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Epidemiological Analysis of the Covid-19 Epidemic in Greece

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Abstract. During the last months the Coronavirus disease 2019 (COVID-2019) has been recognized as a global threat. Transmission of the infection has rapidly increased in Europe as well as in Greece, living behind a huge number of deaths. During this situation an analysis of the spread of the disease must be undertaken and characteristics of the virus must be recognized. For the analysis of the impact of the disease in the population during this time period, epidemiological indexes have been introduced.

Keywords: infection COVID-19, epidemiological indexes, virus, infection disease

1. Introduction

The global impact of COVID-19 has been profound, and the public health threat it represents is considered as the most serious one caused by an RNA virus since the 1918 H1N1 influenza pandemic. The increase in mortality is due to diverse brands of the virus, on the genetic characteristics of the virus circulating and on the existing degree of immunity and the dynamic potential of the immune system appearing in different age groups of the population. If these changes are profound, and since there is no immunity in the population, this RNA virus can cause a pandemic [1,2].

2. Methods

In the case of a pandemic, the spreading of the disease is intense and fast encompassing a large number of the population. This means that a large number of people can get sick at the same time, many of them seriously, a situation that creates serious health problems with various implications economical and societal and a huge burden on the healthcare systems around the world [1, 3]. For this reason, an effort has been made to inspect the degree of the spread of the virus using epidemiological indexes [2, 3, 4]. The outbreak of the Coronavirus COVID-19 has taken the lives of several thousands of people worldwide and locked-down many countries and regions, with yet unpredictable global consequences [6-10].

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In the analysis, different time periods of the recorded collected data would be considered, in particular 4.4.2020, 10.4.2020 and 24.4.2020. During the 4.4.2020, in Greece, 69 new cases have been recorded, 9 new deaths and 91persons were intubated in the intensive care units around the country [11].

In total 68 deaths and 1613 cases. Prevalence (P) [5] is defined as the number of persons with a disease or unhealthy condition in a particular period in the general population. Sometimes is referred as point prevalence and expressed as a proportion or probability. Based on that definition during the previous period, the prevalence (P) for the infected patients is (68/1613)100%=4.21%. The corresponding percentage (probability) for the patients who have been reported dead is (9/68)100%=13.23%.

During the 10.4.2020, in Greece, 54 new cases have been recorded, 4 new deaths and 77 intubated in ICU [11]. In total 90 deaths and 2009 cases. Based on that definition during the previous period, the prevalence (P) for the infected patients is (54/2009)100%=2.88%. The corresponding percentage (probability) for the patients who have been reported dead is (4/90)100%=4.44%.

During the 24.4.2020, in Greece, 7 new cases have been recorded, 0 new deaths and 55 intubated in ICU [11]. In total 121 deaths and 2408 cases. Based on that definition during the previous period, the prevalence (P) for the infected patients is (7/2408)100%=0.29%. The corresponding percentage (probability) for the patients who have been reported dead is (0/121)100%=0%. A map of geographic spreading of the disease in Greece, for 4.4.2020, 10.4.2020 and 24.4.2020 (respectively) is given in Figure 1.

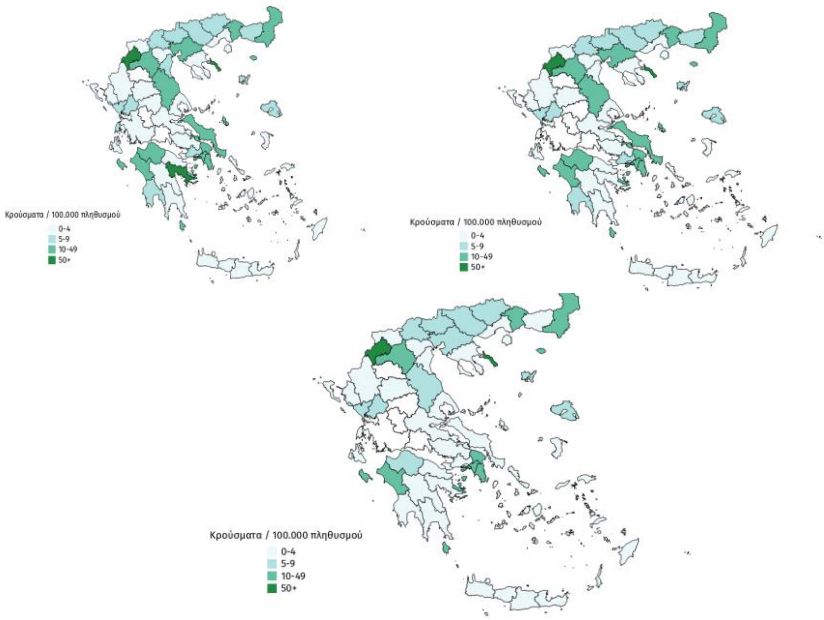

Figure 1. Maps of Greece for different days of Covid-19 spread

3. Results

From the early March of 2020, strict measures have been enforced in the general population to protect all the public from the COVID-19 Infection. The country has been under lockdown for several weeks, were schools and universities were closed, the means of transportation were stopped and only a few of them were functioning. Banks and commercial shops and malls were closed. The highest percentage of the population complied with these measures enforced fearing the strong pathogenicity of the virus. Due to these implemented measures, the epidemic was engulfed and we had very few new cases of the disease, in comparison with other European countries (Italy, Spain, Germany, UK and France) and definitely with the US, where the new cases of the epidemic amounted in several thousands of carriers and victims. It is wishful to expect this epidemiological situation of the spread of the covid-19 virus in Greece will remain stable and only few new cases will appear in the «epidemiological map» of the country in the near future.

4. Conclusions

In this analysis, an introduction of the spreading COVID-19 virus is given and the measurement of the epidemiological indexes is applied. Based on the results, there is a profound increase in the recorded new cases in the general population as well as in the cases were deaths have been recorded.

References

[1] Webby RJ, Webster RG. Emergence of influenza A viruses. Philos Trans R Soc Lond B Biol Sci 2001 356: 1817-1828.
[2] Novel Swine-Origin Influenza A (H1N1) Virus Investigation Team, Dawood FS, Jain S, Finelli L, Shaw MW, Lindstrom S, Garten RJ, et al. Emergence of a novel swine-origin influenza A (H1N1) virus in humans. N Engl J Med 2009;360: 2605-2615.
[3] Chang LY, Shih SR, Shao PL, Huang DT, Huang LM. Novel swine-origin influenza virus A (H1N1): The first pandemic of the 21st century. J Formos Med Assoc2009;108: 526-532.
[4] Simonsen L, Fukuda K, Schonberger LB, Cox NJ. The impact of influenza epidemics on hospitalizations. J Infect Dis 2000;181: 831-7.
[5] Kenneth J. Rothman. Epidemiology: An Introduction. 2012, Oxford University Press.
[6] Zhou P, Yang XL, Wang XG, Hu B, Zhang L, Zhang W, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature 2020.
[7] Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus infected pneumonia. N Engl J Med. 2020.
[8] Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 2020.
[9] Chan JF, Yuan S, Kok KH, To KK, Chu H, Yang J, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. Lancet 2020.
[10] Xia ZQ, Zhang J, Xue YK, Sun GQ, Jin Z. Modeling the transmission of Middle East respirator syndrome Corona virus in the Republic of Korea. PloS One 2015;10:e0144778.
[11] EODY (NATIONAL REPUBLIC HEALTH ORGANIZATION).