



ASTHMA AND COVID-19 AMONG HEALTHCARE WORKERS FROM A MEXICAN HOSPITAL: IS THERE AN ASSOCIATION?

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ABSTRACT

Background: Asthma does not appear to be a risk factor for developing COVID-19. **Objective:** The objective of the study was to analyze the role of asthma as a factor associated with COVID-19 among healthcare workers (HW). **Methods:** A cross-sectional study was conducted in HW from a Mexican hospital. Data were obtained through an epidemiological survey that included age, sex, and history of COVID-19. Multivariate logistic regression analysis was performed to identify factors associated with COVID-19. **Results:** In total, 2295 HW were included (63.1% women; mean age 39.1 years); and 1550 (67.5%) were medical personnel. The prevalence of asthma in HW with COVID-19 was 8.3%; for the group without COVID-19, the prevalence was 5.3% ($p = 0.011$). The multivariate analyses suggested that asthma was associated with COVID-19 (OR 1.59, $p = 0.007$). **Conclusion:** Our study suggests that asthma could be a factor associated with COVID-19 in HW. (REV INVEST CLIN. 2022;74(3):131-4)

Keywords: Asthma. COVID-19. Healthcare workers. Medical staff.

INTRODUCTION

Worldwide, as of August 17, 2021, there have been almost 210 million cases and 4.4 million deaths related to the disease (COVID-19) caused by SARS-CoV-2, which was discovered in 2019¹. Given that patients with asthma have a differentiated immune response compared to subjects without asthma², it is expected that they have a higher risk of being infected by SARS-CoV-2. Based on empirical evidence provided in some published studies, health-care

workers (HW) report that patients with asthma could have a higher risk of acquiring COVID-19³; however, those data remain inconsistent. The objective of this study was to describe the possible association between asthma and COVID-19 among HW.

METHODS

A cross-sectional study was conducted among health-care workers (HW) from a second-level care hospital

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Table 1. Factors associated to COVID-19 in healthcare workers from a Mexican hospital

	Model I			Model II		
	OR	95% CI	p	OR	95 % CI	p
Asthma	1.48	1.01-2.18	0.046	1.59	1.09-2.31	0.015
Medical staff	1.34	1.08-1.66	0.008	1.35	1.09-1.68	0.006
Male	0.86	0.70-1.06	0.163	—	—	0.177
COPD	1.96	0.70-5.48	0.198	—	—	0.196
Age*	0.99	0.99-1.00	0.299	—	—	0.355

All co-variables were entered as dichotomous, except for age which was entered as a continuous variable.

OR calculated by logistic regression. Reference category: OR = 1.

Methods of entering variables into the models:

Model I: enter.

Model II: forward conditional.

OR are not calculated for variables excluded from Model II.

Medical staff: doctor or nurse. COPD: chronic obstructive pulmonary disease.

in Guadalajara, Mexico, between January 13 and April 7, 2021. HW aged ≥ 18 years were included in the study. Subjects who met any of the following criteria were excluded from the study: ≥ 65 years of age; uncontrolled diabetes, uncontrolled systemic arterial hypertension (SAH), morbid obesity, neoplastic diseases, uncontrolled COPD or uncontrolled cardiovascular diseases; use of immunosuppressive medications; and pregnant women.

Data were obtained through an epidemiological survey that included age, sex, and history of COVID-19, defined as the presence of symptoms suggestive of COVID-19 confirmed by a positive real-time reverse transcriptase polymerase-chain reaction (rtRT-PCR) for SARS-CoV-2. In addition, comorbidities such as diabetes, SAH, cardiovascular disease (CVD), chronic obstructive pulmonary disease (COPD), asthma, smoking, and history of allergic disease were investigated. As per convention, HW were categorized into medical personnel (doctors and nurses) and nonmedical personnel.

In the statistical analysis, the categorical variables are presented as frequencies and proportions; the quantitative variables are presented as the mean and standard deviation; 95% confidence intervals (CI) were estimated for proportions; and finally, multivariate logistic regression analysis was performed to identify factors associated with COVID-19. The Ethics

Committee of the Civil Hospital of Guadalajara, Mexico, approved this study.

RESULTS

In total, 2295 HW were included (322 were excluded because for medical reasons they remained in confinement, and 61 more subjects were excluded due to a lack of information); 63.1% were women; the mean age was 39.1 ± 11.1 years; 1550 (67.5%) were medical personnel, and the remaining were nonmedical staff. Regarding comorbidities, we observed the following prevalence rates: diabetes, 5.9%; SAH, 7.4%; CVD, 2.0%; COPD, 0.7%; history of allergic disease, 17.1%; and current smoker 10.8%.

In the study population, 529 cases of COVID-19 (23.1%) were confirmed by rtRT-PCR-SARS-CoV-2. The prevalence of asthma in HW with COVID-19 was 8.3% (95% CI: 6.25% - 11.0%); in the group without COVID-19, the prevalence was 5.3% (95% CI: 4.3% - 6.4%) ($p = 0.011$).

The frequency of SARS-CoV-2 infection was higher in medical staff than in nonmedical staff (24.8% vs. 19.5%, $p = 0.005$). In our study, variables such as sex, age, diabetes, SAH, CVD, and current smoker were not related to COVID-19.

The multivariate analyses show an association between asthma (OR 1.59, $p = 0.007$) or being part of the medical staff (OR 1.40, $p = 0.003$) could be independent factors associated with COVID-19 (Table 1). In the multivariate analysis, having asthma (OR 1.59, $p = 0.015$) or being part of the medical staff (doctor or nurse) (OR 1.35, $p = 0.006$) were independent factors associated with COVID-19 (Table 1).

DISCUSSION

In our study, the prevalence of asthma in HW with SARS-CoV-2 infection was 8.3%. When comparing this number with those observed in population studies conducted around the world (4.3%)⁴ and in Mexico (5.0%)⁵, the value obtained herein is much higher. Throughout the SARS-CoV-2 pandemic, multiple studies have emerged that evaluated the association between COVID-19 and asthma, some of which have been synthesized in several meta-analyses. In the first, the results corresponding to more than 580,000 patients with COVID-19 were evaluated; among them, the prevalence of asthma was 7.5%⁶. In another study, slightly more than 160,000 patients were analyzed; only 1.6% had asthma as a comorbidity⁷. One more study analyzed the data of 410,382 patients, and the prevalence of asthma showed great variability by geographical area, the lowest of which was observed in Italy (1.1%) and the highest in South Korea (16.9%)². The most-recent meta-analysis included almost one million patients with COVID-19, and the overall prevalence of asthma was estimated at 8.1%⁸. A cross-sectional study conducted in Mexico showed that the prevalence of asthma in adults with COVID-19 was 3.3%⁹.

Almost 2 years have passed since the start of the SARS-CoV-2 pandemic, and the relationship between asthma and COVID-19 remains inconsistent because while recent studies have shown that asthmatics have a reduction in the risk of acquiring COVID-19^{6,8,9}, others, as in the case of this research, have found the opposite. Although it would be difficult to have a clear answer to this dilemma through a survey, it should be noted that many of the investigations which have documented a lack of association, or a “protective” association between asthma and COVID-19, were conducted in the general

population, while HW have characteristics or conditions that differentiate them from the rest. As occurred in other countries during the 1st months of the epidemic, in Mexico, “home office” was carried out by various groups of employees, especially those in the educational, administrative, and business sectors, but in the case of HW, this was not always possible due to the priority of their work in the context of an epidemic, which could explain a higher prevalence of COVID-19, especially in those with asthma. In addition, due to the nature of their activity, HW could have had greater access to PCR tests than the rest of the population and although it may seem paradoxical, there could have been some initial rejection of the COVID-19 vaccine due to fear of adverse reactions. On the other hand, it should be taken into consideration that the prevalence of COVID-19 found in this study among HW would also be determined by the time at which the survey was conducted. In the study period (January to April 2021), Mexico was in the second wave or epidemic peak, and vaccination was in its initial phase; furthermore, the information collected would only account for the accumulated cases from the beginning of the epidemic in Mexico during 2020 to April 2021, so an update of the epidemiological situation of COVID-19 in HW could be useful to elucidate the relationship between asthma and COVID-19. There are some other limitations that could have influenced our results. First, the cross-sectional nature of the design did not allow us to assume causality between asthma and increased risk of COVID-19. Second, asthma history was obtained from a single hospital through a self-report survey. Finally, data on asthma treatments for asthmatic patients were not analyzed.

In summary, our study from a single hospital and country suggests that asthma is associated with a higher prevalence of COVID-19 among HW. Further studies are required in this regard.

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