Prevalence of Respiratory Diseases and Epidemiological Behavior of COVID-19 in Patients of the "Centro Histórico" Health Center, period March-May 2020

Prevalência de doenças respiratórias e comportamento epidemiológico da COVID-19 em pacientes do Centro Histórico Pacientes do Centro de Saúde "Centro Histórico", período de março a maio de 2020

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ABSTRACT
The objective of this study was to determine the prevalence of respiratory diseases and the epidemiological behavior of COVID-19 in patients of "Centro Histórico" Health Center, March-May 2020 period. Observational, cross-sectional and descriptive study; in which the records of 1836 patients with respiratory symptoms were analyzed, using measures of central tendency and absolute and relative frequencies. The results revealed that the prevalent age range was 18 to 40 years with 707 (38.5%) cases; upper respiratory diseases were more frequent with 1617 (88.1%) cases. COVID-19, unidentified virus, was present in 91 (4.9%) cases, the older adult population being the most affected with 36 (39.5%) cases. There were 48 (2.6%) patients under home monitoring for suspected COVID-19, cough was the most frequent symptom (60.4%), and arterial hypertension (33.3%) was the most prevalent comorbidity in this group. More studies are required at the first level of care.

Keywords: Ambulatory care, COVID-19, Pandemic, Primary Health Care, Respiratory Tract Diseases.

1 INTRODUCTION

In December 2019, in China, several cases of pneumonia of unknown etiology emerged, later a new coronavirus, called SARS-CoV-2, is recognized as the causative agent, which generates a wide range of clinical manifestations, mainly respiratory, encompassed under the term COVID-19 (Ministry of Health, Government of Spain, 2020).

On February 27, the first case of COVID-19 was reported in Ecuador. Cases were on the rise, so the National Government decreed a state of emergency on March 16, ordering the closure of public services, except for health, security, risk services, in addition to ordering a curfew from 2:00 p.m. to 5:00 a.m. the next day. The Emergency Operations Center (COE) instituted measures such as the suspension of classes, mass events and closure of international borders to reduce the spread of SARS-CoV-2. However, in the provinces of the Coast, due to the disrespect of the population, the transmission of the virus was not controlled as planned (El Universo, 2020).

In the province of Guayas, on March 31, 1615 (70.2%) cases were reported out of the 2302 in the country. On April 30, this figure rose to 10,436 (63.6%) of the 24,934 cases. In Pichincha, cases are constantly increasing, on March 31 219 (9.5%) cases were reported, on April 30 1420 (8.7%) cases and on May 31 3940 (13.1%) of the 39098 cases confirmed to that date in Ecuador, causing an alarming increase in morbidity, mortality and lethality of the population (National Risk and Emergency Management Service, 2020).

Thus, as of June 10, the incidence rate of COVID-19 in Ecuador was 177.2 per 100,000 inhabitants (Ruiz, 2020).

Regarding mortality, a New York Times analysis of more than two dozen countries determined that Ecuador had one of the highest rates of excess mortality, with 10,500 more deaths than usual, representing a 57% increase in mortality from March to May (Wu et al., 2020).

These data indicate a poor response from Ecuador's National Health System, which is organized into three levels of care, of which the first level resolves 80% of the population's health needs. The Health Center (CS.) "Centro Histórico", a first-level unit, is responsible for meeting the health needs of part of the population of the Historic Center of Quito (CHQ), made up of 21,220 inhabitants. The poverty rate of families living in CHQ is higher than the average for the entire Metropolitan District of Quito. The CHQ is made up of 4 sectors, see figure 1 (Instituto de la Ciudad, 2018).

Figure 1. Sectors corresponding to the SC. "Historic Center". Sector 1: Eastern Enveloping Zone, Sector 2: May 24 Axis, Sector 3: Central Core, Sector 4: Western Enveloping Zone.
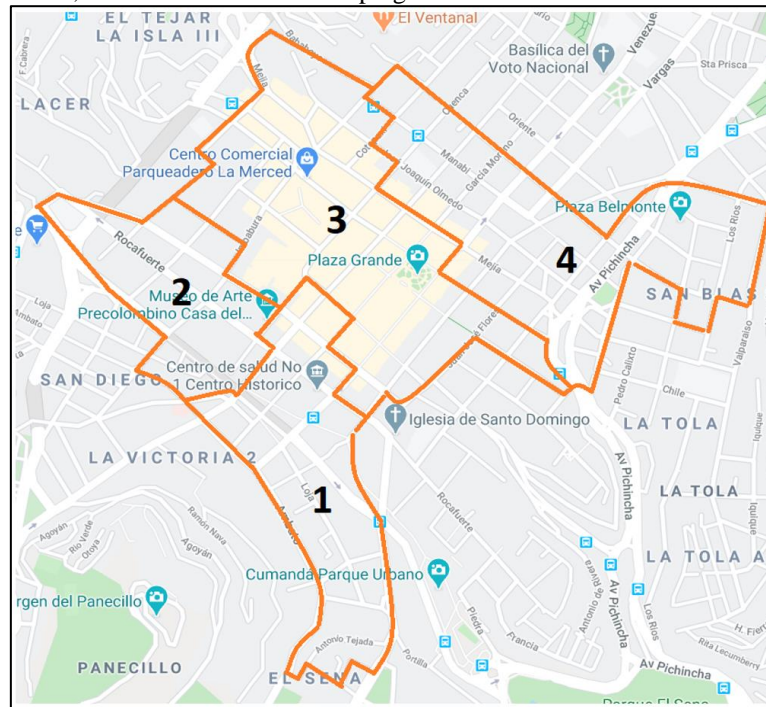
Source: CS. "Historic Center"

In the CS. "Historic Center" case definitions were applied as indicated by the Ministry of Public Health (2020a) in the document "COVID-19, General Guidelines".

The progressive increase in care for people with respiratory symptoms, as well as the alarming increase in cases, starting in March throughout the country, motivated the realization of this study, whose general objective was to determine the prevalence of respiratory diseases and the epidemiological behavior of COVID-19 in patients of the "Centro Histórico" Health Center. Period March-May 2020.

2 MATERIALS AND METHODS

This is a cross-sectional and descriptive observational study, of a quantitative type, whose population sample consisted of 1836 records of patients with respiratory symptoms, attended in the triage tent for respiratory symptomatic patients and in the Emergency Department of the CS. Historic Center from March 1 to May 31, 2020. Finite universe convenience sampling was performed.

Data collection was carried out in two phases: the first, by obtaining information from patients with respiratory symptoms, whose source was the CS Care Matrix. Historic Center; and the second, through the collection of information from patients under follow-up for suspected COVID-19, obtained from the follow-up matrix of suspected cases belonging to the unit, under

strict coding that safeguards the confidentiality of the data. The population was grouped by age ranges into children under one year old, 1-17 years old, 18-40 years old, and 60 years or older.

Subsequently, the collected data were entered into two databases, designed in the SPSS 25 statistical software. Statistical analysis was performed with measures of central tendency, measures of absolute and relative frequencies, as well as 95% confidence intervals (CI), the results are presented by means of graphs and tables.

2.1 THE DISEASES WERE CLASSIFIED ACCORDING TO THEIR ICD 10 CODING

Ethical considerations: the authorization and approval of the Technical Administrator and the Teaching Manager of the Unit was obtained. As this is a secondary data management study, informed consent is not required and we are committed to the confidentiality of the information.

3 RESULTS

During the study period, the records of 1836 patients with respiratory symptoms were analyzed. There were 1050 registrations (57.2%) in March, 492 (26.8%) in April and 294 (16%) in May. Of the total, 894 were men (48.7%) and 942 women (51.2%).

The most representative age range was 18 to 40 years, with 707 (38.5%) cases, followed by 437 (23.8%) cases of patients aged 41-59 years, 80 (4.4%) under one year of age, and 201 (10.9%) cases of 60 years or older.

Upper respiratory diseases were the most prevalent and occurred in 1617 (88.1%) patients (mean: 88.07; *CI*: 86.5-89.5); followed by 99 (5.4%) cases of lower respiratory diseases (mean: 5.3; *CI:* 4.3-6.4); 91 (4.9%) cases of COVID-19, unidentified virus (mean: 4.9; *CI*: 3.9-5.9); 20 (1.1%) cases of other diseases of the respiratory system (mean: 1.09; *CI*: 0.6-1.5); and 9 (0.5%) pregnant patients with rhinopharyngitis or acute pharyngitis (mean: 0.49; *CI:* 0.17-0.81), see Table 1.

Table *1*.
Respiratory diseases by sex, period March-May 2020 in the SC. "Historic Center"

Pathology	Men	%	Women	%	Total	%
Upper Respiratory Diseases	785	(48,5%)	832	(51,5%)	1617	(88,1%)
Lower respiratory diseases	48	(48,5%)	51	(51,5%)	99	(5,4%)
COVID-19, Unidentified Virus	45	(49,4%)	46	(50,6%)	91	(4,9%)
Other diseases of the respiratory system	16	(80%)	4	(20%)	20	(1,1%)
Pregnancy + rhinopharyngitis or acute pharyngitis	-	-	9	(100%)	9	(0,5%)
Total	**894**	**(48.7%)**	**942**	**(51,3%)**	**1836**	**(100%)**

Source: SC Attention Database. Historic Center
Elaboration: The author.

Regarding respiratory diseases in men, upper respiratory diseases were more prevalent with 785 (87.8%) cases, with the most affected group being 18 to 40 years old, with 294 (37.4%) cases. Followed by lower respiratory diseases with 48 (5.4%) cases, of these, the most affected group was the 1 to 17 years old with 12 (25%) cases. Suspected COVID-19 occurred in 45 (5%) men, being more prevalent in those aged 60 years or older, with 19 (42.2%) cases. Other respiratory diseases occurred in 16 (1.8%) men, see Table 2.

Table 2.
Respiratory diseases by age range in men period March-May 2020 in the SC. "Historic Center"

Respiratory disease	Age Range (Years)					
	<1	1-17	18-40	41-59	≥ 60	Total
Upper Respiratory Diseases	34	199	294	165	93	785
Lower respiratory diseases	8	12	7	11	10	48
COVID-19, Unidentified Virus	-	-	13	13	19	45
Other respiratory diseases	-	4	5	1	6	16
Total	42	215	319	190	126	**894**

Source: SC Attention Database. Historic Center
Elaboration: The author.

Regarding respiratory diseases in women, upper respiratory diseases were more prevalent with 832 (88.3%) cases, with the most affected group being 18 to 40 years old, with 361 (43.4%) cases. Followed by lower respiratory diseases with 51 (5.4%) cases, of these, the most affected group was the 41 to 59 years old with 14 (27.4%) cases. Suspected COVID-19 was present in 46 women (4.9%), being more prevalent in those aged 41 to 59 years and in those aged 60 years or older, with a total of 34 (74%) cases between both groups, see table 3.

Table 3.
Respiratory diseases by age range in women period March-May 2020 in the SC. "Historic Center"

Respiratory disease	Age Range (Years)					
	<1	1-17	18-40	41-59	≥ 60	Total
Upper Respiratory Diseases	30	182	361	215	44	832
Lower respiratory diseases	8	10	7	14	12	51
COVID-19, Unidentified Virus	-	2	10	17	17	46
Pregnancy + rhinopharyngitis or acute pharyngitis	-	2	7	-	-	9
Other respiratory diseases	-	-	3	1	-	4
Total	38	196	388	247	73	**942**

Source: SC Attention Database. Historic Center
Elaboration: The author.

Of the 99 (5.4%) cases of lower respiratory tract disease, pneumonia occurred in 51 (51.52%) cases, followed by 32 (32.32%) cases of acute bronchitis, 11 (11.11%) cases of asthma, 2 (2.02%) cases of chronic bronchitis, 2 (2.02%) cases of chronic obstructive pulmonary disease, unspecified and 1 (1.01%) case of influenza, unidentified virus.

When analyzing the diseases individually in relation to the 1836 records, it was found that the prevalent diseases were acute rhinopharyngitis with 1095 (59.6%) cases (mean: 59.6; CI: 57.3-61.8), followed by 256 (13.9%) cases of acute pharyngitis, 181 (9.9%) cases of acute tonsillitis, 91 (4.9%) cases of COVID-19, unidentified virus, and 51 (2.8%) cases of pneumonia, organism not otherwise specified. Data for the other diseases are shown in Table 4.

Table 4.
Individual Registry of Respiratory Diseases, March-May 2020 period in the CS. "Historic Center"

Diagnosis	Men	Women	Total	%
Upper Respiratory Diseases				
Acute rhinopharyngitis	515	580	1095	(59,6%)
Acute pharyngitis	132	124	256	(13,9%)
Acute tonsillitis	102	79	181	(9,9%)
Multi-site acute upper respiratory infections and unspecified sites	21	23	44	(2,4%)
Acute sinusitis	6	13	19	(1%)
Allergic and vasomotor rhinitis	5	6	11	(0,6%)
Laryngitis and acute tracheitis	4	5	9	(0,5%)
Chronic diseases of the tonsils and adenoids	-	2	2	(0,1%)
Lower respiratory diseases				
Pneumonia, organism not otherwise specified	20	31	51	(2,8%)
Acute bronchitis	18	14	32	(1,7%)
Asma	6	5	11	(0,6%)
Chronic obstructive pulmonary disease, unspecified	2	-	2	(0,1%)
Chronic bronchitis	1	1	2	(0,1%)
Influenza, unidentified virus	1	-	1	(0,05%)
Other diseases of the respiratory system				
Respiratory disorders in other diseases classified elsewhere	6	3	9	(0,5%)
Respiratory failure, not elsewhere classified	7	1	8	(0,4%)
Acute respiratory distress syndrome	3	-	3	(0,2%)
COVID-19, Unidentified Virus	45	46	91	(4,9%)
Pregnancy + rhinopharyngitis or acute pharyngitis	-	9	9	(0,5%)
Total	**894**	**942**	**1836**	**(100%)**

Source: SC Attention Database. Historic Center
Elaboration: The author.

Suspected COVID-19 was present in 45 (49.4%) men and 46 (50.6%) women. In men, suspicion was more frequent in those aged 60 years or older, with 19 (42.2%) cases; followed by 13 (28.9%) cases in those aged 41 to 59 years and 13 cases (28.9%) in those aged 18 to 40 years. The most affected age groups in women were those aged 41 to 59 years and those aged 60 and over, with 17 cases per group, which together account for 74% of cases in women. There were 10 cases (21.7%) in women aged 18 to 40 years and 2 cases (4.3%) in women aged 15 years, see figure 2.

Figure 2. Suspicion of COVID-19 by sex and age range in years, period March-May 2020 in the CS. "Historic Center"
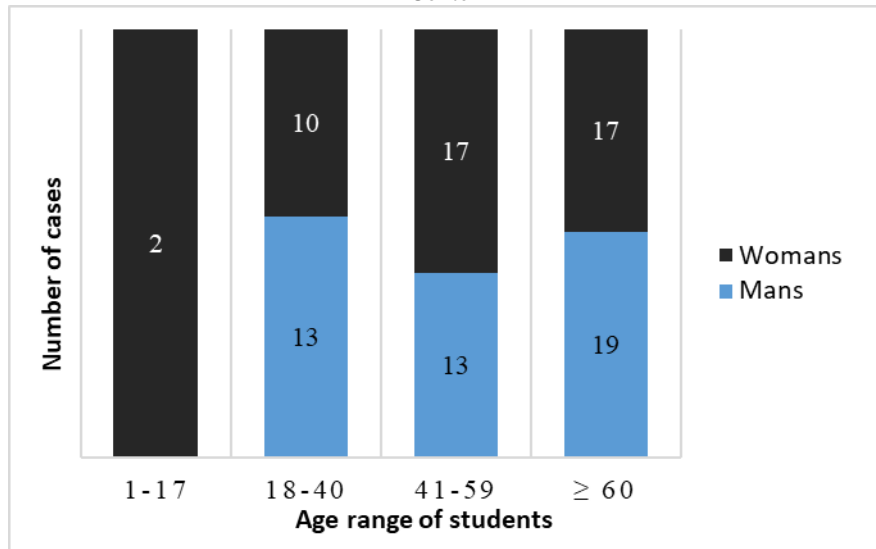
Source: SC Attention Database. Historic Center
Elaboration: The author.

During the study period, 26 (1.4%) of the patients reported referral to a higher level. A total of 6 (23.1%) cases of pneumonia, unspecified organism, were reported; 2 (7.7%) cases of acute respiratory failure and 18 (69.2%) cases of COVID-19, virus not identified.

The CS unit "Centro Histórico" carried out home follow-up on 27 men (56.2%) and 21 women (43.8%). The median age was 40 years and the mean was 44 years (*CI: 38-49*). The most frequent age range was 30 to 44 years, with 15 (31.2%) cases; followed by those aged 45 to 64 years, with 13 (27.1%) cases; 10 (20.8%) cases between 20 and 29 years of age; 8 (16.7%) cases in older adults aged 65 years or older; one male (2.1%) aged 18 years and one female (2.1%) aged 19 years. Of the older adults under follow-up, 6 (75%) were men, see Table 5.

Table 5.
Cases under follow-up for suspected COVID-19, by sex and age, period March-May 2020 in the CS. "Historic Center"

		Patient age (years)					
		0-19	20-29	30-44	45-64	≥65	Total
Sex	Men	1	4	8	8	6	27
	Women	1	6	7	5	2	21
Total		2	10	15	13	8	48

Source: Database Tracking Suspected COVID-19 Cases, CS. Historic Center
Elaboration: The author.

The care of patients suspected of COVID-19 who required home follow-up was higher during the month of May, with 25 (52.1%) cases, with sector 2 being the most affected of the 4 sectors, with 26 (54.2%) cases under follow-up (mean: 54.1; *CI:* 39.5-68.7), as shown in Figure 3.

Figure 3. Number of cases by sector according to the month of care for patients under follow-up for suspected COVID-19, period March-May 2020, in the SC. "Historic Center"
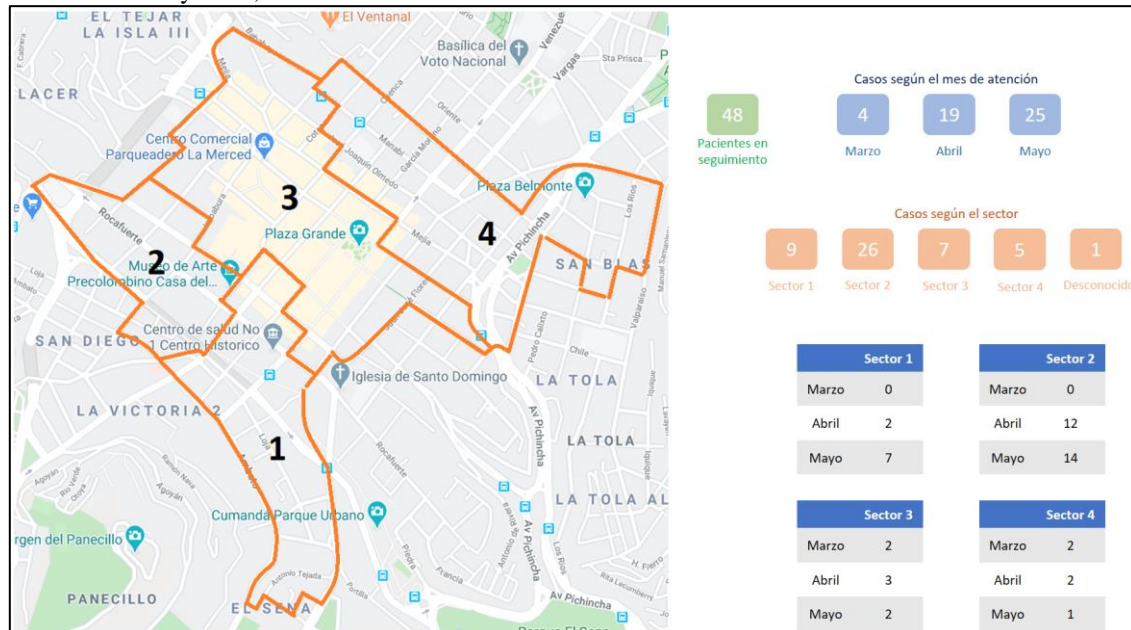
Note: "Unknown" case: patient dies, no information is obtained from the sector of residence.
Source: Database Tracking Suspected COVID-19 Cases, CS. Historic Center
Elaboration: The author.

Many cases under follow-up occurred in 41 patients of Ecuadorian nationality (85.41%), 7 cases were found in foreign patients (14.59%). The registration of the latter does not indicate whether the infection occurred in Ecuador or outside the country.

The most frequent reason for follow-up was presenting respiratory symptoms after contact with family members or acquaintances with suspected or confirmed diagnosis of COVID-19, with 29 (60.4%) cases (mean: 60.4; *CI:* 46-74.7), followed by the presence of suspected symptoms with no apparent cause in 13 (27.1%) cases, travel history in 4 (8.3%) cases, and 2 (4.2%) cases with a positive result in a test carried out in a particular way, the type of which is not specified.

Symptoms occurred in 46 (95%) patients under follow-up (mean: 95.8; *CI:* 89.9-101.7) and 2 (5%) were asymptomatic. The main symptoms were cough (60.4%), fever (37.5%), fatigue (25%), headache (12.5%), dyspnea (10.4%), odynophagia (8.3%), diarrhea (6.3%), rhinorrhea (6.3%), myalgia/arthralgia (4.1%), anosmia/ageusia (4.1%) and vomiting (2.1%).

Confirmation of COVID-19 in these patients was limited to nasopharyngeal swab testing in 27 (56.3%) patients, of which 22 were positive (81.5%) and 5 negative (18.5%). Of the 22 positives, a rapid test was subsequently performed as part of the follow-up and identification of immunity in 10 (45.5%) of them, 8 (80%) with a negative result, 1 (10%) awaiting the result and 1 (10%) disappeared before obtaining the result, see table 6. No samples were taken for further analysis in 21 patients.

Table 6.

Relationship between days elapsed from the onset of symptoms to the performance of the first test and subsequent control test in 27 patients with suspected COVID-19, period March-May 2020 in the SC. "Historic Center"

Days elapsed from the onset of symptoms to the performance of the first confirmatory test	Number of confirmed patients *(RT-PCR)*	Number of patients with control testing *(Rapid Test)*
0-7	14	8
8-14	6	1
15-21	5	0
Unknown*	2	1
Total	27	10

*Patient does not have a record of the day of sample collection
Source: Database Tracking Suspected COVID-19 Cases, CS. Historic Center
Elaboration: The author.

The number of contacts of the patients under follow-up was analyzed, finding that 22 (45.8%) lived with 3 or more people (mean: 45.8; *CI:* 31.2-60.4), 11 (22.9%) with 2 people, 8 (16.7%) with one person, 3 (6.3%) lived alone, and the number of contacts of 4 people (8.3%) is unknown because they died before this data was confirmed.

In addition, comorbidity and mortality were analyzed in the 48 patients under follow-up for suspected COVID-19, and 12 (25%) of them had comorbidities (mean: 25; *CI:* 12.2-37.7), with hypertension being the most prevalent, found in 2 men and 2 women, representing 33.33% of comorbidities. Diabetes Mellitus was found in 2 (16.67%) men, chronic gastritis in 1 woman and 1 man (16.67%), epilepsy in 1 (8.33%) man, asthma in 1 (8.33%) man, knee osteoarthritis, varicose veins in 1 (8.33%) woman and intellectual disability in 85% in 1 (8.33%) woman. Thus, a total of 7 (58.3%) men and 5 (41.7%) had comorbidities. 50% of comorbidities occurred in older adults.

There were 5 (10.4%) deaths during follow-up, of which 4 (80%) were in the 60 years or older group (3 men, 1 woman) and 1 (20%) woman aged 54 years.

Finally, of the 42 patients who complied with isolation until May 31, 35 (83.3%) were discharged and 7 (16.7%) remained under surveillance.

4 DISCUSSION

We describe the registry of 1836 patients with respiratory symptoms treated at the SC. "Centro Histórico", March-May 2020 period, observing that upper respiratory diseases are the predominant, while COVID-19, an unidentified virus, was found in 91 (4.9%) patients. Of these, 18 were referred to a higher level, 29 did not belong to the "Historic Center" unit (so they were notified to the respective units responsible for their follow-up), and 44 required follow-up;

However, the Unit was notified of the responsibility for the follow-up of 4 patients treated in other units, so the number of cases under follow-up ended at 48.

The analysis of cases by sector shows that, although during the month of March there were no records of suspected cases corresponding to Sector 2, in April 12 suspected cases appeared in this sector, which is equivalent to 4 times more cases than in Sector 3, and 6 times more than in Sectors 1 and 4 during this month. In May, 14 new suspected cases appeared in Sector 2; while in the other sectors only 9 cases appeared. This progressive increase in cases and its tendency to concentrate in Sector 2 is largely due to the existing informal trade and its proximity to the San Roque Market, since a large part of its workers live in Sector 2.

This market normally receives thousands of visitors a day, and despite the discovery of two positive cases of COVID-19 among its merchants, crowds of people persisted in the sector so the market was closed on April 20 by the municipal authorities (El Comercio, 2020).

Regarding the confirmation of COVID-19 in patients under follow-up, the collection of samples and their analysis was prioritized for vulnerable groups due to the insufficient availability of tests by the unit, so nasopharyngeal swab (PCR) tests were performed on only 27 (56.3%) patients and rapid tests for the detection of immunity were performed on 10 of them, this decision is supported by the document "COVID-19, General Guidelines" which, regarding community transmission, states that "if the diagnostic capacity is insufficient, sampling will be implemented in prioritized groups that meet the definitions of a suspected case" (Ministry of Public Health, 2020a, p.8). In the 21 patients in whom no type of test was performed, discharge was assessed in person or by telemedicine after 28 days of isolation.

In relation to diagnostic tests, there are rapid antibody, molecular and serological tests. The rapid test detects immunoglobulins type M and G. This should be used as a screening method in people with symptoms older than 7 days, without comorbidities and not belonging to priority groups. When a person with comorbidities or belonging to a risk group presents symptoms, regardless of the days, they must undergo an RT-PCR test, which meets fairly high sensitivity and specificity criteria ($\geq 95\%$), being the reference test for the diagnosis of the disease (Ministry of Public Health, 2020b).

Another important piece of information is the knowledge of the sex-specific mechanisms that modulate the course of the disease, such as the expression of hormone-regulated genes that code for angiotensin-converting enzyme-2 (ACE2), a key component of the pathogenesis of COVID-19 (Maleki et al., 2020).

In this study, data obtained from the follow-up of patients suspected of COVID-19 reveal that males presented more cases compared to females (27 and 21 cases respectively) where 75% of the group of older adults aged 65 years or older were men.

These results are consistent with several international studies that indicate a higher prevalence of males and establish them as a risk factor for infection, severe disease, the need for mechanical ventilation and increased mortality due to a lower level of antibodies against SARS-CoV-2 compared to women, and the fact that immune regulatory genes encoded by the X chromosome in women cause lower levels of viral load. higher CD4+ T cells with better immune response and less inflammation than in man (Conti & Younes, 2020).

In addition to sex-specific mechanisms, present comorbidities play an important role in the progression of the disease. In our study, when analyzing comorbidities according to sex, they were present in 7 (58.3%) men and 5 (41.7%) women under follow-up for suspected COVID-19. Studies show an increased number of pre-existing diseases in men (cerebrovascular disease, hypertension, diabetes, and chronic lung disease) which increases their mortality rate. The likelihood of death is 65% higher in men with COVID-19 than in women (Maleki et al., 2020). These data are consistent with those found in our study, since of the 5 deaths recorded, 3 (60%) occurred in men and 2 (40%) in women.

In addition, 50% of comorbidities occurred in the elderly population, which in itself constitutes a priority population, and a high percentage (80%) of the deaths recorded was also evidenced in this population.

There are diseases such as pneumonia, influenza, and respiratory failure, which should be included under the context of suspected COVID-19, due to their similar clinical presentation. In the present study, it was observed that patients with these diagnoses were not included for home follow-up. Thus, if the cases of pneumonia, unspecified organism, respiratory failure not elsewhere classified, acute respiratory distress syndrome and influenza, unidentified virus (63 cases in total) were considered, the number of suspected cases of COVID-19 would amount to a total of 154 cases, representing an increase of 71.4%, which would be equivalent to 9.4% of the 1836 records analyzed in this study. This analysis denotes the importance of knowledge of the definition of cases, to avoid underreporting of the disease at the first level.

We conclude that strengthening epidemiological surveillance and case tracing capacity are essential to contain the spread of the disease in the community. The first level of care, being the basis of the Health System, should be provided with more technical and financial resources, which strengthen the attention to the COVID-19 pandemic and better solve the health and care problems

of its patients. In addition, studies at the first level are required, given that the available scientific evidence is very scarce.

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