

CONCISE COMMUNICATION

Factors That Influence Influenza Vaccination Among Healthcare Workers in a French Geriatric Hospital

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In a geriatric hospital in France, only 80 (21%) of 390 healthcare workers (HCWs) were vaccinated against influenza. Predictive factors for accepting influenza vaccination were occupation as a physician (odds ratio [OR], 9.79), previous receipt of influenza vaccination (OR, 36), and desire to protect their own health (OR, 2.42) and residents' health (OR, 3.68). Predictive factors for refusing influenza vaccination were occupation as a nurse (OR, 6.41) or nursing assistant (OR, 4.04) and belief that homeopathic medication is more effective than the vaccine (OR, 5.75).

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Influenza is a common nosocomial infection. Serious outbreaks often occur in geriatric hospitals. Staff, patients, and visitors can introduce influenza infections into hospitals and long-term care facilities, causing nosocomial outbreaks. Healthcare workers (HCWs) are at risk of occupational exposure to influenza and may act as vectors in the nosocomial transmission of influenza. Staff-patient cross-transmission is probably common. Vaccination of HCWs against influenza is considered an important means of protecting frail, elderly patients from influenza infection. Two studies^{1,2} have shown a significant reduction in the mortality rate among elderly patients in units where HCWs were vaccinated. Guidelines for vaccination of HCWs in contact with high-risk patients have been available in France since 2000 and recommend annual immunization. Unfortunately, many HCWs do not consider influenza to be a serious concern. Vaccination rates have been reported in different countries to be less than 50% and are often 4%-38%.³⁻¹³ The aims of this study were to assess the level of acceptance of influenza vaccination among HCWs in a geriatric hospital and to determine why HCWs are vaccinated or not.

METHODS

We evaluated knowledge about and attitudes toward vaccination among HCWs and self-reported influenza vaccination status in a tertiary geriatric hospital in Villejuif, France. The University Hospital of Paul Brousse is a 800-bed hospital with 480 geriatric care beds: 284 long-term care beds, 163 rehabilitation care beds, 27 acute care beds, and 6 palliative care beds. A cross-sectional survey was performed between November 2004 and April 2005 using an anonymous structured

questionnaire based on previous research findings.³⁻¹³ The vaccine was available free of charge, and the times and locations for obtaining the vaccine were well advertised. In our hospital, vaccination was recommended but not obligatory.

Reasons for accepting or refusing the vaccine were evaluated. The investigators received a complete list of geriatric department HCWs. All HCWs (eg, physicians, nurses, nursing assistants), including night and weekend staff, were invited to participate in the survey. Each questionnaire was completed during an individual interview with an investigator (E.O.) who did not have medical or administrative responsibilities in the hospital during the study. The HCWs' vaccination status was determined by self-report and checked against the occupational physician logs. Statistical analysis (univariate and multivariate) was performed with the statistical software "R," version 2.0.1 (free software, available at <http://www.r-project.org>). *P* values of <.05 were considered statistically significant.

RESULTS

The total number of HCWs in the geriatric department of the hospital during the study period was 412. The total number of correctly completed questionnaires was 390 (95%). Of these 390 HCWs, only 80 (21%) were vaccinated (mean age \pm SD, 38 \pm 10.7 years), and 310 were nonvaccinated (mean age \pm SD, 36 \pm 9.9 years). Twenty-two (63%) of 35 physicians, 22 (17%) of 130 nurses, and 24 (13%) of 178 nursing assistants were vaccinated. The vaccination was administered by the occupational physician (51 [64%]), the practitioner (7 [9%]), or colleagues (22 [28%]).

The characteristics of vaccinated and nonvaccinated HCWs are summarized in Table 1. No difference was found between the different geriatric units. Vaccinated HCWs were more likely to be physicians, to be older, to have previously received an influenza vaccination, to have frequent infectious diseases during the winter, and to want to protect their own and residents' health. For HCWs older than 40 years, the relative risk for receipt of vaccination was 4.42 (95% confidence interval, 2.03-9.67). A greater percentage of HCWs with prior absence from work of more than 5 days were vaccinated than were other HCWs (67% vs 33%; *P* < .05). Nonvaccinated HCWs were more likely to be nurses or nursing assistants with previous postvaccination symptoms (64% vs 33%; *P* < .001) who believed that the vaccine causes influenza and that homeopathic medication is more effective in preventing it.

In a logistic regression model (Table 2), predictive factors for accepting influenza vaccination were occupation as a physician, previous receipt of influenza vaccination, and a desire to protect their own and residents' health. On the other hand, predictive factors for refusing influenza vaccination were oc-

TABLE 1. Characteristics of Healthcare Workers (HCWs) Vaccinated and Nonvaccinated Against Influenza in a French Geriatric Hospital

Characteristic, by class	No. (%) of HCWs		P
	Nonvaccinated (n = 310)	Vaccinated (n = 80)	
Demographic			
Female sex	260 (84)	62 (78)	.24
Age >40 y	125 (40)	43 (54)	<.05
Occupation			
Nurse	108 (35)	22 (28)	.27
Physician	13 (4)	22 (28)	<.001
Nursing assistant	154 (50)	24 (30)	<.01
Other	34 (11)	9 (11)	.90
Employment duration of <3 y	96 (31)	22 (28)	.64
Day staff	274 (88)	73 (91)	.60
Knowledge of and attitude toward vaccination			
Awareness of the severity of the disease	211 (68)	50 (63)	.42
Perceived risk of contracting influenza	194 (63)	54 (68)	.49
Previous influenza infection	181 (58)	55 (69)	.10
Previous work absence during winter	101 (33)	27 (34)	.95
Previous childhood influenza infection	87 (22)	22 (28)	.97
Previous influenza vaccination	66 (21)	75 (94)	<.001
Desire to benefit themselves	60 (19)	52 (65)	<.001
Desire to protect residents' health	200 (65)	75 (94)	<.001
Belief that vaccination causes influenza	120 (39)	21 (26)	<.05
Doubts concerning vaccine efficacy	78 (25)	16 (20)	.41
Belief that vaccination is dangerous	30 (10)	2 (3)	.10
Belief that homeopathic medications are more effective	181 (58)	11 (14)	<.001
Frequent infectious diseases during winter	67 (22)	27 (34)	<.05

cupation as a nurse or nursing assistant and belief that homeopathic medication is more effective than vaccination.

DISCUSSION

In a geriatric care setting, even if more than 90% of the patients have previously received an influenza vaccine, an outbreak can occur. The retrospective cohort study of Coles et al.¹⁴ showed that the staff immunization rate was poor (10%) and that the outbreak among staff began 16 days before the outbreak among the residents. In a nosocomial influenza A outbreak in an internal medicine unit, the attack rate was 23% (5 of 22 staff members) and resulted in 14 person-days of sick leave.¹⁵

Although the benefits of vaccinating HCWs against influ-

enza are well known and despite active immunization campaigns, influenza vaccination rates among HCWs are low: 21% in our geriatric hospital HCW population, and 20.1% in another French study performed during the winter of 2003 to 2004.¹⁶ Also, specific programs are needed to promote the benefits of vaccination and to change the behavior of HCWs. Improved access has been shown to be important (ie, offering the vaccine at the workplace) but not sufficient, even if vaccination is provided free of charge. Future campaigns should emphasize the benefits of HCW immunization for patients, with readily available information on adverse effects and the efficacy of acetaminophen in reducing them.¹⁷ People should be told that they can transmit influenza before they are aware that they are ill. However, it is also necessary to emphasize

TABLE 2. Multivariate Analysis of the Factors Associated With Accepting and With Declining Influenza Vaccination Among Healthcare Workers in a French Geriatric Hospital

Factor	OR (95% CI)	P
Factors associated with vaccination acceptance		
Previous influenza vaccination	36 (21.41-60.79)	<.001
Occupation as physician	9.79 (6.74-14.23)	<.001
Desire to protect residents' health	3.68 (1.99-6.8)	<.05
Desire to benefit themselves	2.42 (1.63-3.60)	<.05
Factors associated with vaccination refusal		
Occupation as a nurse	6.41 (3.49-11.79)	<.01
Belief that homeopathic medications are more effective	5.75 (3.61-9.15)	<.001
Occupation as a nursing assistant	4.04 (2.20-7.43)	<.05

NOTE. CI, confidence interval; OR, odds ratio.

the health benefits of vaccination for staff members themselves. Unfortunately, more than 30% of HCWs did not consider influenza to be a serious concern. The important difference in vaccination rates between physicians and nurses or nursing assistants (63% vs 17% and 13%, respectively) is probably related to the level of education. Thus, educational programs that target nurses and nursing assistants are necessary, and additional education seems to be needed also for physicians, to approach a 100% vaccination rate.

In our study, the major reasons identified for accepting vaccination were a desire to protect residents' health and to stay healthy. The most common reason cited for rejecting vaccination was a belief that homeopathic medications are more effective. In a previous Canadian study,⁸ nonvaccinated HCWs were more likely to believe that taking vitamins and supplements, eating a nutritious diet, and taking naturopathic or homeopathic medications were more effective than vaccination.

The limitations and possible information bias of our study were the self-reporting of vaccination status (although we checked this against occupational physician logs) and the fact that the questionnaire was administered by one of the study investigators, which carried the risk of embarrassment or the fear of punishment. However, the questionnaire was anonymous for the statistical analysis, and the investigator was free of medical or administrative responsibilities in the hospital during the study.

In practice, the major factor that limits the rate of influenza vaccination among HCWs in France is the use of homeopathy. Oscilloccinum (manufactured from wild duck heart and liver) is widely used and is one of the best-selling over-the-counter medicines in France.¹⁸ The increasing use of homeopathy worldwide (in France, Germany, and the United Kingdom but also in Canada and United States since the 1970s), despite the lack of data from serious trials,¹⁹ suggests that this factor should be seriously addressed. Rigorous clinical trials on homeopathic medicine are needed to better educate the population; it is difficult to propose allopathic medicine such as vaccination to persons who believe in homeopathy, because most of them indicate that nothing could convince them to receive an influenza vaccine. This belief is potentially dangerous if there were a worldwide epidemic of avian influenza and this population refused to be vaccinated. The results of our study were used to improve education and communication strategies. A prospective, multicenter study is ongoing to evaluate a specific program to improve the rate of influenza vaccination of HCWs in geriatric care settings in France (the VESTA Study, Observance des Vaccinations Antigrippales du Personnel Soignant en Gériatrie).

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REFERENCES

- Potter J, Stott DJ, Roberts MA, et al. Influenza vaccination of health care workers in long-term-care hospitals reduces the mortality of elderly patients. *J Infect Dis* 1997; 175:1-6.
- Carman WF, Elder AG, Wallace LA, et al. Effects of influenza vaccination of health-care workers on mortality of elder people in long-term care: a randomised controlled trial. *Lancet* 2000; 355:93-97.
- Yassi A, Murdzak C, Cheang M, Tran N, Aoki FY. Influenza immunization: knowledge, attitude and behaviour of health care workers. *Can J Infect Control* 1994; 9:103-108.
- Doebbeling BN, Edmond MB, Davis CS, Woodin JR, Zeitler RR. Influenza vaccination of health care workers: evaluation of factors that are important in acceptance. *Prev Med* 1997; 26:68-77.
- Harbarth S, Siegrist CA, Schira JC, Wunderli W, Pittet D. Influenza immunization: improving compliance of healthcare workers. *Infect Control Hosp Epidemiol* 1998; 19:337-342.
- Habib S, Rishpon S, Rubin L. Influenza vaccination among healthcare workers. *Isr Med Assoc J* 2000; 2:899-901.
- Ludwig-Beymer P, Gerc SC. An influenza prevention campaign: the employee perspective. *J Nurs Care Qual* 2002; 16:1-12.
- Manuel DG, Henry B, Hockin J, Naus M. Health behaviour associated with influenza vaccination among healthcare workers in long-term-care facilities. *Infect Control Hosp Epidemiol* 2002; 23:609-614.
- Murray SB, Skull SA. Poor health care workers vaccination coverage and knowledge of vaccination recommendations in a tertiary Australia hospital. *Aust N Z J Public Health* 2002; 26:65-68.
- Rehmet S, Ammon A, Pfaff G, Bocter N, Petersen LR. Cross-sectional study on influenza vaccination, Germany, 1999-2000. *Emerg Infect Dis* 2002; 8:1442-1447.
- Stephenson I, Roper JB, Nicholson KG. Healthcare workers and their attitudes to influenza vaccination. *Commun Dis Public Health* 2002; 5: 247-252.
- O'Rourke C, Bourke W, Bedford D, Howell F. Uptake of influenza vaccine by healthcare workers in an acute hospital in Ireland. *Ir Med J* 2003; 96:207-209.
- Qureshi AM, Hugues NJ, Murphy E, Primrose WR. Factors influencing uptake of influenza vaccination among hospital-based health care workers. *Occup Med* 2004; 54:197-201.
- Coles FB, Balzano GJ, Morse DL. An outbreak of influenza A (H3N2) in a well immunized nursing home population. *J Am Geriatr Soc* 1992; 40:589-592.
- Sartor C, Zandotti C, Romain F, et al. Disruption of services in an internal medicine unit due to a nosocomial influenza outbreak. *Infect Control Hosp Epidemiol* 2002; 23:615-619.
- Gil H, Bailly P, Meaux-Ruault N, et al. Influenza vaccination among health-care workers: vaccination rates in university hospital of Besançon winter 2003-2004. *Rev Med Interne* 2006; 27:5-9.
- Aoki FY, Yassi A, Cheang M, et al. Effects of acetaminophen on adverse effects of influenza vaccination in health care workers. *CMAJ* 1993; 149: 1425-1430.
- Vickers AJ, Smith C. Homeopathic Oscilloccinum for preventing and treating influenza and influenza-like syndromes. *Cochrane Database Syst Rev* 2004; (1):CD001957.
- Shang A, Huwiler-Müntener K, Nartey L, et al. Are the clinical effects of homeopathy placebo effects? comparative study of placebo-controlled trials of homeopathy and allopathy. *Lancet* 2005; 366:726-732.