

## Letter to the Editor

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Emerging infectious diseases pose a serious threat to health systems worldwide. An outbreak of a novel coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has spread to several countries, including Iraqi Kurdistan.<sup>1,2</sup> By March 4, 2021, the total confirmed cases of coronavirus disease (COVID-19) were 114 653 749, including 2 550 500 deaths, reported by the World Health Organization (WHO).<sup>2</sup> Out of these, 36 862 confirmed cases were reported from Duhok with 740 deaths (mortality rate: 2.0%).

Iraqi Kurdistan has established several restrictive preventive measures to prevent spreading this outbreak within this autonomous region. The preventive measures include restriction of population movement, school and university shutdown, and public lockdown from February to October 2020.<sup>3</sup> It is well known that such preventive measures are crucial in reducing infection and mortality rates.<sup>1,4</sup> However, there is scarce information on the trend of COVID-19 following discontinuing public lockdown in this region. Therefore, we aimed to make a brief report about trends of COVID-19 infection and mortality rates in Duhok Province. The ethical approval of the present protocol was obtained from the local health ethics committee.

Between early November 2020 and late February 2021, a total of 46 514 people were tested for SARS-CoV-2, among whom 29 407 were males (63.22%) and 17 107 were females (36.78%) of ages 0–105 years. Both health care workers (560; 1.22%) and non-health care workers (45 444; 98.78%) were included in this screening process. Of the 46,514 persons who were tested in the screening process, 16.49% (n = 7669) were tested positive and 82.42% (n = 38 335) were tested negative for COVID-19 and 1.09% (n = 510) patients died (Table 1).

We found that the infection rates/100 tested persons were significantly higher in November and December 2020 compared to January and February 2021. The ranges of infection/100 tested persons were between 15.65 and 38.26 in November 2020, between 7.89 and 35.61 in December 2020, between 4.06 and 35.77 in January 2021, and between 2.15 and 17.00 in February 2021. The infection rates/100 tested persons were significantly reduced in November 2020 to February 2021, from 26.44 to 10.47/100, respectively. In addition, a similar pattern was found for mortality of COVID-19 over time: 2.23%, 1.38%, 0.42%, and 0.48%, respectively (Figure 1).

We found that females (18.0%) were more likely to be tested positive for COVID-19 compared with males (15.61%;  $P < 0.001$ ). The health care and non-health care workers had no significant difference in the infection rate: 15.18% vs 16.69%;  $P = 0.361$  (see Table 1). Besides, the infected and non-infected persons were similar in age: 36.8 (SD: 15.7 years) vs 35.2 (SD: 15.1 years;  $P = 1.000$ ). However, the dead patients were significantly older (median: 69 years) compared with those persons with negative (median: 35 years) or positive outcomes (median: 36.0 years;  $P < 0.001$ ) (Figure 2).

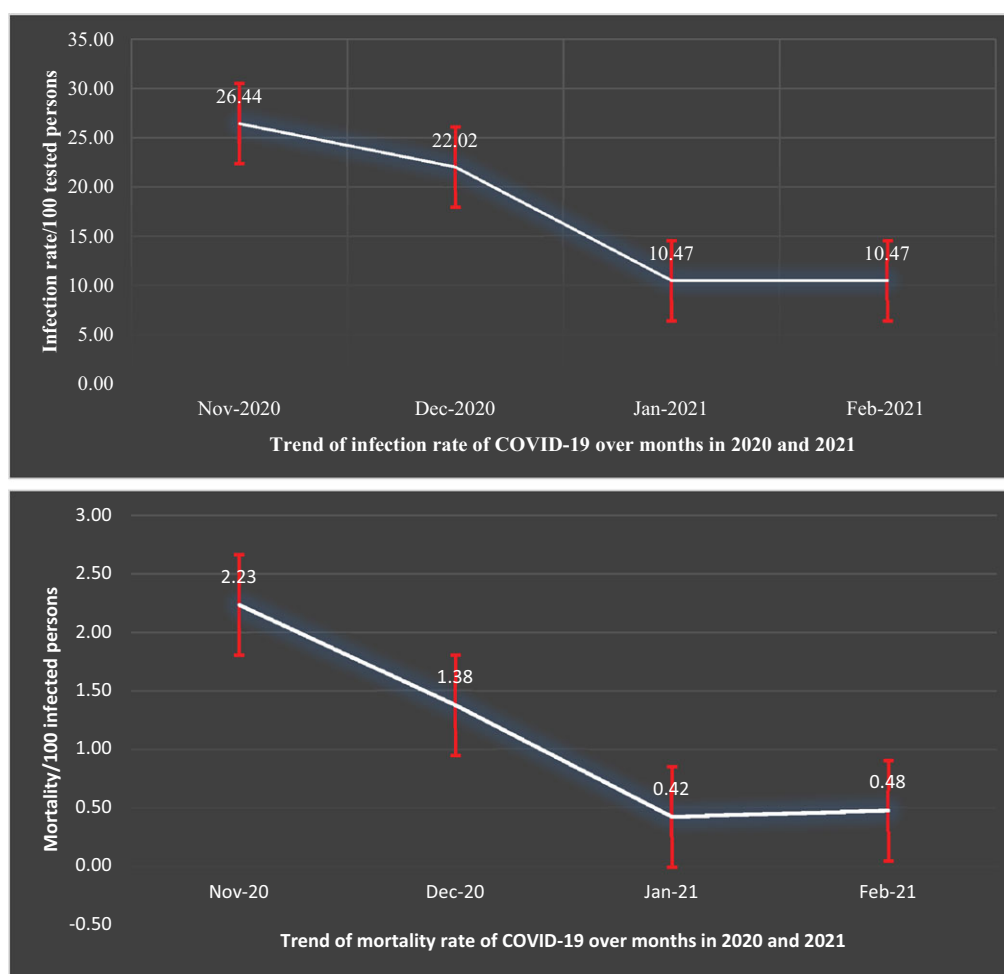
Based on the infection rates obtained in 2021 (10.47/100 tested persons), we speculate that the public has obtained to an extent a level of immunity in 2021, since the infection rate has been significantly reduced from November 2020 to February 2021. We understood that many scholars have different perceptions of the effect of preventive measures on the trend of this epidemic.<sup>5</sup> Whether we consider the effect of preventive measures<sup>3</sup> or the possible effect of respiratory vaccinations,<sup>6</sup> we believe that the public in Duhok Governorate in Iraqi Kurdistan has obtained some level of potential protective efficacy against this virus.

The WHO has suggested achieving herd immunity against COVID-19 through vaccination, not by exposing the public to the pathogen. It suggests that a substantial proportion of the public must be vaccinated to lower the overall amount of the virus spread in an endemic area.<sup>7</sup> Iraqi individuals did not receive the vaccine by February 2021. Therefore, we believe that this shortage resulted in natural immunity to the virus in the Iraqi people. The immunity made by recovering from COVID-19 lasts up to 8 months after being infected.<sup>8</sup> Basically, several scientists believe that after people are immunized against COVID-19, herd immunity is established through reaching a threshold of 60–70% of the population.<sup>9</sup> This herd immunity could be obtained through vaccinations or past exposure to the virus. Based on the findings of this report, the

**Table 1.** Comparison of infection rate in gender and occupation between October 2020 and February 2021

Characteristics (n = 46 514)	Test Result No. (%)			Total	P-Value
	Negative (n = 38 335, 82.42%)	Positive (n = 7669, 16.49%)	Dead (n = 510, 1.09%)		
<b>Gender</b>					< 0.001
Male	24 498 (83.31)	4590 (15.61)	319 (1.08)	29 407	
Female	13 837 (80.89)	3079 (18.00)	191 (1.12)	17 107	
<b>Occupation</b>					0.361
Health care worker	475 (84.82)	85 (15.18)		560	
Non-health care worker	37 860 (83.31)	7584 (16.69)		45 444	
<b>Total</b>	38335	7669	510		

Pearson's chi-square test was performed for statistical analyses.

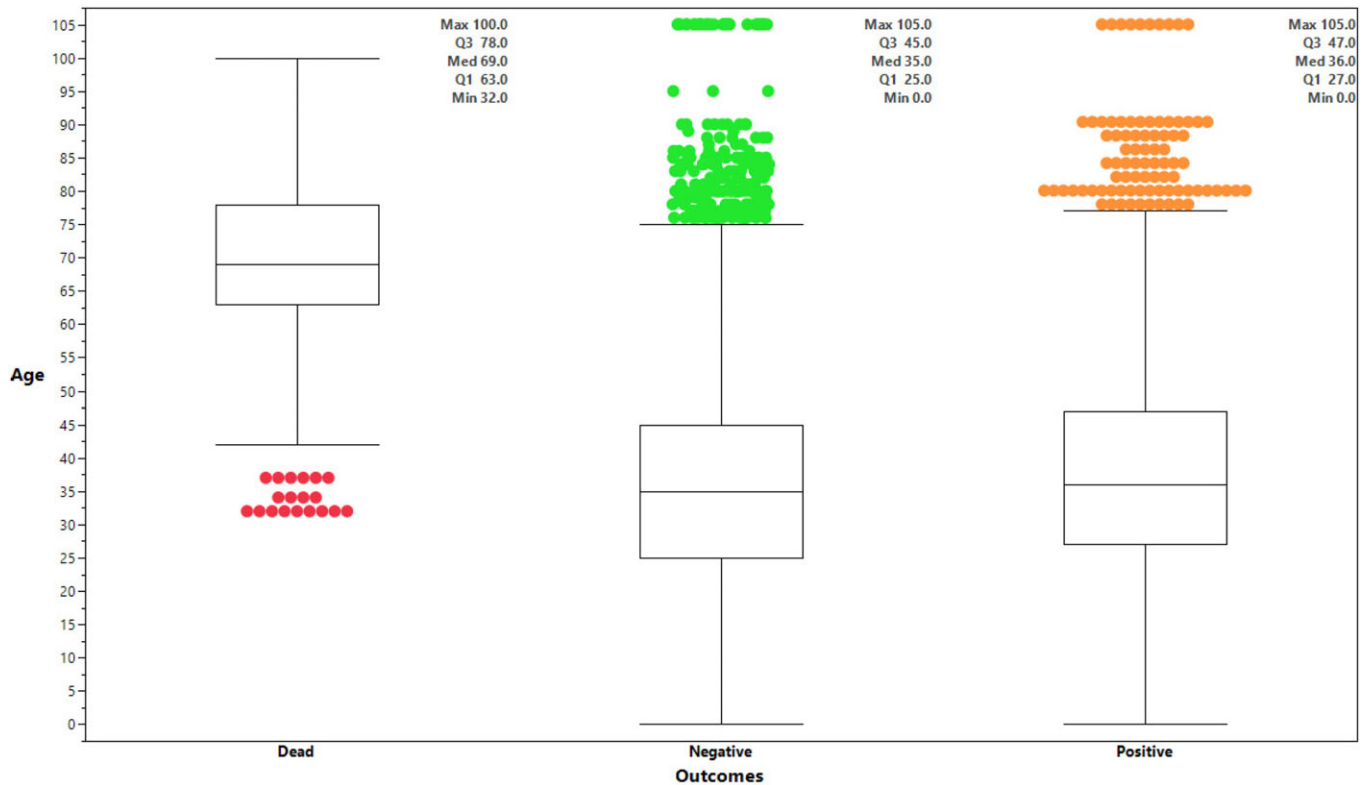
**Figure 1.** Trend of infection and mortality rate/100 tested persons over months in 2020 and 2021.

populations of Iraqi Kurdistan have not obtained adequate herd immunity. However, maybe the populations are close to this threshold because the official screening rates have not been documented in either public or private sector.

Being debated, scientist Youyang Gu claims that reaching a herd-immunity threshold is not promising due to vaccine hesitancy, the emergence of new variants, and vaccine-related technical

issues. On the contrary, it is essential to acknowledge that some effective vaccines are available at the moment, which is effective against the variants of this virus.<sup>9</sup>

However, the heterogeneity of populations may impact disease-induced immunity owing to affecting different proportions in age groups with the highest contact rate compared with age groups with low contact rates.<sup>10</sup>



**Figure 2.** Comparison of age among subjects with different outcomes.

**Conflict(s) of Interest.** The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this paper.

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