

Original article

Etiology of Acute Respiratory Infections during an Outbreak in Al-Marj City, Libya: A Descriptive Cross-sectional Study, November 2025

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ABSTRACT

Keywords:

Acute Respiratory Infections, Influenza A, Al-Marj City, Libya.

Acute respiratory infections (ARIs) are a leading cause of morbidity and mortality worldwide, particularly during seasonal outbreaks. In November 2025, an unusual increase in respiratory illness was reported in Al-Marj City, Libya. A descriptive outbreak investigation was conducted. A total of 43 nasopharyngeal swab samples were collected from suspected cases and tested at the national reference laboratory for influenza A and B, SARS-CoV-2, and respiratory syncytial virus (RSV). Epidemiological data, including age, sex, residence, and clinical severity, were analyzed. Thirty out of 43 samples (69.8%) were positive for influenza A, while all samples tested negative for influenza B, SARS-CoV-2, and RSV. Most confirmed cases were reported from Al-Marj municipality (25 cases). Children under five years and adults aged 50 years and above were the most affected age groups. Sixteen cases were managed at outpatient clinics, seven required hospitalizations, and seven were admitted to intensive care units. Influenza A was identified as the primary causative agent of the outbreak. Strengthening laboratory-supported surveillance systems is essential for early outbreak detection and effective public health response in Libya.

Introduction

Acute respiratory infections (ARIs) represent one of the most significant public^o health challenges globally, contributing substantially to morbidity, mortality, and healthcare burden. Influenza viruses are among the most common viral causes of ARIs, with seasonal epidemics occurring annually and affecting all age groups, particularly young children, older adults, and individuals with underlying chronic conditions [1,5].

Globally, influenza is responsible for millions of severe illnesses and hundreds of thousands of deaths each year. The burden is especially pronounced in low- and middle-income countries, where surveillance systems and laboratory capacity may be limited [1,2,7]. The World Health Organization emphasizes the importance of integrated epidemiological and laboratory-based surveillance to detect influenza activity early and guide timely public health interventions [2,9]. In the Eastern Mediterranean Region and North Africa, influenza remains a major contributor to seasonal respiratory infections, with variations in circulating strains and disease severity reported across countries [4,8]. However, gaps in surveillance coverage and limited published data persist in several countries within the region.

In Libya, epidemiological data on influenza and other respiratory viruses remain limited, and published studies are scarce. This shortage of local data hampers evidence-based decision-making and outbreak preparedness. Therefore, this study aimed to investigate the epidemiological characteristics of an acute respiratory infection outbreak in Al-Marj City, Libya, and to identify the causative viral agent using laboratory confirmation. The general objective of this study is to investigate the epidemiological characteristics and identify the primary viral etiology of an acute respiratory infection (ARI) outbreak that occurred in Al-Marj City, Libya, in November 2025. Specifically, the study aims to determine the proportion of suspected ARI cases attributable to influenza A, influenza B, SARS-CoV-2, and Respiratory Syncytial Virus (RSV) using molecular diagnostic techniques, while also describing the demographic distribution of laboratory-confirmed influenza A cases in terms of age and sex during the outbreak. Furthermore, it seeks to analyze the geographic distribution of confirmed cases across the municipalities of the Al-Marj region and to assess the clinical severity of the outbreak by categorizing confirmed cases according to healthcare utilization, including outpatient visits, general ward admissions, and intensive care unit admissions. Ultimately, the study intends to document and report the epidemiological and virological profile of this respiratory infection outbreak in Libya, thereby contributing valuable evidence to the limited local knowledge base and supporting public health decision-making.

Methodology

Study Design and Setting

A descriptive outbreak investigation was conducted in Al-Marj City, Libya, during November 2025, following multiple reports of increased respiratory illness from outpatient clinics, hospitals, and schools.

Case Investigation and Sample Collection

A total of 43 suspected cases were identified. Nasopharyngeal swab samples were collected according to standard procedures and transported to the national reference laboratory at the National Center for Disease Control.

Laboratory Testing

Samples were tested for influenza A and B, SARS-CoV-2, and respiratory syncytial virus (RSV) using validated molecular diagnostic techniques. Laboratory results were communicated to the surveillance team for analysis.

Data Collection and Analysis

Demographic and epidemiological data, including age, sex, municipality, area of residence, and clinical severity (outpatient visit, hospital admission, ICU admission), were collected through routine surveillance forms. Data were analyzed descriptively.

Ethical Considerations

Approval to publish the findings was obtained from the Director of Health Services, Al-Marj. All data were anonymized and used solely for public health and research purposes.

Results

Laboratory Findings

Out of 43 samples tested, 30 (69.8%) were positive for influenza A. All samples tested negative for influenza B, SARS-CoV-2, and RSV.

Table 1. Distribution of sample according to Laboratory Findings (n=43)

Method	Investigation Type of Infection	Results			
		Negative		Positive	
		N	%	N	%
GENEXPER	influenza A	13	30.2	30	69.8
	Influenza B	43	100	0	0
	SARS-CoV-2	43	100	0	0
	Respiratory Syncytial Virus (RSV)	43	100	0	0

The study tested 43 patient samples for four different viruses using a method called GENEXPER. The key finding is that Influenza A was the only virus detected in this sample group.

Geographic Distribution

Among confirmed cases, 26 were reported from Al-Marj municipality, 3 from Jardas, and one case from Tocra.

Table 2. Distribution of laboratory-confirmed influenza A cases according to place of residence

The Municipality	Frequency	Percent
Al-Marj	26	86.7
Jardas	3	10.0
Tocra	1	3.3
Total	30	100.0

Clinical Severity

Sixteen cases presented to outpatient clinics, seven required admissions to hospital wards, and seven cases were admitted to intensive care units, indicating notable disease severity.

Table 3. Clinical severity distribution of laboratory-confirmed influenza A cases (n=30)

Department	Frequency	Percent
ICU admission	7	23.3
medium severity	7	23.3
outpatient visits	16	53.3
Total	30	100.0

Age and Sex Distribution

Higher proportions of confirmed cases were observed among children under five years of age and adults aged 50 years and above. Males accounted for 20 cases (66.7%), while 10 cases were female, as shown in (Table 4,5).

Table 4. Age distribution of laboratory-confirmed influenza A cases (n=30)

The Age Period	Frequency	Percent
0- 5 years	9	30.0
6--20 years	4	13.3
21-40 years	6	20.0
41-60 years	8	26.7
more than 60	3	10.0
Total	30	100.0

Table 5. Gender distribution of confirmed influenza A cases

The Gender	Frequency	Percent
Male	20	66.7
Female	10	33.3
Total	30	100.0

Table 6 shows the occupations of 30 confirmed influenza A patients. Children represent the largest single group (33.3%), followed by office workers/officers (23.3%) and housewives (13.3%). Together, children and students account for 43.3% of all cases.

Table 6. Distribution of laboratory-confirmed influenza A cases according to occupation (n=30)

The Occupation	Frequency	Percent
house wife	4	13.3
officer	7	23.3
retired	1	3.3
child	10	33.3
farmer	1	3.3
teacher	3	10.0
student	3	10.0
Freelancing	1	3.3
Total	30	100.0

Table 7 shows the symptoms for 30 lab-confirmed influenza A patients. The classic triad of cough (86.7%), fever (83.3%), and shortness of breath (dyspnea, 63.3%) was most prevalent, defining the serious respiratory nature of this outbreak

Table 7. Clinical Symptom Frequency in Lab-Confirmed Influenza A Cases (n=30)

Symptoms	Yes		No	
	Frequency	Percent	Frequency	Percent
Fever	25	83.3	5	16.7
Sneezing	9	30	21	70
Coughing	26	86.7	4	13.3
Rhinorrhea	11	36.7	19	63.3
Dyspnea	19	63.3	11	36.7
Arthralgia	8	26.7	22	73.3
Headache	12	40.0	18	60.0
Diarrhea	3	10.0	27	90.0
Vomiting	7	23.3	23	76.7
Appetite	16	53.3	14	46.7
Sore Throat	17	56.7	13	43.3
Fatigue	10	33.3	20	66.7

Figure 1 shows the distribution of influenza cases by age group and clinical severity (ICU, hospitalization, outpatient). The number of cases in hospitalization (departments) was very high in young Children (0-5 years), while the cases that needed to be admitted to ICU (severe) increased with an increase in age.

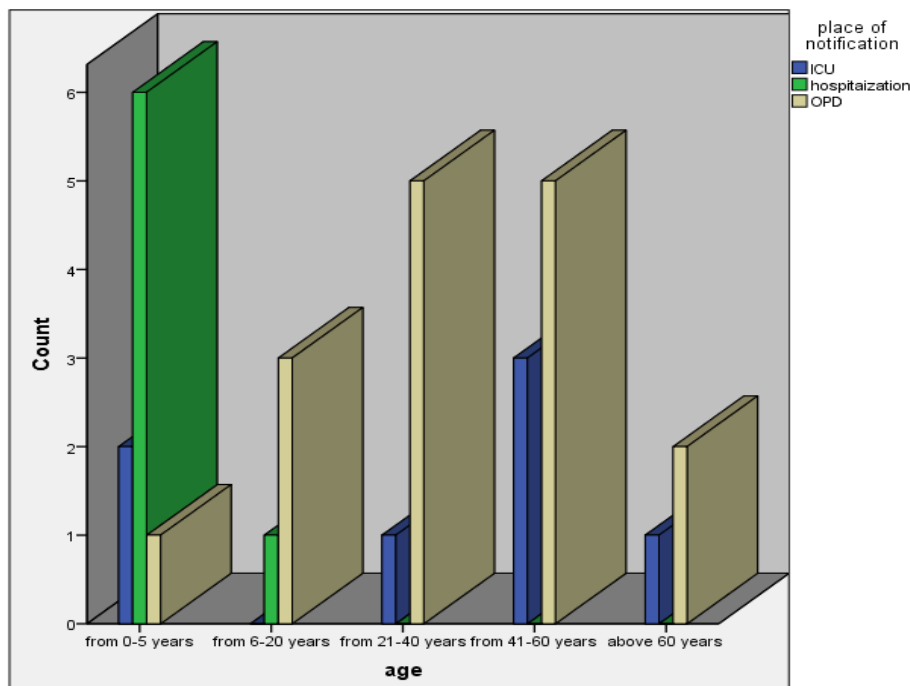


Figure 1. shows relationships between age and severity

Discussion

Our study describes the epidemiological characteristics of an acute respiratory infection outbreak investigated in Al-Marj City, Libya, during November 2025. The findings indicate that influenza A was the primary causative agent responsible for the observed increase in cases presenting to outpatient clinics and hospitals. Similar studies have been reported in other countries, where influenza viruses have been identified as a major cause of seasonal acute respiratory infections, especially during peak transmission periods [3,5]. Our findings are consistent with regional and global surveillance reports indicating that influenza remains a leading cause of acute respiratory infections worldwide [2,7].

In this investigation, a higher proportion of laboratory-confirmed cases was observed among children under five years of age and adults aged 50 years and above. This aligns with established evidence showing that these age groups are at increased risk of influenza infection and complications due to immature or weakened immune responses and the presence of underlying chronic conditions [3,6].

A significant proportion of confirmed cases required hospitalization, including intensive care admission, highlighting the potential severity of influenza-associated illness and the burden on healthcare services. These findings emphasize the importance of timely epidemiological surveillance and laboratory confirmation for early detection and effective outbreak response.

This study has several limitations. The investigation was conducted over a short period and included a limited number of samples, which may restrict the generalizability of the findings. Additionally, reliance on routine surveillance data limited access to detailed clinical information and long-term patient outcomes. Despite these limitations, the study provides valuable insight into local influenza epidemiology and highlights the importance of laboratory-supported surveillance in Libya.

Conclusion

This investigation highlights the importance of robust surveillance systems and laboratory-supported testing for the early detection and management of respiratory infection outbreaks. Influenza A was identified as the primary causative agent of the observed increase in cases in Al-Marj City, Libya. Strengthening local surveillance and ensuring timely reporting are essential to enhance outbreak preparedness and public health response in the region.

Conflict of interest. Nil

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