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Personal attitudes and misconceptions, not official recommendations guide occupational physicians' vaccination decisions

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ABSTRACT

Introduction: Healthcare personnel (HCP) are often under-vaccinated. The aim of this study was to evaluate occupational physicians' potential role by assessing relations between their knowledge and attitudes regarding HCP vaccination and the extent to which official vaccination recommendations are communicated.
Methods: Cross-sectional survey, $n = 135$ occupational physicians.
Results: Occupational physicians who treat HCP recommend vaccinations more often to HCP when they have better knowledge of official vaccination recommendations and a more positive attitude towards vaccination compared to physicians with less such knowledge or a more negative attitude. The attitude towards vaccination most strongly affects whether occupational physicians recommend the measles, mumps, and rubella (MMR) vaccination: physicians with less positive attitudes recommend MMR to HCP in a more restricted way. A more positive attitude towards vaccination also relates to fewer misconceptions. Occupational physicians' knowledge and attitude further influence the extent to which pregnant HCP receive vaccinations against influenza. Knowledge about official recommendations does not influence the recommendation of influenza vaccination for pregnant women.
Conclusions: Reasons for vaccination gaps in HCP might have their roots in occupational physicians' incomplete knowledge of vaccination recommendations. Attitudes, which are related to misperceptions, also influence which vaccinations are recommended to HCP. Official recommendations, and not personal attitudes and misconceptions, should guide occupational vaccination behavior.

1. Introduction

Healthcare personnel (HCP) are at an increased risk of acquiring infectious diseases due to their exposure to patients and bodily fluids. The prevention of nosocomial infections requires comprehensive occupational safety programs [1]. The vaccination of HCP is an essential part of infection prevention and control. Employers and HCP have a shared responsibility to prevent occupationally acquired, vaccine-preventable diseases and avoid nosocomial outbreaks [2]. Further, HCP play a critical role in communicating vaccination recommendations to their patients and should therefore be vaccinated themselves.

Analogue to the national immunization technical advisory groups (NITAGs) in other countries, the German *Standing Committee on Vaccination (STIKO)* provides recommendations to the general population and special recommendations for HCP. These annually updated recommendations provide advice regarding which vaccinations are recommended for HCP (hepatitis, influenza, pertussis, measles, mumps, rubella, varicella at the time of the study) as well as the duration of protection after vaccination and need for booster vaccinations [3].

Occupational physicians are responsible for workplace safety. In Germany, employers must provide free vaccinations to employees if the risk of infection is greater than that for the general population. Vaccination of HCP should be included in all healthcare settings; and all medical facilities should formulate an unambiguous vaccination policy for all HCP [4,5].

However, despite decades of effort to encourage HCP to receive vaccinations against nosocomial infections, vaccination levels remain insufficient, resulting in numerous nosocomial outbreaks (e.g. measles, influenza; [6–9]). In terms of demand, numerous

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studies have assessed why HCP do not receive the recommended vaccinations [10–12]. However, there is a noticeable lack of research concerning how occupational physicians – who might play the most important role in creating and implementing a workplace vaccination program – offer vaccinations. Indeed, occupational physicians' contribution to insufficient vaccination rates among HCP has not yet been explored in detail. The knowledge, attitudes, and beliefs of those who create e.g. a hospital-based vaccination program and advise vaccinations may play an important role.

In this study, therefore, we aimed to assess occupational physicians' attitudes and knowledge regarding the recommendations for vaccinating HCP, the extent to which they communicate these recommendations to the HCP they treat, and how attitude and knowledge relate to these recommendations. In doing so, we sought to identify areas that may be targeted for improvement.

2. Methods

In this cross-sectional correlational questionnaire study, 135 occupational physicians responded to established measures assessing their attitude towards vaccination [13] and general vaccination related knowledge [14,15]. Moreover, we tested physicians' specific knowledge regarding which vaccinations are recommended for HCP as well as whether they recommend those vaccinations to their HCP patients.

2.1. Study population

A German occupational health conference on vaccination took place in June 2013. All participating occupational physicians were asked to complete an anonymous questionnaire in German. We refrained from assessing their occupational status within their facilities but instead collected information about the frequency with which they treat HCP.

2.2. Ethical considerations

Participants were informed that all information gathered would be anonymous and handled confidentially. Participation was voluntary. Completion of the questionnaire implied consent for study participation. Individual participants cannot be identified based on the presented material. This study caused no plausible harm to participating individuals.

2.3. Questionnaire

The questionnaire comprised 15 questions divided into six areas of inquiry:

1. Demographic data. Age, sex, professional qualification (specialists in occupational medicine (5 year residency), minor specialization in occupational medicine (2 year residency), residency not yet completed), and frequency with which the physician treats HCP (not at all, occasionally, predominantly).
2. Knowledge of official vaccination recommendations. Eight vaccine preventable diseases were presented (hepatitis, influenza, pertussis, measles, mumps, rubella, varicella, pneumococcus). For each disease participants indicated whether they thought that STIKO recommends vaccination for susceptible HCP (yes, no, don't know). Knowledge regarding the official vaccination recommendations was calculated as the sum of correctly marked STIKO recommendations. All mentioned vaccinations were recommended for HCP at the time of the study with the exception of the pneumococcal vaccination, which was included as a distractor item. "Don't know" answers count as wrong answers.
3. Communication of recommendations. Participants indicated whether they recommend the above-mentioned vaccines to the HCP they treat (yes to all, yes to certain subgroups, no). "Yes to all" represents the official recommendation: there is no conditional recommendation (such as measles only for HCP in pediatric settings); in Germany the recommendations pertain to all HCP in all types of facilities.[2] The recommendations that occupational physicians pass on to HCP were summarized as a recommendation score. When the occupational physicians indicated that they recommended the vaccination to all HCP, 1 point was added to a sum score. For positive but conditional and no recommendation, they received zero points. Thus, this score ignores partial recommendations to special risk groups. The rationale behind this is to analyze which factors lead occupational physicians to strictly follow the official recommendations. Only the seven vaccinations recommended by STIKO at the time of the study were included (i.e. the score excludes pneumococcal vaccination).
4. Risk perception. Theoretically, perceived risk is a function of the perceived probability of an event and its expected consequences [16]. Thus, perceived risk can be assessed as the mathematical product of subjective probability and disease severity [16]. Table 1 provides the exact wording of the risk variables. We used fully labeled, 7-point scales regarding the probability of contracting influenza among unvaccinated HCP and disease severity of influenza as well as the probability and severity of adverse events following influenza vaccination (AEFI) [13,14,16].
5. General knowledge. The knowledge test developed by [15] comprises 9 true-false statements such as "Vaccinations increase the occurrence of allergies." (false). The statements cover typical misconceptions on vaccination. Thus, the number of incorrect answers can be interpreted as the degree of misconceptions held by the participant. Participants rated all statements as true, false, or don't know. Knowledge as assessed with this test successfully predicted influenza risk perceptions and vaccination intentions in previous studies [14,15]. Table 2 shows the full knowledge test with the number of correct, incorrect, and don't know answers provided by participants. General knowledge was calculated as the sum score of all correct answers. "Don't know" answers count as wrong answers [14,15]. The higher the score, the greater the correct knowledge is and, concurrently, the lower the degree of misconceptions.
6. Attitudes. Participants rated their attitudes towards occupational vaccinations and the influenza vaccination for pregnant women (wording and labeling according to [13], see Table 1; higher numbers represent a more favorable attitude).

2.4. Data analysis

We calculated the described indices for general knowledge, knowledge about STIKO recommendations, and a recommendation score, which assesses the extent to which physicians pass on official recommendations to their patients. In regression analyses (SPSS 20), we assessed the relative influence of attitudes, general knowledge, and knowledge about recommendations on both the recommendation score and the reported vaccination of pregnant women. In the analyses, we controlled for age, sex, and the frequency with which the physician treats HCP (predominantly vs. occasionally). Significance level was 5%.

[2] Rubella is the only exception here. However, in Germany the vaccination against rubella is included in the MMR vaccine. The monovalent rubella vaccine is no longer available. We therefore treat rubella in the same manner as every other vaccination.