

INFLUENZA VACCINATION AMONG HEALTHCARE WORKERS IN A UNIVERSITY CHILDREN'S HOSPITAL

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ABSTRACT

OBJECTIVES: To evaluate the attitudes of pediatric healthcare workers (HCWs) toward influenza vaccination and to increase their rate of immunization.

METHODS: A survey was conducted among pediatric HCWs using an anonymous questionnaire. Survey results were used to design an intervention to increase the immunization rate of staff. Immunization rates before (2003–2004) and after (2004–2005) intervention were assessed using immunization clinic records.

SETTING: A university children's hospital in Switzerland.

INTERVENTIONS: (1) An informational letter based on misconceptions noted in the survey, (2) educational conversations with head nurses, (3) more "walk-in" immunization clinics, and (4) a direct offer of influenza immunization on the wards.

RESULTS: Among vaccine nonrecipients, doubts about

the efficacy and necessity of influenza immunization were prevalent and more often reported by nurses than physicians (75% vs 41%, $P = .002$; and 55% vs 23%, $P = .001$, respectively). Physicians more often than nurses reported lack of time as a reason for not receiving influenza vaccination (23% vs 5%, $P = .01$). After intervention, the immunization rate of HCWs increased from 19% to 24% ($P = .03$). The immunization rate of physicians increased from 43% to 64% ($P = .004$). No change was noted among nurses (13% vs 14%) and other HCWs (16% vs 16%).

CONCLUSIONS: Misconceptions about influenza vaccination were prevalent among pediatric staff, particularly nurses. Active promotion and educational efforts were successful in increasing the immunization rate of physicians but not nurses and other HCWs (*Infect Control Hosp Epidemiol* 2005;26:855-858).

Healthy infants and young children without underlying conditions are at increased risk for hospitalization for influenza at rates comparable to those observed in adults in high-risk groups.^{1,2} Critical life-threatening influenza is more frequent among infants and children with chronic underlying disease, and almost one-third of influenza cases admitted to pediatric intensive care units are nosocomial.³ Moreover, nosocomial influenza outbreaks have been described in many hospital settings, including neonatal intensive care units, organ transplant units, and infectious disease wards.^{4,7}

Influenza vaccination for healthcare workers (HCWs) is recommended and reimbursed in many countries to reduce transmission of influenza to high-risk patients.^{8,9} Nevertheless, the immunization rate of HCWs often remains low.¹⁰⁻¹² In pediatric hospitals, the acceptance of influenza immunization among HCWs is particularly important as many chronic patients are younger than 6 months and therefore cannot be immunized directly.⁸

Our institution has offered information and influenza immunization free of charge to all HCWs for several years. Despite these efforts, the overall immunization

rate of our staff has remained low. A previous study performed by members of our group revealed that many unimmunized pediatricians in our hospital had doubts about the necessity and efficacy of influenza vaccination.¹³ We hypothesized that there may be important differences in reasons for accepting or declining immunization in different occupational groups that should be considered when influenza immunization is promoted for all HCWs. Therefore, we conducted a survey to evaluate reasons for immunization or refusal of immunization. The results were used to design an intervention to increase the rate of immunization among our staff.

METHODS

After the 2003–2004 influenza season, an anonymous questionnaire was sent to all HCWs in our institution. The questionnaire and study protocol were approved by the Ethical Committee of the University of Basel Medical Faculty. Response rates among vaccine recipients and nonrecipients were calculated by comparing the figures obtained from returned questionnaires with data regarding immunizations administered in our immunization clinic. Information about

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TABLE 1
DESIGN OF THE INTERVENTION TO INCREASE INFLUENZA IMMUNIZATION RATES BASED ON THE RESULTS OF THE ATTITUDE SURVEY DURING THE PREVIOUS INFLUENZA SEASON

Period	Intervention
Before walk-in immunization clinics were open	Informational letter to all healthcare workers based on the results of the previous year's attitude survey What is influenza? Efficacy of influenza immunization Side effects Patient protection Real contraindications Educational conversations with the head nurses of each ward General information Patient protection
Free walk-in immunization clinics	Increased number Extended to wards not located in the main hospital
After walk-in immunization clinics were closed	Opportunity for voluntary immunization was directly offered on wards

immunizations performed outside the hospital (ie, by family physicians) was not solicited.

The questionnaire comprised several multiple-choice questions. Reasons for immunization were evaluated using the following alternatives: (1) to reduce my own risk, (2) to reduce the transmission of influenza from me to patients, and (3) to set a good example for my patients because I recommend influenza vaccination. As reasons for refusal of immunization, the following alternatives were offered: (1) I am generally not convinced about influenza vaccination, (2) I am afraid of possible side effects of influenza vaccination, (3) I am not convinced about the efficacy of influenza vaccination, (4) I am afraid of injections, (5) I did not have time for immunization, and (6) I thought that the offer to get influenza vaccination was obtrusive. All negative arguments were based on comments by HCWs during informal conversations before the first survey.

An intervention to increase the immunization rates was designed based on the results of the attitude survey (Table 1). Data on immunization rates were obtained using immunization clinic records. Immunization rates before (2003–2004) and after (2004–2005) intervention were compared. Attitudes were reevaluated after intervention using the same anonymous questionnaire with the addition of one question about side effects after immunization.

The differences in immunization rates before and after intervention and between occupational groups were analyzed by chi-square tests. Ninety-five percent confidence intervals for immunizations rates were calculated. Statistical analysis was performed with the statistical program SPSS (version 11.0; SPSS, Inc., Chicago, IL).

RESULTS

In total, 406 (75%) of 538 HCWs returned the questionnaire after the 2003–2004 influenza season. The re-

sponse rate was 70% (63 of 90) among physicians, 78% (249 of 320) among nurses, and 70% (90 of 128) among other HCWs. Information on the occupational group was missing from four returned questionnaires. The response rate was lower among unimmunized physicians (45%), unimmunized nurses (72%), and unimmunized other HCWs (62%) than among those who had been immunized (100% for all three groups).

The attitudes of 60 of 63 physicians, 232 of 249 nurses, and 60 of 90 other HCWs who reported having regular patient contact were further analyzed (Table 2). The number of immunized nurses based on self-assessment ($n = 45$) was higher than the number of immunizations performed among nurses in our clinic during the 2003–2004 season ($n = 40$; Table 3), indicating that some nurses had been immunized elsewhere. Doubts about the efficacy and necessity of influenza vaccination were the most common reasons for refusal of immunization, followed by fear of side effects and missed opportunities. Physicians reported doubts about efficacy and necessity less often than did nurses and other HCWs. Furthermore, physicians reported that they remained unimmunized due to lack of time or missed opportunities more often than did other HCWs.

After intervention, the immunization rate increased from 43% (39 of 90) to 64% (66 of 103) among physicians, but remained unchanged among nurses and other HCWs (Table 3).

The response rate of the second attitude survey (ie, 71%; 394 of 554) was similar to that of the first survey. Specifically, rates were 71% (73 of 103) among physicians, 71% (229 of 323) among nurses, and 68% (87 of 128) among other HCWs. Information on the occupational group was missing from five questionnaires. The reasons for immunization of HCWs with regular patient contact remained similar in all

TABLE 2

REASONS FOR IMMUNIZATION OR NONIMMUNIZATION AGAINST INFLUENZA BEFORE INTERVENTION (2003–2004) AMONG PHYSICIANS, NURSES, AND OTHER HEALTHCARE WORKERS WITH REGULAR PATIENT CONTACT*

Reason for Immunization	Physicians (N = 38)	Nurses (N = 45)	Other HCWs (N = 13)	P
Self-protection	36 (95%)	39 (87%)	12 (92%)	.44
To reduce transmission to patients	32 (84%)	27 (60%)	10 (77%)	.046 [†]
To set a good example for patients	14 (37%)	5 (11%)	3 (23%)	.021 [†]
No reason	0	2 (4%)	0	ND
Reason for Nonimmunization	Physicians (N = 22)	Nurses (N = 187)	Other HCWs (N = 35)	P
Not convinced about efficacy	9 (41%)	141 (75%)	22 (63%)	.002 [†]
Not convinced about necessity	5 (23%)	103 (55%)	26 (74%)	.001 [†]
Fear of side effects	6 (27%)	53 (28%)	9 (26%)	.972
Missed opportunities	5 (23%)	10 (5%)	2 (6%)	.010 [†]
Fear of injection	0	9 (5%)	3 (9%)	ND
Dislike of initiative	3 (14%)	21 (11%)	5 (14%)	.846
Contraindication	0	1 (0.5%)	0	ND
No reason	1 (5%)	3 (1.5%)	0	ND

HCW = healthcare worker; ND = not determined.

*One or more reasons could be given.

[†]*P* < .05.

TABLE 3

INFLUENZA IMMUNIZATION RATES BEFORE (2003–2004) AND AFTER (2004–2005) INTERVENTION AMONG HEALTHCARE WORKERS WITH OR WITHOUT REGULAR PATIENT CONTACT BASED ON DATA FROM THE HOSPITAL IMMUNIZATION CLINIC

Occupation	2003–2004			2004–2005			P
	No. Immunized/Total	%	CI ₉₅	No. Immunized/Total	%	CI ₉₅	
Physician*	39/90	43	33% to 54%	66/103	64	55% to 75%	.004 [†]
Nurse	40/320	13	9% to 16%	46/323	14	10% to 18%	.52
Other HCW	21/128	16	10% to 23%	21/128	16	10% to 23%	1.0
Total	100/538	19	15% to 22%	133/554	24	20% to 28%	.03 [†]

CI₉₅ = 95% confidence interval; HCW = healthcare worker.

*The number of physicians was greater during the 2004–2005 influenza season due to an increased number of interns and residents.

[†]*P* < .05.

occupational groups (data not shown), with the exception that patient protection (83%) instead of self-protection (74%) became the most prevalent reason for immunization reported by physicians. Reasons for refusal of immunization also remained unchanged in all occupational groups, with the exception that efficacy doubts among nurses decreased from 75% to 58% (*P* = .001) after intervention.

Side effects after immunization were reported by 25 (20%) of 127 vaccine recipients who returned the second questionnaire: systemic reactions such as fever were reported by 18 (14%) of the HCWs on days 0 to 4 after immunization and any local reaction by 7 (6%) of the HCWs on days 0 to 2 after immunization. No serious adverse events were reported.

DISCUSSION

Many surveys have been published that report the attitudes of HCWs toward influenza immunization and

a positive relationship between knowledge and compliance.^{14–20} However, only a few studies have tested the effectiveness of different intervention methods to increase the rate of immunization among HCWs in practice.^{21–23}

In a randomized study among residents and junior medical students, an educational personal letter and a direct offer of influenza immunization in clinics and conferences increased the compliance most effectively.²¹ In a study among HCWs caring for high-risk pediatric patients, posters and educational fact cards distributed to clinics were associated with an increased immunization rate.²² Finally, an influenza immunization campaign on high-risk wards of a university hospital showed that educational efforts based on the results of an attitude survey and the on-site availability of a vaccination nurse were the most important factors increasing the rate of immunization among HCWs.²³

Our intervention was based on the results of the preceding attitude survey showing that doubts about the necessity and efficacy of immunization were prevalent among our staff, particularly nurses. Moreover, lack of time was an important reason for physicians' not receiving influenza vaccine. Personal educational letters and increased opportunities for immunization were practical and effective ways to improve compliance with influenza immunization among physicians in our hospital. Disappointingly, we failed to increase the rate of immunization among nurses, although we recognized the greater need for education among nurses based on the results of our survey. A similar reluctance toward influenza immunization among nurses has been reported in previous studies.^{15,19,23}

Not surprisingly, some vaccinated HCWs reported adverse events that they considered to be side effects of immunization, but the rate was comparatively low. When active prospective surveillance of side effects was applied in a randomized study with 849 healthy working adults, the rate of systemic side effects after influenza vaccination did not differ between recipients of placebo (35%) and vaccine (34%).²⁴ In the same study, mild arm soreness was noted by 24% of placebo recipients and by 64% of influenza vaccine recipients.

Misconceptions about influenza vaccination were prevalent among pediatric staff, particularly nurses. Active promotion and educational efforts based on the results of an attitude survey were successful in increasing the rate of immunization of physicians but not nurses and other HCWs.

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