INFLUENZA IMMUNISATION OF DOCTORS AT AN AUSTRALIAN TERTIARY HOSPITAL: IMMUNISATION RATE AND FACTORS CONTRIBUTING TO UPTAKE

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Abstract

Immunisation of health care workers against influenza reduces influenza-related morbidity and mortality of hospital inpatients and staff absenteeism. Uptake of influenza vaccination amongst hospital doctors is generally inadequate, and factors contributing to influenza vaccine uptake among doctors have not been well defined. We performed an audit of doctors at an Australian hospital to establish the rate of and the factors contributing to influenza immunisation uptake. The audit was conducted by delivering a survey to doctors for self-completion at major departmental meetings. Of 243 doctors employed at the hospital, 150 completed the survey (response rate 62%), of whom only 28% received influenza immunisation in 2007 and 44% in any prior year. Doctors immunised in 2007 were of an older age (39.1 vs. 34.7 years, P=0.01) and level of seniority (odds ratio for consultant vs. more junior staff=2.9, P=0.02) than those not immunised. Doctors who had ever been immunised had a better knowledge about influenza than those never immunised (odds ratio for high knowledge score 4.2, P<0.001). The most common reasons cited for not being immunised in 2007 were being too busy, immunisation not being offered conveniently and not being aware how to access the vaccine. Immunisation rates among doctors in this study are inadequate. A perceived lack of convenience of the immunisation service and poor knowledge about influenza vaccination are the major contributing factors. Efforts to improve influenza immunisation uptake amongst hospital doctors should focus on education, and on innovative strategies to make immunisation more convenient and accessible specifically for doctors. *Commun Dis Intell* 2008;32:443–448.

Keywords: influenza vaccine, immunisation programs, physicians, hospital medical staff

Introduction

Around 1,500 Australians die each year from influenza related complications.[1] Doctors are often exposed to influenza during the course of their work, resulting in substantial rates of clinical and subclinical infection during the influenza season.[2] They may then act as vectors, passing infection to patients, staff, family and friends. It is important that influenza is recognised as a significant nosocomial illness, with high mortality in vulnerable groups.

There is good evidence that immunising health care workers (HCWs), including doctors, against influenza is cost-effective in reducing staff absenteeism,[3] and may also reduce morbidity and mortality in high-risk patients under their care.[3] In healthy adults aged under 65 years, immunisation has 70%–90% protective efficacy against influenza virus infection when the antigenic match between vaccine and circulating virus is close.[4]

The standard of care for influenza immunisation in Australia is unambiguous: annual influenza immunisation is recommended for all contacts of high risk patients such as HCWs, as stated in national guidelines such as *The Australian Immunisation Handbook*.[4] While a 100% uptake is desirable, it is not realistically achievable by even the most efficient hospital immunisation services. Studies have shown that 60% coverage provides significant protection,[5] therefore aiming for 80% coverage strikes a balance between the ideal and the achievable.

Bull et al found that in 2005 only 29% of doctors in Victorian public hospitals (with more than 100 beds) received influenza immunisation, according to a survey of hospital infection control staff, although this study collected data at a health service rather than individual level.[6] Other previous studies demonstrate a range of immunisation rates of overseas doctors, from 38%–82%.[7,8] This study sought to establish the rate of influenza immunisation uptake among doctors at an Australian tertiary referral hospital and the factors contributing to the uptake. A preliminary report of this audit has been previously published in a local bulletin.[9]

Methods

Setting

The Royal Darwin Hospital (RDH) is a 300 bed tertiary hospital and is the main teaching hospital in the Northern Territory of Australia. Influenza is a recommended (but not mandatory) immunisation for all HCWs. Annually updated influenza vaccine is available free of charge and promoted throughout March and April, with occasional catch-up clinics

in May. Immunisation is available from a drop-in staff clinic between 1 pm and 3 pm most days or by appointment on Friday afternoons. Mobile clinics are also conducted for 1–2 days on each ward, but immunisation is not available outside of business hours. The immunisation campaign is publicised with flyers in common areas and loudspeaker announcements.

Data collection

An anonymous, written survey was given to RDH doctors at the end of the 2007 hospital influenza immunisation campaign. The survey was delivered face-to-face at major meetings for each department, and self-completed independently.

The main information sought is summarised in Table 1. A knowledge score was obtained from 5 true or false questions derived from information in *The Australian Immunisation Handbook*.[4]

Table 1. Summary of survey questions

Had they received influenza immunisation in 2007, or in the past?
If they had (in 2007), what reasons motivated them?
If they had not, what were the perceived barriers?
A knowledge score about influenza immunisation
What might facilitate more doctors getting immunised?
What level of doctor (intern, RMO, registrar, consultant), speciality and age were they?

Statistics

Continuous variables were compared using student's t test if normally distributed, and Mann Whitney U test was used for non-parametric variables. Categorical variables were compared using chi^2 test. Multivariate analysis for the outcome of vaccination was done using logistic regression analysis, using a backward stepwise approach. All analyses were performed using Stata 10 (Statacorp, California). P values of <0.05 were considered significant.

Table 2. Survey respondents by level of seniority

	Total number at Royal Darwin Hospital	Number surveyed	% surveyed
Interns & RMO's	68	48	71
Registrars	94	56	60
Consultants	81	46	57
Total	243	150	62

Results

Characteristics of respondents

Of 243 doctors who work at RDH, 150 (62%) completed the survey. Of the 150 doctors surveyed, the distribution by level of seniority was representative of that of the hospital as a whole (Table 2), and proportionate for each major department (medicine, surgery, paediatrics, emergency, obstetrics and gynaecology, critical care, psychiatry). Overall, the knowledge about influenza infection and immunisation was good, with 84% of respondents scoring four or five out of five, and 16% scoring three or less.

Immunisation status

Of 150 respondents, 42 (28%) reported having received influenza immunisation in 2007. This was well below our desired standard of 80%. Of the 108 doctors (72%) not immunised in 2007, 66 (44%) had received influenza immunisation in any year prior to 2007. Given that annual immunisation is recommended for all doctors, it was surprising to find that 42 (28%) had never been immunised.

Predictors of immunisation in 2007

On univariate analysis, the only significant predictors of having been immunised in 2007 were higher age and level of seniority (Table 3). On multivariate analysis (controlling for age, area of work and knowledge score) only level of seniority remained an independent predictor.

Table 3. Predictors of having received influenza immunisation in 2007

	Immunised in 2007 (n=42)	Not immunised in 2007 (n=108)	P value	Adjusted OR* (95% CI)
Mean age	39.1	34.7	0.01	
Consultant (%)	45	25	0.02	2.9 (1.2–7.1)
Knowledge score of 5/5 (%)	71	56	0.08	1.8 (0.8–4.0)

* Adjusted using multivariate logistic regression, controlling for work area (e.g. medicine, surgery, ED etc), level of seniority and knowledge score. Age was not included in the model, as it strongly correlated with level.

Predictors of ever immunised

The only significant predictor of having ever received immunisation was a high knowledge score. Those with a knowledge score of five out of five were 4.2 times more likely to ever have been immunised as those with a knowledge score of four or less (Table 4).

Factors facilitating influenza immunisation uptake in 2007

Among doctors immunised in 2007, most did so to protect themselves, their patients, family and friends against influenza (Table 5).

All respondents, regardless of whether they had received immunisation or not, were also asked an open-ended question: what they thought might facilitate and encourage more doctors to receive influenza immunisation at RDH. Of the 112 respondents who answered this question, 50 (45%) suggested that the immunisation service needed to be more convenient, and 25 (22%) suggested there needed to be more reminders about when immunisation was available. Additionally, 15 (13%) suggested more education was required, 10 (9%) suggested bribery, nine (8%) suggested making immunisation compulsory and three (3%) suggested peer pressure would help influence their decision.

Impediments to immunisation uptake in 2007

Among doctors who did not receive influenza immunisation in 2007, the most common reasons given related to accessing the immunisation service, with 30% being too busy, 29% saying immunisation was not offered conveniently and 26% being unaware of how to access the vaccine (Table 6). Reasons relating to the actual vaccine were far less common. No respondents reported not receiving the vaccine due to a contra-indication.

Previous adverse reactions to influenza immunisation

Rates of adverse reactions were consistent with rates suggested in *The Australian Immunisation Handbook*[4] and were minor in nature. The majority of respondents (87%) had never had a previous adverse reaction to influenza immunisation. Fifteen (10%) reported experiencing a mild flu-like illness and four (3%) reported local soreness after previous immunisation.

Location of immunisation

Of the 42 doctors who received influenza immunisation in 2007, 38 (91%) did so through RDH staff immunisation service (65% in staff clinic, 26% on the wards). Only three (7%) received their vaccine elsewhere and 1 respondent had self-administered it.

Table 4. Predictors of ever having received influenza immunisation

	Immunised ever (n=108)	Never immunised (n=42)	P value	Adjusted OR* (95% CI)
Mean age	36.3	35.8	0.22	
Consultant (%)	32	29	0.7	0.83 (0.3–2.0)
Knowledge score of 5/5 (%)	70	35	<0.001	4.2 (1.9–9.1)

* Adjusted using multivariate logistic regression, controlling for work area (e.g. medicine, surgery, ED etc), level of seniority and knowledge score. Age was not included in the model, as it strongly correlated with level.

Table 5. Reasons given for receiving influenza immunisation in 2007*

Reason immunised	Number citing reason	Percentage citing reason
Protect self	38	90
Protect patients	30	71
Protect family/friends	24	57
Offered conveniently	24	57
Reduce sick-leave	18	43
Encouraged by peers	11	26
Recommended in guidelines	7	17

* More than 1 reason could be cited by each respondent.

Table 6. Reasons given for not receiving influenza immunisation in 2007*

Reason not immunised	Number citing reason	Percentage citing reason
Too busy	32	30
Not offered conveniently	31	29
Unaware how to access vaccine	28	26
Concern re: flu-like illness	16	15
Forgot	15	14
Other	15	14
Concern re: adverse reaction	12	11
Unlikely to catch flu	10	9
Don't believe evidence/guidelines	8	7
Unlikely to spread to patients	3	4
Unlikely to spread to family/friends	3	3

* More than 1 reason could be cited by each respondent.

Discussion

We have found a disappointingly low immunisation rate among RDH doctors for influenza in 2007 (28%), and a significant number of doctors who have never received influenza immunisation (28%). The only significant predictor of having been immunised in 2007 were higher age and more senior level, and the most common reasons cited for not being immunised were lack of time and inconvenience. We also found a higher level of knowledge about influenza immunisation was strongly associated with ever having received immunisation.

Access and convenience

Some current strategies to increase the accessibility of immunisation, such as mobile ward-based clinics at limited times, may not be as effective for doctors as for staff who have more reliable breaks such as allied health professionals and nurses. Offering immunisation at times and places specifically convenient for doctors, such as at major meetings and education sessions, has been shown to improve compliance.[10] Increasing the availability of drop-in clinics and extending the service to out-of-hours is also likely to be beneficial.

Some respondents who were not immunised in 2007 (26%) were not aware of how to access the immunisation service, and 14% just forgot. Effective publicity thus appears important to ensure all doctors are aware of the immunisation program and how to access it. Several reminders may be needed, such as sending targeted messages to doctors who have not yet received immunisation.

When all doctors (not just those immunised in 2007) were asked what might facilitate more doctors receiving influenza immunisation, their responses that greater convenience (45%) and more reminders (22%) were needed further reinforce these notions.

Motivation and education

The findings that protection of self (90%) and others (patients 71%) (family/friends 57%) are the major factors motivating doctors to receive influenza immunisation is consistent with studies overseas: 93% of the 205 American doctors surveyed by Wodi et al cited self-protection as a reason for receiving immunisation.[7]

Knowledge about influenza immunisation was good overall with 84% of all respondents having high levels of knowledge scores (4/5 or 5/5), but higher levels of knowledge about influenza and its consequences was strongly associated with ever-having received immunisation. This result is also consistent with other studies: Wodi et al. found that doctors ever-immunised had higher knowledge scores than doctors never-immunised.[7] Martinello et al however found in their study that knowledge influences immunisation uptake for nurses but not for doctors.[8]

Study limitations

We have assumed that the convenience sampling method we used would give us a representative sample of the cohort of doctors at RDH. It is possible though that doctors who are less likely to attend meetings are also less likely to get immunised against influenza, and we might thus overestimate the immunisation rate. It is, however, reassuring that the characteristics of the survey respondents (level of seniority, area of work) were similar to doctors in the hospital overall.

Immunisation rates in this study were derived from self-reported data. It is unlikely that the 2007 immunisation rates would be inaccurate, but the respondents' recall of previous vaccination may have been prone to error and consequent under-reporting.

Implications

HCWs and health care systems have an ethical and moral duty to protect vulnerable patients from influenza.[11] The disappointing immunisation rate suggests that successful immunisation campaigns must implement specific strategies that target doctors and take into account the busy nature of their work. Effective multi-faceted interventions can significantly improve immunisation uptake as demonstrated clearly by Cooper and O'Reilly's Australian study,[12] where immunisation rates of staff in contact with patients improved from 8% to an impressive 81%. New innovation is required, such as was demonstrated in an American hospital which significantly improved the immunisation rate of HCWs by conducting a bioemergency pandemic influenza drill incorporating staff immunisation.[13]

Since it appears that most doctors receive their immunisation through staff immunisation clinics, this is an ideal opportunity for Infection Control Departments to keep accurate records of doctors' influenza immunisation status (as they do for other immunisations). The Commonwealth Government is currently considering a 'Whole of Life Register', similar to the Australian Childhood Immunisation Register (which records immunisations given up to the age of 7 years for all Australian children). This would ensure documentation of influenza immunisation status for all Australians, and would thus assist with enhancement of coverage.[14]

There are many difficulties in meeting standards for influenza immunisation in hospitals, including the annual turnover of junior staff, further emphasising the need for effective annual campaigns that make immunisation convenient and accessible. Where these strategies are unsuccessful, a mandatory influenza immunisation policy (or an opt-out policy) could be considered.

Based on the data from our study and those of others,[6,7,8] influenza immunisation rates are generally insufficient among hospital doctors. Efforts to improve influenza immunisation uptake among hospital doctors should focus on education about influenza emphasizing the protective benefits of immunisation, as well as strategies to make immunisation more convenient and accessible.

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