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5 authors, including:

Mohamed A Daw
University of Tripoli

Abdallah HUssien El-Bouzedi
Faculty of Sciences, Tripoli University. Tripoli-Libya

Cheikh Yebouk
Université de Nouakchott

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Commentary

Spatial Distribution and Geographic Mapping of COVID-19 in Northern African Countries; A Preliminary Study

Mohamed Ali Daw[1]*, Abdallah Hussean El-Bouzedi[2], Mohamed Omar Ahmed[3] and Yebouk Cheikh[4]

[1]*Department of Medical Microbiology & Immunology, Faculty of Medicine, University of Tripoli, CC 82668, Tripoli, Libya*

[2]*Department of Laboratory Medicine, Faculty of Biotechnology, Tripoli University, CC 82668, Tripoli, Libya*

[3]*Department of Microbiology & Parasitology, Faculty of Veterinary Medicine, University of Tripoli, CC 82668 Libya*

[4]*Department of Biology, Faculty of Sciences, University Abdelmalek Essaâdi, BP 2121, Tetouan, 93000 Morocco*

Since its discovery in China COVID-19, has spread quickly over the world particularly among neighboring countries. Northern African region which includes Egypt, Libya, Tunisia, Algeria and Morocco; is one of the largest geographically and socially integrated region. No boarders can be found or easily controlled between these countries. The demographic nature of the region composed of same tribes particularly in Sub-Saharan area. Furthermore, the inhabitants within this region have been displaced and scattered over the boarders and they have to move between these countries for daily needs [1]. Hence then, tracing, and geographic mapping of COVID-19 within this region is an important step to implement proper national and regional strategies to control this killing pandemic. Spatiotemporal epidemiology has been recently found to be successful in controlling spread of infectious diseases such as HIV and HCV within the region [2,3]. Here in we highlight the geographic patterns and spatial distribution of COVID-19 in Northern African countries. Every reported COVID-19 case was followed and the geographic analysis was carried from February 14th, as first case reported till April 1st, 2020.

***Corresponding author:** Mohamed A Daw, Department of Medical Microbiology &Immunology, Faculty of Medicine, University of Tripoli, Libya, Tel: +218-91-2144972; E-mail: mohamedadaw@gmail.com

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Algeria

On 25thFebruary, Algeria confirmed its first case of COVID-19; an Italian man who arrived on 17thFebruary. Immediately after that, six cases were arrived from France and another one form Spain. (Since then) By April 1st, 986 cases were recorded and 86(59%) cases dead [4]. The heavy clusters were reported in the Northen region of Algeria. By end of March the pandemic spread to the central region of the country particularly Ghardaïa and Ouargla followed Illizi-In the south-eastern corner of Algeria bordering Libya as illustrated in Figure-Algeria A. The highest number of cases were reported in Blida 385 (39%) cases 22(2%) (death), Algiers 154 (16%) followed by Oran 62 (6.3%) and Tizi Ouzou 40 (4.1%) cases . These cities became the focal points that where the COVID-19 spread through all over the country Figure-Algeria B.

Egypt

In Egypt, the first case of COVID-19 t was confirmed on 14th February 2020 at Cairo International Airport involving a Chinese national. Within the same week, other cases where reported from arrivals coming from USA (2), Tunisia (2), France (2), Canada(1) and Taiwan (1). By April 1st, 985 cases were reported and 66 (7 %) dead [5]. The early cases were reported in Central Northern part of Egypt, then spread all over Egypt to cover most of the coastal area. Then It spreads to Western region in Albuhayrahand Matruh approaching Libyan boarders. Furthermore, to the South-Western region to reach Aswan as shown in Figure-Egypt A.The first cases were reported in Cairo Tanta and Qasr El Eyni at the second of March and then Aswan to Luxor, at March on March 6th. From where the new cases were scattered all over the country as shown in Figure-Egypt B.

Libya

By April 1st 2020; a total of 265 suspected cases were reported in Western region; only 10(4%) cases (laboratory confirmed), 134(51%) under quarantine and 121(46%) suspected cases. Most of the confirmed cases (80%) were reported in Misrata; the only city that has an acting airport [6]. In the Eastern region 171 suspected cases were reported; most of them were in Benghazi and Tubruk- (Albtanan;-the open borders with Egypt. More suspected cases were also reported in other regions that have no acting governmental authority. Including Southern region (102 suspected cases), Central (97 suspected case) and Western Mountain (47 suspected cases) regions. Figure-Libya A, illustrated the geo-distribution of Corona virus in Libya. The density is higher at coastal cities in both east and west regions though it's slightly lower within the central and west mountain area. In Southern region most of the cases were concentrated in Sebha surrounding area (Figure-Libya A). The cities that showed the presence of active infected cases particularly those within the entry boarders may act as focal points to spread the infection all over the country. This is clearly evident in Benghazi, Tripoli, Misrata and Nalout (Figure-Libya B).

Morocco

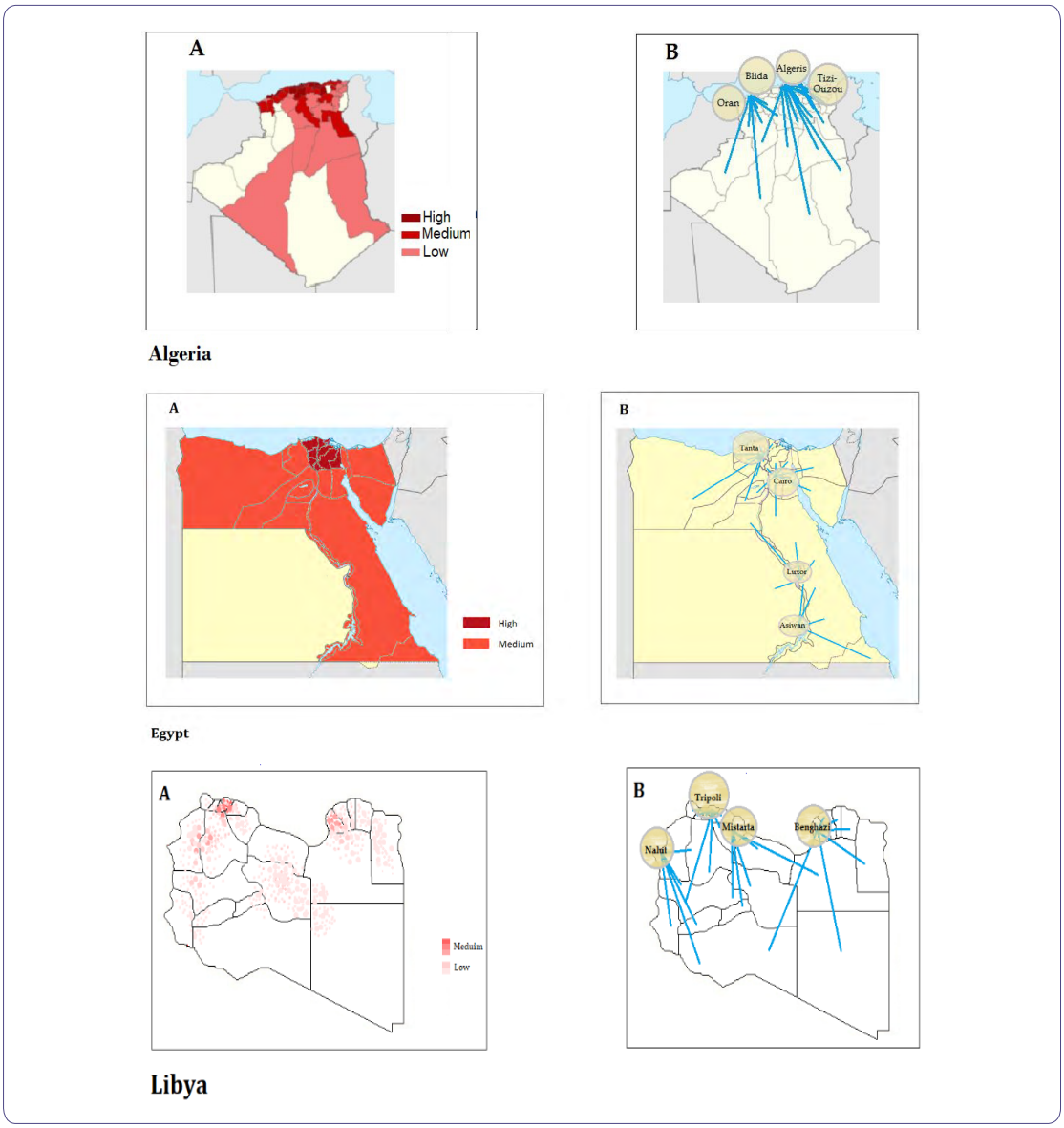
COVID-19 was confirmed to have spread to Morocco on 2nd of

March 2020, when the first case was confirmed in Casablanca. It involved a Moroccan Expatriate arriving from Italy, the second case was also confirmed in the same day, involving an 89-year-old woman Moroccan residing in Italy as well. .By April 1st a total of 708 cases was reported and 44 (6.2%) were dead [7]. The heaviest density were reported at upper western region of the country at the Atlantic coast. Then it spread over to the central north followed by the Eastern region bordering Algeria as illustrated in Figure-Morocco A. Casablanca (207 cases), Marrakesh (127), Rabat (115) and Fes (113) reported the highest number of COVID-19 cases which acted as a focal point to the spread the pandemic as shown in Figure-Morocco B.

Tunisia

Tunisia confirmed its first case on 2ndof March 2020, with the victim being a 40-year-old Tunisian man from Gafsa returning from Italy. By April 1stthe country reported 455cases with 14 (3.1%) deaths [8]. The highest number were first reported in the Northern region of the country followed by Eastern region bordering Libya then spread to the south and to less extent in the central region as illustrated at Figure- Tunisia A. The highest number of cases were reported in the capital Tunis (105), followed by Ariana (60), Medinine (51) and Ben Arous (45) as shown in Figure- Tunisia B.

This is study showed the epidemiological maps and spatial distribution of COVID-19, which varied greatly within each region and city of Northern African countries. Furthermore certain focal cities at the boarding areas have higher density of the infection such as Matrouh and Albtanan (Egyptian-Libyan Border), Libyan- Tunisian-Algerian borders and Algerian–Moroccan border. Hence then, spatial variations data could help the local authorities in mapping the needed demands, which will be key to effective strategic planning to control the spread of the pandemic within Northern African countries [9].



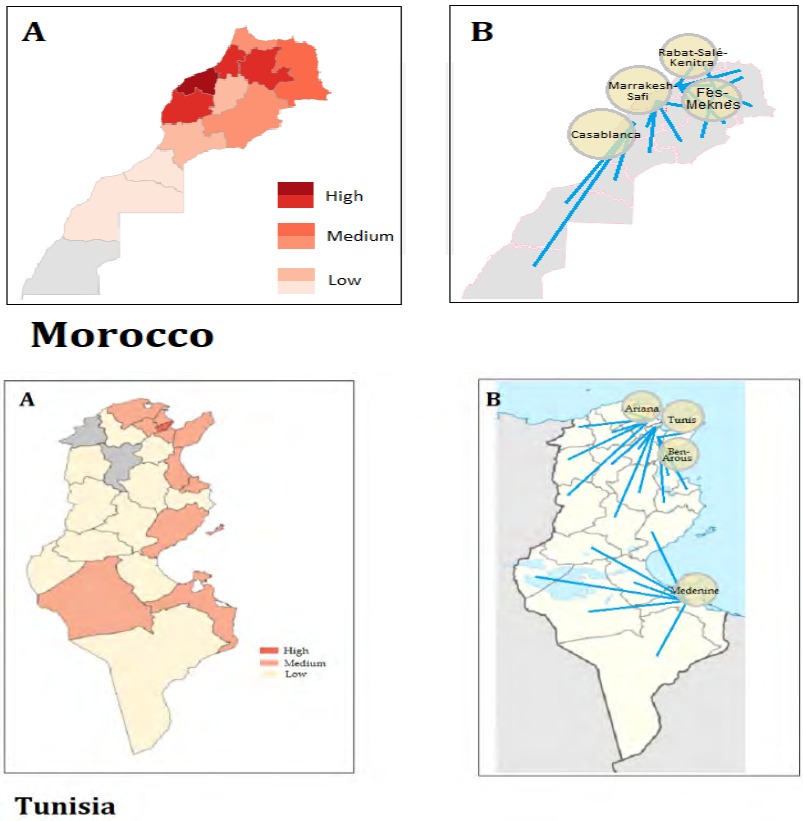


Figure: The geographic distribution of Corona viruses in Each country in Northern African Region A-National Geographic patterns and Spatial distribution of corona virus (Low-Moderate-High) B- The destination and spread of the corona virus within the cities over the country (Epi-City). Algeria; Egypt; Libya; Morocco; Tunisia.

Conclusion

Corona virus (COVID-19) has been found to spread all over the Northern African countries with a particular tense at the Coastal cities particularly the capitals. The geo-distribution varies from one country to another, the largest number were reported in Egypt, Algeria and Morocco followed by Tunisia and Libya. Hence then specific measure has to be implemented both at the regional and national level to combat the spread of COIVD-19 within this region.

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