



Review

Influenza vaccination of health care workers in hospitals—A review of studies on attitudes and predictors[☆]

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ABSTRACT

Introduction: Immunization guidelines from many countries recommend influenza vaccination of health care workers (HCW). However, influenza vaccination rates among HCW are universally low. To aid in designing effective immunization programs we reviewed the literature for studies reporting on (1) self-reported reasons of HCW regarding vaccination against influenza and (2) predictive factors for influenza vaccination in HCW.

Methods: We searched PUBMED for relevant publications from 1980 to 2008 with predetermined search strategies and applied pre-defined criteria for inclusion or exclusion. To be included in the review as a predictor study, a multivariate analysis must have been conducted.

Results: We included 25 studies relevant to self-reported reasons for rejecting or accepting vaccination. These studies identified two major reasons for lack of vaccine uptake by HCW: firstly, a wide range of misconceptions or lack of knowledge about influenza infection; and secondly, a lack of convenient access to vaccine. In contrast, among studies reporting on reasons for vaccination acceptance, all but two found that HCW stated self-protection was the most important reason. In the area of “predictive factors for influenza vaccination”, we included 13 studies. At least five of them identified the following three factors: previous receipt of influenza vaccine, belief in the vaccine’s effectiveness, and older age.

Conclusion: Our findings indicate that if HCW get immunized against influenza, they do so primarily for their own benefit and not for the benefit to their patients. Misconceptions about influenza and influenza vaccine could be improved by education, and organizational barriers could be bridged with sustainable, structural changes to allow flexible and workplace vaccine delivery.

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1. Introduction

Influenza infections among hospitalized patients can have much more serious consequences than among the general population because an increasing proportion of hospital patients are elderly and/or immunocompromised. Several outbreaks of health care facility-acquired influenza involving older patients as well as adults and children with immunosuppression have been documented in the infection control literature [1–12]. Although these patients belong to risk groups that should be vaccinated against influenza, vaccination rates in these groups vary widely among countries. Even if vaccinated, the efficacy of influenza vaccine is lower in the elderly and immunocompromised than in younger adults [13–18] necessitating indirect protection through vaccination of health care workers (HCW).

Influenza vaccination of HCW reduces the risk for infection, influenza-like-illness, absenteeism and presenteeism¹ among staff [19–22] and appears to prevent nosocomial infections and associated morbidity and mortality among their patients [21,23–25]. The World Health Organization (WHO), US Centers for Disease Control and Prevention (CDC) and immunization guidelines of many countries recommend influenza vaccination of HCW, or at least in those who are in regular, frequent contact with high-risk persons, to prevent transmission of influenza from HCW to patients [26–29]. However, the same countries report a low uptake of influenza vaccine in HCW [30–35].

Understanding the barriers to and facilitators of influenza vaccine uptake by HCW is essential to overcome low compliance with recommendations. To aid public health officials responsible for infection control programs as well as hospital and infection control managers in their efforts to design effective interventions to raise rates of influenza vaccination (among HCW), we undertook a review of published studies with the following objectives: (1) to identify self-reported reasons among HCW for vaccine acceptance or non-acceptance and (2) to identify predictive factors² that are statistically associated with influenza vaccine acceptance.

2. Methods

2.1. Selection and analysis of literature

Published articles were obtained using PUBMED computerized databases from 1980 to 2008 searching the following words: influenza, influenza vaccine³, vaccination, immunization, health care worker(s), health care personnel, nurse(s), physician(s), knowledge, attitudes, behavior, practice(s), acceptance, refusal, predictor(s), infection control, survey(s), questionnaire(s). The following selection criteria were applied: the study population included HCW (physicians, nurses or both and not support staff or para/non-medical personnel) from hospitals; the publication was published in English, French or German.

To be included in the review of self-reported reasons for influenza vaccine acceptance or non-acceptance the study had to list (i) at least 6 reasons given by HCW for not having been vaccinated or (ii) at least 3 self-reported reasons for having been vaccinated. For each of the selected studies we restricted the review to only the first 6 most frequently cited reasons for non-receipt and

Table 1

Categorization of self-reported reasons for vaccine non-acceptance among HCW.

No.	Categories	Examples of identified reasons
1.	Lack of concern	"Influenza is not a serious disease", "I forgot it", "I do not think about it", "I am not interested", "I did not know of the availability", "I am not in the target group", "I disagree with the recommendation", "I have doubts about necessity", "I did not know that I needed influenza immunization", "dislike of initiative", "not useful"
2.	Lack of perception of own risk	"I do not feel at risk for getting influenza", "I am healthy and I don't get sick", "I believe in my own host defense"
3.	Doubts about vaccine efficacy	"The vaccine does not work"
4.	Fear of adverse reactions	"Fear of side effects", "I am concerned about getting influenza from the vaccine", "vaccine may harm my health", "had serious adverse effects after previous vaccinations"
5.	Self-perceived contra-indications	"I had an allergy", "I was pregnant", "I was breastfeeding during the vaccination campaign", "I felt ill on the day when the vaccine was offered", "not feeling well", "having flu, headache or cough"
6.	Dislike of injections	"The shot is painful", "I do not like needles", "fear of needle"
7.	Avoidance of medications	"I avoid medications", "I do not need vaccines", "I believe in homeopathic medicine"
8.	Lack of availability	"The vaccine was not offered"
9.	Inconvenient delivery	"Inconvenient to obtain", "I was too busy", "I did not have time to get it", "absence during vaccination program", "had insufficient time"

the first 3 most frequently cited reasons for acceptance of influenza vaccine. We then grouped the reasons for receiving or not receiving vaccination into 9 categories respectively (Tables 1 and 3). Using this classification, we identified for each study the most frequent 6 reasons given by HCW who did not receive influenza vaccine and the most frequent 3 reasons as to why HCW reported being vaccinated. According to the order of frequency of reasons reported by each study the categorized reasons were given a score: 6 for the most frequently stated reason for non-receipt and 3 for the most frequent reason for vaccine acceptance in a given study. A score of one was given for the 6th and 3rd most frequent reason, respectively. Thus, it was possible that more than 1 reason in a given study applied to the same category. To obtain an impression of the overall importance of each category, we added up the scores for each category over all studies and determined relative rankings (Figs. 1 and 2).

For the identification of predictive factors associated with influenza vaccine receipt, we used the following selection and review methods: the study reported results of a multiple logistic regression model determining the impact of various independent variables on the outcome variable "influenza vaccination". For example, patients' characteristics and attitudes towards influenza or influenza vaccine were used as independent variables. For factors that were negatively associated with vaccine uptake (OR < 1),

¹ In contrast to absenteeism, when employees are absent from work, presenteeism discusses the problems faced when employees come to work despite being ill.

² In this review, predictive factors or "predictors" are defined as factors that were independently associated with influenza vaccine acceptance.

³ Either inactivated or live attenuated influenza vaccine (LAIV) have been used by immunization programs to reduce the risk for influenza among HCW. However, none of the eligible studies reported the use of LAIV.

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