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Attitudes, believes, determinants and organisational barriers behind the low seasonal influenza vaccination uptake in healthcare workers – A cross-sectional survey

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ABSTRACT

Background: Seasonal influenza threatens hospitalised patients and residents of nursing homes annually. Due to age and chronic disease their protection following immunisation is diminished. Additional immunisation of direct contacts and in particular healthcare workers (HCWs) has proven added value. As vaccination coverage in HCWs remains low, we aimed to gain insight in the factors behind the demotivation for influenza vaccination.

Methods: Attitudes and believes towards influenza vaccination and socio-demographic and professional determinants were surveyed in 5141 Belgian HCWs from 13 hospitals and 14 nursing homes. Additionally, influenza campaign coordinators of the participating healthcare institutions were interviewed about the factors of success/failure in their campaigns.

Results: The mean vaccination coverage registered by the participating healthcare institutions was 40.4% in the hospitals and 45.3% in the nursing homes. Overall, up to 90% of HCWs found it important not to infect their patients. However, only 20% of non-vaccinated HCWs considered influenza vaccination a duty to not harm their patients. Up to 40% of unvaccinated staff believed they could get influenza after vaccination and that vaccination weakens their immune system. Also, only about 20% of unvaccinated staff thought to have a high chance of getting influenza. Reasons for unvaccinated staff to get vaccinated in the future are self-protection and protection of family members. Factors that positively influenced vaccination coverage are encouragement by supervisors (OR, hospitals: 7.1, $p < 0.001$; nursing homes: 7.5, $p < 0.001$) and well-organized vaccination campaigns with on-site vaccination. Factors that negatively affected vaccination coverage are misconceptions about influenza and its vaccine (OR, range 0.1–0.7, $p < 0.001$ for most misconceptions) and underestimation of the risk of contracting influenza by patients or HCWs (OR of perceived susceptibility, range 2.1–5.1, $p < 0.001$ for most factors).

Conclusion: There is a need for guidance for the organization of seasonal influenza campaigns, in which education, communication and easy accessible vaccination are promoted.

1. Introduction

Seasonal influenza is an infectious disease that threatens public health every year. A recent study estimated that 291,000 to 646,000 individuals die from seasonal influenza associated respiratory complications annually [1]. Up to 90% of these lethal cases occur in the age group ≥65 [2]. Immunocompromised patients and persons with a chronic disease have a 4- to 10-fold increased risk of hospitalisation and complications caused by influenza [3,4]. Since direct protection of these patients through vaccination is diminished, it needs to be supplemented with vaccination of their direct contacts, in particular healthcare workers (HCWs). The latter is of high importance since as many as 25% of HCWs get infected with influenza annually and may thus transmit influenza to patients prior to having symptoms. Moreover, it has been shown that vaccinating HCWs is an effective strategy in reducing all-cause mortality and influenza-like illness in patients and

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residents of healthcare institutions (HCIs) [5–9]. To this end, influenza vaccination for all HCWs has been recommended. Despite the known advantages of immunizing HCWs, coverage rates are generally low, and range from 14% in Poland to 45.6% in England according to a recent review [10]. Reasons for low influenza vaccination uptake are diverse and comprise organisational barriers, such as lack in time and poor accessibility, doubts about the effectiveness, fear for side effects and personal reasons including the right to become ill themselves [11–19].

However, most studies tended to focus on HCWs from hospitals or nursing homes, rather than focussing on HCWs from both types of HCI. Furthermore, only limited studies have focussed on the composite of demographic, behavioural and organisational factors that are associated with vaccination uptake [13,14]. Insights in these factors are important for the development of specific influenza vaccination programs that aim to increase vaccination coverage. For this reasons, we aimed to determine demographic, behavioural and organisational factors that are associated with vaccination uptake in HCWs in both hospitals and nursing homes in Flanders, Belgium.

2. Methods

2.1. Study population and procedure

In October 2015, 22 hospitals and 47 nursing homes of different size were approached for study participation in Flanders, Belgium. Of those HCIs, 13 hospitals and 14 nursing homes agreed to participate. An anonymous online survey was used to determine social, demographic and behavioural factors and beliefs that were associated with influenza vaccination uptake among HCWs. A link to the online survey was provided to all staff of the participating HCIs, further defined as HCWs, in November 2015, and was available for 6 weeks. A reminder was send twice to all HCWs and promotional material (posters and tissue boxes) was distributed in the HCIs to promote participation. Participation in the survey was voluntary and anonymous. Only fully completed questionnaires were used for data analysis. In addition, possible key factors of success/-failure during the organisation of influenza vaccination campaigns were identified with semi-structured interviews with the organisers of influenza vaccination campaigns in the participating HCIs. The study was approved by the Ethical Committee of the University Hospitals of Leuven, Belgium (S58512).

2.2. Online survey (HCW)

The online survey was designed with LimeSurvey (LimeSurvey Project, Hamburg, Germany) and based on questionnaires that were previously used in the Netherlands to ensure comparability [13,14]. The survey was divided into four parts: (i) demographics; (ii) knowledge about the recommendations of the Superior Health Council; (iii) the perception of influenza and the influenza vaccine; and (iv) behaviour. The behavioural part was based on the Health Belief model, the Health Intention Model and the attitude/social influence/self-efficacy (ASE) model [20–22]. Finally, depending on the vaccination status in the previous year (2014), respondents answered 5 or 6 additional questions about reasons for or against vaccination. The complete questionnaire is added in supplementary (currently only in Dutch).

2.3. In-depth semi-structured interviews (HCI)

In person semi-structured interviews were conducted with the influenza campaign organisors of the participating HCIs and took approximately one hour. The interviews contained items on the demographic profile of the institution, the vaccination coverage in the current (2015) and previous two seasons, and open-ended questions on the methods that were used for organising the campaign, and actions that had been taken to increase the vaccination coverage. All interviews were written out and compared. In case of ambiguity, the organisors were contacted once more. In order to identify factors leading to success, methods used in HCIs with a high vaccination coverage were analysed separately. The structure of the interview is added in supplementary (currently only in Dutch).

2.4. Statistical analysis

A sample size of 500 participants per province (n_{total} = 2500) for HCWs in hospitals was calculated based on an estimated vaccination coverage of 50% and a 95% confidence interval (CI) [11]. Since the staffing levels in nursing homes are generally lower, a sample size of 500 HCWs over all five provinces was targeted for recruitment. Questions on the 5-point Likert scales were dichotomised analogously to previous surveys by combining (i) "Strongly agree" and "agree" as a positive response and (ii) "do not agree/do not disagree", "disagree" and "strongly disagree" as a negative response [13,14]. Univariate and multivariate logistic regression analysis and chi-squared tests were used to identify factors (demography, beliefs, behaviour) that influence influenza vaccination coverage in HCWs. Results are expressed as odds ratios (OR) and their 95% confidence intervals (CI). In the multiple regression analysis, final models were selected by backwards elimination of non-significant variables, using the Mallow Cp criterion [23]. A test probability of 5% was considered statistically significant. All data were analysed with R. version 3.0.2 (R Foundation for Statistical Computing, Vienna, Austria, 2013).

3. Results

3.1. Participation and characteristics of healthcare institutions and participants

In total, 28 790 HCWs, of which 26 524 were hospital staff and 2 266 nursing home staff, received a link to complete the survey. The total response rate among HCWs was 17.9%: 17.0% in the hospitals and 27.9% in the nursing homes. The respondents were mainly women (79% in hospitals and 88.5% in nursing homes) and the mean age was 42.6 years in the hospitals and 43.5 years in the nursing homes. All demographic characteristics of our study population are listed in Table 1 and are comparable to available census data on Flemish HCWs. The vaccination coverage of all HCWs in the participating HCIs (as registered by the HCIs) from season 2013–2014 until season 2015–2016 is represented in Fig. 1. The mean vaccination coverage registered by the participating HCIs was 40.4% in the hospitals and 45.3% in nursing homes during the last influenza season (2015–2016). Based on self-reported vaccination status of 2014, 62.4% and 52.6% of the respondents of respectively hospital and nursing homes claimed to be vaccinated.

3.2. Determinants of vaccination

3.2.1. Demographical determinants

Demographic factors that are univariately associated with vaccination uptake in hospitals or nursing homes are listed in Table 2. Male gender, older age, chronic illness, higher education and working irregular shifts or night shifts only were significantly associated with influenza vaccination uptake. In hospitals, physicians were significantly more likely to be vaccinated than nurses, whereas midwives, nursing assistants and nursing aides

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