



COVID-19 in Libya: Immunity and Protective Measures?

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Authors' contributions

This work was carried out in collaboration among all authors. Author MHA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AA and SM managed the analyses of the study. Author MHA managed the literature searches. All authors read and approved the final manuscript.

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Short Communication

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ABSTRACT

Coronavirus Disease 2019 (COVID-19) is a pandemic illness and so far, there are almost 8860331 confirmed infected cases worldwide concentrating mainly in Americas and Europe, whereas data are less prominent in African countries. In Libya, the preliminary reports revealed there are small numbers of COVID-19 confirmed cases, which subsequently showed only a steady rise with no yet a clear explanation. In way we might find a reason behind Libya having a relatively small number of COVID-19 cases, the literature therefore was searched for all relevant journal articles and published reports that dealt with COVID-19 outbreaks. According to the latest released data, the incidence rate of COVID-19 in Libya remained relatively low as compared to the other countries, where only 571 out of almost nine millions total confirmed cases across the globe were documented in Libya. Further, there is a strong claim that Bacillus Calmette-Guérin (BCG) vaccine, a part of national immunization program of many countries including Libya, might offer at least a partial protection against COVID-19. Cross-protective immunity triggered by other related viral infections is an additional immunological theory might explain the current low trend of COVID-19 epidemic in Libya.

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1. INTRODUCTION

In December 2019, there was an allegedly infectious outbreak involved a number of workers based in a seafood wholesale market in Wuhan city, the capital of Hubei province China, who were presented with a clinical picture of pneumonia with unknown etiology [1]. Later, the genetic sequence of the causative agent has been identified as a new strain of Corona viruses called 2019-new Coronavirus (2019-nCoV) or Coronavirus Disease 2019 (COVID-19) [2].

Subsequently, on 11th March 2020 the outbreak was declared by World Health Organization (WHO) as a pandemic illness when the disease has rapidly spread across China to the other Asian countries and globally to involve a wide scale of countries and territories including USA and most of the European countries [3]. Of note, the initial data have shown that the virus is being less reported in Africa and the Mediterranean region, as compared to its high prevalence in Asia, Europe and USA [4]. In Libya, for instance, the preliminary reports revealed there are small numbers of COVID-19 confirmed cases, which subsequently showed only a steady rise [5,6]. Certainly, the total infected patients remained negligible as compared to what has been recorded in the other parts of the world, most notably in USA and across Europe [7]. Although there is no yet a clear explanation behind Libya having a limited number of COVID-19, several theories have been proposed including questionable immunological benefits of Bacillus Calmette-Guérin (BCG) vaccine [5].

In this report we will make an update about the epidemiology of COVID-19 across the globe, with paying more attention to the current situation in Libya. An additional aim is discussing further the allegedly protective role of BCG vaccine and its relation with the immune system in defending against spread of the virus.

2. METHODS

The literature was searched for all relevant journal articles and published reports that dealt with COVID-19 outbreak in Libya. WHO COVID-19 situation reports and the ones released by the Libyan National Centre for Disease Control were also included.

3. RESULTS AND DISCUSSION

The initial report of an allegedly spread of COVID-19 in Libya was delineated on 20th of March 2020 when eight symptomatic individuals arrived from different countries where COVID-19 is officially documented [6]. Few days later, on 24th of March 2020, the first confirmed case of COVID-19 was reported by the National Center for Disease Control in Libya [8]. Case zero was an elderly man who recently returned from Saudi Arabia, and he became symptomatic almost 2 weeks later. All family members were isolated until they tested negative against COVID-19 (8). Since then, the number of COVID-19 cases, as per WHO COVID-19 periodic situation reports, has grown but in a slow steady trend [7].

At time of writing this report, the WHO COVID-19 situation report released on 22th of June 2020 indicated that there are almost 8860331 confirmed COVID-19 infected cases across the globe [7]. Almost half of them (4370519) were recorded in Americas followed by Europe that scored almost a quarter of the total number (2543778). In contrast, the report showed there were only 224673 confirmed cases of COVID-19 in Africa. Out of that, 571 were recorded in Libya, and thereby scoring one of the lowest global incidence rates of COVID-19. These data clearly indicates that Libya, as the case in the most of African countries, has a relatively limited number of COVID-19 cases. To date no clear reason(s) might explain this trend, however, several reasons have been suggested, particularly immunological utility of BCG and cross-reactive immunity [5].

Are we partially protected against COVID-19? Certainly, there is a strong claim that BCG vaccine might offer at least a partial protection against COVID-19 [9]. The BCG is a live attenuated strain derived from an isolate of *Mycobacterium bovis*, and used widely across the world in many countries including Libya, as vaccine against Tuberculosis [10]. Of note, several reports showed that the BCG is an immune modulator enhancing the protection against various microorganisms including viral infections, specifically by increasing secretion of several pro-inflammatory cytokines with antiviral activity [11-13]. Interestingly, a recent epidemiological study investigated the correlation between universal BCG vaccination policy and reduced morbidity and mortality for COVID-19

outbreak, and showed promising results [14]. The study found that countries without universal policies of BCG vaccination (Italy, Nederland, USA) have been more severely affected compared to countries with universal and long-standing BCG policies, as the case in Libya. Certainly, the report revealed that countries with universal BCG program being given at birth have lower incidence rates of COVID-19. That might further support the proposed theory of BCG induced trained immunity and its relation with the observed low trend, at least based on the current data, of COVID-19 epidemic in Libya.

Given the noticeable reduced morbidity of COVID-19 in countries with BCG universal program [14], prevalence of COVID-19 cases in Libya might be higher than what have been reported so far as majority of infected subjects could just have had experienced mild symptoms that can be easily overlooked and interpreted as a simple flu. Conducting a retrospective study utilizing a robust kit for detecting antibodies against COVID-19 on a wide scale of Libyan community, might be of a great value in proving and/or refuting these preliminary claims and should be tried in the foreseeable future.

Cross-protective immunity triggered by other related viral infections offering partial protection against COVID-19 is an additional hypothetical claim. Indeed, an evidence for the partial cross-protection against respiratory infection episodes by prior infections due to other related viruses has been shown before [15]. At time of COVID-19 outbreak in China, Libya was exceptionally experienced an epidemic of unusual severe viral respiratory infections targeting all age groups that resulted in an increase in the mortality rates among the hospitalized patients over the period from December 2019 till February 2020 (unpublished data). This might refer to the point that we might even have been earlier hit by COVID-19 as early as China's outbreak took place. Although no evidence at the moment could support these claims, searching back Hospital records of the admitted patients will definitely reveal some valuable information. The work should include imaging investigations and reanalyzing patients' samples against COVID-19 and other related viruses.

4. CONCLUSION

Collectively, COVID-19 is a pandemic infectious illness; though it is more prevalent in Americas and across Europe. In Libya, as the case in the

majority of African countries, has so far one of the lowest global records of COVID-19. BCG induced anti-viral immunity, at least in part, might explain this trend. However, cross-protective immunity from other viral respiratory infections must be considered. Further research studies are required now to either support or reject these potential hypothetical claims.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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