

# Covid-19 Variants in Morocco

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## ABSTRACT

Coronavirus disease 2019 is a respiratory sickness that may spread between persons. It is caused by a novel coronavirus that produces an outbreak in Wuhan, China and spread all over the world to become a pandemic. From the appearance of the first case of the new coronavirus in Morocco, Moroccan authorities has spared no effort to promote the health of Moroccans, ahead of that of the country's economy. On 28th January, the campaign started, and the King of Morocco was the 1st Moroccan to be vaccinated against the coronavirus. Thereafter, on 27 April 2021, the people fully vaccinated in Morocco is 11,47 %. In December 2020, a new variant of SARS-CoV-2 emerged in the UK (United Kingdom) before entering Morocco. With a transmissibility of 30 to 70% higher than the strains of SARS-CoV-2 previously circulating in the world, UK variant is present in seven regions of Morocco. Other variants emerged in Brazil, South Africa, and recently in India. Thus far, only two cases of Indian variant have been detected in Morocco. This study demonstrates that Morocco is controlling the propagation of Covid-19 pandemic and specially Covid-19 variants by anticipating lockdown and partial containment.

## Introduction

Coronavirus disease 2019 (Covid-19) is a respiratory sickness that may spread between persons. It is caused by a novel coronavirus that produced an outbreak in Wuhan, China, and spreads all over the world to become a pandemic [1-3]. The symptoms associated with COVID-19 are fever, cough, and fatigue, congestion, rhinorrhea, olfactory dysfunction, sore throat and diarrhea [4,5]. COVID-19 is primarily transmitted through respiratory droplets, which are released when a person sneezes, coughs, or talks. Furthermore, when a person touches a contaminated surface or object, and then touches his mouth, nose, or eyes may get infected [6-8]. As of May 02, 2021, Covid-19 has affected more than 511,856 people in Morocco, of which 9,028 have died, while 498,415 have recovered [9].

Furthermore, from the appearance of the first case of the new coronavirus in Morocco, His Majesty King Mohamed VI launched a special COVID-19 fund (more than 3,8 billion US dollar (USD) in contributions), initiated the National monitoring and response plan against Coronavirus infection and the vaccination campaign against COVID-19 [10]. with its experience of containing pandemics

especially H1N1 pandemic in 2009, the Moroccan government launched the National monitoring and response plan Coronavirus infection whose objectives are

- 1) Prevent the introduction into the national territory of SARS-Cov 2.
- 2) Detect cases early and contain their spread.
- 3) (Organize a national response adapted from the health system; and
- 4) Strengthen infection prevention and control measures in hospitals [11].

The limitation of people circulating outside their home, social distancing, the cessation of almost all working activities and the request to the population to use protective masks and gloves all have the aim of minimizing the likelihood that people who are not infected come into contact with others who are already infected and probably still asymptomatic [12]. In Addition, Moroccan

government decided to suspend travel to the countries most affected by the pandemic, and soon after to close the borders. On 28 January, the campaign started, and the King of Morocco was the 1st Moroccan to be vaccinated against the coronavirus [11]. On 27 April 2021, the people fully vaccinated in Morocco is 11,47 % [13].

In December 2020, a new variant of SARS-CoV-2 emerged in the UK before entering Morocco. Known as lineage 20B / 501Y.V1, VOC 202012/01 or B.1.1.7), this variant, now detected in 130 countries, is starting to spread like wildfire in the kingdom. With a transmissibility of 30 to 70% higher than the strains of SARS-CoV-2 previously circulating in the world, the mutating virus is present in seven regions of Morocco. This is what the SARS-CoV2 (Covid-19) genomic watch device reveals. Indeed, the sequencing of the complete genome allowed the confirmation of the presence of signature mutations of the British variant 89 strains B.1.1.7 (British variant) have been assigned, and no other variant of concern (VOC) has been confirmed in Morocco" [14-16].

The South African variant emerged around the same time as the English one and has since been detected in at least 20 countries. Genomic data from South Africa suggested that the variant, known as 501Y.V2, quickly displaced other circulating lineages in the country as it appears to have a higher viral load and is therefore more transmissible.4 These variant shares similarities with the English and Brazilian variants in that it contains both the N501Y and E484K spike protein mutations [17].

Another variant, known as P.1 or VOC202101/02 in the UK, was first detected in travelers from Brazil who arrived in Japan in January 2021. It involves 17 unique amino acid changes, three deletions, four synonymous mutations, and one 4nt insertion. It has several mutations that are known to be biologically important, including E484K and N501Y. The N501Y mutation, which is also a feature of the English variant, has been linked to increased infectivity and virulence in mouse models. Meanwhile, the E484K mutation is thought to be associated with escape from the neutralizing antibodies produced by the body against SARS-CoV-2. This mutation is present in the South African variant as well as has not yet been detected in Morocco, and travel bans have been put in place to try to prevent it reaching the country [17]. The mutations found in the Indian variant are identified as E484Q and E484K. They are known in other mutations as well they are not entirely new. They have been detected in the South African variant, B.1.353, and in the Brazilian variant. In some cases, the Indian mutations were detected in the British variant, B.1.1.7. There are other mutations, such as one called L452R, which is detected in a Californian variant of the virus, B.1.429. The same was found in a variant in Germany.

In the Indian state of Maharashtra, over 60% of all coronavirus infections have been linked to the new B.1.617 variant, based on the infections that have been sequenced for their origin [18,19]. The new variant, which has a so-called double mutation, is thought

to be fueling India's deadlier new wave of cases that has made it the world's second worst-hit country, surpassing Brazil again, and has already begun to overwhelm its hospitals and crematoriums. India has reported more than 14.5 million Covid cases so far and more than 175,600 fatalities [20]. In fact, India is experiencing an unprecedented rise in the number of coronavirus infections. This Asian country has recorded more than 300,000 cases per day since April 22, which has resulted in saturation of the country's health system and a serious shortage of hospital beds, oxygen and drugs [21].

Morocco announced on Monday the detection of two confirmed cases of the Indian strain of the coronavirus in Casablanca (the country's largest city). These are the first two cases of the Indian variant detected in this Arab country [21]. Moroccan health authorities first spoke with the two people who were positive for the Indian variant in order to identify possible contact cases. The aim was to list all the people who had been in contact with the two cases over a period ranging from 2 days before the onset of the first symptoms until the 14<sup>th</sup> day of the disease. All the people identified through this process were contacted by the authorities to inform them, then to set up the planned monitoring system, which will extend until the end of the second week after having been in contact with the contaminated case.

Actually, Morocco had put in place an anticipatory strategy to manage the Indian variant crisis. Since April 24, 2021, and while no case had yet been detected in the kingdom, all flights from or to India have been suspended to prevent this new variant, deemed to be more contagious, from spreading in Morocco. To our knowledge, our study in COVID-19 variant is the first one in Morocco and Africa. It demonstrates that Morocco is controlling the propagation of Covid-19 pandemic and specially Covid-19 variants by anticipating lockdown and partial containment.

## Author Contributions

Conceptualization, R.A.; methodology, R.A.; validation, R.A., formal analysis, R.A.; investigation, R.A.; writing, R.A.; original draft preparation, R.A.; writing-review and editing, R.A.; visualization, R.A, A.B.; supervision, M.C.; All authors have read and agreed to the published version of the manuscript.

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## Conflicts of Interest

The authors have no conflict of interest to disclose.

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