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Is there value in screening asymptomatic patients with no risk factors for COVID-19 in the Emergency Department?

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ABSTRACT

Introduction: During the COVID-19 pandemic, screening asymptomatic admitted patients for COVID-19 became routine in order to minimize the potential risk of these individuals as silent but infectious hosts in the propagation of this pandemic. However, testing is costly and the value of this indiscriminate testing was not studied. Hence, our study aimed to determine the rates of positive COVID-19 PCR results in patients presenting to the emergency department (ED) with no suspicion for a COVID-19 infection at different times during the pandemic.

Methods: This was a retrospective cohort study of asymptomatic patients presenting to the ED with no COVID infection risk factors, in an urban, tertiary care hospital in Lebanon, from March 2020 to January 2021, representing periods with different national incidence rates of COVID-19. We included patients of all ages, from the last 15 days of each month, who were tested for COVID-19 by PCR in the ED and who fulfilled the following “screening group” criteria: no travel within the last 14 days; no known COVID-19 exposure within the last 14 days; and no symptoms or physical exam findings that could be associated with a COVID-19 infection. We collected data on age, and PCR result.

Results: We identified 3,853 patients who underwent COVID-19 PCR test during the above time intervals in our ED. The rate of test positivity in the community during this study period ranged from 1.1% to 21.8%. Out of the 743 (19.3%) patients that fit our inclusion criteria, none had a positive COVID-19 test.

Conclusion: Even during high countrywide incidence rates of COVID-19, all patients in the screening group had a negative PCR. Algorithms identifying this group can be used to minimize a costly test, to avoid delaying inpatient care or surgeries and to reduce patient’s length of stay in already overwhelmed EDs.

Key words: COVID-19 PCR, Emergency Department, incidence rates, mass screening, pandemic, risk factors

INTRODUCTION

It has been over two years since the beginning of

the novel coronavirus 2019 (COVID-19) pandemic with the first reported case in Wuhan, China.¹ By the end of December 2020, more than 73 million people were infected with at least 1.7 million dead.^{2,3}

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The first confirmed case of COVID-19 in Lebanon, a country of 6,000,000 inhabitants (citizens and refugees included), was reported on the 21st of February 2020.⁴ Despite the precautionary measures that were taken by the Ministry of Public Health (MOPH) since then, the number of confirmed COVID-19 cases reached

over 150,000 by December 2020, with nearly 1,500 deaths and is continuing to increase drastically.^{5,6} After the initial case, the Lebanese government instituted an immediate whole country lockdown. However, as the lockdown eased between June and September 2020, the number of COVID-19 cases rose considerably. In fact, on the 1st of June, there was still a mere 1,233 total cases, reaching 39,634 cases by the end of September, with a daily number of new cases exceeding 1,300.⁶

Despite the high case fatality rate from COVID-19, this disease has been shown to be two-faced, such that it may present silently with a benign course in a large cohort of patients, to the extent that they are not even aware of their infection.⁷⁻⁹ However, recent data has shown that up to half of the patients who were asymptomatic with a positive COVID-19 test, later develop symptoms.⁹ Spread of COVID-19 has also been documented up to 12 days before the onset of symptoms thus necessitating the establishment of screening policies for asymptomatic patients.¹⁰

At our institution, the American University of Beirut Medical Center (AUBMC), the most common technique used for the detection of COVID-19 is a reverse transcriptase polymerase chain reaction (PCR) targeting N-gene, E-gene and RdRp gene segments, wherein qualitative detection of the viral RNA extracted from nasopharyngeal and oropharyngeal swabs is performed. Screening for COVID-19 by PCR in asymptomatic patients without any physical exam findings nor any risk factors was implemented early on in our institution for all patients being admitted to the hospital from the emergency department (ED). The rationale being to determine the potential risk of these individuals as silent but infectious hosts in the propagation of this pandemic. Nevertheless, the value of such a plan should be studied considering many other factors including cost and delayed proper care.

The aim of this study was to determine the rates of positive COVID-19 PCR results in asymptomatic patients with no physical exam findings suggestive

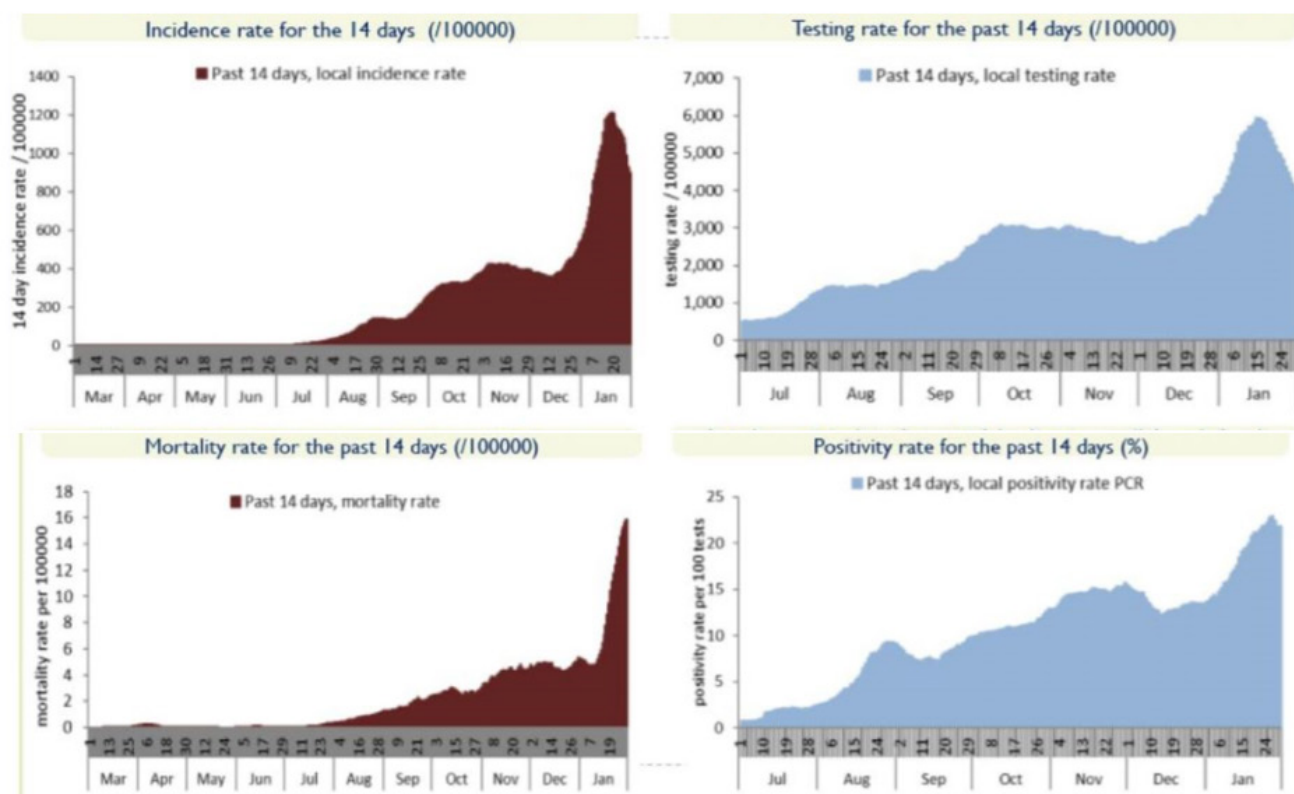


Figure 1 COVID-19 statistics in Lebanon during our study period. *Used with permission from the Ministry of Public Health, Lebanon.*¹¹

of COVID-19 and no risk factors for COVID-19 infection at different times during the pandemic.

MATERIALS & METHODS

Study Design

We performed a retrospective chart review of patients presenting to the ED of the AUBMC in Beirut, Lebanon, from March 2020 to January 2021. Specifically, we reviewed charts of patients seen in the last 2 weeks each month during the following intervals: March to May 2020, July to September 2020 and November 2020 to January 2021; each period representing a different time in the COVID-19 pandemic in Lebanon, with increasing incidence rates as represented by Figure 1.¹¹

Participants

Inclusion Criteria: All patients who presented to the ED of AUBMC and underwent a COVID-19 PCR despite not having:

- any symptoms that could be attributed to COVID-19 (i.e., no infectious symptoms such as fever, cough, diarrhea, abdominal pain, headache, weakness... etc.)
- any physical exam findings suggestive of a COVID-19 infection (e.g. tachypnea, abnormal lung exam, and non-specific rash)
- any risk factors for COVID-19 infection, specifically no close contact with a known COVID-19-infected patient within the past 14 days
- any travel history within the past 14 days

In this manuscript, we will refer to this group as the screening group.

Exclusion Criteria

Patients who were not cared for in the ED, who had incomplete records at the time of data collection, who presented in cardiac arrest and those who did not have COVID-19 PCR test results available on record were all excluded.

Data Collection

Our outcome was the percentage of positive

COVID-19 PCR tests in the screening group presenting to the ED, during different periods of the pandemic. Thus, we reviewed the clinical presentations of all patients, but only collected data on the COVID-19 PCR results and age.

Statistical Analysis

All statistical analyses were performed using excel. Age, a continuous variable, is reported as mean $\pm$ standard deviation, and COVID-19 PCR result, a categorical variable, is reported as frequency and percentage.

RESULTS

We reviewed the charts of 3,853 patients who had a COVID-19 PCR done in our ED during our study periods. Of those, 346 (8.9%) were positive. 743 (19.3%) fit our inclusion criteria with a mean age (N=651) of 53.581 years (SD $\pm$ 2.24); 58 (10.2%) were less than 19 years old and 223 (38.8%) were >65 years old. None of our included patients had a positive PCR. The distribution of results over time is shown in Table 1.¹¹ During our study time period, the reported positivity rate of COVID-19 PCR tests ranged between 1.1% on the 30th of June, 2020 and 21.8% on the 31st of January, 2021 (Figure 1).¹¹

DISCUSSION

We conducted a retrospective chart review of a group of ED patients with a very low risk for COVID-19, we designated as the *screening group*, who were tested for COVID-19 by PCR during three time periods. This group included asymptomatic patients with no risk factors for COVID-19 infection and no suggestive physical exam findings. Although the incidence of COVID-19 was different in each period, the rates of positivity in the *screening group* of patients remained at zero.

To the best of our knowledge, we may be the first to study this particular group of ED patients. Several studies have looked at pre-screening for scheduled surgeries or interventions¹² others at cancer patients.¹³ This is valuable data as it is clinically relevant to physicians, infection control teams and hospital administrators who will decide on who needs a COVID-19 test prior to emergent

Table 1 COVID-19 testing in Lebanon and at AUBMC¹ ED, color-grouped by increasing incidence rates, during our study period.

Date Range	Average number of COVID-19 cases in Beirut ¹¹	Average number of positive tests per day in Lebanon ¹¹	Total patients tested for COVID-19 (AUBMCED*)	Total positive for COVID-19 (AUBMC ED) n (%)	Screening group n (%)	Screening group positive for COVID-19
15-3-2020 to 31-3-2020	Not Available	23	269	5 (1.85)	16 (5.94)	0
15-4-2020 to 30-4-2020	Not Available	5	199	1 (0.5)	73 (36.6)	0
15-5-2020 to 31-5-2020	Not Available	15	236	4 (1.7)	94 (39.8)	0
15-7-2020 to 31-7-2020	Not Available	100	701	37 (5.2)	91 (12.9)	0
15-8-2020 to 31-8-2020	Not Available	562	568	75 (13.2)	89 (15.6)	0
15-9-2020 to 30-9-2020	291.7/100,000	945	571	81 (14.2)	72 (12.6)	0
15-11-2020 to 30-11-2020	346.8/100,000	1498	439	49 (11.2)	93 (21.1)	0
15-12-2020 to 31-12-2020	575.8/100,000	1942	580	55 (9.5)	141 (24.3)	0
15-1-2021 to 30-1-2021	931.7/100,000	3709	290	39 (13.4)	74 (25.5)	0

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hospital admission or surgery; where to admit that patient waiting for the test result; if they can be placed in a double room or if they should remain in the already crowded ED until the PCR results is out. It is noteworthy that our ED population is a sicker one, especially during the pandemic¹⁴ when compared to healthier patients who are more likely to get tested in outpatient laboratories, avoiding the ED.^{12,13} Our data shows that even in a sicker ED population, often considered “higher risk”, a specific *screening group* that still has a likelihood of zero of having a COVID-19 infection, can and should be identified.

From the beginning of the COVID-19 pandemic, our institution, as many others, imposed strict COVID-19 testing, based on best available evidence, for all patients being admitted or requiring surgery from the ED. This was done to protect patients, staff and limit the overuse of personal protective equipment that was initially scarce. Initially, all patients were waiting in the ED until the PCR result was available, which could take up to 12 hours. To date, an algorithm guiding the admission process based on the patient's predetermined risk of COVID-19 is in place, allowing patients with no symptoms and no risk factors to be admitted to double rooms while awaiting PCR results. This algorithm is constantly updated. For example, at the beginning of the pandemic, any travel history was not considered a risk factor, but only travel from specific countries¹⁵, which has since then changed. Still, in our institution's experience, this algorithm is not always followed by the inpatient teams, for fear of missing an asymptomatic carrier. In this study, we chose a very conservative set of criteria to consider a patient in the *screening group* compared to other studies that evaluated screening criteria.¹⁶⁻¹⁸ As our results show, these strict criteria can identify patients with no risk for COVID-19. As more information about the clinical presentation of SARS-CoV2 and its transmission rates are known, such algorithms should be continually updated and refined to make the best and safest decision for all patients and staff.

Finally, our data can help clinicians make decisions on who truly needs a COVID-19 PCR

test, especially in a country like Lebanon, where the test is not covered by insurance companies and where 50% of the population now lives below the poverty level amidst a national economic collapse.¹⁹ Understanding who is truly at risk of COVID-19 infection, based on our data, will allow safe and expedited care for this subgroup of patients.

This is a single institution study hence our data may not be replicated in other institutions, and especially other countries with different pandemic waves. However, we studied this population at different times during the pandemic with different incidence rates, including January 2021 when Lebanon had an increase in COVID-19 case.¹¹ In addition, COVID-19- PCRs may have up to 54% false negative rates in tested individuals²⁰, or patients may develop symptoms up to 13 days after exposure.²¹ We were not able to follow our sample to see if they developed symptoms or another positive PCR after presentation. Yet we aimed to represent real-life data where the ED physician and the infection control team must make the best possible decisions with the results they have at that time. Only 10.2% of our data was in children, making extrapolation to this group difficult.

CONCLUSION

In a specific group of individuals without clinical symptoms or physical exam findings of COVID-19, and no risk factors such as a travel history or a COVID-19 contact, the likelihood of having a positive COVID-19 PCR is zero. This knowledge can help expedite admissions from ED to inpatient services and surgical interventions for those who need it, improving and expediting proper patient care, patient satisfaction and ED throughput which is essential during the COVID-19 pandemic.

Conflicts of Interest: Authors declare no conflicts of interest or sources of funding.

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