

Case reports in the use of vitamin C based regimen in prophylaxis and management of COVID-19 among Nigerians

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Abstract

This case study was based on the novel opinion that daily intake of vitamin C can serve as a prophylactic and curative intervention for the coronavirus disease of 2019 (COVID-19) via homeostatic and epigenetic mechanisms. To substantiate this hypothesis, some Nigerians who used vitamin C based regimen consented to share their experience in the prevention and management of the coronavirus irrespective of their country of abode. Participants all agreed to the use of their information for the public, albeit anonymous, via appending their signatures on an informed consent form. The documented cases took place from March 15 to September 1, 2020, this was to allow for more time to be able to observe the participants. The study provided evidence that regular use of Ascorbic acid tablets and vitamin C enriched plants could improve the immunity needed against the infection of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).

Keywords: COVID-19, Ascorbic acid, Vitamin C, Epigenetics, Homeostasis, Coronavirus

1. Introduction

Since 1747, citrus fruits which have a high content of vitamin C have been used to treat the disease called Scurvy by the British naval surgeon, James Lind [1]. Vitamin C was coined by Casmir Funk in 1912, isolated in 1928 by Albert Szent-Györgyi, and christened ascorbic acid by Walter Haworth in 1932 [2]. It is a six-carbon lactone electron donor (reducing agent or antioxidant), synthesized from glucose by many animals. The liver of some mammals and the kidney of aves and reptiles synthesizes it. However, it is not synthesized in primates, due to the absence of the terminal enzyme, L-gluconolactone oxidase in the biosynthetic pathway of ascorbic acid. This situation came to be because the gene encoding for this enzyme has undergone substantial mutation such that it can no longer produce the needed protein [3].

Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), the RNA virus that causes the novel disease called coronavirus disease of 2019 (COVID-19), was discovered in Wuhan, China, in the latter part of 2019. The virus SARS-CoV-2 is known to be airborne, hence can be transmitted to an unsuspecting person, especially within the range of 1 meter. Studies have shown it can stay in the air or on inanimate objects for hours or days, partly explaining its propensity for widespread and transmissibility. This viral agent has a predilection for the tissues of the lungs causing pulmonary edema, hyperplastic pneumocytes, and often, pneumonia; the combination of these manifests as the typical signs and symptoms such as pyrexia, cough, dyspnoea, myalgia, anosmia, and anorexia seen in COVID-19. Diagnosis is via these symptoms,

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travel history, and Real-Time Polymerase Chain Reaction [4].

Currently, obeying the safety measures as enunciated by the World Health Organisation (WHO) and administering a cocktail of drugs to patients has been the norm; irrespective of the cost and possible side effects associated with this cocktail. This is because there is no known standard cure for COVID-19 at the moment; despite the myriad of studies recommending vitamin C enriched plants such as Bitter kola, Ginger, Garlic, Citrus, Turmeric, and Giloy for the prophylaxis and management of COVID-19 [5-7].

These case reports are intended to serve reference purposes. It is a documentation of information shared by Nigerians who used vitamin C based regimen. It is based on the novel opinion that daily intake of vitamin C can serve as a prophylactic and curative intervention for COVID-19 via homeostatic and epigenetic mechanisms.

2. Case presentation

Case 1

A physiotherapist in her mid-thirties, who resides in Abakaliki, Ebonyi State, Nigeria; she started her dose of ascorbic acid tablets (100 mg/day) on March 18. She upgraded and maintained 1000 mg/day from April 1 till September 1. A friend of hers, whom she fortuitously spent about 1 hour with, after a religious service on Sunday, June 28, later tested positive and died of COVID-19 on Saturday, 4th of July. She was not conscious of wearing her mask and using hand sanitizers during this visit as she never anticipated that her friend could be infected. She was advised to continue with vitamin C rich foods and ascorbic acid tablets daily. She never contracted COVID-19 even as at the time of concluding this report.

Case 2

An aviation analyst in his fifties, who lives in Ikotun, Lagos, Nigeria; was told by a friend to take ascorbic acid tablets (1000 mg/day) for prevention. He started the routine of taking ascorbic acid on March 25. During the second week of April, he and his friend voluntarily went to test themselves for SARS-CoV-2 at the Nigeria Centre for Disease Control (NCDC) in Lagos. He was negative, while the friend was positive. Here is what he had to say on May 6: "...I inadvertently drove someone with COVID-19 around Lagos. We talked for long hours in my car, even with the air condition switched on. I've gone for repeat tests to check if I'm positive for

COVID-19, surprisingly, I'm not". He has not fallen ill to COVID-19 as at the time of concluding this report on September 1, despite not using the mask inside the car whilst the AC was on.

Case 3

A businesswoman in her fifties, living in Ejigbo, Lagos State, Nigeria; started her routine of ascorbic acid tablets (500 mg/day) as at March 18, though she skipped her dose sometimes. She was not also diligent in her use of the mask and hand sanitizer as she felt there was no need for it, since she was often indoors during this period. She tested positive to COVID-19 on April 24, according to the call she received from the NCDC located in Lagos. She noted that the test was conducted about 11 days before this call. Symptoms she manifested were cough and myalgia. She contacted her caregiver, who advised her to place her family members on the dose of 1000 mg/day, while she takes 2000 mg/day for seven days after which she can taper it. Her treatment with 2000 mg/day of ascorbic acid commenced on April 25; on May 2, she tapered her dose to 1000 mg/day. The significant side effect seen after tapering this dose was that her habit of defaecating increased from once a day to four times; an effect which stopped in 24 hours. She was encouraged to go for a follow-up test on May 12. The result of the follow-up test came out about a week after, and it still read positive, even though the typical signs and symptoms of COVID-19 were gone within three days of her taking ascorbic acid. The repeat test that read positive could imply that the antibodies developed against SARS-CoV-2 were still present, even after two weeks of commencement of treatment. She also drank warm water containing a blend of plants with a high content of vitamin C such as garlic, ginger, lime, lemon, and others. She maintained a prophylactic dose of ascorbic acid tablets (1000 mg/day) until September 1. It is pertinent to note that during the period she was sick, she was never isolated nor quarantined from her family, and none of them contracted the disease, as they have been on ascorbic acid before she fell sick. She and the entire members of her family are currently very healthy. Speaking with her on June 20, she said: "...Africans are surviving the onslaught of COVID-19, due to the organic content of our foods, which is highly fortified with vitamin C...".

Case 4

A Nigerian in his late thirties who currently works as a caregiver and lives in Wolfsburg,

Germany; he might have contracted the disease because he was not consistent with his ritual of ascorbic acid tablets after the advice was given to him as at March 15. He manifested symptoms such as pyrexia, cough, dyspnoea, myalgia, anosmia, and anorexia sometimes in April, despite his use of mask and hand sanitizer as a caregiver. He tested positive on April 14 and subsequently infected his octogenarian mum, pentagenerian sister, and nephew within this period. They used ascorbic acid tablets (1000 mg/day), steam inhalation, and plants with a high content of vitamin C such as garlic, ginger, and lime, and recuperated faster than when other drugs were used. He tested negative on May 4 alongside these relatives of his. They have prophylactically maintained the tradition of vitamin C fortified fruits and ascorbic acid tablets (480 mg/day) till the time of compiling this report as of September 1.

3. Discussion

For ages, vitamin C (Ascorbic acid) continues to be an antioxidant, boosting immunity; repairing worn-out tissues; enhancing wound healing; and replenishing extracellular matrix. It also quells inflammation, cardiovascular diseases, and cancer. All these attributes make it invaluable in the control of COVID-19 [8-11]. Natural sources of vitamin C in Nigeria include *Garcinia kola*, *Moringa*, *Guava*, *Pineapple*, *Paw-Paw*, *Citrus fruits*, *Garlic*, *Ginger* and some others.

In Case 1, the participant started her vitamin C tablets (100 mg/day) on March 18 and upgraded to 1000 mg/day from April 1, which she maintained until September 1. Case 2 shows a participant who took vitamin C tablets (1000 mg/day) for prevention from March 25, 2020. Both cases remains negative for SARS-CoV-2, indicates the potential protective effects of ascorbic acid. This situation agrees with previous reports who opined that vitamins could boost immunity against COVID-19 [1,5,12,13].

In the case 3, the participant used vitamin C tablets (500 mg/day) but skipped some days and later tested positive to COVID-19 on April 24 and remained at home to manage herself with 2000 mg of vitamin C tablets while the family members maintained 1000 mg/day. One can say that the use of vitamin C should be a continuous one. Notably, there were no debilitating symptoms of COVID-19 observed in the subject, thereby showing that earlier doses of vitamin C could have improved the immunity in agreement with those studies that showed vitamin C (tablet or infusion) serve as a

potent prophylactic and curative intervention in some viral infections [1,12-14].

In the case 4 we saw where a Nigerian living in Wolfsburg, Germany was not keen with the regular use of vitamin C tablets as at March 15 and tested positive on April 14 and subsequently infected his octogenarian mum, pentagenerian sister, and nephew. This case confirms that a combination of ascorbic acid tablets and a hot pulp of vitamin C enriched plants, either drank or inhaled, made a faster recovery than when other means were used. This agrees with previous reports [5,6,15], with regards to vitamin C enriched plants in the management of COVID-19.

The *sine qua non* of containing this pandemic as observed among Africans, especially Nigerians is via the prophylactic use of vitamin C fortified plants or ascorbic acid tablets and to an extent proper use of the masks and hand sanitizers. Observations made during this period show that doses lower than 500 mg/day can also be used by adults to maintain a steady-state needed to ward off the virus, however for optimal efficiency, the given range is preferred. Due to the need for standardization and scarcity of vitamin C fortified fruits; it was advised that pupils below 11 years, take ascorbic acid tablets (100 mg-200 mg) depending on their body weight and age. While 300 mg to 400 mg per day is sufficient for students under 18; 500 mg/day is for adults; essential workers survive on 1000 mg/day [13]. This modality is vital, especially during an unpremeditated violation of social distancing due to overpopulation in major cities, just like it is epochal in remote areas with a looming paucity of face masks and the dearth of hand sanitizers.

These case reports agree with stories found on the internet, which talked about the testimonies of recovery from COVID-19 given by Governor Seyi Makinde and Professor Otegbayo J.A.O; testimonies which confirm the efficacy of ascorbic acid and medicinal plants in Nigeria [16-18]. It could be part of the factors which led to the low number of cases (53,021) seen in Nigeria [19] as at August 26, while her German counterpart was having 239,000 cases [20]. However, the inability for Nigeria to test to full capacity might have also contributed to this situation, posing a significant limitation to this work.

4. Conclusion

Encouraging the use of ascorbic acid alongside the face mask and hand sanitizers by local health authorities could help to break the chain of transmission, de-escalates the number of hospital

visits, and circumvents the debilitation associated with COVID-19, averting many cases of in-patient care. This feat amortizes the humongous amounts budgeted on health by nations; brings to the barest minimum, the stress on every healthcare facilities around the world; revitalizes the ailing economies of countries; expedite the opening of schools, and saves the caregivers from prolonged exposure and death. This case report support the use of ascorbic acid or vitamin C loaded plants as an important supportive medicine for preventing the infection by SARS-CoV-2, or in the management of COVID-19.

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Ethical declarations

This study was performed in accordance with the declaration of Helsinki.

Consent for publication

Written informed consent was obtained from the patients for publication of this case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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Conflict of Interests

The authors declare no competing interests.

Authors Contribution

All Authors contributed equally and approved the final version of manuscript.

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