



Observational study of the first month of the influenza vaccination campaign in patients followed up for asthma in 2019 and 2020. Does one month make a difference?

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Abstract

Key words:

- Asthma
- Flu
- SARS-CoV-2
- Vaccination

Introduction: the main objective of the study was to analyse the influenza vaccination coverage in years 2019 and 2020 and assess the impact of the COVID-19 pandemic on it. To do so, we compared the patients vaccinated in 2 primary care centres (PCCs) of similar characteristics but that differed in that one of them actively recruited patients for vaccination by sending a reminder to their home address.

Material and methods: we conducted an observational study in a sample of 934 patients vaccinated in the first month of the influenza vaccination campaign in years 2019 and 2020. We did a descriptive analysis of the sample. Subsequently, we compared the percentage of vaccinated patients at the end of the first month of the campaign in 2019 and 2020 and in the 2 PCCs using the χ^2 test.

Results: the overall percentage of patients vaccinated after the first month of the campaign was 33.9% in 2020 and 19.9% in 2019 ($p < 0.001$), with significant differences between PCCs as well. A greater percentage of patients received the vaccine in PCC 1, which had an active patient recruitment strategy ($p < 0.001$).

Conclusions: the vaccination coverage was higher in 2020 compared to 2019, which could be explained by the anxiety elicited in the population by coexistence of influenza virus and SARS-CoV-2. Active recruitment strategies help increase vaccination coverage in patients with asthma.

Estudio observacional del primer mes de campaña vacunal de la gripe en pacientes controlados por asma en 2019 y 2020. ¿Un mes marca la diferencia?

Resumen

Palabras clave:

- Asma
- Gripe
- SARS-CoV-2
- Vacunación

Introducción: el objetivo principal del estudio es analizar la influencia de la pandemia causada por el SARS-CoV-2 en el porcentaje de vacunación antigripal, comparando la cobertura vacunal del año 2019 con la del año 2020. Para ello, se han utilizado los pacientes vacunados en dos centros de salud (CS) de características similares, con la diferencia de que en uno de ellos se realiza captación activa de pacientes mediante envío de una carta a domicilio.

Material y métodos: estudio observacional realizado a partir de una muestra de 934 pacientes vacunados durante el primer mes de campaña en los años 2019 y 2020 en dos CS. Se ha realizado un análisis descriptivo de la muestra. Posteriormente, se han comparado los porcentajes de vacunación de ambos años y ambos CS mediante el test χ^2 .

Resultados: el porcentaje de vacunación global al final del primer mes de campaña en el año 2020 fue 33,9% y en 2019 fue 19,9% ($p < 0,001$), obteniéndose también diferencias significativas en función del CS. Se vacunaron mayor porcentaje de pacientes en el CS 1, que realiza captación activa ($p < 0,001$).

Conclusiones: los porcentajes de vacunación son mayores en el año 2020 con respecto a 2019, lo que puede ser explicado por la angustia de la población ante la coexistencia de ambos virus. Para aumentar la cobertura vacunal en pacientes asmáticos son de ayuda estrategias de captación activa.

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INTRODUCTION

Infections by influenza viruses are an important public health problem, affecting 10% to 20% of the population each year and causing significant morbidity and mortality worldwide.¹ Influenza viruses belong to the *Orthomyxoviridae* family of RNA viruses and are characterised by constant antigenic drift, which is the reason why vaccination must be performed annually. Influenza viruses are classified into types A, B and C, and types B and C affect humans exclusively. Influenza A viruses have 2 key antigens, neuraminidase and haemagglutinin, which are the main targets of vaccines.² There are subsets of the population at increased risk of influenza, more likely to transmit the virus or to suffer complications. Asthmatic individuals are one such subset. Asthma causes chronic inflammation of the airways, impairing the antiviral response in the respiratory tract, which results in an increased risk of developing severe influenza and bacterial superinfection.^{2,3} The recommendations for the 2020-2021 period of the Advisory Committee on Vaccines of the Asociación Española de Pediatría (Spanish Association of Paediatrics, AEP) called for vaccination against influenza of patients at higher risk of severe or complicated infection due to age or the presence of risk factors such as asthma.⁴

To date, infection by SARS-CoV-2 has caused significant morbidity and mortality with a substantial impact on health care systems in many countries, so the overlap with the annual flu season was anticipated to have even more deleterious consequences. For this reason, public health authorities considered achieving high influenza vaccine coverage rates to have a positive impact on health systems that have been significantly strained in the months of the SARS-CoV-2 pandemic.⁵ The objectives set for the 2020-2021 season by the Interterritorial Council of the Spanish National Health System were to achieve or exceed a vaccination rate of 60% in individuals with risk factors.⁴

Thus, we were interested in the coverage rate achieved in the influenza vaccination campaigns

of seasons 2019-2020 and 2020-2021, the factors that could have affected the success of the campaigns based on the comparison of the different strategies implemented in 2 primary care centres (PPCs) of similar demographic characteristics, and the impact of the coronavirus disease 2019 (COVID-19) pandemic in the influenza vaccine coverage rate in 2020 compared to the previous year.

Objectives of the study

- To compare the percentage of patients aged less than 15 years with a diagnosis of asthma or recurrent wheezing vaccinated in PPC 1, which engaged in active patient recruitment, compared to PPC 2, which did not engage in active recruitment.
- To establish the influenza vaccination coverage in children under 15 years with asthma or recurrent wheezing that were being followed up in these PPCs in the first month of the 2019-2020 and 2020-2021 seasons, assessing the impact of the COVID-19 pandemic on these outcomes.

MATERIAL AND METHODS

Study design and material

We conducted an observational descriptive study to assess the annual influenza vaccination coverage by reviewing the health records of all patients with a diagnosis of asthma or equivalent respiratory illness in the caseloads of 2 PPCs in Health District I in Zaragoza (Spain) in the first month of the influenza vaccine campaign in years 2019 and 2020. The study universe comprised a total of 5659 paediatric patients.

Before starting to collect data, we conducted a literature search on different aspects related to influenza vaccination campaigns and the risk factors that determine the indication of vaccination, which include the diagnosis of asthma. We also obtained the approval of the Research Ethics Committee of the Autonomous Community of Aragon (file no. PI20/495), after which we proceeded to retrieve data from the electronic health records.

The inclusion criteria were age 14 years or younger, a diagnosis of asthma and management of asthma in the PPCs included in the study, whether or not the patient had received the influenza vaccine in the first month of the vaccination campaign. We excluded patients aged 14 years or younger that received the influenza vaccine for reasons other than asthma. The resulting sample included a total of 934 patients: 483 in 2019 and 451 in 2020.

Statistical analysis

We collected data on the following variables for all included patients: date of birth, sex, PPC, vaccination against influenza (yes/no), date of vaccination (if applicable) and whether or not they had a diagnosis of asthma. For the purpose of the study, the age of the patients was documented as the chronological age at the start of the vaccination campaign: November 4 in 2019, and October 15 in 2020.

The statistical analysis was carried out with the software SPSS Statistic version 23.0. First, we did a descriptive analysis of the sample. We compared proportions by means of the χ^2 test and considered *p*-values of <0.05 statistically significant.

RESULTS

Sample characteristics

The sample included 934 paediatric patients with asthma. Of the 483 patients with an asthma diagnosis in 2019, 123 were managed in PPC 1 and 360 in PPC 2. In 2020, 110 paediatric patients with asthma were managed in PPC 1 and 341 in PPC 2. The mean age of patients vaccinated in 2019 was 8.15 years, compared to 7.15 in 2020. The differences in age were not statistically significant. We found a predominance of male patients in PCC1 (70.7% in 2019 and 72.7% in 2020). In PCC 2, the sex distribution was more uniform (male sex: 53.9% in 2019 and 56.6% in 2020).

Analysis of vaccination coverage

When it came to the vaccination coverage rate in the 2 years under study, we found an increase in coverage in patients with asthma aged up to 14 years in 2020 compared to 2019. In 2019, the overall percentage of patients in both PCCs vaccinated in the first month of the campaign (November) was 19.9%, compared to 33.9% in 2020 ($p < 0.001$; *odds ratio* [OR] = 2.070; 95% confidence interval [95 CI]: 1.539 to 2.784). To assess the groups of patients with the highest vaccination coverage rates, we divided them in 5 age groups: < 3 years, 4-6 years, 7-9 years, 10-12 years and ≥ 13 years. In 2019, the age groups with the highest proportion of vaccinated children were the 4-6 years and 10-12 years groups. In 2020, they were the 4-6 years and 7-9 years groups. **Table 1** presents the percentage of children vaccinated in each age group, and the differences were not statistically significant.

Table 1. Vaccination coverage rate by age in 2019 and 2020

	2019	2020
0-3	16.7%	15.7%
4-6	24.0%	28.1%
7-9	18.8%	24.8%
10-12	24.0%	18.3%
>12	16.7%	13.1%

When it came to the vaccination coverage by PPC, we found that PCC 1 achieved coverage rates of 44.7% in 2019 and 62.7% in 2020 ($p = 0.006$; OR: 2.081; 95 CI: 1.231 to 3.518). In contrast, PCC 2 achieved a coverage of 11.4% in 2019 and 24.6% in 2020 ($p < 0.001$; OR: 2.543; 95 CI: 1.691 to 3.824). The differences between the 2 PPCs in vaccination rates by year were also statistically significant ($p < 0.001$ for both years; 2019: OR: 0.159; 95 CI: 0.098 to 0.257 versus 2020: OR: 0.194; 95 CI: 0.123 to 0.307). Based on our findings, the overall vaccination coverage and the vaccination coverage in each PCC in patients under 15 years with asthma was higher in 2020 compared to 2019 and in PCC 1 compared to PCC 2.

DISCUSSION

The findings of our study show that the influenza vaccination coverage in patients with asthma aged 14 years or younger was higher in 2020 compared to 2019 and in PCC 1 compared to PCC 2.

The difference between the PPCs could be attributed to the fact that PPC 1 sent a notice regarding visiting the centre to receive the influenza vaccine, while PPC 2 did not do it. This shows the positive impact of actively recruiting patients at risk, with a percentage of vaccination that was greater in PPC 1 by 33.3% in 2019 and 38.1% in 2020. Previous studies have already reported greater vaccination coverage rates in the general population with use of proactive vaccination strategies, with increases ranging from 2.6% to 6.1%. In our study, we found that these increases are even more marked in the case of patients aged 14 years or less with asthma.⁶

The European Academy of Allergy and Clinical Immunology (EAACI) commented that the vaccination coverage rates in these patients in Spain was low, ranging between 18 and 20%.⁷ The data from the Primary Care Clinical Database published by the government of Spain showed percentages of vaccination in patients with asthma aged 0 to 14 years of approximately 8 to 13%, with the percentage decreasing with increasing age.⁸ In our analysis, the coverage data obtained for year 2019 were consistent with previous sources or even higher. In 2020, we found a significant increase in the vaccination coverage of up to 33.9%, which made us contemplate what the differences may have stemmed from. We attribute these changes in vaccination coverage to the current epidemiological situation at the global level, the COVID-19 pandemic. However, we must not forget that these coverage rates were still well below the 60% target for risk groups established by the ICNHS for the 2020-2021 season.

We ought to highlight that the general measures proposed to prevent COVID-19 helped reduce the

transmission of influenza viruses. Social distancing with an interpersonal space of at least 1.5 m and the widespread use of masks prevent the spread of influenza, as it is transmitted by air droplets that are larger compared to the aerosolised particles in the case of SARS-CoV-2, which can remain suspended in the air, facilitating transmission. Due to this situation, combined with a higher vaccination coverage in patients at risk, the incidence of influenza has been nearly negligible thus far this year.

In addition to the preventive measures imposed to confront the pandemic, another salient phenomenon associated with it is the considerable anxiety that the emergence of SARS-CoV-2 has elicited in the general population. The need to develop a vaccine to fight this virus may have inspired an urge in the general population to take advantage of whatever resources are available at any given time. Thus, given the availability of a resource to decrease the morbidity and mortality associated with influenza viruses, individuals may be more open to receiving this vaccine, which had an indirect effect against the SARS-CoV-2 pandemic. Systematic reviews have found evidence that vaccination against influenza in individuals with asthma prevents the development of influenza, with most of the evidence obtained from observational studies like the one presented here.³

The epidemiological context changed significantly between 2019 and 2020. The damage caused by the COVID-19 pandemic is irreparable and has brought a global health crisis, but this is no reason to neglect primary prevention measures like vaccination against influenza, which can also cause epidemic disasters. Vaccination against influenza in patients with risk factors such as asthma is indicated by important international organizations. In this study, we perceived the impact of the epidemiological context in vaccination coverage, but it is still important not to neglect simple measures such as sending a reminder of vaccination through regular mail.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to disclose in relation to the preparation and publication of this article.

ABBREVIATIONS

AEP: Asociación Española de Pediatría (Spanish Association of Pediatrics) • **CNHS:** Interterritorial Council of the Spanish National Health System • **OR:** odds ratio • **PCC:** primary care centre • **95 CI:** 95% confidence interval.

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