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The Effect of Influenza Vaccination on Workers' Absenteeism in Hospital Personnel in Iran

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ABSTRACT

Influenza like illness (ILI) is the most common cause of absenteeism in the workplace. This study was designed to assess the effect of anti-influenza vaccination on reducing illness and absenteeism among health care workers (HCWs) of two academic hospitals of Mashhad University of Medical Sciences in Iran from September 2015 through June 2016. In this follow up study 166 health care workers in two academic hospitals were observed for 9 months. Influenza vaccine was administered to 83 HCWs on a voluntary basis in September 2015. Respiratory symptoms and absenteeism due to influenza like illness in vaccinated group were evaluated and compared with unvaccinated group every 3 months. A questionnaire was also administered for collecting the socio-demographic and occupational data such as age, sex, job and etc. in the studied groups. The mean of age in the vaccinated and unvaccinated groups was 36.69±8.43 and 37.12±8.3 respectively (P=0.73). There was no significant difference between two studied groups regarding sex, marital status, hospital, shift of work (fixed or rotational), educational degree, smoking and history of atopy. The individuals who were absent from work due to influenza during the first and second trimester were 13 (15.7%) and 7(8.4%) in the case group and 31(37.3%) and 24(28.9%) in the control group respectively (P=0.003, P=0.001). During 9 months of study 23(27.7%) individuals in case group and 51(61.4%) in control group were absent from work. (P=0.001). In this study the vaccinated group showed lower flu-like symptoms and sickness absenteeism compared with unvaccinated group. Therefore we can conclude influenza vaccination is very effective in reducing sickness absenteeism in hospital personnel and annual influenza vaccination is recommended for this job groups.

Key words: Vaccination, Influenza, Absenteeism

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INTRODUCTION

Sickness absence is one of the most important issues of work, resulting increase in health care costs and productivity loss in workplaces. Influenza and influenza like illness (ILI) are the most common cause of sickness absence in workplaces that have diverse effects on work and productivity [1]. It is estimated that, 10-12% of all sickness absence from work is related to influenza-related illness [2]. Other occupational diseases, occupational accidents, job stress, work fatigue and socio-economic problems are some other reasons for absence from work [3].

Influenza epidemics are reported almost every year. The considerable number of mortality and

morbidity due to influenza during influenza pandemic suggest the importance of anti-influenza immunization for hospital personnel [4]. The role of hospital personnel in influenza virus spreading and incidence of hospital infections was confirmed in different countries. It has also been proved that occupational exposure of hospital personnel with influenza patient and transmitting the virus to other patients, their colleagues and their families has a significant role in influenza pandemics [5].

In recent years, many organized efforts have been made to increase the level of immunization against influenza in health care workers. The influenza vaccine is efficient in preventing infection in healthy adults in 60% of cases and it also decreases the duration and intensity of infection [6]. Two studies have previously observed the effects of vaccination on the absence of personnel from work, which in one of them a 28% decrease in the absence related to the respiratory system was reported [7]. In the other study, no meaningful relation was found between these two variables [8]. An observational study comparing the absence of personnel before and after receiving the vaccine, reported a 30% decrease in the absence of personnel from 9.14 to 6.15 in every 100 persons in each month. In a cohort retrospective study, Buynder et al, observed the preventive effect of influenza vaccination on the absence of the health care personnel during the season of influenza prevalence [9]. The World Health Organization (WHO) and Center for Diseases Control and Prevention (CDC) emphasize the necessity of annual anti-influenza vaccination for health care personnel [10].

Considering no research has been done to assess the effects of ant-influenza vaccination in hospital personnel in Iran so far, this study was conducted for evaluating the effect of influenza vaccination on disease and absence from work in Mashhad University of Medical Sciences (MUMS) hospital personnel during 2015-2016.

MATERIALS AND METHODS

This longitudinal follow up study was performed during the year 2015-2016 in two academic hospitals of Mashhad University of Medical Sciences, with the voluntarily participation of the employees. Primarily the research plan was sent to the university's ethics Committee and after attaining the confirmation, the study was initiated under the supervision of the university.

At first the general information of participants was collected by a questionnaire designed by the conductors of the study. This information includes demographic characteristics (age, gender, marital status, number of children, etc.), job information (work task, academic degree, work experience, contact with respiratory secretions, etc.), history of anti-influenza vaccination and atopy.

The vaccine used in this research was the deactivated H_1N_1 influenza vaccine made in Netherland. 0.5 ml of the vaccine was injected in to the right deltoid muscle. The studied population was followed for nine months to evaluate if they have been affected by the flu like illness and also if they have been absent from work due to this illness. They were investigated every 3 months by an occupational medicine resident and in case of respiratory illness or absence from work due to this disease and their information was recorded. The participants, who didn't want to participate in the follow up or gave up cooperation during the investigations, were excluded from the study.

The statistical analysis was carried out using the SPSS 20 software. The normal distribution of quantitative data was checked by the Kolmogorov-Smirnov test. For nominal variables the chi-square test and if necessary the accurate fisher test was used. The t-test was used for comparing the numeric data in the two groups. The relation between quantitative variables was studied with the correlation coefficient. The level of significance was considered 0.05.

RESULTS

At first, 200 employees of two academic hospitals in Mashhad University of Medical Science entered the study. 34 subjects were excluded from the study during the follow up and finally 166 of hospital personnel who worked in different parts of the Hospitals, evaluated in the study. 83 participants who had received the influenza vaccine entered in the case group and 83 participants who had not received the vaccine entered in the control group. The demographic characteristics of the studied population are presented in the table 1.

41(49.4%) individuals of the case group and 38(45.8%) of the control group worked in a fixed shift and the rest had a rotational work shift (p=0.756). In the case group the level of education of the participants was as follows: 25 high school

degree and diplomas, 9 associate degree, 41 bachelor degrees, 8 PhD and in the control group 30 participants had a diploma, 5 of them had an associate degree, 46 had a bachelor degree and 2 had PhD degree (p=0.14). Table 2 shows the job distribution of the participants in two studied population.

One individual in the case group and 4 in the control group were smokers. The history of atopy was positive in 4 subjects of the case group and 11 of the control group (p=1.02). 29 (34.1%) subjects of the case group and 28 subjects (33.7%) of the control group were in contact with children and the elderly (p=1). Also 9(10.8%) subjects of the case group and 8(9.6%) of the control group kept house pets (p=1).

Table1. Demographic characteristics of the participants of the study

job	Case group n (%)	Control group n (%)
Nurse	28 (33.7%)	38 (45.8%)
Paramedical workers	13 (15.7%)	15 (18.1%)
Service worker	7 (8.4%)	7 (8.4%)
Laboratory personnel	9 (10.8%)	7 (8.4%)
Administrative	26 (31.3%)	16 (19.3%)
P. value	0.368	

Table 2. Job distribution of the participants of the study

Variable		Case group	Control group	P.value
Age	Mean±SD	36.69±8.43	37.12±8.3	0.739
Gender n (%)	Male	40 (48.2)	38 (45.8)	0.876
	Female	43 (51.8)	45 (54.2)	
Marital status n (%)	Single	12 (14.5)	8 (8.3)	0.33
	Married	71 (85.5)	75 (91.7)	

The number of individuals who were absent from work due to influenza during the first trimester was 13 (15.7%) in the case group and 31(37.3%) in the control group (p=0.003). In the second trimester this number was reduced to 7(8.4%) in the case group and 24(28.9%) in the control group (p=0.001). In the third trimester this number was even lower, i.e. 4(4.8%) in the case group and 10(12%) in the control group (p=0.161). Altogether during the entire period of the study, 23(27.7%) subjects in the case group and 51(61.4%) in the control group were absent from work. Figure 1 shows the detail of absence from work in two studied population during 9 months follow up. The prevalence of clinical symptoms was presented in the table 3.

Figure 1. Comparing the number of absence from work in the two studied population

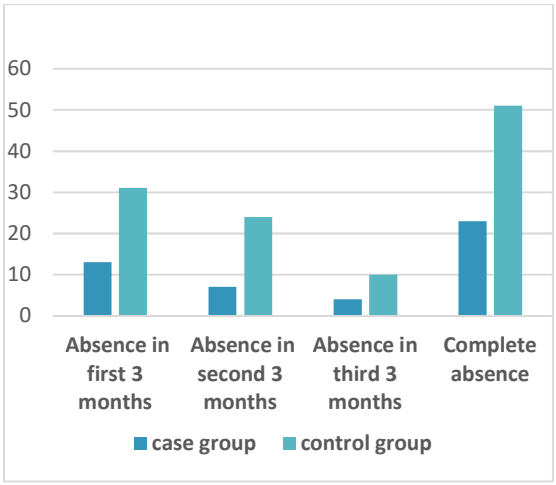

Table3. The prevalence of clinical symptoms in the two studied population

Time	Clinical symptoms	Case group n (%)	Control group n (%)	P.value
First trimester	**Cough**	12 (14.5%)	24 (28.9%)	0.037
	Myalgia	18 (21.7%)	14 (16.9%)	0.555
	Sore throat	12 (14.5%)	26 (31.3%)	0.016
	Fever	10 (12%)	30 (36.1%)	<0.001
Second trimester	**Cough**	6 (7.2%)	19 (22.9%)	0.008
	Myalgia	6 (7.2%)	17 (20.5%)	0.023
	Sore throat	9 (10.8%)	18 (21.7%)	0.091
	Fever	6 (7.2%)	20 (24.1%)	0.005
Third trimester	**Cough**	5 (6%)	5 (6%)	0.397
	Myalgia	6 (7.2%)	10 (12%)	1
	Sore throat	6 (7.2%)	9 (10.8%)	0.691
	Fever	5(6%)	10(12%)	1

DISCUSSION

In this research, 166 persons of two academic hospitals were studied for evaluating the effect of

flu vaccine on work absenteeism and flu like diseases. There was no statistically significant difference between the two studied groups regarding age, sex, work experience, job, smoking and etc. During the 9 months follow up of studied population in this study, sickness absence rate and ILI were lower in vaccinated group compared with unvaccinated group.

Similarly Saxen et al reported a 28% decrease in absence due to respiratory infections in health care workers who had received the influenza vaccine. They observed the number of absence days was significantly lower in vaccinated group. [8]

As our study in a retrospective cohort study, Buynder et al observed the effect of receiving the influenza vaccine on the health care personnel absence in the influenza season.77 percent of the 10079 individuals were vaccinated in winter. The absence of the group who had not received the vaccine increased twice as much of the group who were vaccinated compared to the season in which influenza was not so prevalent [9]Wilde et al did not find a clear difference in the absence of the health care personnel who received and those who did not receive the vaccine, which may be due to small sample size of their study. [11]

In a study done by Honarvar et al, the immunization status of Shiraz hospital personnel was investigated in Iran. In this cross-sectional study, the immunization status of 207 hospital personnel was investigated.75% of the individuals filled out the questionnaires .The majority of studied population were nurses and physicians159 (77%) and 24 (12%)respectively. Unlike in our study, the studied group were mostly female (85%). 135 cases (65%) did not have a history of receiving the influenza vaccine during the recent year and the reasons they mentioned for not receiving the vaccine were: being healthy and rarely getting influenza (30%), having doubt in the efficiency and benefits of the influenza vaccine (24%), and fear from vaccine side effects (19%). As it was noted earlier, doubt about the vaccine's efficiency and worries about its side effects were the most reasons for disaffiliation in the participant's opinion. [15]

In Dastani and Dadashi study it has also been mentioned that after vaccinating the soldiery, the seasonal influenza B test was negative in 21 participants from the case group and positive in one person,91.3%against 4.3% and the frequency distribution of the seasonal influenza Bin the control group was negative in 19 participants and positive in 8 participants .According to the chi-square test the incidence of influenza was significantly higher in the control group compared to the case group(70.4% against 29.6%). They concluded that there is a meaningful relation between the influenza vaccination and prevention of influenza infection and its complications; therefore vaccination in high risk environments can prevent influenza. [16]

Most of the studies tend to evaluate the absence due to respiratory problem. Bridgeset al. in the 2000 showed that absence specifically because of respiratory difficulties was 32% lower in the vaccinated group compared with the control group [17].

Other studies have also shown the positive effect of vaccination on the absence of health care worker. In a study in 2007, Chan et al found no meaningful difference in the number of days of absence because of illness between the health care workers of the emergency department, but the cases of flu-like illness was 25% higher in the group who had not received vaccination [18]. A study by Liu et al in Taiwan in 2004 [19] showed that acute respiratory disease in vaccinated individuals who were not part of the health care personnel decreased by 38% and they had less absent days from work, too; however, this difference between the two groups was not meaningful.

In our study we observed that the flu like symptoms including cough, sore throat and fever during the first and second trimester were meaningfully lower in the case group compared to the control group, however, in case of myalgia the difference was not significant. In the third trimester the difference was not significant in case of any of the symptoms; a fact which might be due to the decrease in the incidence of all symptoms and lower prevalence of the disease.

In a study by Vauex al in 2010 in France, the efficiency of the influenza vaccine in hospital staff, residents and the nurses of the elderly was investigated. In this study, the vaccine coverage was 33.6%for the personnel and 91% for the residents. The efficiency of the vaccine was varied depending on the personnel job .Higher vaccination coverage was seen in private nurses of the elderly who received the vaccine for free, in small retirement houses and in conditions in which

training courses about flu was held at the sometime. Also, the most prevalent free vaccination cases were observed in cleaning and service worker of health centers, nurses and practical nurses; however, it was not the same among the physicians. Therefore it was concluded that free vaccination programs and training courses aiming to train nurses and practical nurses in health centers can be useful in the effective prevention of the disease. However, the discrepancy observed might be caused by the differences in geographic and population properties, brand and method of applying vaccine and most likely by lack of consistency between the viruses in the flow and the influenza vaccine. [21]

In the study of O'Lorcain al in the 2011-2012, the acceptance of the seasonal influenza vaccine among the health care workers was reported as that of 18% in hospital staff and 14% in nursing service providing centers [22]. Moreover, the influenza vaccine was prescribed for 88% of the patients who had a long stay in these centers and hospitals. Additionally, Lee et al reported the seasonal influenza vaccine coverage in health care personnel in California during 2011-2012 as follows: 60.7% in emergency centers, 54.7% in long term care center, 59.4% in outpatient surgery centers, 58.6% in dialysis centers and 77% in private practice. [23]

In the review on the effective factors for receiving the vaccine for health care personnel in South Australia, Tuckerman et al reported that from the 92 individuals being studied, only 9.8% had been properly studied as to the recommended vaccine for the personnel. 80% had already received the vaccine and 50% had received the whooping cough vaccine. The independent indicators of receiving the seasonal influenza vaccine were: younger age, English as the native language, acknowledging the fact that vaccination against influenza is beneficial for their health, protecting the patient and understanding that influenza can be very serious in immune deficient patients. They mentioned that explaining the benefits of influenza vaccine for health care personnel and their patients can be helpful. [24].

In our study the subjects with absenteeism were mostly married women and working as a nurse. Most of them did not have a history of influenza vaccination in the past years. 4 percent of them were smokers and about 8 percent had a history of atopy.

This study was a cohort research and we could follow studied groups for 9 months, however we had some limitations in our study. A small proportion of participants (34 persons) were missed due to lack of cooperation, but the number of these persons was similar in the both groups. We couldn't confirm influenza infection by serological tests duo to limited financial resources. Furthermore we didn't evaluate some of organizational factors effective on workers absenteeism such as cultural factors, financial support and management policies in prevention of presentism that can be investigated in future studies.

CONCLUSION

The results of this study shows acceptable efficiency of influenza vaccine in preventing this disease during the cold seasons and reducing the sick leaves due to ILI in hospital personnel. Considering that health care workers are at higher risk of influenza infection and can also act as an intermediate in the rapid spread of the disease, it seems that influenza vaccine is very helpful in this work group.

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