by WHO on February 11, 2020) which was supposed to be considerably larger than 1 (ranges from 2.24 to 3.58) [1].

COVID-19 is around 80% like to SARS-CoV and attacks host human cells by linking to the angiotensin-converting enzyme 2 (ACE2) receptor. Notwithstanding of it is well documented that COVID-19 is mostly revealed as a respiratory system infection, intensifying data show that it should be regarded as a systemic illness. Mortality rates of COVID-19 are slighter than SARS and Middle East Respiratory Syndrome (MERS); but, COVID-19 is more deadly than seasonal flu. Elder persons and those with comorbidities are at augmented jeopardy of death from COVID-19, but younger persons without main underlying diseases may also existing with possibly lethal complications such as fulminant myocarditis and disseminated intravascular coagulopathy [2].

Established cases of COVID-19 in Sudan 9th June, 2020 were 6.427, 2.127 recovered, 389 deaths, 6.1% fatality rate and 33.1% recovery rate [3]. A distinct characteristic feature of COVID-19 is that the majority of persons infected fights it off efficiently with scarce or no symptoms existing. The characteristic immune response is more than acceptable to overcome the virus. There is however a minor fragment of the populace that is not able to do that and inappropriately succumb. There is somewhat dissimilar about this subsection of the persons. We distinguish situations that expand the hazard for succumbing to the virus are age, hypertension, obesity, and diabetes.

Interestingly all of these circumstances are also related with the bioaccumulation of heavy metals. Elders have meaningfully higher heavy metal levels in their blood than young persons since each year you typically hold more than you expel [4].

Heavy metals are distinct metals and metal compounds that can distress human health. Typically, humans are exposed to these metals by ingestion or inhalation. Operative in or living near an industrial site which uses these metals and their compounds augments ones risk of contact, as does living close to a location where these metals have been unsuitably disposed. Existence régimes can also impose higher jeopardies of exposure and health impacts because of hunting and gathering actions.

Vital heavy metals

Levels of Heavy Metals among COVID.19 Patients

Arsenic

Apart from happening naturally in the environment, arsenic can be free in greater amounts through volcanic action, destruction of rocks, forest fires, and man action. The wood preservative manufacturing uses about 90% of the industrial arsenic in the U.S. Arsenic is also present in paints, dyes, metals, drugs, soaps and semi-conductors. Animal nourishing operations and some fertilizers and pesticides can discharge high quantities of arsenic to the environment as can manufacturing practices such as copper or lead smelting, mining and coal burning.

Health effects

Arsenic is odorless and tasteless. Inanimate arsenic is a recognized carcinogen:

- Lesser level contact can cause nausea and vomiting, reduced manufacture of red and white blood cells, abnormal heart beat, harm to blood vessels, and a sensation of “pins and needles” in hands and feet.
- Ingestion of very high levels can possibly result in death.
- Long-term low level exposure can cause a darkening of the skin and the appearance of small “corns” or “warts” on the palms, soles, and torso.

Barium

It is a very plentiful, naturally happening metal and is applied for a diversity of manufacturing aims. Barium compounds, such as barium-nickel alloys are applied for spark-plug electrodes and in vacuum tubes as a drying and oxygen-removing agent; barium sulfide is applied in fluorescent lamps; barium sulfate is used in analytic medicine; barium nitrate and chlorate give fireworks a green color. Barium compounds are also applied in drilling muds, paint, bricks, ceramics, glass, and rubber.

Health effects

Barium is not recognized to cause cancer:

- Short term contact can cause vomiting, abdominal cramps, diarrhea, problems in breathing, augmented or reduced blood pressure, numbness around the face, and muscle weakness.
- Large quantities of barium intake can cause, high blood pressure, alterations in heart rhythm or paralysis and possibly death.

Cadmium

It is a very poisonous metal. All soils and rocks, counting coal and mineral fertilizers, comprise some cadmium. It has numerous uses, counting batteries, pigments, metal coatings and plastics. It is used extensively in electroplating.

Health effects

Cadmium and its compounds are identified human carcinogens. Smokers get exposed to meaningfully upper cadmium concentrations than non-smokers. Severe harm to the lungs may occur through breathing high concentrations of cadmium:

- Ingesting very high concentrations harshly irritates the stomach, resulting in vomiting and diarrhea.

Levels of Heavy Metals among COVID.19 Patients

- Long-term contact to lesser concentrations leads to a buildup in the kidneys and possible kidney disease, lung damage, and fragile bones.

Chromium

Chromium is present in rocks, animals, plants, and soil and can be a liquid, solid, or gas. Chromium compounds fix to soil and are not probable to migrate to ground water but, they are very tenacious in sediments in water.

Chromium is used in metal blends such as stainless steel; protecting coatings on metal (electroplating); magnetic tapes; and pigments for paints, cement, paper, rubber, composition floor covering and other materials. It's solvable forms are applied in wood preservatives.

Health effects

Chromium (VI) compounds are poisons and recognized man carcinogens, while Chromium (III) is a vital nutrient:

- Breathing high concentrations can cause irritation to the lining of the nose; nose ulcers; runny nose; and breathing problems, such as asthma, cough, shortness of breath, or wheezing.
- Skin exposure can cause skin ulcers. Allergic reactions involving of severe redness and swelling of the skin have been observed.
- Long term contact can cause harm to liver, kidney circulatory and nerve tissues, as well as skin irritation.

Lead

As a result of human activities, such as fossil fuel burning, mining, and manufacturing, lead and lead compounds can be found in all parts of our environment. This includes air, soil, and water. Lead is used in many different ways. It is used to produce batteries, ammunition, metal products like solder and pipes, and X-ray shielding devices. Lead is a highly toxic metal. Today, the most common sources of lead exposure in the United States are lead-based paint and perhaps water pipes in older homes, contaminated soil, household dust, drinking water, lead crystal, lead in some cosmetics and toys, and Lead-glazed pottery.

Health effects

It can influence every organ and system in the body. Long-term contact of adults can result in reduced performance in some tests that measure functions of CNS; weakness in fingers, wrists, or ankles; minor rises in blood pressure and anemia:

- Exposure to high lead concentrations can harshly damage the brain and kidneys and eventually cause death.
- In pregnancy, exposure to high concentrations may lead to miscarriage.
- High concentration contact in men can harm the organs accountable for sperm making.

Mercury

Mercury syndicates with other elements to form organic and inorganic mercury compounds. Metallic mercury is used to synthesize chlorine gas and caustic soda, and is also used in thermometers, dental fillings, switches, light bulbs, and batteries. Coal-burning power plants are the largest man-caused source of mercury releases to the air in the United States. Mercury in soil and water is changed by microorganisms to methyl mercury, a bioaccumulating toxin.

Levels of Heavy Metals among COVID.19 Patients

Health effects

- The CNS is very sensitive to all forms of mercury.
- Contacts to great concentrations can enduringly harm the brain, kidneys, and rising fetuses. Influences on brain working may consequence in irritability, shyness, tremors, alterations in vision or hearing, and memory problems.
- Short-term contact to great concentrations of metallic mercury fumes may cause lung injury, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

Selenium

Selenium is a trace mineral extensively dispersed in most rocks and soils. Treated selenium is applied in the electronics industry; as a nutritional complement; in the glass manufacturing; in plastics, paints, enamels, inks, and rubber; in the preparation of pharmaceuticals; as a nutritional feed preservative for poultry and livestock; in pesticides preparations; in rubber manufacture; as an element in antian-druff shampoos; and as a basic of fungicides. Radioactive selenium is used in analytic medicine.

Health effects

Selenium is poisonous in great quantities, but trace quantities of it are essential for cellular role in most, if not all, animals. For man, selenium is an important trace nutrient. E.g. selenium plays a role in the element functioning of the thyroid gland:

- Short-term oral contact to high concentrations can cause nausea, vomiting and diarrhea.
- Chronic oral exposure to high concentrations can produce selenosis. Major signs of selenosis are hair loss, nail brittleness and neurological abnormalities.
- Transitory contacts to high levels in air can lead to respiratory tract irritation, bronchitis, trouble breathing and stomach pains. Longer-term exposure can cause respiratory irritation, bronchial spasms and coughing.

Silver

Silver usually combines with other elements such as sulfide, chloride and nitrate.

Silver compounds are used in photographic film. Dilute solutions of silver nitrate and other silver compounds are used as disinfectants and as an antibacterial agent.

Health effects

- Contact to high levels for a long duration may lead to a state named argyria, a blue-gray staining of the skin and other body tissues. Argyria looks to be a cosmetic defect that may not be then damaging to health. Contact to high levels of silver in the air has caused breathing problems, lung and throat irritation, and stomach pains.
- Skin exposure to silver can cause mild allergic reactions such as rash, swelling, and inflammation in some persons [5].

Zinc

Zinc is recognized to show a dominant task in immune system, and zinc-deficient persons experience augmented vulnerability to a diversity of microbes. The immunologic methods whereby zinc controls amplified vulnerability to infection have been studied for numerous

Levels of Heavy Metals among COVID.19 Patients

decades. It is clear that zinc affects multiple aspects of the immune system, from the barrier of the skin to gene regulation within lymphocytes. Zinc is crucial for usual expansion and function of cells mediating nonspecific immunity such as neutrophils and natural killer cells. Zinc deficiency also disturbs development of acquired immunity by stopping both the outgrowth and certain roles of T lymphocytes such as activation, Th1 cytokine production, and B lymphocyte help. Similarly, B lymphocyte development and antibody production, chiefly immunoglobulin G, is compromised [6].

Heavy metals levels are greater in elder people in contrast to young people, because of its inadequate excretion of it amongst the elder's age cluster; also we notice that the mortality rate is high among elders infected with COVID-19, then we try to distinguish the possible role of heavy metal in COVID-19 mortality amongst positive patients.

Bibliography

1. Hussin A. "The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak". *Journal of Autoimmunity* 109 (2020): 102433.
2. Terpos E., *et al.* "Hematological findings and complications of COVID-19". *American Journal of Hematology* (2020): 1-14.
3. Corona Tracker.
4. Tim X Lee. "COVID-19 Heavy Metal Hypothesis". Qeios, CC-BY 4.0.
5. Sabine E Martin and Wendy Griswold. "Human Health Effects of Heavy Metals, Environmental Science and Technology Briefs for Citizens". *Center for Hazardous Substance Research* (2009).
6. Anuraj H Shankar and Ananda S Prasad. "Zinc and immune function: the biological basis of altered resistance to infection". *The American Journal of Clinical Nutrition* 68 (1998): 447S-63S.

Volume 6 Issue 3 March 2021

©All rights reserved by Mosab Nouraldein Mohammed Hamad and Sufian Khalid M Noor.

Citation: Mosab Nouraldein Mohammed Hamad and Sufian Khalid M Noor. "Levels of Heavy Metals among COVID.19 Patients". *EC Endocrinology and Metabolic Research* 6.3 (2021).