Supplement

Future MICROBIOLOGY

Influenza vaccination of healthcare workers in Italy: could mandatory vaccination be a solution to protect patients?

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Several studies have reported that influenza infections in healthcare workers (HCWs) can lead to nosocomial outbreaks. HCWs can potentially be infected with influenza every year, and may continue to work, encouraging the spread of the virus. Different strategies, such as informative interventions on influenza and influenza vaccination, 'onsite' vaccination weeks, communicative strategies through dedicated web and social media pages, and mandatory informed dissent form, were organized for HCWs working at the University Hospital of Palermo, during previous influenza seasons. However, the increased vaccination rates observed among HCWs still remain far from the 75% recommended by Public Health Authorities. The level of coverage observed in countries with mandatory vaccination policies for HCWs, could suggest the adoption of this strategy for increase influenza vaccination adherence in Italy.

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Nosocomial infections caused by influenza virus are a considerable problem, especially among fragile patients (i.e., hospitalized elderly and those with chronic degenerative diseases), and are associated with a high morbidity and mortality [1]. Hospitalized patients or subjects assisted in their own home can be infected by other persons, such as healthcare workers (HCWs) or occasional visitors [2]. Approximately 20% of HCWs contract influenza during the annual influenza season, and frequently continue to work, leading not only to nosocomial epidemics but also to staff reduction with consequent disruption to medical care [3].

Influenza infection epidemics among HCWs could anticipate the spread of the infection in the general population [4]. Moreover, a common lack of knowledge about influenza infection diagnosis and coding has been reported among HCWs [5].

Worldwide, the importance of vaccination as the most effective measure to prevent influenza infection among the general population and HCWs has been recognized [6]. A meta-analysis of studies conducted from 2007 to 2016 provided up-to-date information on the effectiveness of influenza vaccine at reducing measurable outcomes, such as outpatient visits and hospitalization [7]. Despite international guidelines and documented vaccination efficacy and safety, influenza vaccination adherence among European and Italian HCWs continues to be less than the recommended 75% [8,9].

This paper analyzed the impact of different public health strategies, adopted over the past few years, in order to increase vaccination rates among HCWs and suggests policies that could improve future adherence of Italian HCWs.

Influenza vaccination perception & adherence among HCWs

According to the Centers for Disease Control and Prevention guidelines, hepatitis B, measles, mumps, rubella, varicella and pertussis immunizations, more than annual influenza vaccination, were strongly recommended for all HCWs [10].

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Compared with the recommended immunizations, influenza vaccination adherence among HCWs is considerably lower than others [11]. This evidence could be attributed to a different perception of the impact and severity (possible severe complications or become chronic) of other communicable diseases such as measles or hepatitis B, in comparison with influenza infection [12,13].

Moreover, recommended vaccinations for HCWs are usually administered during childhood and require only a few administrations, whereas influenza prevention requires yearly vaccine administration, which contributes to the low coverages observed.

In Italy, several studies have aimed to investigate knowledge, attitudes and behaviors of HCWs regarding influenza vaccination [8,11,14–16]. A multicenter survey conducted among approximately 2500 Italian medical residents (MRs) found very low compliance with influenza vaccination (around 15% in the 3 years of observation) [13]. Italian MRs seemed to accept influenza vaccination as a habit that is unrelated to professional responsibility and patient protection while MRs who refused vaccination in the previous seasons usually maintain their behaviors over time. MRs not vaccinated against influenza did 'not consider themselves as a part of a high-risk group for developing influenza' and were sure that 'influenza illness and complications does not justify risk of influenza vaccination', highlighting a general lack of knowledge and information about the risk of transmitting influenza to patients [14]. Influenza vaccination uptake among MRs was associated with adherence to seasonal influenza vaccination of medical school tutors (adjusted odds ratio [OR]: 4.4; 95% CI: 1.35–14.26) and other MRs of the hospital unit (adjusted OR: 2.2; 95% CI: 1.14–4.23). Moreover, knowledge of seasonal influenza vaccine (adjusted OR: 2.43) and consultation of scientific sources or Institutional recommendations on influenza vaccination (adjusted OR: 6.96) were associated with higher coverage rates among Italian MRs [8]. More than half of the MRs suggested multidisciplinary courses on influenza vaccination (49.3%) or mandatory vaccination (20.1%), as the best strategies to improve influenza vaccination adherence [14]. Higher vaccination coverage (26.2%) was reported among general practitioner (GP) trainees of western Sicily, Italy [15]. 'Considering themselves as a high-risk group for developing influenza' and 'had been vaccinated more than three times in the previous five influenza seasons' were significantly associated with influenza vaccination acceptance of GP trainees, confirming that the risk of contracting infection overtake the risk of transmitting infection to patients, as the main reason for accepting influenza vaccination [15].

Another survey conducted among public health MRs of two Italian Region (influenza vaccination coverage 27.2%) confirmed that 'not considered themselves as a part of a high-risk group for developing influenza' was the main reason for refusing influenza vaccine acceptance [16].

Correct information provided by HCWs plays a major role among patients [8,15]. A study showed that the advice received by physicians of the Reference Center for solid organ transplant had a higher influence (OR: 53.4; $p < 0.001$) on patients at risk [17].

Intervention to increase influenza vaccination coverage among HCWs

The role of various interventions to improve the rate of influenza vaccination was analyzed and led to a general improvement of attitudes, knowledge and behaviors of HCWs, but with only a slight vaccination coverage increase [18,19].

At the University Hospital (UH) of Palermo, several actions were carried out during previous influenza seasons in order to improve knowledge and awareness on influenza vaccination efficacy and safety among HCWs. Specifically, during the last three influenza seasons (2015/2016, 2016/2017 and 2017/2018) the following initiatives were organized: distribution of pins (with the logo 'I'm vaccinated') to vaccinated HCWs, to hang on work clothes after vaccine administration; the creation of dedicated pages on influenza vaccination campaigns on social networks and on the institutional website; organization of dedicated vaccination weeks for HCWs directly at hospital units; and creation of dedicated posters for display in each ward at the UH of Palermo with the slogan: 'Protect yourself to protect your patients'. In addition, a dedicated dissent form for HCWs that refused seasonal influenza vaccination, asking the main reason for refusal, was required. Figure 1 depicts the improvement of influenza vaccination adherence observed between the two periods including three influenza seasons before (2012/2013, 2013/2014 and 2014/2015) and after (2015/2016, 2016/2017 and 2017/2018) the introduction of the strategies tailored to increase vaccination adherence of HCWs at the UH of Palermo.

Discussion

European and Italian HCWs have shown very low compliance with influenza vaccination [12,14]. A consistent lack of perception of the risk of transmitting influenza infection to patients has been repeatedly demonstrated over

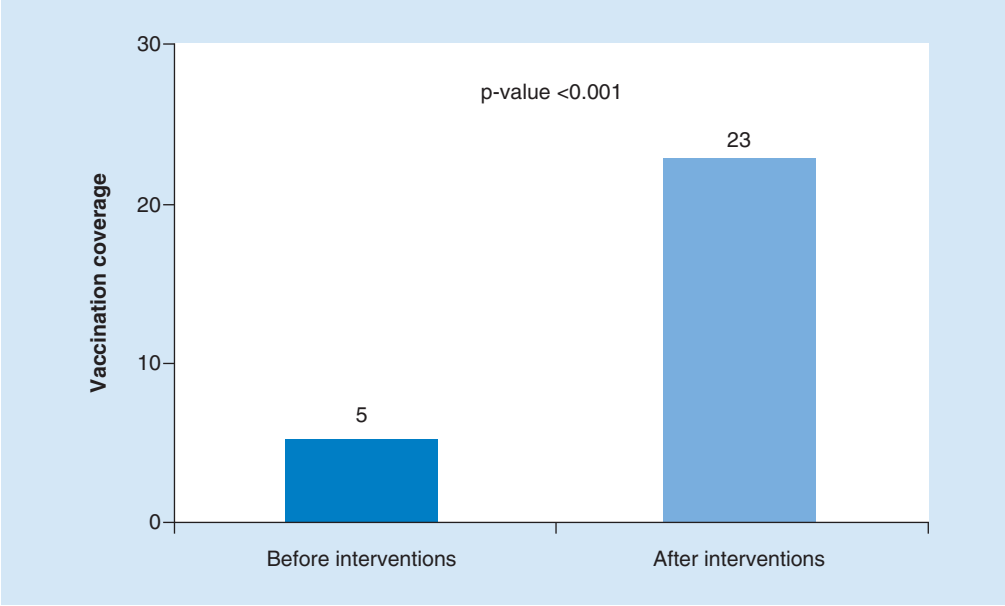

Figure 1. Average vaccination coverages observed before (2012/2013, 2013/2014 and 2014/2015) and after (2015/2016, 2016/2017 and 2017/2018) the introduction of strategies tailored to increase vaccination adherence of healthcare workers at the University Hospital of Palermo, Italy.

time [8,9]. Also, MR and GP trainees, who should be considered an important target of vaccination since they are the medical specialists of the future and the first-line providers for hospitalized and debilitated patients, reported a general lack of knowledge [14–16]. Several experiences have documented that educational interventions can slightly improve adherence to influenza vaccination in a sample of HCWs. Nevertheless, the vaccination coverage achieved still remains below the recommended levels, and below levels required to limit the spread of influenza virus from HCWs to their patients [3,9,10]. At the same time, communicative strategies and a dissent form for HCWs who refused seasonal influenza vaccination, demonstrated a significant, but not satisfactory, increase of vaccination coverage [18,19]. Given that mandatory vaccination has been demonstrated to be effective in other European and non-European countries, Italy should consider a mandatory vaccination policy for HCWs in contact with fragile patients or with patients particularly at risk to contract influenza, in combination with educational strategies as previously discussed, or adopt strict limitations in the workplace for unvaccinated HCWs during influenza seasons [20–22].

Future perspective

Introduction of mandatory vaccination for HCWs in Europe could considerably improve influenza vaccination coverage, resulting in a reduction of influenza spread in healthcare settings. To increase HCWs awareness on influenza vaccination, standardized educational interventions should be organized during university and postgraduate healthcare training. Moreover, before the beginning of each seasonal influenza vaccination campaign, multidisciplinary courses on influenza for HCWs should be planned each year.

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Executive summary

Background

- Nosocomial infections caused by influenza virus represent a concerning issue associated with high morbidity and mortality.
- Influenza among healthcare workers (HCWs) often precedes the spread of infection within the general population.
- Influenza vaccination adherence among European and Italian HCWs remains considerably lower than the recommended 75%.

Influenza vaccination perception & adherence among HCWs

- According to HCWs, their perception of the risk of contracting influenza infection and experiencing its complications was generally lower than that reported for other communicable diseases such as measles or hepatitis B.
- Influenza vaccination refusal was related to a low perception of risk of contracting influenza or experiencing its complications.
- Neither vaccinated nor unvaccinated HCWs considered influenza as a potential threat to patients, or considered themselves as a potential route of transmission of infection.

Intervention to increase influenza vaccination coverage among HCWs

- Educational interventions about influenza vaccination improved knowledge and attitudes of HCWs.
- Mandatory informed dissent forms or tailored communicative strategies slightly increased vaccination adherence.
- Neither educational nor communicative strategies alone achieve 75% influenza vaccination coverage among HCWs.

Discussion

- Italian HCWs demonstrated a very low compliance with influenza vaccination.
- Mandatory vaccination has been demonstrated to be effective in reaching high levels of vaccination coverage among HCWs.
- Mandatory vaccination policies for HCWs in contact with fragile patients or with patients at higher risk for influenza, or the adoption of strict limitations in the workplace for unvaccinated subjects during the influenza seasons, should be considered in the future to increase influenza vaccination coverages among HCWs.

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