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Editorial

Endemicity, Seasonal Variations, Lack of Epidemiological Surveillance and General Practice in Covid-19

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Currently, high levels of immunity to the severe acute respiratory syndrome coronavirus (SARS-CoV-2) are beginning to limit its impact and reach [1]. Many countries are adopting strategies to manage coronavirus disease 2019 (covid-19) as an endemic disease [2]. Epidemiologically, covid-19 can be defined as endemic when it exists at a predictable level that does not require special socio-health interventions [2].

If covid-19 becomes endemic, it will be present at a certain level in a population at certain times of the year or throughout the year. A disease that is not eradicated is, by definition, endemic. Epidemiologists, who study the spread of disease, would consider a disease endemic when levels are consistent and predictable, as opposed to the "boom and bust" waves there have been so far in the pandemic. Endemic would be a term to indicate that covid-19 is still present, but we no longer need to restrict our lives. This does not necessarily mean that it is circulating at low levels; or that it is harmless. In other words, more emotionally: when we feel a sense of normality. The designation of covid-19 as endemic is possibly more of a political issue than a scientific one, and it speaks to the number of sick people and deaths the authorities and their citizens are willing to tolerate. Thus it would join the swarm of endemic diseases - such as the common cold, AIDS, measles, malaria and tuberculosis - that are always with us [1-4].

It is true that the short-term effectiveness of vaccines has been demonstrated with respect to the severity of SARS-CoV-2 infection [5]. But, on the other hand, there is increasing scientific evidence that shows that the protection generated by vaccination decreases over time, although it is reestablished with the inoculation of booster doses. In addition, the decrease in immunity as a result of the new variants must be taken into account [6]. Despite vaccines, boosters, and natural immunity, variants appear able to evade any protection that may have been obtained against SARS-CoV-2 [7, 8]. Consequently, in the endemic phase, people may experience reinfections of covid-19 over time.

In epidemiology, the study of variations in morbidity includes the study of seasonal variations (those occurring regularly at certain times of the year). Knowledge of these variations can be related to their associated causes or factors, such as agent ecology, climate and atmospheric phenomena, human activities, human concentration and dispersion, exposure to different agents, etc. This knowledge of the seasonal evolution of the morbidity allows to control or to manage its frequency, and to establish predictions and interventions [9-11].

Any biomedical variable is considered to have seasonal behavior, or shows seasonality when its presentation at different times of the year defined as seasons (astronomically or climatologically) is not statistically uniform. In the complex problem of seasonal pathology, three groups of seasonal phenomena have been distinguished: 1) truly seasonal diseases: they occur every year practically at the same time and are closely related to changes in time as a consequence of astronomical seasons; 2) pseudo-seasonal processes: communicable and non-communicable diseases that have their maximum development at certain times of the year (e.g. summer or winter) but not

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necessarily in the same month of each year or coinciding with astronomical seasons; 3) indirect seasonal effects: processes that are indirectly affected by various factors that change during different seasons, such as changes in the kind and composition of food, clothing, daily amount of physical exercise, facilities and modalities of human contact, in insects vectors, etc. [12].

The study of seasonal variations is of interest to know the environmental or personal factors that influence, or the variation in exposure to infectious agents due to the natural life cycle of the infectious agent, or the changes in the opportunity for exposure, or the variations in habits, such as diet, or other environmental factors, or the possible influence of sunlight, cold or heat, humidity, barometric pressure, exercise or physical inactivity in winter versus summer, environmental pollution, variations in neuroendocrine and metabolic function or seasonal population movements, etc. [13-19]. All of these are factors that can probably act on seasonal variations in diseases are reflected in the morbidity seen in general practice and force services to be adapted to the variability of demand [20].

The rise of Omicron variants could mean that SARS-CoV-2 waves are beginning to settle into predictable patterns, with new waves periodically emerging from circulating strains. These are the first signs that the virus is evolving differently compared to the first two years of the pandemic, when variants seemed to appear out of nowhere. If SARS-CoV-2 continues on a path of endemicity, its evolution could resemble that of other respiratory infections, such as influenza. In this scenario, immune-evading mutations in circulating variants could combine with drops in population-wide immunity to become key drivers of periodic waves of infection [21].

Seasonality in the post-pandemic circulation of SARS-CoV-2 has been suggested [22]. Although climate is not currently the dominant factor driving SARS-CoV-2 transmission, it has been hypothesized that in the future covid-19 may become a winter disease. Infections caused by many respiratory viruses, including influenza and some coronaviruses, increase in winter and decrease in summer. Growing evidence suggests that a small seasonal effect will likely contribute to larger outbreaks in winter, based on what is known about how the virus spreads and how people behave in colder months. Although, climate has not governed whether Covid-19 emerges or disappears in a given place or time, data points to low temperature, low humidity and limited sunlight as conditions that encourage the spread of SARS-CoV-2. But, if SARS-CoV-2 can survive better in cold conditions, it is still difficult to disentangle that contribution from the effect of people's behavior. Currently, factors such as human behavior exceed the influence of climate, although covid-19 could be ultimately a seasonal disease [23, 24].

In reality, it is too early to say whether SARS-CoV-2 will become a seasonal virus. To assess whether infections from a particular virus rise and fall with the seasons, researchers typically study its spread in a specific location, several times a year, for many years. Evaluation may be needed for at least five years through natural infection, or less if people are vaccinated. Whether and what a seasonal pattern emerges will depend on many factors that have not yet been understood, including how long immunity lasts, how long recovery takes, and how likely it is that people can be reinfected [25, 26]. Of course, understanding seasonality in the potential post-pandemic SARS-CoV-2 circulation season would contribute to knowledge to inform future strategy and help limit its scope and consequences [22].

But, since the disappearance of the health alarm in many countries, cases of covid-19 are not counted, and tests are carried out in health services only in certain situations, such as in people over 60 years of age, pregnant women, hospitalized patients, and health personnel [27]. In this scenario, we are in a "dark" situation about how covid-19 will develop in the coming months. The patterns of variant emergence for covid-19 are largely unknown and covid-19 does not appear to follow simply climatological seasonal patterns.

Understanding the epidemiology of a disease means understanding the patterns of the disease in the population, knowing how and why it affects different population groups. The focus of the public health response is control: stopping the transmission of the disease to prevent further spread [28]. Public health preparedness in the endemic phase of covid-19 is challenging in the absence of specific epidemiological data. Understanding seasonal profiles of infection risks will be critical to inform effective surveillance and control strategies [29]. Current official figures imply significant under-reporting. However, frequently (although predictably not 100%), people with a positive test at home do communicate this circumstance to their family doctor, to seek treatment and/or sick leave.

In this context, general medicine can provide a set of alternative indicators to shed light on this situation, in addition to the number of hospitalizations, levels of SARS-CoV-2 in wastewater and purchases of home tests by consumers (2): frequency of visits to the GP for upper respiratory tract infection and/or for reporting a positive covid-19 test at home, which can be equated to "minimal incidence rates", and the estimation of community risk as a function of the immunity of its members based on what is known about vaccination rates and previous infections [2, 30, 31].

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