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Influenza vaccination of future healthcare workers: A cross-sectional study of uptake, knowledge and attitudes

Debra L. Blank[a], David M.S. Bodansky[a,*], Anna Forbes[a], Emma Garde[a], Fleur Story[a], Andrea K. Roalfe[b], Lynda Tait[b]

[a] Medical School, University of Birmingham, Vincent Drive, Edgbaston, Birmingham B15 2TT, United Kingdom
[b] Primary Care Clinical Sciences, School of Health & Population Sciences, Primary Care Clinical Sciences Building, University of Birmingham, Edgbaston, Birmingham B15 2TT, United Kingdom

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ABSTRACT

Promotional campaigns recommend immunisation against influenza in healthcare workers (HCWs) but the uptake in this group remains low. We conducted a survey study during the 2008–2009 influenza vaccination period amongst future HCWs to quantify uptake and identify barriers to immunisation. Overall uptake was 8.0% (95% CI 5.9–10.8%), which is lower than the uptake amongst current HCWs (13.4%) and short of current government targets (75%). Knowledge about influenza was good but insufficient to encourage HCWs to get vaccinated. Promotional campaigns are needed that emphasise the role of vaccination in personal and patient protection.

1. Introduction

Influenza is a major health problem and contributes a significant burden to health services in the UK [1–3]. In 2008–2009 in England and Wales, influenza and its complications contributed 36,700, mostly elderly, additional deaths to winter mortality figures [4]. Vaccination is recommended to directly reduce morbidity and mortality attributable to influenza, particularly in high-risk and vulnerable individuals [5,6]. In 2000, the Chief Medical Officer extended this recommendation to include vaccination for all healthcare staff "directly involved in patient care" to reduce the risk of occupational infection and to prevent nosocomial transmission to vulnerable patients [7–9]. Healthcare workers (HCWs) are doubly at risk of infection since they are exposed in the community and also at work [9]. Given that up to 25% of non-immunised HCWs contract influenza in the winter months [9], vaccination of HCWs could also reduce staff absence during influenza outbreaks, allowing continued delivery of optimum healthcare [10]. Pandemic influenza is a particular concern and vaccinating HCWs should help to increase herd immunity, thereby potentially reducing influenza outbreaks [11].

Although vaccination is recommended, coverage amongst HCWs is low, with reported uptake of 13–40% [7,12,13]. A systematic review reported that the reasons often cited for low uptake were: fear of vaccine side effects, fear that influenza would be caused by the vaccine, aversion to injections, lack of knowledge about the usefulness of the vaccine or its availability, forgetfulness or time constraints, and misperception of the risk of contracting influenza [13]. Further understanding of factors that influence HCWs' vaccine uptake may be crucial to inform targeted implementation strategies needed for improving the success of promotion campaigns to increase influenza vaccine uptake.

Knowledge about attitudes towards influenza vaccination and the current vaccination uptake amongst HCWs is necessary for successful implementation of current recommendations. Most studies, however, have compared newly recruited or established HCWs [14,15]. Few studies have focused specifically on the uptake of influenza vaccination in those training to become doctors, nurses, physiotherapists and dentists, considered to be 'future' HCWs. One study reported uptake of 5.2% in healthcare students in Iran [14]. Our study is the first to assess influenza vaccine uptake in future HCWs in a Western country. The aims of this study were to determine the uptake of influenza vaccination in future HCWs and compare this with the uptake of current HCWs, and to examine future HCWs' knowledge about recommended occu-

* Corresponding author. Tel.: +44 7788801799.
E-mail addresses: dlb628@bham.ac.uk (D.L. Blank), bodansky@gmail.com (D.M.S. Bodansky), axf654@bham.ac.uk (A. Forbes), elg684@bham.ac.uk (E. Garde), fleur.story@gmail.com (F. Story), a.k.roalfe@bham.ac.uk (A.K. Roalfe), l.tait.1@bham.ac.uk (L. Tait).

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pational influenza vaccination and attitudes towards influenza vaccination.

2. Methods

2.1. Study design and setting

We conducted a cross-sectional survey among future HCWs for the season 2008–2009 at the College of Medical and Dental Sciences at the University of Birmingham, West Midlands, UK.

2.2. Study population

We selected participants to represent a population of future HCWs who have direct patient contact and are therefore eligible to receive the influenza vaccination. Undergraduates were chosen from every year of medicine, nursing, physiotherapy and dentistry and were further classified into 'pre-clinical' and 'clinical' groups depending on their exposure to patients. The first two years of medical and dental students, without clinical exposure were classified as the 'pre-clinical' group. Physiotherapy and nursing students have clinical exposure from the start of their courses whereas medical and dental students do so from the third year and so were allocated to the 'clinical group'.

2.3. Materials

We designed a structured, self-administered 23 item questionnaire which included fixed questions with closed answers and attitude statements (see Appendix A). Information concerning demographic characteristics (age, sex, course) was also collected. Questions 1 and 2 required a yes/no response to vaccination status. Questions 3–5, designed to assess knowledge of influenza, required true or false responses. Correct answers scored 1 point and incorrect answers were scored as 0. The dimensions of the Health Belief Model [16] have contributed to the understanding of preventative health belief behaviours. We therefore developed the attitude section of our survey based on these dimensions. Questions 6–18 were designed to assess attitudes towards vaccination and influenza, with Likert scale scores ranging from 1 (strongly disagree) to 5 (strongly agree). Total scores were summed for each subscale. In line with the Health Belief Model [16], the questions were grouped into the following subscales: beliefs (11, 17, 18); severity (6, 8, 14); susceptibility (7, 13, 16); barriers (9, 12) and benefits (10, 15). Strongly positive answers scored 5 and strongly negative answers scored 1, depending on the favourability of the question. For example, question 8 "I cannot die from 'flu"': 'strongly agree' received 1 point and 'strongly disagree' received 5 points. For questions that had a favourable outcome or were factually correct, such as question 6, "the 'flu' is a potentially fatal illness", reverse scoring was applied: 'strongly agree' scored 5 points and 'strongly disagree' scored 1 point. We pre-tested and piloted the questionnaire in order to refine its content and design.

2.4. Data collection

The College of Medical & Dental Sciences, University of Birmingham, UK, granted approval to conduct the study. Predetermined representative sample groups were allocated by the medical school to ensure that students were not answering multiple questionnaires. Questionnaires were distributed during the start of lectures and completed anonymously. Returned completed questionnaires were regarded as representing informed consent. Data collection was carried out throughout January 2009 to April 2009, following the 2008–2009 influenza vaccination campaign.

2.5. Data analysis

Results were categorised by sex, and by medical course. The results were also classified into pre-clinical and clinical groups in order to evaluate any differences between students who had more practical medical experience and those who were in the later stages of their course. Eligibility and uptake were compared across gender, course and level of experience using chi-squared tests. 95% confidence intervals were calculated using the Binomial exact method. Logistic regression was used to identify independent predictors of eligibility and vaccination uptake. Total knowledge scores were compared by course, experience, eligibility and uptake using Mann–Whitney and Kruskal–Wallis tests. Multivariate analysis of variance (MANOVA) was used to identify between group differences in the attitude subscales. The five subscales: beliefs, severity, susceptibility, barriers and benefits were included as dependent variables; and gender, discipline, clinical exposure, eligibility and exposure status included as independent variables. The level of statistical significance was set at 5%. Statistical analysis was performed using SPSS, version 16.0 and Stata version 10.1.

3. Results

3.1. Questionnaire response rate

550 questionnaires were distributed and 519 returned (response rate 94.4%). Three questionnaires were excluded because of missing data. 516 usable responses were obtained from future doctors (64.7%), future nurses (15.3%), future physiotherapists (9.5%) and future dentists (10.5%). Participant characteristics are summarised in Table 1.

3.2. Influenza vaccination uptake and comparison with current HCWs

In total, 8.0% (95% CI = 5.9–10.8%) future HCWs were vaccinated against influenza during the 2008–2009 season. In our study, fewer future HCWs were vaccinated compared to uptake amongst current HCWs [8] over the 2007–2008 campaign (8.0% vs. 13.4%; $p < 0.001$), with the exception of nurses. Vaccination uptake for future nurses was significantly higher than the reported uptake for current nurses [7] (12.7% vs. 11.1%; $p < 0.001$).

3.3. Vaccination rates by discipline

Vaccination uptake by discipline was: future nurses 12.7% (95% CI = 6.2–22.0%), future physiotherapists 8.2% (95% CI = 2.3–19.6%), future doctors 8.1% (95% CI = 5.4–11.6%), and future dentists 0% (95% CI = 0–6.6%). 3.9% (95% CI = 1.6–7.8%) of pre-clinical students and 10.2% (95% CI = 7.2–14.0%) clinical students received the influenza vaccine ($\chi^2 = 6.43$, d.f. = 1, $p < 0.001$). There were no statistical differences between males and females in vaccination uptake. In the final multivariable logistic regression model, only level of experience (i.e. clinical status) was significantly associated with uptake.

3.4. Perceived eligibility for influenza vaccination

Overall, more than a third of future HCWs ($n = 195$, 37.6%) (95% CI = 33.4–41.9%) believed they were eligible to receive the influenza vaccine. Of those who did not have the vaccination, 31.7% believed they were eligible to receive it ($\chi^2 = 26.13$, d.f. = 2, $p < 0.001$). There were significant differences between disciplines concerning vaccine eligibility ($\chi^2 = 45.89$, d.f. = 6, $p < 0.001$): 64.6% (51) of future nurses believed they were eligible compared with 44.9% (22) of future physiotherapists and 32.9% (110) of future medics. Only 22.2% (12) of future dentists believed they were eligible to receive