Influenza severe cases and deaths in Tunisia: Season 2015-2016

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I- Introduction and aim

Seasonal influenza continues to be a major public health problem worldwide. In fact, this acute viral infection is highly contagious and affects all ages. Although in most cases it's a minor illness, it may lead to severe complications and death especially in high risk populations. Effective surveillance is needed to have a vision of the dynamics of influenza and to control it.
The purpose of this work is:

- To describe influenza severe cases and deaths in the season of 2015-2016 and compare it to previous seasons.
- To determine what are the influenza viruses currently circulating and which types have particular virulence in 2015-2016 season
- To suggest recommendations to improve influenza control

II- Methods

This retrospective study is based on data provided by the National influenza surveillance unit. It is a descriptive analysis of influenza surveillance data collected from the network of ILI (Influenza-Like Illness) and SARI (Severe Acute Respiratory Infection) sentinel sites and national Influenza Center (NIC).

III- Results and Discussion

In Tunisia, Influenza Sentinel Surveillance Network (ISSN) was implemented since 1999 and was based on the National Influenza Center (NIC) and sentinel sites. However, it has been considerably improved and developed in March 2014 in order to conform to international standards.
Influenza surveillance for 2015-2016 lasted from week 40/2015 (1st October 2015) to week 18/2016 (30th April 2016). During this season, 96.240 cases of ILI (Influenza-like illness) were collected representing 6.9% of total patients seen at ILI sites.

❑ Influenza Hospitalization Surveillance

Among these cases, 190 were severe and needed hospitalization. The hospitalization rate was 0.19% which was comparable to the previous year (0.2%). Men were slightly more affected (51,1%). The average age was 46.5 years (extremes varying from 6 months to 73 years). Adults between the age of 50 and 65 years were the most affected (Figure 1). Less than a half of the cases had risk factors or associated illness (Figure 2).
In France, among a total of 2.3 million cases of ILI, 1050 severe cases were collected. Men were more affected (sex ratio 1.5). The average age was 55 years (1 month to 100 years) and the majority had risk factors [1]. In Canada and USA, the number of hospitalized influenza cases are less than the previous season [2,3].

Figure 1: Distribution of influenza severe cases by age

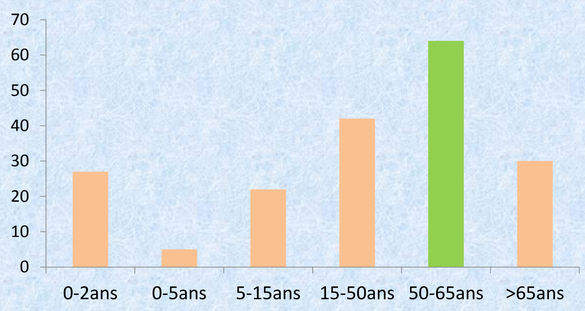
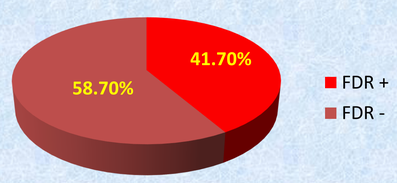


Figure 2: Risk factors and associated illness in influenza severe cases



❑Influenza Lethality

Unlike the hospitalization rate which was comparable to the previous season,, the lethality rate was significantly higher in 2015-2016 comparing to 2014-2015 season (20% vs 3%).
In fact, we reported a total of 38 deaths during this season . The majority were men (57%). Their age ranged from 6 months to 73 years with an average of 46.9 years. The 50- 65 year group was the most affected age group (Fig ure 3). Most of the deaths had risk factors (62.9%) mostly diabetes, HTA and obesity (Figure 4). Besides none of these death was vaccinated.

Figure 3: Distribution of influenza deaths by age

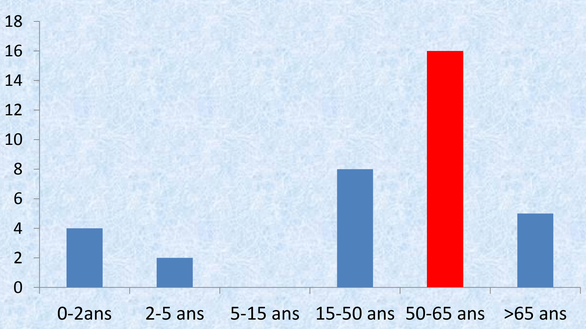
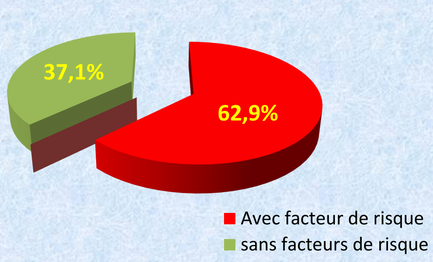


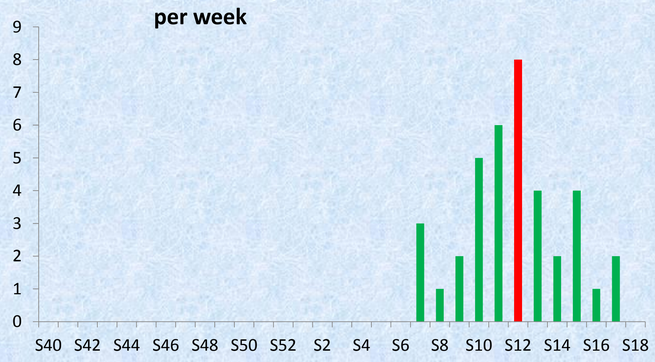
Figure 4: Risk factors and associated illness in influenza deaths



However, in France, 2015-2016 season was less severe with a lower number of deaths comparing to the previous season and a lower lethality rate (167 deaths representing 16%) [1]. The same was reported in Canada where the number of deaths was almost the half of that of 2014-2015 [3].
Moreover , USA had a lower percentage of outpatient visits for influenza-like illness (ILI), a lower hospitalization rate, and a lower percentage of deaths attributed to pneumonia and influenza (P&I) compared with the preceding three seasons [2].

Regarding the distribution per week, week 12 was the week with the highest number of deaths reported during this season (Figure 5). Simultaneously it was the week with the highest circulation of influenza viruses in Tunisia. This was close to USA findings. In fact, during the week ending March 19, 2016 (week 11), a peak at 7.9% of the percentage of deaths attributed to pneumonia and influenza (P&I) was reported [2].

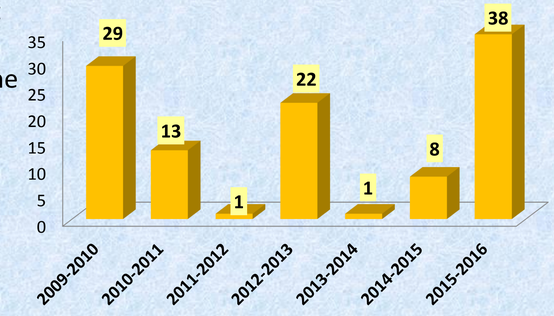
Figure 5: Reported number of influenza deaths per week



❑Influenza deaths comparing to the previous seasons:

According to the surveillance data of influenza deaths in Tunisia, the number of annual deaths in the last six years varied from 1 to 38 deaths (Figure 6).
The highest number was recorded in 2015-2016 season, close to that of the season of 2009-2010, season of pandemic influenza.
This high number can be explained by the improvement of the surveillance system especially after the establishment of SARI sites in the sentinel system. On the other hand, this can be due to the virulence of AH1N1 virus, responsible of most of the deaths. To confirm this hypothesis, an analytical study with more detailed virological investigation should be conducted.
These findings are different from those of Canada and USA where a lower percentage of influenza deaths comparing to the previous seasons was reported [2,3].

Figure 6: Reported number of deaths from flu season in Tunisia, 2009-2010 to 2015-2016



❑Virological analysis:

The National Influenza Centre (Charles Nicolle Hospital) is the national reference influenza laboratory . It ensures the virological surveillance by analyzing samples from sentinel sites and identifying strains of influenza viruses using RT-PCR technique.
During the 2015-2016 season: 1518 samples were collected with a positivity rate of 24.4%.
Like the previous season, different types of influenza were circulating mostly type A (H3N2), A (H1N1) and type B. These three types co-circulated from late January (week 4).
However, we noted a gradual increase in the circulation of the type A (H1N1) pmd09 virus utand during week 12, it was the predominant type. Simultaneously the highest number of deaths was reported in week 12 (10 deaths representing 26.3% of all influenza deaths).
In 2015-2016 season, the type A (H1N1) pmd09 virus was responsible of 57% of severe cases and 77% of influenza deaths. Besides, the type A(H3N2) was reported in 23% of the deaths and virus B in only one death (Figures 7 and 8).

Figure 7: Distribution of virus types of influenza severe cases

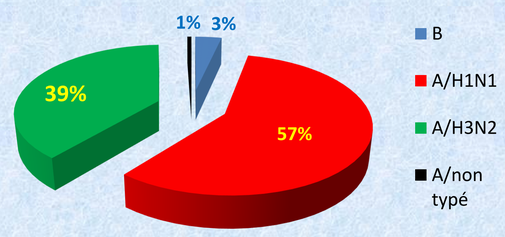
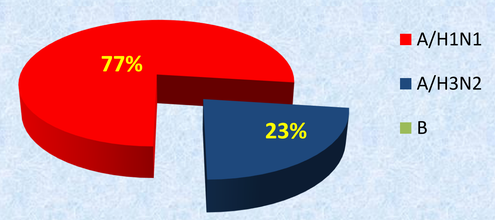


Figure 8: Distribution of virus types of influenza deaths



In USA, Influenza A(H1N1)pdm09 virus has prevailed overall, but influenza A(H3N2) and influenza B viruses also circulated [2,5,6]. The same was reported in most European regions with type A viruses predominating, especially type A(H1N1)pdm09 [4].
However in France, the main circulating virus types were type B (71 % of identified viruses) but type A viruses were responsible of most of severe influenza cases (59% of cases hospitalized in intensive care) [1]. As for the types B, nearly 90% belonged to the lineage B/Victoria [1,4], not included in the influenza trivalent vaccine. That's why influenza vaccines need to be adapted in order to fit with the current virological situation and to ensure a better level of protection [7].

IV- Recommendations

- ❑ Increase access and scale up vaccination, especially in health workers and high risk groups
- ❑ Adapt influenza vaccine to the current virological situation
- ❑ Prepare a planning in case of flu pandemic conforming to international standards and provide infrastructure for an early warning system for outbreaks of new virus subtypes.
- ❑ Sensitize the sentinel sites to a regular reporting for a better surveillance
- ❑ Strengthen the network of virology laboratories by implementing more laboratories and updating the knowledge and working methods of those already implemented.
- ❑ Add more sentinel sites in Influenza surveillance, especially SARI sites
- ❑ Standardize data collection and sample procedures and improve the management system
- ❑ Provide a national electronic system for collection of information as a platform for sharing epidemiological data and better and easy feedbacks

V- Conclusion

In Tunisia, the influenza epidemic of 2015-2016 is considered more severe than the previous season with a significantly higher lethality of severe cases (38 deaths in total). Most of severe cases and deaths were due to the virulent type A (H1N1) pmd09 virus. Since most of the deaths had risk factors and none of them was vaccinated, this highlights the need to improve preventive measures in high risk groups.

VI- References

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