



PERSONAL AND SYSTEM BARRIERS ASSOCIATED WITH LOW INFLUENZA IMMUNIZATIONS AMONG HEALTH CARE WORKERS: PRELIMINARY ANALYSIS OF TWO LOS ANGELES COUNTY HOSPITALS

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INTRODUCTION

Voluntary influenza immunizations among Health Care Workers (HCW) have not improved above the national average of 40% in spite of a “call-to-action” from the National Foundation for Infectious Diseases [1]. Low rate of influenza immunizations are thought to be a source of infectious disease outbreaks in hospitals, especially influenza [2]. These outbreaks have been linked epidemiologically to higher patient morbidity, mortality, and cost in hospital settings.

BACKGROUND

From 2005 to 2007, the Immunization Coalition of Los Angeles County (ICLAC), a constituency of hospitals, clinics, health plans, and vaccine companies, collaborated with its members from two large urban hospitals in Los Angeles County (herein referred to as Hospital A and Hospital B) to recognize National Adult Immunization Awareness Week (NAIAW) activities. The adult population selected for vaccination outreach was hospital-based health care workers (HCW). The goal of the partnership was to increase baseline influenza vaccination coverage rates among HCW and provide technical assistance in promoting institution-wide awareness about the importance of influenza vaccinations for hospital employees. An influenza vaccine campaign promotional toolkit was developed and tailored for hospital managers to plan the components of an effective vaccination effort. Educational materials were compiled and distributed to HCW and placed in strategic locations throughout the hospital. Subsequently, this activity provided a brief “window of opportunity” to gather additional preliminary data to explore the specific factors influencing influenza immunization coverage rates among HCW at these two hospitals.

OBJECTIVES

The objectives of the collaborative project were to increase influenza vaccination coverage rates amongst employees from Hospital A and B by 10% from a baseline of less than 40%. Infection Control and Employee Health Managers at each hospital received the ICLAC Health Care Worker Influenza Toolkit which consisted of educational materials (template employee reminder letters, flyers, timelines for influenza promotion activities), and ready-made vaccination and influenza declination forms to monitor influenza vaccination and declination rates. In addition, ICLAC developed a brief, self-administered knowledge, attitude and behaviors (KAB) survey to assess the demographic and KAB factors associated with increasing influenza immunization coverage rates and to identify specific strategies and barriers to achieving optimal vaccination rates at both hospitals.

METHODS

Determination of Baseline Coverage Rates

At the time of collaboration, the baseline influenza immunization coverage rates at these two hospitals were self-reported by the manager of Infection Control and/or the Director of Employee Health. At Hospital A (2005), the baseline coverage rate was reported to be 36%. At Hospital B in 2006 and in 2007, the baseline coverage rate was reported to be 32% and 38%, respectively.

Overview of NAIWA Campaign Procedures

The NAIWA campaign activities were held during the influenza seasons 2005 through 2007; hospital-based NAIWA influenza campaigns were implemented at urban hospitals in Los Angeles County (LAC). Both of these hospitals were Level 3 trauma facilities and Hospital B has several primary care clinics.



A variety of participation strategies were used to engage both hospital managers (e.g., Employee Health Directors, Infection Control Practitioners) and employees. During the NIAAW campaigns, influenza vaccination posters were strategically placed in locations within the hospitals, such as employee/physician lounges, cafeterias, and on medical-surgical floors. The educational toolkit for HCW consisted of a “personalized health record” along with educational materials. Recruitment strategies included use of e-mail announcements, flyers and incentives.

Knowledge, Attitude and Behavior (KAB) Survey

The self-administered knowledge, attitude, belief (KAB) survey was distributed to assess demographic, attitudinal and behavioral factors associated with receiving an influenza immunization. Specifically, the survey measures included the following variables: 1) respondent demographics (i.e., age, gender and occupation); 2) self-reported measure of the physical proximity of HCW to patient’s respiratory droplets; 3) self-report of receipt of a influenza vaccination in the previous year; 4) future intention to be vaccinated; 5) suggested strategies to increase vaccination rates; and 6) perceived barriers to vaccination for HCW.

Given that the original intent of the project was to improve vaccinations through social awareness activities, the KAB survey and methodology evolved over time. Therefore, in 2005 and 2006, the KAB survey was distributed simultaneously during the NIAAW campaigns. However, in 2007, only Hospital B chose to participate and administer the KAB survey. This report will highlight data from Hospital A in 2005; Hospital B in 2006 and 2007. The sampling methodology used at Hospital B in 2007 changed due to internal priorities and a desire to focus on high risk departments. In addition, the KAB survey was administered two weeks prior to the launch of their annual influenza campaign.

NIAAW Campaign at Hospital A – 2005

NIAAW was celebrated in the last week of September, 2005 during a hospital-wide employee barbeque luncheon. A “brown bag” influenza educational presentation was provided in a nearby auditorium to accommodate a large number of employees. These incentives were used to enhance employee participation in the NIAAW campaign. A vaccine clinic was held simultaneously during the barbeque luncheon to facilitate the employee’s access to influenza vaccinations. At the time of vaccination, the influenza educational materials packet was provided to the employee along with a raffle ticket. The KAB survey was administered simultaneously during the barbeque event and vaccination clinic. For evening shift employees, a mobile vaccination cart was taken to each medical and surgical floor so employees could be vaccinated. For these evening shift employees, ICLAC educational materials and the KAB survey were provided and collected on the same day.

NIAAW Campaign at Hospital B – 2006

NIAAW was observed during Hospital B’s annual employee influenza vaccination campaign the first week of October, 2006. The ICLAC HCW Influenza Toolkit was distributed to the hospital’s Infection Control Practitioners and to the Employee Health Director. The Employee Health Department expanded the influenza vaccination hours and set up satellite clinics within the hospital, so that regardless of work shift, employees could easily obtain influenza vaccinations at various times. In addition, a mobile immunization cart was used in the morning and late afternoon to vaccinate employees from the Emergency Department (ED) and the Pediatric, Medical and Surgical hospital units. The KAB survey was administered at the same time as influenza vaccine was administered using the mobile vaccination carts. Special influenza vaccination clinics were also established at the hospital’s three primary care comprehensive health centers for two full days.

NIAAW Campaign at Hospital B – 2007

In 2007, Hospital B modified the existing NIAAW campaign activity by administering the KAB survey two weeks prior to the influenza vaccination campaign and respondents consisted only of employees from departments identified to have patients at higher risk for influenza (i.e., Medical and Surgical, Pediatric, Neonatal, Burn Intensive Care Units (ICUs), and ED). Otherwise, Hospital B implemented similar methods to promote vaccination and completion of the KAB survey as in 2006.



Data Analyses

The data presented in this report was stored, managed, and analyzed by the Epidemiology Unit of the Los Angeles County Immunization Program (LACIP). Descriptive and bivariate analyses were performed using SAS System for Windows, version 9.0 (SAS Institute, Cary, NC). Chi-square tests were used to determine significant associations between demographic variables, receipt of vaccination in prior year and future intention to be vaccinated for Hospital A (2005); Hospital B (2006) and Hospital B (2007). Two logistic regression models were created to determine independent predictors of “future intention to vaccinate” controlling for age, gender, occupation, prior receipt of vaccine. Four independent variables were tested for association with either receiving influenza vaccinations or not receiving influenza vaccinations. The first set of independent variables were categorized as “passive” strategies (reminder emails, letters, and flyers), and “active” strategies (employee luncheons, raffle prizes, mobile vaccination carts). The last sets of independent variables were categorized as “personal” barriers (perceptions about disease risk, vaccine side effects, vaccine efficacy, and fear of needles) or “system” barriers (accessibility to vaccinations and cost).

RESULTS

Respondent Characteristics and Vaccination Coverage Rates

Hospital A – 2005

Of the 1,600 employees, 500 (31%) HCW responded to the KAB survey. Of the 500 respondents, 44% were non-patient care staff; 41% were nurses; 9% were ancillary staff, and 4.2% physicians. Eight (1.6%) of the respondents did not provide an occupation. Of the 500 respondents, 94% were hospital employees; 4% were contract employees and nearly 1% listed themselves as volunteers. Four individuals did not provide their specific work status. The majority of the participants were female (78%) and over 41 years of age (52%). Sixty-three percent of the respondents reported that they “currently interact on a daily basis within 5 feet of a patient’s respiratory droplets”. Seventeen respondents (3%) did not answer this question. Lastly, 47% of respondents self-reported receiving the influenza vaccination in the prior year. According to Director of Employee Health, the influenza vaccination coverage rate increased from 36% at baseline to 40% post NAIWA campaign activities.

Hospital B – 2006

Of the 7,800 employees, 2,724 (35%) HCWs responded to the KAB survey. Of the 2,724 respondents, 41% were non-patient care staff; 27% were nurses; 20% were physicians; and 9% were ancillary staff members. Eighty (3%) respondents did not answer the occupation question. One hundred twenty-seven (5%) individuals did not provide their specific work status. The majority of the participants were female over the age of 41 (61%). Eighty respondents (3%) did not answer the occupation question. Lastly, 45% of respondents self-reported receiving the influenza vaccination in the prior year. Sixty-three individuals (2%) did not report their prior year’s vaccination status. According to the Infection Control Practitioner, baseline coverage rates for Hospital B improved from 32% to 38% between September 2006 and March 2007. However, from the period September 2007 and March 2008, influenza immunization coverage rates declined from 38% to 30%. The decline may have been for reasons not entirely clear.

Hospital B – 2007

As previously described, the KAB survey was distributed only to “high risk” departments. Of the 7,800 employees, 580 (13%) HCW responded to the survey. Of the 580 respondents, 52% were nurses; 21% were non-patient care staff; 11% were ancillary staff members and 10% were physicians. Thirty

(5%) respondents did not answer the occupation question. Lastly, 38% of respondents self-reported receiving the influenza vaccination in the prior year. Six individuals (1%) did not report their prior year’s vaccination status.



KAB Survey Results

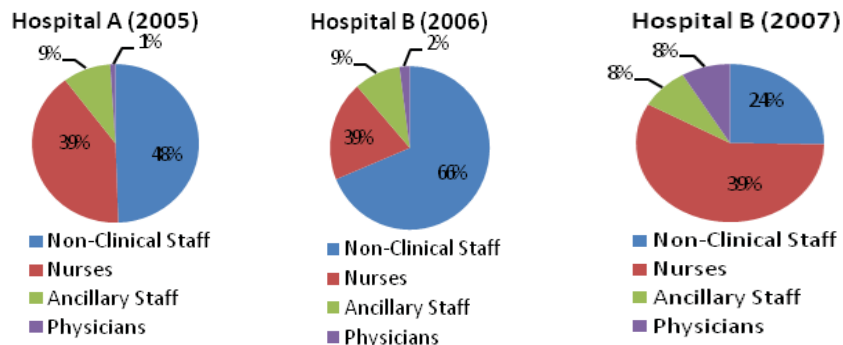
In Table 1, the data profile illustrates by year and by occupation the HCW vaccinators (those who receive influenza vaccine-YES) ranged from 35% to 71% and for non-vaccinators (those who did not receive influenza vaccine – NO) ranged from 28% to 65%.

	Hospital A (2005)		Hospital B (2006)		Hospital B (2007)	
	Yes	No	Yes	No	Yes	No
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Non-Patient Care Staff*	96 (46)	111 (54)	473 (51)	461 (49)	39 (35)	73 (65)
Ancillary Staff**	23 (53)	20 (47)	123 (60)	81 (40)	24 (44)	30 (54)
Nurses	97 (44)	102 (56)	309 (50)	306 (50)	118 (42)	73 (58)
Physicians	15 (71)	6 (29)	292 (62)	177 (28)	25 (44)	32 (56)

*Non-patient care staff is defined as dietary, administration, building & safety, and security
**Ancillary staff is defined as radiology technician, phlebotomist, respiratory and occupational therapy

In Figure 1, the data highlights the percentage of HCW (by occupation) who were not vaccinated in the prior year and responded that they did not intend to vaccinate in the coming year.

Figure 1. Percentages of HCW Who Did Not Vaccinate in the Past Year And Did Not Plan to Vaccinate In Coming Year



Personal vs. System Barriers among Non-Vaccinators

Several factors were assessed that have been shown to influence HCW influenza immunization coverage rates. LACIP identified and categorized perceptions about disease risk; vaccine side effects; vaccine efficacy; and fear of needles as personal barriers, whereas accessibility to vaccinations and cost were categorized as system-related barriers.

Among non-vaccinators who did not intend to be vaccinated in the future, personal barriers were cited more frequently than system barriers at Hospital A (2005) and Hospital B (2007). In Hospital A (2005), personal barriers were cited by all of the physicians (100%); followed by 89% for non-patient care staff; 86% for ancillary staff and 85% for nurses. In Hospital B (2007), personal barriers were cited by 90% of the nurses; followed by 81% of non-patient care staff; 80% of ancillary and 61% of physicians (see below in Table 2).



	Hospital A (2005)			Hospital B (2007)		
	Personal N (%)	System N (%)	Other* N (%)	Personal N (%)	System N (%)	Other N (%)
Non-Patient Care Staff	94 (90)	3 (3.0)	8 (7)	54 (81)	12 (18)	1 (2)
Ancillary	19 (86)	1 (5.0)	2 (9)	20 (80)	5 (20)	0 (0)
Nurses	62 (85)	2 (3.0)	9(12)	147 (90)	13 (8)	1 (2)
Physicians	3 (100)	0 (0)	0 (0)	17 (61)	9 (32)	2 (8)

*Refers to miscellaneous strategies

Logistic Regression Model – Predictors Associated with Future Intention to be vaccinated

A logistic regression model was created to identify the predictors associated with the dependent variable, “future intention to receive an influenza vaccination in the upcoming season”. The logistic regression model controlled for covariates, age, gender, occupation and consisted of three independent variables, previous year’s vaccination status; type of barrier cited for not getting the influenza vaccine and preferred strategies to promote vaccination. Due to limited variability in the dependent variable in 2006, the model was initiated for only 2005 and 2007.

For 2005, the strongest predictors of future intention to vaccinate were the prior year’s vaccination status (OR=34.0; 95% CI=15.0-77.0) and the identification of personal and system barriers (OR=2.33; 95% CI=1.23-4.43). Specifically, individuals who had received the influenza vaccine in the prior year were more likely to report a future intention to be vaccinated in the current year. In addition, individuals who reported a “combination of personal and system barriers” were more likely to report future intentions to be vaccinated in comparison to those who identified only “personal barriers”.

For 2007, the strongest predictors of future intention to vaccinate were the prior year’s vaccination status (OR=30.0; 95% CI=14.4-65.3); being an ancillary staff member (OR=3.0; 95% CI=1.12-7.79); and the identification of personal and system barriers (OR=1.87; 95% CI=1.06-3.29). Specifically, ancillary staff members were more likely to report future vaccination intent compared to nurses. Individuals who had received the influenza vaccine in the prior year were more likely to report a future intention to be vaccinated in the current year. In addition, individuals who reported a “combination of personal and system barriers” were more likely to report future intentions to be vaccinated in comparison to those who identified only “personal barriers”.

DISCUSSION

Immunization Coverage

Across both hospitals and years 2005-2007, very modest improvements in vaccination coverage were appreciated in spite of the NIAAW special outreach strategies (e.g. Health Care Worker educational toolkits, mobile carts, and raffle prizes, expanded clinic hours) to address system and personal barriers.

Chronic Non-Vaccinators by HCW Occupation

This study quantified the proportion of specific (HCW) at two hospitals who self-identify to have continuous and close contact with hospitalized patients, but for personal reasons (beliefs about vaccine efficacy, safety, perceptions of low disease risk) more than system factors (cost, accessibility) choose not to be vaccinated in the future. For example, in this study, 80% of nurses across both hospitals self-reported that personal barriers were reasons they chose not to receive influenza vaccinations currently or in the future. Over 35% of ancillary personnel and physicians across both hospitals self-report not being vaccinated in the previous influenza season and did not intend to be vaccinated in the current influenza season. The proportion of non-patient care staff was equally divided between getting vaccinated in the



upcoming influenza season and not intending to vaccinate in the upcoming influenza season. However, in this survey it is difficult to clearly discern which of the non-patient care staff (dietary, administration, building & safety, security) hold these personal beliefs.

Study Limitations

The results of the survey should be interpreted cautiously since the survey had several important methodological shortcomings, threatening the internal and external validity of the findings. First, administration of the survey in 2005 and 2006 was conducted at the time of vaccination which may have influenced the respondent's answers to the survey questions. Secondly, the survey was not administered to the population in a standardized fashion, disallowing for comparability of the results across hospitals and occupations. Similarly, in 2007, the survey was handed out in specific departments and the respondents merely self-selected to participate in the survey. Third, ethnicity data was not collected to identify potential trends in cultural similarities and differences, thereby compromising the ability to generalize these findings to similar settings.

CONCLUSIONS AND FUTURE DIRECTIONS

The NAIWA outreach and subsequent KAB survey provided a unique opportunity to engage immunization stakeholders from hospitals, health departments, and health plans to leverage resources and work collaboratively toward identifying their baseline employee influenza immunization coverage levels and work toward the goal of improving the coverage levels of high risk adults to at least 60% to meet the Healthy People 2010 goals [3]. The KAB survey assisted employee health directors and Infection Control Practitioners at these two hospitals to identify and therefore prioritize the health care personnel (e.g., nurses) needed for targeted educational interventions with an aim toward changing attitudes about the efficacy and safety of the vaccine to decrease influenza outbreaks in hospitals. Future research should include the implementation of evaluation studies that can rigorously test the efficacy of educational interventions with an aim toward changing personal beliefs and attitudes about vaccine safety, effectiveness, and disease risk to patients and their families, in order to effectively improve and sustain influenza immunization coverage levels among HCW.

Since 2007, legislative hearings spearheaded the introduction of specific health policy to change the entire landscape of health care worker influenza immunization coverage levels in California. Acute care hospitals are now required to adopt and implement California Health and Safety code 1288.5-1288.9 [4] standardizing hospital employee influenza policies and practices to include the provision of influenza vaccinations to all employees free of charge, and to systematically monitor the influenza immunization coverage and declination rates of all employees. To assist hospitals in compliance, the ICLAC health care worker subcommittee has implemented a baseline hospital survey amongst over 100 acute care hospitals in LAC to assess the hospital's policies and procedures used to monitor health care worker influenza coverage and declination rates and to assess the components of their employee influenza program. The results of the survey will be analyzed to determine if ICLAC members can provide any technical assistance in meeting the new health and safety code. Future plans include testing the effectiveness of educational interventions systematically in a randomized controlled design to determine the types of educational strategies that are more successful to improve influenza immunization coverage levels among HCW throughout Los Angeles County.

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