Influenza Vaccination among Healthcare Workers

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Abstract

Objective: To determine the vaccination rates among healthcare workers in the Haifa subdistrict and to assess factors associated with vaccination uptake among them.

Methods: The study was conducted in the three general hospitals in Haifa City, and in five nursing homes in the Haifa subdistrict. Self-administered questionnaires were distributed to 1,014 employees of whom 71% were females, 34% were nurses, 27% were physicians and 28% were non-professional workers.

Results: The crude response rate was 66%. Response rates were higher in females (71%) than in males (49%), in nurses (70%) than in physicians (43%), and in staff of internal and pediatric departments than in workers of surgery departments and emergency rooms. The overall vaccination rate among the respondents was 11%, which was higher among males (15%) than among females (10%). No significant relationship between vaccination rate and age, occupation and department was found. The vaccination rate among employees with chronic illness was very low (7%). Influenza vaccine was actively recommended to 29% of the employees. The main reasons for non-compliance were low awareness of the severity of the disease and of the vaccine's efficacy and safety, and unavailability of the vaccine within the workplace.

Conclusions: Educational efforts and offering the vaccine at the workplace at no cost are the most important measures for raising influenza vaccination rates.

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and may cause pneumonia and exacerbation of underlying medical conditions such as chronic lung disease and congestive heart failure, leading to death among high risk groups. Most of the influenza epidemics in the United States are associated with high rates of hospitalization among the elderly and other high risk groups [1,2]. Influenza is considered a major cause of morbidity and absenteeism among the general population, incurring economic losses of 1–10 billion dollars in the U.S. each year.

The Ministry of Health in Israel, as most ministries of health in the world, publishes annual recommendations for the prevention and control of influenza. Because healthcare workers are considered a high risk group for contracting influenza as well as transmitting it, particularly to high risk patients, they are advised to receive an annual vaccination. Despite this, low vaccination rates (30%) among healthcare workers were reported in the USA [2,3].

In 1989, the U.S. Center for Disease Control decided to actively encourage influenza immunization among healthcare workers [4]. To coordinate the campaign for immunization, a subcommittee was organized whose objectives were to determine possible reasons for staff resistance to influenza vaccinations. Barriers to vaccine acceptance that were identified included fear of adverse reactions, avoidance of medications, concerns of inefficacy, and a lack of understanding that immunization was recommended as part of a national health policy.

In 1997 Campbell and Rumley [5] examined the effect of influenza vaccine on absenteeism and the cost of influenza illness among healthy workers in textile plants in North Carolina (USA). They demonstrated costs of $22.36 for every workday not lost to illness for a company savings of $2.58 per dollar invested in the vaccination program. They concluded that the influenza vaccine could significantly reduce the incidence, absenteeism, and cost associated with influenza illness in the workplace.

The objectives of the present study were to determine the vaccination rates among healthcare workers in the Haifa subdistrict in Israel and to assess factors associated with vaccination uptake among them.

Methods

The study was conducted in the three university-affiliated general hospitals: Rambam , Bnai-Zion and Carmel Medical Centers, in Haifa City and in five nursing homes (436 beds) in the Haifa subdistrict. Self-administered questionnaires were distributed among healthcare staff during March 1997. The questionnaire included demographic variables, health status, and vaccination uptake status among the workers and the reasons for non-compliance. The different variables were defined as follows:

- **Age** – divided into three categories: under 35 years old, 35–45 years and above 45 years old. The third category was used as the baseline.
- **Gender** – the female category was used as the baseline.

- **Type of institution** – divided into two categories: general hospitals and nursing homes; the nursing home category was used as the baseline.
- **Occupation** – divided into three categories: physicians, nurses and non-professional workers including secretaries, social workers, nursemaids and maintenance workers; the physician category was used as the baseline.

In the three general hospitals, the questionnaires were distributed among the employees in the internal, pediatric, surgery, orthopedic and cardiology departments and the emergency rooms during the morning and the afternoon shifts of one day. The total numbers of workers on the day of the survey and their distribution according to gender and occupation were obtained from the head nurses of the respective departments. The response rate to the survey was estimated from the number of the questionnaires returned divided by the total number of the workers selected to work on that day.

In the five nursing homes the questionnaires were distributed to all the workers within the course of a week. The number of all the workers within the home and their distribution according to age, gender and occupation were obtained from the administration. The response rate was calculated from the number of returning questionnaires divided by the total number of workers in the facility.

The internal, pediatric and cardiology departments and the emergency rooms were classified as departments with higher prevalence rates of high risk patients, whereas the surgery and orthopedic departments were classified as departments with lower prevalence rates of high risk patients.

Statistical analysis was carried out using SPSS. We performed logistic regression using the enter method.

Results

Questionnaires were distributed to 1,014 employees (644 in the general hospitals and 370 in the nursing homes), comprising 71% females, 34% nurses, 27% physicians and 39% non-professional workers. In the nursing homes, 35% of the employees were younger than 35 years, 38% were between the age of 35 and 45 and 27% were older than 45.

The crude response rate was 66%. The response rate was higher in females than in males, in nurses than in physicians, and in the internal and the pediatric departments staff than in the surgery departments and the emergency room staff. The variables affecting the response and the vaccine uptake rates are listed in Table 1.

The vaccination rate among healthcare workers was very low, 11%. A higher vaccination rate ($P<0.05$) was observed at the Carmel Medical Center (19%) as compared to the Rambam (8%) and Bnai-Zion Medical Centers (5%). There was no significant difference in the vaccination rates between nursing homes and general hospitals. A very low vaccination rate was found among healthcare workers with self-reported chronic illnesses (7%). A higher vaccination rate was observed in males (15%) than in females (10%) ($P<0.05$). Among those who were not vaccinated, 31% were concerned about side effects, 18% indicated that influenza and its complications were not serious, 11% indicated that the vaccine had not been recommended to them, and 4% did not believe in the efficacy of the vaccine.

Table 1. Variable-specific response and vaccine uptake rates

	Response rate (%)	*P*	Vaccination rate (%)	*P*
Crude	66	–	11	–
Institute				
General hospitals	60	NS	10	NS
Nursing homes	90		12	
Gender				
Female	71	<0.001	10	0.05
Male	49		15	
Occupation				
Doctor	43		18	
Nurse	70	<0.001	33	NS
Non-professional	78		39	
Employees with chronic disease	–		7	NS
Age (yr)*				
<35	72		8	
35–45	56	<0.001	11	0.76
>45	94		13	
Dept. with high risk patients**				
High prevalence	55		14	
Low prevalence	43	<0.001	9	NS
Vaccine				
Offered	–	–	31	<0.001
Not offered			2	

* In nursing homes only
** In general hospitals only.

Influenza vaccine was actively recommended to only 29% of the respondents. The epidemiological nurses of the general hospitals or the head nurses of the nursing homes were most frequently noted to recommend the vaccine. Among the healthcare workers 31% who were offered the vaccine received it, while only 2% of those not offered the vaccine received it (OR = 24.24). Sixty-six percent of the vaccine recipients were offered the vaccine at their workplaces. The relationship between vaccination receipt and offering vaccination in the workplace was significant ($P<0.05$).

Statistical analysis using enter logistic regression of the factors associated with compliance showed that gender [OR (CI 95%) = 2.1, $P<0.05$] and the active recommendation of the vaccine [OR (CI 95%) = 24.2, $P< 0.01$] were statistically correlated to the vaccine receipt.

Perception of disease consequence was the strongest variable to determine the vaccination rate among healthcare workers. It was not included in the multivariate analysis because no employee with a low level of awareness was vaccinated. Therefore, when considering the epidemiological square, one cell consisted of the number 0. The positive

predictive value among employees with a high level of awareness was 33.5%.

Discussion

Healthcare workers are considered as potential vectors in hospital outbreaks of influenza. They often care for patients while they themselves are ill with respiratory infections, thus exposing their patients to infectious agents. Because healthcare workers are considered a high risk group for contracting and transmitting influenza, they are advised to be immunized against the disease.

In the different health institutes in the Haifa subdistrict there are two different ways for offering the vaccine to the employees. In the Carmel, Rambam and Bnai-Zion medical centers and in the nursing homes, the epidemiological nurse of the institute distributes the recommendations of the Ministry of Health concerning vaccination against influenza to the different departments. Only at the Carmel Medical Center does the hospital pharmacy supply the vaccine directly. This resulted in a higher vaccination rate compared to Rambam and Bnai-Zion.

With regard to the potential selection biases in our study:

- The difference in the response rates between the general hospitals and the nursing homes is most probably due to the fact that the questionnaires were distributed within one day in the general hospitals, while in the nursing homes they were distributed within one week.
- There were no representatives from the community clinics.
- The departments included in the study do not represent all the departments in the general hospitals.
- Only 5 of 31 nursing homes were included in the study. These nursing homes cooperated by providing data on the workers. Their representativeness is unknown.

We conclude that educational efforts and offering the vaccine at the workplace at no cost are the most important measures to be taken to increase influenza vaccination rates. The educational efforts should emphasize the risks and the complications of influenza and the proven efficacy and safety of the vaccine. Our conclusions, despite the above mentioned biases, may be relevant for making decisions with regard to increasing the vaccination rates among healthcare workers not only in the Haifa subdistrict but in the entire health setting in Israel.

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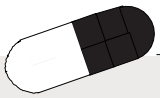
Shakespeare was a dramatist of note who lived by writing things to quote.

Henry Cuyler Bunner, American humorist (1855–96)

Capsule



Sublingual cobalamin for pernicious anemia

For decades physicians have been treating cobalamin (vitamin B12) deficiency with intramuscular injection, despite the drawbacks of this method of administration that commonly result in discontinuation of the treatment. Although oral cobalamin replacement therapy has proved reliable and effective, it is rarely prescribed ("medicine's best kept secret"). It is true that oral therapy also has its pitfalls: it is not effective in patients with diarrhea or vomiting, or in those unable to swallow or tolerate oral medication. Georges Delpre and colleagues at the Rabin Medical Center in Israel have reported the effectiveness of sublingual cobalamin replacement therapy in 18 patients with cobalamin deficiency – 5 with pernicious anemia, 7 who were vegetarians, 2 with Crohn's disease (ileitis), and 4 long-term blood donors. The patients were given two sublingual nuggets of 1,000 μg cobalamin every day for 7–12 days. An increase in cobalamin concentration as much as fourfold compared with pretreatment serum concentration was observed in most patients. No patient showed any side effect. All participants found the method of administration convenient and preferred it to intramuscular injection. The authors concluded that sublingual cobalamin is an effective, safe and convenient treatment, which provides rapid restoration of serum cobalamin concentrations and should be considered as an alternative method of administration

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