Letter to the Editor

Clinical characteristics of 51,815 patients presenting with positive and negative SARS-CoV-2 swab results in primary health care settings: Priority populations for vaccination

Dear Editor,

We read with interest Brendish et al. study on the comparison between patients with SARS-CoV-2 positive and negative swab results.[1] The study compared the clinical characteristics of adult hospitalised patients with SARS-CoV-2 infections positive and negative results. Brendish et al. reported that different health comorbidities including, hypertension, diabetes, chronic kidney disease, chronic liver disease did not differ significantly between both groups. On the other hand, patients with COPD, smokers were less often presented among patients with positive rt-PCR swab results in hospitalised patients. They suggested that the lower the presentation of current smokers and patients with COPD may be linked, and they have noted that other studies associated smoking with worse disease outcomes.

The study is of significance as earlier research studies reported the characteristics of hospitalised patients with no comparator groups.[2–6] To our knowledge, there are no studies to report on the clinical characteristics of patients with SARS-CoV-2 in primary care settings with comparison groups. The SARS-CoV-2 presentations in primary care settings reflect mild-to-moderate form of the disease, which presents different cohort of patients to hospitalised patients.

Following the methodology used by Bendish et al. study, this record-based study compares the demographics and comorbidities among patients attending primary health care corporation (PHCC) with a suspected diagnosis of SARS-CoV-2 infection. PHCC is a governmental institution that runs 27 health centres in Qatar.

The study population included all adult patients attending primary health care corporation from February 10th, 2020 to July 30th, 2020. Inclusion criteria included all adult patients with a documented diagnosis of a suspected diagnosis of SARS-CoV-2 infection and a documented rt-PCR swab result during the study period. Comparison groups are based on rt-PCR positive and negative results. Patients with more than one result were considered positive if any of the results is positive. Patients with inconclusive results were excluded from the analysis.

The study examines and compares demographics and clinical characteristics of adult patients presenting to primary health care settings testing positive and negative for SARS-CoV-2 rt-PCR, using electronic medical records. The comparison might reflect which clinical characteristics might increase the risk of infection rather than predict the outcomes. The result might inform both public health policies and vaccination guidelines.

Overview

During the study period, we retrieved 63,444 patient records. 51,815 adult patients had documented positive or negative swab results. The mean of the population age was 35.8 ± 11.4. (Median: 34 [Min: 18.3 - Max: 99]). Male patients were more represented in the sample (30,236/51,815; 58%). More than a quarter of the sample had a positive SARS-CoV-2 PCR result (14,672/51,815, 28%).

Table 1
Characteristics of the population with recurrent positive results.

	Overall ($N = 51,815$)
PCR	
Negative	37,143 (71.7%)
Positive	14,672 (28.3%)
Gender	
N-Miss	12
Female	21,567 (41.6%)
Male	30,236 (58.4%)
Age	
Mean (SD)	35.8 (11.4)
Range	18.3 - 99.0
Age Groups	
18–30 Yrs.	19,200 (37.1%)
30–40 Yrs.	18,096 (34.9%)
40–50 Yrs.	8647 (16.7%)
50–60 Yrs.	3929 (7.6%)
>60 Yrs.	1943 (3.7%)
HTN	
No	46,244 (89.2%)
Yes	5571 (10.8%)
DM	
No	46,096 (89.0%)
Yes	5719 (11.0%)
Dyslipidemia	
No	46,780 (90.3%)
Yes	5035 (9.7%)
CKD	
No	51,298 (99.0%)
Yes	517 (1.0%)
CVD	
No	50,679 (97.8%)
Yes	1136 (2.2%)
Asthma	
No	47,777 (92.2%)
Yes	4038 (7.8%)
COPD	
No	51,763 (99.9%)
Yes	52 (0.1%)
Smoking Status	
N-Miss	26,479
Nonsmoker	19,269 (76.1%)
Former Smoker	1438 (5.7%)
Smoker	4629 (18.3%)
Pregnancy	
N-Miss	30,248
Negative	20,889 (96.9%)
Positive	678 (3.1%)

Table 2
Cross table for comparison of patient characteristics between groups with positive and negative rt-PCR swab results

	N	Negative (N = 37,143)		Positive (N = 14,672)		Test Statistic	Rate ratio	95% CI
Gender: Male	51,803	0.6	21,213/37,135	0.6	9023/14,668	X^2_1=83.42, P<0.01	**1.2**	**1.15–1.25**
Age Groups	51,815					X^2_4=502.86, P<0.01		
18–30 Yrs.		0.4	14,646/37,143	0.3	4554/14,672		Ref	
30–40 Yrs.		0.3	12,967/37,143	0.3	5129/14,672		**1.27**	**1.21–1.33**
40–50 Yrs.		0.2	5846/37,143	0.2	2801/14,672		**1.54**	**1.48–1.63**
50–60 Yrs.		0.1	2478/37,143	0.1	1451/14,672		**1.88**	**1.75–2.03**
>60 Yrs.		0.0	1206/37,143	0.1	737/14,672		**1.96**	**1.78–2.2**
HTN: Yes	51,815	0.1	3547/37,143	0.1	2024/14,672	χ^2 =197.55, P<0.01	**1.52**	**1.43–1.61**
DM: Yes	51,815	0.1	3584/37,143	0.1	2135/14,672	χ^2 =257.42, P<0.01	**1.60**	**1.51–1.69**
Asthma: Yes	51,815	0.1	3100/37,143	0.1	938/14,672	χ^2 =55.83, P<0.01	**0.75**	**0.7–0.81**
COPD: Yes	51,815	0.0	43/37,143	0.0	9/14,672	χ^2 =3.11, P = 0.08	0.52	0.26–1.09
CVD: Yes	51,815	0.0	753/37,143	0.0	383/14,672	χ^2 =16.68, P<0.01	**1.29**	**1.14–1.47**
CKD: Yes	51,815	0.0	340/37,143	0.0	177/14,672	χ^2 =9.02, P<0.01	**1.32**	**1.1–1.59**
Dyslipidemia: Yes	51,815	0.1	3350/37,143	0.1	1685/14,672	χ^2 =72.86, P<0.01	**1.31**	**1.23–1.39**
Smoking Status	25,336					χ^2 =302.59, P<0.01		
Nonsmoker		0.7	13,147/17,917	0.8	6122/7419		Ref	
Former Smoker		0.1	1012/17,917	0.1	426/7419		0.9	0.80–1.02
Smoker		0.2	3758/17,917	0.1	871/7419		**0.5**	**0.46–0.54**
Pregnancy 18–50 Yrs. of age: Yes	18,863	0.0	435/14,079	0.1	243/4784	χ^2 =40.80, P<0.01	**1.68**	**1.43–1.97**

Comparison of patient characteristics between groups with positive and negative rt-PCR swab results

Age had the most significant difference between both groups with increasing odds ratio. Patients over 60 years of age were nearly twice as likely to have positive rt-PCR results compared to patients younger than 30 years of age (odds ratio = 1.96; 95% CI = 1.78, 2.2). Pregnancy was the second most common condition associated with an increased frequency of positive swab results (odds ratio = 1.68; 95% CI = 1.43, 1.97). Diabetes and hypertension and gender were also associated with increased risk, but to a lesser extent. Smoking and asthma were associated with less presentation among the population with positive results (Table 2).

Summary

The study results report on the risk of infection associations with different population characteristics. Patients over 40 years of age, pregnant women and patients with diabetes and hypertension seem to be at higher risk.

Earlier studies suggest that older age is associated with higher mortality.[7] However, authors of the same report suggested that there are no studies to report on the age-dependence in susceptibility to infection. Other studies have suggested that high mortality is associated with higher comorbidities rather than age[8]. Besides the fact that patients of over 60 years of age had the highest risk of infection, the population showed a progressive increase in risk among different age groups. The findings are supportive of age as an independent variable plays a key role in susceptibility to infection.

Also, in our results, pregnancy, diabetes, and hypertension had an increased risk of infection. There are no studies that have reported on the association between pregnancy and risk of SARS-CoV-2 infections.[9] Our results are the first to support the increased risk among this cohort of patients. The increased risk of infection in patients with diabetes and hypertension may be linked to the increased disease prevalence in older age groups. Patients with diabetes and hypertension had higher rates of ICU admissions and mortality.[10,11]

Patients with current smoking status and asthma were less likely to have positive swab results. Similar to the findings of earlier studies, we think both diagnoses are linked. Further research must explore causes for the lower risk among this cohort of patients.

In conclusion, there are differences between patients with positive and negative rt-PCR SARS-CoV-2 swab results presenting to primary health care settings in Qatar. Older age, pregnancy, and

diabetes are among the most associated with increased frequency of positive results. Our results should complement the earlier evidence from secondary care, which suggested that they also influence disease outcomes. Of interest, the list of characteristics and comorbidities had no impact on recurrence rates.[12]

In view of the current surge of numbers, the list may inform prediction models for diagnosis, public health measures, and vaccination prioritisation policies. In our view's vaccination should be prioritised for patients older than 50 years of age, pregnancy, and patients with cardiovascular risk factors.

Strengths and limitations

The study reports on the large sample size, 51,815, which instils confidence in the significance of our findings. Also, the study reports on characteristics of mild-to-moderate presentations in primary health care settings. The study compares patients with positive SARS-CoV-2 swab results with patients with negative results as a control group. However, the data points do not report on patients' outcomes. Regression analysis is required to further examine the association between variables and including assessment of disease susceptibility risk (Table 1).

Informed consent

Data request and analysis were anonymous, and no patient consent was required.

Authorship

All authors have contributed to the drafting and critical revision of the article. The final version approved by all authors.

Ethics statement

Anonymous data request approved by the department of clinical research, primary health care corporation with reference number PHCC/DCR/2020/04/031.

Declaration of Competing Interest

There are no competing interests for any author.

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