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ABSENCE OF THE INFLUENZA EPIDEMIC IN THE 2020-2021 INFLUENZA SEASON IN CATALONIA, SPAIN, BASED ON SURVEILLANCE DATA COLLECTED BY SENTINEL PHARMACIES

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ABSTRACT

Objective: To analyse influenza surveillance obtained by sentinel pharmacies in Catalonia, Spain, in the 2020−2021 influenza season. **Methods:** Sentinel pharmacies reported all influenza-like illness (ILI) cases detected among individuals attended during in 2020−2021 influenza season. Influenza surveillance data collected included: ILI symptoms, medications dispended, medications prescribed by physicians, and influenza vaccination. ILI cases were identified based on ECDC criteria. The moving epidemic method (MEM) was used to assess the influenza epidemic in 2020−2021 influenza season. The t test was used to compare mean number of ILI cases reported per week in different influenza seasons, with a $p < 0.05$ considered as statistically significant. The screening method was used to assess influenza vaccination effectiveness in patients aged 65 or more years. **Results:** 177 ILI cases were reported by sentinel pharmacies in the 2020-2021 influenza season. No influenza epidemic activity was observed in the 2020-2021 influenza season based on two criteria. First, the number of ILI cases reported per week was kept bellow the MEM-based epidemic threshold (29 cases per week). Second, the mean number of ILI cases reported per week in 2020-2021 was significantly lower than in 2017−2018 (5.4 vs. 25.3, $p<0.005$), 2018−2019 (5.4 vs 30.3, $p<0.0001$) and 2019−2020 (5.4 vs. 18.8, $p<0.01$) influenza seasons. Paracetamol was the drug most frequently dispended (71.2%) and prescribed (28.8%) to ILI patients. The influenza vaccination effectiveness in patients aged 65 or more years was 53.7% (95% CI: 46.0−61.3%). **Conclusion:** The influenza epidemic did not occur in Catalonia, Spain, in the 2020-2021 season based on ILI cases reported by sentinel pharmacies of Catalonia. The study found that influenza surveillance based on sentinel pharmacies can provide information on ILI patients that is not provided by traditional influenza surveillance systems.

KEYWORDS: Influenza, influenza surveillance, influenza epidemic, sentinel pharmacies.

INTRODUCTION

Influenza is responsible for a seasonal epidemic every winter in the Northern hemisphere, with a great impact on then health system due to morbidity, mortality and health services use. Influenza surveillance include monitoring annual epidemics, detection of the start and duration of the epidemic in order to alert health services to reduce morbidity and economic impact. Influenza surveillance based on drug dispensation, health services utilisation and no clinical data is a recent practice.[1,2]

Since 1988, in Catalonia, a region of Spain with 7,5 million inhabitants, influenza surveillance is carried out using the information obtained from an influenza surveillance system based on sentinel physicians, and from medical visits and hospitalizations due to influenza.[3,4] Traditional influenza surveillance information systems provide information on the week of start and duration of the influenza epidemic, and influenza morbidity. Nevertheless, traditional influenza surveillance systems do not provide information about influenza morbidity not attended in health centres and medications used to treat influenza-like cases. In 2017, a new influenza syndromic surveillance system based on sentinel pharmacies was developed in Catalonia.[5] The objective of this new sentinel surveillance system was to

obtain information about the influenza epidemic and medications dispensed to patients with influenza-like illness during the influenza season.

In a previous paper, the results of influenza surveillance based on sentinel pharmacies of Catalonia in 2017−2018, 2018−2019 and 2019−2020 influenza seasons were assessed.[6] The acute respiratory syndrome coronavirus 2 (SARS-COV-2) pandemic, which began in Catalonia on April 2020, could have reduced the risk of influenza transmission due to the implementation of measures to prevent COVID-19. The objective of this study was to assess the influenza pandemic in the 2020−2021 influenza season using influenza surveillance data collected by sentinel pharmacies of Catalonia from 2017 to 2021.

METHOD

Influenza syndromic surveillance

Influenza surveillance information was collected from a representative sample of community pharmacies of Catalonia, a region of Spain with 7.5 million inhabitants. Fifty pharmacies were selected randomly from the list of community pharmacies located in the four provinces of Catalonia: 33 (66%) pharmacies were selected from Barcelona, 7 (14%) from Tarragona, 7 (14%) from Girona, and 3 (6%) from Lleida.

Influenza syndromic surveillance activity developed by sentinel pharmacies participating in the study consisted in: 1) to detect ILI cases among individuals attended during in the 2020−2021 influenza season, and 2) to collect socio-demographic and influenza-related health information from ILI patients.

Sentinel pharmacies should declare all ILI patients attended during the influenza season (from week 40 to week 20 of next year). ILI cases were identified based on the European Centre for Disease Prevention and Control (ECDC) case definition:[7] 1) sudden onset of symptoms; 2) fever; 3) at least one of three systemic symptoms: malaise, headache, muscle pain (myalgia); and 4) at least one of three respiratory symptoms: cough, sore throat, shortness of breath.

Data collection

An anonymous questionnaire, accessible on-line, was used to collect influenza surveillance data: age and sex, ILI symptoms, medications dispended, medications prescribed by physicians, Covid-19 detection tests undertaken, and influenza vaccination status (≥ 14 days before symptoms onset).

Analysis of the 2020−2021 influenza epidemic

Weekly numbers of ILI cases declared by sentinel pharmacies were used to analyse the influenza epidemic in 2020-2021 influenza season. The moving epidemic method (MEM)[8] was used to assess the threshold at which the onset of the epidemic activity was set during the 2020−2021 influenza season. The influenza epidemic begins when the number of reported ILI cases is higher than the epidemic threshold.

The MEM method determines the epidemic threshold for detecting influenza epidemics occurring during the 2020−2021 influenza season in two phases. In the first phase, the MEM method used influenza surveillance data collected during previous influenza seasons (2017−2020) to detect the star and duration of influenza epidemics occurring in 2017−2020. In the second phase, the MEM method used pre-epidemic and post-epidemic values of ILI cases reported per week during 2017−2020 to indicate the epidemic threshold (ILI cases reported per week) for detecting the start and duration of the 2020−2021 influenza epidemic.

Statistical analysis

The t test was used to compare the mean number of ILI cases reported per week during the 2020−2021 influenza season with those o during previous influenza seasons (2017−2020), setting $p < 0.05$ as statistically significant. Sociodemographic characteristics of ILI cases, medications dispensed by pharmacies, medications prescribed by physicians, previous medical visits, and influenza vaccination status were assessed. Percentages and 95% confidence intervals were determined for study variables. The Chi-square test (Fisher's exact test when necessary) and the odds ratios were used to compare percentages in different groups, considering a $p<0.05$ as statistically significant. The statistical analysis of the results was carried out using IBM-SPSS Version 18 (IBM-SPSS, Chicago, IL, USA).

The effectiveness of influenza vaccination (VE) in 2020−2021 among individuals aged ≥ 65 years and 95% confidence intervals were calculated using the screening method.[9] The influenza vaccination effectiveness (VE) was determined using the formula: VE = (PV – PCV)/(PV (1 – PCV)). In this formula, PV is the influenza vaccination coverage in individuals aged ≥ 65 years in Catalonia during the 2020−2021 vaccination campaign, and PCV is the proportion of cases aged ≥ 65 years vaccinated against influenza.

Ethics approval

The study was approved by the Public Health Agency of Catalonia and the Consell de Col·legis de Farmacèutics de Catalunya. Verbal informed consent was obtained from all influenza-like patients or their parents to participate in the study and collect sociodemographic and influenza-related health information.

RESULTS

Forty two community pharmacies (84% participation) reported 177 influenza-like illness (ILI) cases during the 2020−2021 influenza seasons (Table 1). The distribution of sentinel pharmacies by province in 2020−21 was: 25 (59.5%) from Barcelona, 7 (16.7%) from Tarragona, 6 (14.3%) from Girona and 4 (9.5%) from Lleida. The distribution of the number of sentinel pharmacies by

province was not different to the distribution of the population of Catalonia by province.[10]

Table 1: Distribution of influenza-like illness cases reported by sentinel pharmacies by age and sex in Catalonia (Spain) in the 2020−2021 influenza season.

Age	Influenza-like illness cases	
	No.	% (95% CI)
Both sexes		
0-4 years	13	7.3 (3.2−11.5)
5-14 years	14	7.9 (3.6−12.2)
15-64 years	127	71.7 (64.8−78.7)
≥ 65 years	23	13.0 (7.8−18.2)
Total	177	100
Men		
0-4 years	9	9.8 (3.2−16.4)
5-14 years	6	6.5 (0.9−12.1)
15-64 years	68	73.9 (64.4−83.4)
≥ 65 years	9	9.8 (3.2−16.4)
Total	92	100
Women		
0-4 years	4	4.7 (1.3−11.6)
5-14 years	8	9.4 (2.6−16.2)
15-64 years	59	69.4 (59.0−79.8)
≥ 65 years	14	16.5 (8.0−24.9)
Total	85	100

Ninety two (52.0%) ILI cases were men and 85 (48.0%) were women. The mean age of ILI cases was 38.3 years, 36.4 years in men and 40.3 years in women. The percentage of cases aged 15−64 years was significantly higher than that for cases aged 0−14 years or ≥65 years, with an OR of 6.45 (95% CI: 4.06−10.24, p < 0.001) for both sexes, 8.72 (95% CI: 4.40−17.29, p < 0.001) for men, and 5.19 (95% CI: 2.67−10.10, p < 0.001) for women. The percentage of cases aged 15−64 years in 2020−2021 was slightly lower than in previous influenza seasons (79.4% in 2017−2018, 77.3% in 2018−2019 and 73.1% in 2019−2020),[6] but differences were not statistically significant.

All 177 ILI cases reported had not a positive result for SARS-CoV-2 or were contacts of COVID-19 cases, and 31 (17.5%) ILI cases had a negative result for SARS-CoV-2 detection tests.

No influenza epidemic activity was observed during the 2020−2021 influenza season (Figure 1). The MEM-based influenza epidemic threshold for the 2020−2021 influenza season 29.79 ILI cases reported per week was determined using influenza surveillance data obtained in the previous three influenza seasons (2017−2020). The absence of influenza activity during the 2020−2021 influenza season was detected based two criteria. First, the number of ILI cases reported per week was kept bellow the MEM-based epidemic threshold (29.79 cases per week) (Figure 1). Second, the mean number of ILI cases reported per week was 5.4 (SD: 5.4), significantly lower than in previous influenza seasons: 25.3 (SD: 33.7) in 2017−2018 (p<0.005), 30.3 (SD: 35.5) in 2018−2019 (p<0.0001) and 18.8 (SD: 25.6) in 2019−2020 (p<0.01).

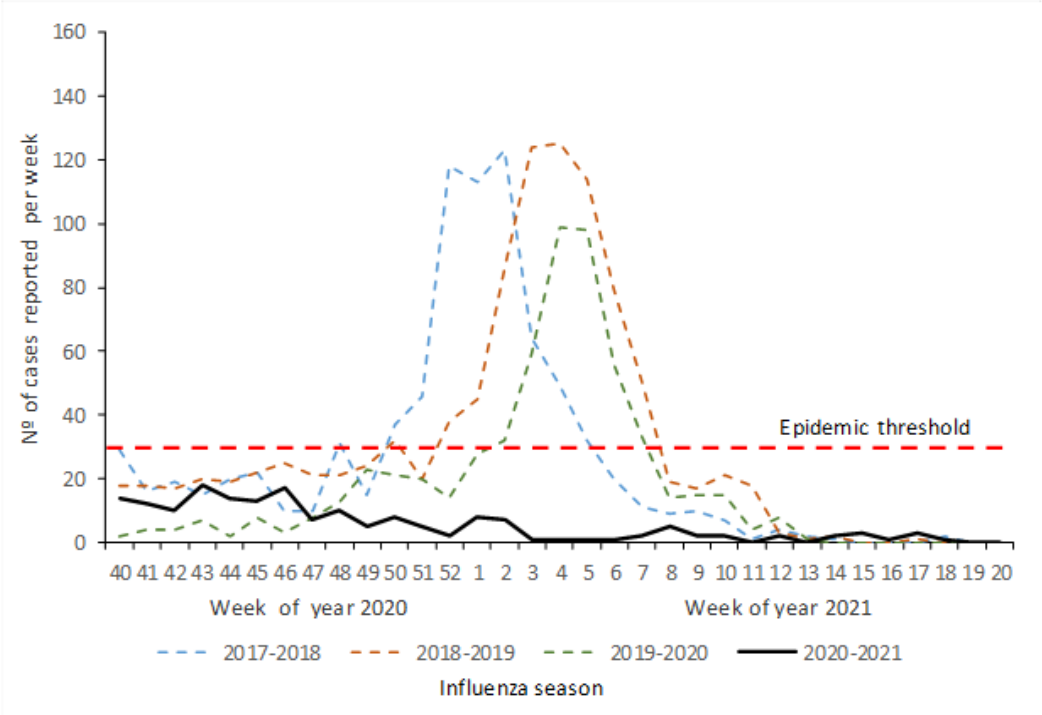

Figure 1: Analysis of the sentinel pharmacies-based influenza epidemic curve observed in Catalonia (Spain) in the 2020−2021 influenza season. The epidemic threshold for the 2020−2021 influenza season was determined using the MEM method and data collected by sentinel pharmacies in the 2017−2018, 2018−2019 and 2019−2020 influenza seasons.

The thresholds for determining the influenza epidemic intensity in the 2020−2021 influenza season were: 29.79 ILI cases per week for the basal intensity of influenza activity (epidemic threshold); 51.63 ILI cases per week for the medium intensity; 133.8 ILI for high intensity; and 203.7 ILI cases for the very high intensity. Based on the MEM method, the influenza epidemic did not occur in the 2020−2021 season because the number of cases reported per week was lower than the epidemic threshold of 29 cases per week.

Seventy one (40.1%) ILI cases reported by sentinel pharmacies had received a previous medical visit (Table 2). The percentage of ILI cases attended by sentinel pharmacies without a previous medical visit was significantly higher that the percentage of patients that had received a previous medical visit (OR = 1.70; 95% CI: 1.11−2.57, $p < 0.05$). The percentage of ILI cases that had received a previous medical visit was lower among 15−64 years old cases than among cases aged 0−14 years or ≥65 year, although differences were not statistically significant (Table 2).

Table 2: Percentage of patients with influenza-like illness attended by sentinel pharmacies that had received a previous medical visit in Catalonia (Spain) in the 2020-2021 influenza seasons.

Age	Influenza-like illness cases that had received a previous medical visit		
	No.	% (95% CI)	n
Both sexes			
0-4 years	7	53.8 (25.1−80.8)	13
5-14 years	9	64.3 (35.1−87.2)	14
15-64 years	42	33.1 (24.5−41.6)	127
≥ 65 years	13	56.5 (34.1−78.9)	23
Total	71	40.1 (32.6−47.6)	177
Men			
0-4 years	5	55.6 (21.2−86.3)	9
5-14 years	3	50.0 (11.8−88.2)	6
15-64 years	22	33.4 (20.5−44.2)	68
≥ 65 years	6	66.7 (29.9−92.5)	9
Total	36	39.1 (28.6−49.6)	92
Women			
0-4 years	2	50.0 (6.7−93.2)	4
5-14 years	6	75.0 (34.9−96.8)	8
15-64 years	20	33.9 (21.0−46.8)	59
≥ 65 years	7	50.0 (23.0−77.0)	14
Total	35	41.2 (30.1−52.2)	85

Sentinel pharmacies dispended medications to 169 (95.5%) ILI patients (Table 3). The three drugs more frequently dispended were paracetamol (71.2%), ibuprofen (22.6%) and antihistamines (22%) (Table 4). Antibiotics were dispended to 3.4% ILI patients.

Physicians had prescribed medications to 74 (41.8%) ILI patients (Table 3). The three drugs more frequently prescribed were paracetamol (28.8%), cough medication (15.8%) and ibuprofen (13%) (Table 4). Antibiotics were prescribed to 3.4% ILI patients. Oseltamivir was not prescribed to ILI patients in 2020−2021.

Table 3: Percentage of patients with influenza-like illness (ILI) that sentinel pharmacies dispensed medications and physicians prescribed medications in Catalonia (Spain) in the 2020-2021 influenza seasons.

Age	ILI cases with dispended medications			ILI cases with prescribed medications		
	No.	% (95% CI)	n	No.	% (95% CI)	n
Both sexes						
0-4 years	12	92.3 (64.0−99.6)	13	9	69.2 (38.6−90.9)	13
5-14 years	14	100.0 (76.8−100)	14	7	50.0 (23.0−77.0)	14
15-64 years	122	96.1 (91.0−98.7)	127	45	35.4 (26.7−44.1)	127
≥ 65 years	21	91.3 (71.9−98.9)	23	13	56.5 (34.1−78.9)	23
Total	169	95.5 (92.1−98.8)	177	74	41.8 (34.2−49.4)	177
Men						
0-4 years	8	88.9 (51.7−99.7)	8	6	66.7 (30.0−92.5)	8
5-14 years	6	100.0 (54.1−100)	6	2	33.3 (4.3−77.7	6
15-64 years	65	95.6 (87.6−99.1)	65	23	33.8 (21.8−45.8)	65
≥ 65 years	8	88.9 (51.7−99.7)	8	6	66.7 (29.9−92.5)	8
Total	87	94.6 (87.8−98.2)	87	37	40.2 (29.6−50.8)	87

Women						
0-4 years	4	100.0 (39.7−100)	4	3	75.0 (19.4−99.4)	4
5-14 years	8	100.0 (63.1−100)	8	5	62.5 (24.5−91.5)	8
15-64 years	57	96.6 (88.3−99.6)	57	22	37.3 (24.1−50.5)	57
≥ 65 years	13	92.9 (66.1−99.8)	13	7	50.0 (23.0−77.0)	13
Total	82	96.5 (90.0−99.3)	82	37	43.5 (32.4−54.7)	82

Table 4: Drugs dispended by sentinel pharmacies and drugs prescribed by physicians to patients with influenza-like illness in Catalonia (Spain) during the 2020−2021 influenza seasons.

Drug	Drugs dispensed (n = 177)		Drugs prescribed (n = 177)	
	No.	% (95% CI)	No.	% (95% CI)
Paracetamol	126	71.2 (64.2−78.1)	51	28.8 (21.8−35.8)
Ibuprofen	40	22.6 (16.1−29.0)	23	13.0 (7.8−18.2)
Acetylsalicylic acid	11	6.2 (2.4−10.1)	2	1.1 (0.1−4.0)
Cough medication	26	14.7 (9.2−20.2)	28	15.8 (10.2−21.5)
Antihistamines	39	22.0 (15.6−28.4)	8	4.5 (15.6−28.4)
Epinephrine	28	15.8 (10.2−21.5)	5	2.8 (10.2−21.5)
Antibiotic	6	3.4 (0.4−6.3)	6	3.4 (0.4−6.3)
Antiseptic	3	1.7 (0.3−4.7)	1	0.6 (0.0−3.1)
Mucolytic	18	10.2 (5.4−14.9)	7	4.0 (0.8−7.1)
Medicinal plants	3	1.7 (0.3−4.9)	2	1.1 (0.1−4.0)
Bronchodilator	5	2.8 (0.9−6.5)	3	1.7 (0.9−6.5)
Anti-inflammatory	3	1.7 (0.3−4.9)	0	0.0 (0.3−4.9)
Oseltamivir	0	0.0 (0.0−2.1)	0	0.0 (0.0−2.1)

Seventeen (9.6%) ILI patients had received influenza vaccines in the 2020−2021 influenza vaccination campaign (Table 5). The mean age of vaccinated patients was 61.8 years. Influenza vaccination coverage increased significantly ($p < 0.001$) with age from 0% in children aged 0−14 years to 43.5% in individuals aged 65 or more years. Influenza vaccination coverage was significantly higher in individuals aged 65 or more years than in those aged less than 65 years (43.5% vs. 4.5%, $p < 0.001$). Ten (58.8%) patients had been vaccinated for the recommendation addressed to people of 65 or more years; 1 (5.9%) patient for the recommendation addressed to people with high risk of influenza complications: 1 (5.9%) patient for the recommendation addressed to pregnant women; 2 (11.8%) patients for the recommendation addressed to health personnel; and 3 (17.6%) patients had been vaccinated for personal reasons.

The effectiveness of influenza vaccination obtained in this study for individuals aged ≥ 65 years in Catalonia was 53.7% (95% CI: 46.0−61.3%) (Table 5). Influenza vaccination effectiveness was determined using the information on influenza vaccination coverage in individuals aged ≥ 65 years in Catalonia in 2020−2021 (62.3%).[11] The effectiveness of influenza vaccine in individuals aged ≥ 65 years observed in 2020−2021 was lower than in 2019−2020 (67.1%)[6] and higher than in 2018−2019 (53.7%),[6] but differences were not statistically significant.

Table 5: Percentage of cases of influenza-like illness vaccinated against influenza in the 2020-2021 influenza campaigns.

Age	Percentage of cases vaccinated against influenza		
	No.	% (95% CI)	n
0-4 years	0	0.0 (0.0−24.7)	13
5-14 years	0	0.0 (0.0−23.2)	14
15-64 years	7	5.5 (1.1−9.9)	127
≥ 65 years	10	43.5 (21.0−65.9)	23
Total	17	9.6 (5.0−14.2)	177
Vaccine Effectiveness (≥ 65 years)	53.7 (46.0−61.3)		

DISCUSSION

This study showed that the influenza epidemic was absent during the 2020-2021 influenza season in Catalonia, Spain based on the number of ILI cases reported per week being lower than the MEM-based influenza epidemic threshold over the whole season. In addition, the mean number of cases reported per week in the 2020−2021 influenza season was significantly lower than in previous influenza seasons.

In the 2019−2020 influenza season, a lower influenza activity attributed to SARS-COV-2 pandemic was detected in USA and Korea, but the influenza epidemic occurred as in previous years. In the USA, influenza activity in terms of percentage of positive specimens decreased by 98% during March-May of 2020 compared to September-February of 2020.[12] In South Korea, the influenza epidemic duration (20 weeks) and the influenza activity peak (49.8 ILI cases per 1000 visits) detected in the 2019-2020 influenza season were lower than in the 2018-2019 influenza season (32 weeks, 71.9 ILI cases per 1000 visits).[13]

An important factor that could explain, at least in part, the low number of ILI cases during the 2020−2021 influenza season was that people were wearing mask in order to avoid COVID-19 infection.

The low number of ILI cases reported by sentinel pharmacies was consistent with a very low influenza activity in Catalonia (2 influenza virus detections)[14] and Europe (10 influenza virus detections).[15] A very low influenza activity was reported in countries of the European Union and Economic European Area, with a total number of 10 (0.05%) influenza virus detections in sentinel specimens and 158 (0.03%) influenza virus detections in non-sentinel specimens during the 2020−2021 influenza season.[15] Nevertheless, in Catalonia, sentinel-based incidence of ILI and acute respiratory disease was higher than 200 per 100,000 population during the 2020−2021 influenza season.[16] The high incidence of ILI and acute respiratory disease observed in Catalonia, and in most countries, can be explained by the COVID-19 pandemic and by the intensive active surveillance of SARS-CoV-2 infections.[16]

Influenza surveillance based on sentinel pharmacies could not be affected by SARS-CoV-2 pandemic during the 2020−2021 influenza season for several reasons. First, individuals with COVID-19 should not go to sentinel pharmacies for medications. In fact, sentinel pharmacies did not attend any COVID-19 case during the 2020−2021 influenza season. Second, sentinel pharmacies did not participate in active surveillance of SARS-CoV-2 infections. Third, individuals who were contacts of patients with COVID-19 or who were contacts of individuals with a positive result for SARS-CoV-2 infection should not go to sentinel pharmacies for medications. In fact, sentinel pharmacies did not attend any ILI patient who was contact of patients with COVID-19 or who was contact of individuals with a positive result for SARS-CoV-2 infection.

The study found that influenza surveillance based on sentinel pharmacies can provide information on ILI patients that could not be provided by traditional influenza surveillance systems. The study found that 59.9% of ILI patients attended by sentinel pharmacies had not received primary health care. The fact that 60% of ILI patients could solved their ILI with medications dispended by pharmacies without prescriptions showed that community pharmacies were acting as health managers and gatekeepers of the health system, reducing the impact of influenza on health services.

Sentinel pharmacies dispended medications to 94.6% ILI patients. This percentage was similar to those observed in previous influenza seasons (94−98%).[6] Only paracetamol was dispended to more than 25% of ILI patients in 2020−2021, while in previous influenza seasons paracetamol, cough medications, ibuprofen and antihistamines were dispended to more than 25% of ILI patients.[6] Dispensation of paracetamol in 2020−2021 (71.2%) was lower than in previous influenza seasons (72.4−83.8%).[6] Oseltamivir was not dispensed to ILI patients in 2020−2021, but it was dispended to ILI patients (0.1−1%)[6] in previous influenza seasons.[6] Dispensation of antibiotics to ILI patients in 2020−2021 (2.8%) was lower than in previous influenza seasons (3.7−7.9%).[6] The lower dispensation of antibiotics in 2020−2021 can be explained by a lower prescription of antibiotics to ILI patients in 2020−2021.

Physicians had prescribed medications to 41.8% ILI patients. This percentage was slightly higher than in previous influenza seasons (30−38%).[6] Drugs prescribed to more than 8% of patients included paracetamol, cough medications and ibuprofen. In previous influenza seasons, the same drugs were prescribed to more than 8% of patients.[6] The prescription of antibiotics was lower in 2020−2021 (2.8%) was lower than in previous influenza seasons (3.7−7.9%).[6]

The study found that 9.6% of ILI patients reported by sentinel pharmacies had been vaccinated in 2020−2021. Influenza vaccination effectiveness in individuals aged ≥ 65 years was 53.4%. The effectiveness of influenza vaccine in 2020−2021 was lower than in 2019−2020 (67.1%)[6] and higher than in 2018−2019 (51.4%),[6] but differences were not statistically significant.

The study has several limitations. First, 42 sentinel pharmacies reported ILI cases to the influenza surveillance information system in 2020−2021. More consistent results could have been obtained with a higher number of sentinel pharmacies participating in the influenza surveillance information system. Nevertheless, the analysis of influenza surveillance data collected in previous influenza seasons showed that 35-41 sentinel pharmacies could be sufficient to detect influenza epidemics.[6] Second, the number of ILI cases reported by sentinel pharmacies could be lower than the real number if pharmacies were not able to detect all ILI cases among attended persons. Nevertheless, it should be necessary to develop a complex and costly study to assess the exact number of ILI patients attended by sentinel pharmacies during the influenza season. Third, 17.5% of ILI cases reported were negative for COVID-

19 detection tests. Antigenic COVID-19 tests could have been used to exclude ILI patients with SARS-CoV-2 infections among ILI cases attended by sentinel pharmacies, but antigenic tests could not be used by pharmacies in Spain in 2020−2021 influenza season.

Several studies have found that drug sales data analysis could be a useful tool for surveillance and outbreak detection of acute respiratory infections.[17] Nevertheless, influenza surveillance based on drug sales data analysis is more complex and costly than that based on sentinel pharmacies, and it does not provide precise information about ILI patients, medications dispensed and medications prescribed to ILI patients and influenza vaccination effectiveness.

The information provided by the influenza surveillance system based on sentinel pharmacies was complementary of the information provided sentinel physicians. The influenza surveillance system based on sentinel physicians can obtain consistent information about influenza epidemics, while sentinel pharmacies can provide information about influenza-like patients who are looking for influenza medication but are not willing to receive medical assistance.

CONCLUSION

The influenza epidemic did not occur in Catalonia, Spain, in the 2020−2021 season based on the analysis of ILI cases reported by sentinel pharmacies of Catalonia. The study found that influenza surveillance based on sentinel pharmacies can provide information that it is not obtained by traditional influenza surveillance systems.

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