

# Selenium, Zinc and Copper: Can Their Deficiency Facilitate Complications COVID-19 and Omicron Pandemic

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**Abstract:** Two years after the beginning of the COVID-19 pandemic, we set out to evaluate with this study the possible correlations between the complications from COVID-19 disease and omicron disease with selenium, zinc and copper deficiency or with the presence of some heavy metals or dioxins. The main objective of this study is that deficient in selenium, zinc and copper cannot avoid the risk of contagion, but can reduce the occurrence of complications. Therefore it seems appropriate to advise to control and rebalance the values of selenium, zinc and copper to deal in the best possible way with various bacterial and viral diseases and in particular a new possible viral pandemic. The above findings make us ponder over the impossibility of escaping the risk of contagion but, nevertheless, we can reduce its complications. So the question to ask is not if “we can escape the disease but how we can prevent its complications.” The challenge for us is to succeed in predicting the onset of different complications. Checking the right range of selenium, zinc and copper is important not to avoid contagion but to reduce symptoms and complication, not only in pandemics, but also in the treatment of many infectious diseases and cancers, in the last it is useful to check the excessive presence of different toxic metals that may affect the result of the therapy practiced and put patients’ health at risk. It means that it is better not to wait clinical signs to undergo diagnostic and instrumental tests that will, probably, show only a state of ongoing illness. Often such clinical investigations are performed in an incomplete, superficial and improper way. We even know that it is not easy to identify toxic substances because of difficulties related to their determination, and, first of all, for the small number of medical doctors competent to advise and to interpret medical tests according to reference values. Nowadays a very good early diagnosis is performed by using accurate and technologically advanced instrumental methods but, if instrumental diagnostic could be used alongside tests for heavy metals, dioxins, IPA, present into different biological matrix it would be possible to start a program of early clinical biochemistry diagnosis in order to prevent the complications related to these infectious diseases.

**Keywords:** COVID-19 and Omicron, Complications, Heavy Metals and Dioxins, Interferon

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## 1. Introduction

The environmental pollution is nowadays one of the greater problems on global scale and it has a significant impact on human health. Despite that, not much has been done to highlight the possible relationship between the different forms of pollution and the diseases which can be correlated to them, as well as their ability to affect the spread of infectious disease such as, recently, the coronavirus outbreak (Fondazione Gimbe) spread all over the world with high morbidity and mortality and with a dramatic socio-economic impact.

In the last two years, because of the Sars CoV2 pandemic and successive Omicron, in many countries, the most varied *off-label* therapies have been administered [1-3, 5, 7].

Among these therapies none has proved to be totally effective in reducing viral aggressiveness and in limiting the disease spread and its complications. Actually the higher expectations are placed in the use of oral antivirals (for example Molnupiravir), notwithstanding that, at the moment, the better assurances reside in using (are offered by) vaccines (pharmacological herd immunity), although many doubts have to be removed about their duration, their effectiveness on different virus versions and about their possible immediate and in the long term toxicity. The most used vaccines into the European countries are the Vaccine BioNTech-Pfizer, the Vaccine Moderna, the Vaccine Johnson&Johnson, the Vaccine Novavax, the Vaccine Oxford Astrazeneca, the Vaccine Sputnik. The most used vaccines used in Italy are the Vaccine BioNTech-Pfizer and the Vaccine Moderna [4, 6-8].

## 2. Materials and Methods

In the light of scientific evidences that correlate the presence of heavy metals with tumor and inflammatory diseases (rheumatoid arthritis, fibromyalgia, etc...), we had already recruited, in earlier times, one group of patients on which, subsequently, at the onset of the disease COVID-19 and its variants, we decided to verify the possible correlation between SARS-CoV-2 and an abnormal presence, excess or deficiency of some heavy metals and dioxins.

Hence we have re-evaluated the dosing of some heavy metals and dioxins detected during periods preceding the pandemic in patients come to our observation because of other issues. We considered the following metals: aluminium, antimony, arsenic, barium, cadmium, chromium, iron, gallium, lithium, manganese, mercury, nickel, lead, brass, selenium, strontium, zinc and some dioxins: polychlorinated biphenyls (PCB), polychlorinated dibenzo-p-dioxins (PCDD), polybromodiphenyl ethers (PBDE), polichlorinated dibenzofuran (PCDF). [24, 25, 30, 31, 36, 38].

The analysis of blood samples have been carried out, in previous times and for different reasons, at the laboratory NutraPharmaLabs of the Department of Pharmacy of the University of Naples, and with the scientific advice of the Department of Chemical Sciences of the University of Naples.

All the individuated patients have been contacted to know if

they had contracted the disease COVID-19 or its variants and, if the answer was affirmative, to know the ways of its manifestation, with symptoms or not, and, in the symptomatic cases, which were the symptoms, their extent, the complications and the recovery time.

In addition, the patients were asked which of them was vaccinated, what was the vaccine used and how many were the doses of the vaccine they had undergone.

Furthermore, the vaccinated patients were asked if they had developed clinical manifestations of toxicity from vaccine, their extent, the duration times and their resolution time.

As a result of the above informations, our main goal was to show the possible correlation between the COVID-19, as well as its Omicron variant, complications and the abnormal presence of some heavy metals and dioxines.

## 3. Results

The study takes into account the analysis of some metals and dioxines in 42 patients in a period preceding the pandemic COVID-19 for various reasons. Among the patients recalled in a first phase (July-August 2020), the 40,47% declared they had contracted the COVID-19 infection in an asymptomatic as well as symptomatic form. In a second phase (November 2021-February 2022) corresponding to the emergence of the Omicron variant, we recalled the same patients and we detected a global increase up to the 60,90% of infections, with a clear increase of the 20,43% of patients affected by the Omicron variant.

First phase:

Positives for COVID-19: 40,47% (17 patients).

The 76,74% of these patients showed a deficiency of Selenium, Zinc and Copper.

Among them, the 35,29%, who had reported more pronounced symptoms, showed a higher concomitant deficiency of two or three of the above cited heavy metals (Selenium, Zinc and Copper).

On the contrary, the 23,25% of patients did not show any deficiency of Selenium, Zinc and Copper and they did not report any symptoms; they had, therefore, contracted the COVID-19 or its variant in an asymptomatic form.

Negatives for COVID-19: 59,53% (25 patients).

Additional parameters were considered as to the patients positive for COVID-19:

Number of people considered by the research: 42, of which 17 patients positive for COVID-19 (40,47%).

Women: 9 out of 17 pazienti (53%); Men: 8 out of 17 patients (47%).

Age: between 25 and 68.

Smokers: 6 out of 17 patients.

Type of water: all patients drank mineral water from plastic bottles and used drinking water from the tap to cook.

Residence: all the patients lived in urban centers.

Diabetic: 2 out of 17 patients (11,76%) reported more accentuated clinical symptoms.

Second phase:

In this phase, although all patients were vaccinated, we detected a further increase of 8 patients who resulted to be affected by a COVID-19 Omicron variant, in a differently asymptomatic form. We don't have news about people who contracted the variant in an asymptomatic form.

We have updated all the statistical values as it follows:

Positive for COVID-19 and its variants: they resulted to be 59,5% (of which those successively affected by Omicron have been 8 with a total of 25 patients).

In 68% of these patients we detected a deficiency of selenium, of zinc or of copper.

Out of this 68%, the 36% of patients which had referred more pronounced symptoms, showed a higher simultaneous deficiency of two or three of heavy metals (selenium, zinc and copper).

On the other side, 32% out of 59,5% did not show any deficiency of the above cited heavy metals and did not refer any clinically relevant symptoms.

Negatives for COVID-19: 40.5% corresponding to 17 patients who showed normal values of selenium, zinc and copper, were still negative for COVID-19.

In short, this clinical reassessment has proved to be extremely interesting even if it was performed on a limited number of patients re-evaluated, since it was found that immunocompromised patients, for lack of selenium, zinc and copper, contracted very easily the COVID-19 disease, with symptoms like fever, inflammation of respiratory tract with respiratory insufficiency, severe headache, cough, general discomfort and fatigue, loss of smell and taste (anosmia and ageusia), diarrhea and sometimes, intermittent brain fog. Whereas, with regard to Omicron variant, the predominant symptoms have been: more or less severe febrile illness, inflammation of the upper respiratory tract (nose and throat), cough, headache, anxiety, diarrhea and sometimes, sleep paralysis.

On the contrary, it was found that patients, who showed almost all values within range and weren't affected by other pathologies, had not contracted COVID-19 or they had contracted it in an asymptomatic way.

## 4. Discussion

The main objective of our study is that of stressing how selenium, zinc and copper cannot avoid contagion but they could reduce the occurrence of complications of COVID-19 disease and its variants. Their deficiency could be seen as a possible "predisposition" to contagion (phase pre-COVID-19) as well as a possible increased risk that symptomatic patients could get the complications (phase COVID-19). It has been reported in literature that deficiency of selenium, zinc and copper can be related to possible immunodeficiency from lack or modified production of interferon that plays a key role in the adjustment, of the inflammatory process of various viral diseases, to specific-organ inflammation, to neurotoxicity and to respiratory insufficiency.

For these immunodefence activities body uses metals that are important for both enzymatic and genetic processes, such as: zinc, selenium, copper, manganese and iron. The zinc, for example, is involved in DNA, binding (zinc, finger protein) and in proteins uses for signaling and repairing DNA damaged [37].

Furthermore, it results in recent literature that [27, 28, 35], in cases that showed complications of the disease COVID-19, these last have been related to the non-activation of specific genes correlated to immune defenses, that do not appear activated. Their non-activation could be referred to low concentrations (or values) of selenium, zinc or copper.

The heavy metals dosing is not and cannot be the methodology of prevention of the disease contagion but a further technique useful to detect, among "subjects at risk", those who could not only sicken or get contaminated once more but, mainly, could have a series of complications more or less severe because of the presence of altered dosage of heavy metals and dioxines, in other words to understand the reason why some people resulted positive without any clinical manifestation [10, 12, 13, 16].

We must consider two other factors that affect many diseases: nutrition [17-19], with the possible introduction of different toxins and of few substances useful to our body such as vitamin D and vitamin C in addition to selenium, zinc and copper, as well as the environment we live in, because of soil, water and air contamination, furthermore for the presence of electromagnetic fields and industrial sites. [9, 14, 15, 27, 28].

We must remember that our genome cannot adapt to climate change quickly. Interferons are proteins that have the ability to block many viral and bacterial aggressions and also to inhibit the growth of malignant or toxic cells by activating or regulating the function of different cells and molecules of immune system. [21-23, 32, 35].

Moreover, according to several international studies, hyperglycaemia is considered a personal risk factor not as much during the period of infection as during the COVID-19 disease and its variants evolution, due to its complications. Recent studies, in fact, have shown that there is an increase of morbidity and mortality in hyperglycemic patients, without regard to presence of diabetes in them [11].

Finally, we observed that complications related to COVID-19 disease and its variants occur mostly in chronic degenerative diseases carriers, in patients with cancer or in unaware patients carrying toxic substances that accumulate over the years as well as in patients deficient in fundamental substances for their action in metabolic processes and in body's defense mechanism.

Therefore, once more, environmental pollution has proved to be a serious danger for human health, since there are so many diseases that can be related to it among which COVID-19 disease and its variants, that showed a greater spread and aggressiveness in polluted areas.

From the above it can be argued that COVID-19 disease and its variants could be among acute inflammatory diseases with a possible chronic degenerative evolution (long-Co-Vid).

Unfortunately, in addition to heavy metals (selenium, zinc and copper) even other substances such as some dioxines could be related to deficiency of immune defence system, due to a reduced production of especially B and T lymphocytes or such as IPA that could cause lung damage, respiratory and neurological deficit [20, 24, 25, 26, 32, 34].

The present research aims to be a further invitation to start a

clinical-scientific program for a broader study on heavy metals, dioxins, IPA, polychlorinated biphenyls.

Moreover, an abnormal presence of these substances finds a correspondence into the possible organ-specific complications, giving us the opportunity to predict who will be the patients more susceptible to develop fast and aggressive courses of the disease with an individual-specificity and an organ-specificity and who will be the patients who will show an asymptomatic or paucisymptomatic type of the disease.

## 5. Conclusions

This preliminary scientific program starts from the conviction that, just like there is a connection between some chronic degenerative diseases, tumors, malformations and toxic substances (heavy metals, dioxins, IPA, etc) so there could be a correlation between these substances (heavy metals and dioxins) and the disease COVID-19 complications. The data we collected induce us to pursue the study in the most statistically significant way.

“The most we pollute, the most we fall ill.”

The above findings make us ponder over the impossibility of escaping the risk of contagion but, nevertheless, we can reduce its complications. So the question to ask is not if “we can escape the disease but how we can prevent its complications.” The challenge for us is to succeed in predicting the onset of different complications. It means that it is better not to wait clinical signs to undergo diagnostic and instrumental tests that will, probably, show only a state of ongoing illness.

Often such clinical investigations are performed in an incomplete, superficial and improper way. We even know that it is not easy to identify toxic substances because of difficulties related to their determination, because of the small number of test laboratories accredited to perform such exams, and, first of all, for the small number of medical doctors competent to advise and to interpret medical tests according to reference values.

Nowadays a very good early diagnosis is performed by using accurate and technologically advanced instrumental methods but, if instrumental diagnostic could be used alongside tests for heavy metals, dioxins, IPA, furans, present into different biological matrix (blood, urine, hair, human milk, sperm, etc.) it would be possible to start a program of early diagnosis in order to prevent the complications related to these infectious diseases. These analysis would enable not only the prevention of so many disease complications but also the implementation of a specific, highly effective treatment and a successive policy of recovery of polluted environment and land. [29, 32, 33, 35].

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